

International Handbook Series on Entrepreneurship

Zoltan J. Acs
David B. Audretsch
Editors

Handbook of Entrepreneurship Research

An Interdisciplinary
Survey and Introduction

Second Edition

 Springer

Handbook of Entrepreneurship Research

International Handbook Series on Entrepreneurship

VOLUME 5

Series Editors

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SERIES FORWARD

Interest in entrepreneurship has surged in the last decade. Scholars across a broad spectrum of fields and disciplines have responded by generating new research approaches uncovering a wealth of new findings and insights about entrepreneurship. This new research spans not just a diverse set of fields, such as management, finance, psychology, economics, sociology, and geography but also a wide range of countries reflecting the fact that entrepreneurship is a global phenomenon. The exceptionally cross-disciplinary nature of entrepreneurship has made it difficult for scholars in any one particular field to become aware of and understand the leading contributions and insights emerging in other disciplines. The purpose of this series is to compile a series of handbooks, each devoted to a particular issue in entrepreneurship. Each handbook will draw upon the leading international scholars from the entire range of disciplines contributing to entrepreneurship to articulate the state of knowledge about a particular topic. The contribution should identify the fundamental questions, which are being posed, the methodological approaches, types of data bases used for empirical analyses, the most important empirical regularities to emerge in the literature, major policy conclusions, and the most promising research direction. Thus, each handbook will reflect the interdisciplinary nature of entrepreneurship that has proven to be elusive to discipline-based scholars. A goal of the *International Handbook Series on Entrepreneurship* is not only to provide a state-of-the-art coverage of what has been learned about entrepreneurship, but that when viewed in its entirety, entrepreneurship is emerging as bona fide academic discipline.

The particular topics in the Series will be drawn from discussions with the leading scholars. Each handbook will be directed and compiled by a Handbook Editor. (S)he will work closely with the Series Editors to ensure that the contents and contributions are appropriate, and that there is consistency with the other volumes in the Series.

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Editors

Handbook of Entrepreneurship Research

An Interdisciplinary Survey and Introduction

Second Edition



Springer

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Preface

The purpose of the *Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction* is to provide a distinctive introduction to the field of entrepreneurship.

The first edition of the *Handbook of Entrepreneurship Research* was well received. Indeed, it far exceeded our expectations, resulting in the publication of a paperback edition in 2005. It served as a useful guide to researchers and scholars spanning a broad spectrum of academics in different disciplines and graduate students with an interest in entrepreneurship. The volume was an invaluable resource identifying state-of-the-art knowledge from research in entrepreneurship a decade ago.

The present volume updates the *Handbook* and documents the creation of the field of entrepreneurship in the first decade of the 21st century. The volume focuses on the theoretical aspects of the field and does not cover the many empirical contributions that appear elsewhere. It is a carefully crafted “roadmap” through the theoretical literature on entrepreneurship. Answers to many research questions can be found in the handbook. Our objective as in the first edition was to create a reader friendly but still, valuable resource for the entrepreneurship community.

Too many people have contributed in one way or another to mention here. However, several colleagues need to be mentioned that over the years have been integral to this project. They are Siri Terjesen (University of Indiana), Lawrence A. Plummer (University of Oklahoma), Samee Desai (University of Missouri at Kansas City), Robert Wuebker (University of Utah), Erkkö Autio (Imperial College Business School), Nichola Virgill (College of the Bahamas), Julienne Senyard (Queensland University of Technology), Pekka Stenholm (University of Turku), Wim Neude (UN Wider), Saul Estrin (London School of Economics), Magnus Henrekson (Research Institute of Industrial Economics), David Hart (George Mason University), Philip Auerswald (George Mason University), Laszlo Szerb (University of Pecs), Jonathan Levie (University of Strathclyde), Bo Carlsson (Case Western Reserve University), Pontus Braunerhjelm (Royal Institute of Technology), Connie L. McNeely (George Mason University), Richard Florida (University of Toronto), Carl Schramm (Kauffman Foundation), Robert Litan (Kauffman Foundation), William Baumol (New York University), Edward Glaeser (Harvard Business School), Howard Aldrich (University of North Carolina), Scott Shane (Case

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Fairfax, Virginia
Bloomington, Indiana

Zoltan J. Acs
David B. Audretsch

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The Global Award for Entrepreneurship Research: Organization, Objectives, and Criteria

Pontus Braunerhjelm, Magnus Henrekson[†], and Anders Lundström

10 October 2009

Introduction

In 1996, the Swedish Entrepreneurship Forum (then the Foundation for Small Business Research, FSF) and the Swedish Agency for Economic and Regional Growth hosted the International Council for Small Business (ICSB) World Conference in Stockholm. During the planning stage of this conference, a new prize was proposed: an award for outstanding contributions in the field of entrepreneurship and small business research.^{1,2} Given for the first time that same year, the *International Award for Entrepreneurship and Small Business Research* quickly became the foremost global award for research on entrepreneurship. The award aimed to spotlight a vibrant and rapidly expanding research field that brings issues of crucial importance for future prosperity to the fore. At the time, however, entrepreneurship research was still largely neglected in discussions of economic development and policymaking.³

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¹This article builds on Braunerhjelm and Henrekson (2009) and Henrekson and Lundström (2009).

²Anders Lundström FSF proposed to the Swedish Agency for Economic and Regional Growth that a prize in this research area should be established. The Agency looked favorably upon the idea and has been the largest sponsor of the prize up until 2008.

³At the beginning of the 1990s, a few studies—together with David Birch's pioneering work in the late 1970s—emerged that clearly documented the increasing importance of small businesses in most countries (Birch, 1979, 1987; Brown & Medoff, 1989; Sengenberger et al., 1990; Storey, 1994). Yet, in basic micro-economic models of the firm or aggregate (exogenous or endogenous) models of economic growth, no room for entrepreneurs exists (Barreto, 1989; Bianchi & Henrekson, 2005; Braunerhjelm, 2008).

In 2008, the prize was revamped and renamed the *Global Award for Entrepreneurship Research*, given for the first time in 2009. In addition, a website for the Award was launched (www.e-award.org), which describes the prize, presents all award winners since 1996 and their Prize Lectures, and details other pertinent information about the winners and the field of entrepreneurship.

The Research Institute of Industrial Economics (IFN) joined the Swedish Entrepreneurship Forum and the Swedish Agency for Economic and Regional Growth as a new partner in 2008; the three organizations are jointly responsible for the prize. The prize sum now amounts to 100,000 euros – twice the size of the previous award – due to a generous donation from Swedish entrepreneur Rune Andersson and his holding company Mellby Gård AB. The procedure for nominating and evaluating prospective award winners has been reformed as well.

This article gives a brief account of the background of the Award, and describes how a worthy award winner is selected.

Nomination and Selection: The Structure

According to the original statutes, the Award should be given to “a person who has produced scientific work of outstanding quality and importance, thereby giving a significant contribution to theory-building concerning entrepreneurship and small business development, the role and importance of new firm formation and the role of SMEs in economic development”. Hence, outstanding scientific achievement comprises the primary reason for receiving the Award. In addition, the extent to which research has served to accomplish the following aspects should also be taken into consideration: (1) highlighting the importance of research produced in the areas of entrepreneurship and small business; (2) further stimulating and promoting research within these fields; and (3) diffusing state-of-the-art research among scholars, practitioners, and people involved in small business development.⁴ Thus, several disciplines engaged in research on entrepreneurship and small businesses could be considered for the Award. The statutes also make clear that it is possible to reward research focusing both on the aggregate effect of small firms and entrepreneurial activity and micro aspects of small businesses and entrepreneurship, in which the individual entrepreneur or firm is the object of study.

The nomination, evaluation, and selection of award winners is delegated to an autonomous Prize Committee, which is elected by the board of the Swedish Entrepreneurship Forum. The Committee consists of six members, in which the chairman holds the decisive vote in case of a split decision. In order to ensure continuity, no more than two members are replaced in a given year. The Committee

⁴See Lundström and Halvarsson (2006).

members are appointed solely based on their scientific credentials and represent different disciplines, predominantly economics and business administration. They are leading academics in the field, and have attained the distinction of full professor or equivalent. A chairman cannot be reelected for a consecutive term, but Committee membership can be extended for an additional 3-year-period. The discussions within the Committee are confidential; members are not allowed to report the reasoning behind individual prizes and candidacies.

A number of distinguished entrepreneurship scholars are invited to nominate candidates. This invitation, extended every year since 1995, is accorded in February/March to scholars who belong to the following four categories: (i) previous award winners; (ii) editors and editorial board members of the journals of entrepreneurship and small business research included in the Social Sciences Citation Index (currently *Entrepreneurship Theory and Practice*, *Journal of Business Venturing*, *Small Business Economics*, *Entrepreneurship and Regional Development*, *Journal of Small Business Management*, and *International Small Business Journal*); and (iii) present and past members of the Scientific Forum of the Swedish Entrepreneurship Forum, who also hold or have held positions as full professors. In addition, members of the Prize Committee have the right to nominate candidates, although self-nominations are not allowed.⁵

These nominations provide a list of potential candidates to be considered by the Committee; the Committee then decides which candidates should be targeted for a more thorough evaluation. A candidate can be on the list for several years and be regarded as a potential candidate for the Award during that time. The eventual selection of the winner is based on thorough evaluations and comparisons of a number of worthy candidates; the pool of candidates from which the winner is selected must be reasonably stable, reflecting the long-term efforts of the Prize Committee. The Prize Committee “inherits” therefore a limited number of short-listed candidates from the previous year, and except in rare cases the winner is selected from this pool of short-listed candidates. However, the Committee is also commissioned to add one or two new candidates to this pool based on nominations and discussions in that year (and in previous years).

All short-listed candidates are thoroughly evaluated by a specialist in the candidate’s field. These outside evaluations are strictly confidential, although they later form the basis for a published presentation of the winner co-authored by the member of the Prize Committee who is most familiar with the winner’s work. In some cases, the commissioned expert may be a member of the Prize Committee, but this is likely to be an exception rather than a rule.

⁵Editorial review boards are not included; eligibility requires membership in the more restricted editorial board. Moreover, the Prize Committee may make a decision to include additional high-quality entrepreneurship journals if these are deemed likely to be included in the SSCI in the foreseeable future.

The name of the award winner is announced at Swedish Entrepreneurship Forum's annual conference *Small Business Days* in late January. After the announcement, the award winner will be requested to prepare a publishable Prize Lecture that can be delivered at the official Award Ceremony in Stockholm in May. The Award is normally given by the Minister of Industry; the winner is then expected to tour Sweden during the *Entrepreneurship Week*, an annual seminar tour of Swedish university cities taking place during the week when the Award is conferred. Both the essay presenting the contribution of the winner and his or her Prize Lecture are published in *Small Business Economics* as soon as possible after the Award is given.

Selection of Award Winners: The Criteria

So, what is a worthy contribution? This key question lacks a precise answer, but it must, nevertheless, be elaborated upon. Naturally, there have been lengthy discussions of this issue in the Prize Committee over the years, and the following is greatly inspired by those discussions and by input from current and previous Committee members on an earlier version of this text. Assar Lindbeck's (1985, 2007) insightful exploration of the criteria used to select the Nobel Memorial Prize in Economic Sciences has also been an important source of inspiration.

First and foremost, a prize worthy contribution needs to be *original* and *influential*. A contribution can be influential in many fashions, with impact on subsequent scientific work the most notable consideration; this impact can be achieved by virtue of the scientific work per se but sometimes through the organization of large research programs as well. Influence may also be obtained by furthering entrepreneurship as a field (by creating important databases, starting influential journals, supporting scientific communities, and so forth), by furthering entrepreneurship education and training at the academic level, and by influencing policy making and society more broadly. However, it takes time before one can be reasonably sure that a contribution is both original and influential, rather than a fad that will taper off with little long-lasting effects. One needs to allow the requisite time for potential criticism and scrutiny by other scholars before one can be confident that the contribution is as solid as it first appeared to be. Therefore, a certain caution and "conservatism" can be expected to continue in the future.

One of the Prize Committee's prime ambitions is that the award-winning contributions will reflect the extraordinary width of entrepreneurship as a social science field, spanning the entire spectrum from anthropology to theoretical microeconomics, and award methodological diversity ranging from hermeneutics to formalized deductivism via traditional hypothesis testing by means of state-of-the-art statistical methods. Therefore, the Committee does not limit itself to a certain type of work, such as designating that only articles in peer-reviewed journals should count. Rather, the Committee is governed by the originality and uniqueness of the research's insights.

Another concern involves which aspects of entrepreneurship research can be rewarded. At least three important considerations arise: (i) the environment and the organizations in which entrepreneurship is conducted; (ii) the character of the entrepreneur (personality, cognitive, and affective aspects); and (iii) the role of the entrepreneur and/or the entrepreneurial function in a wider sense (at the level of the community, region, country, industry).⁶ All three aspects are highly relevant, and a scholar may be rewarded for contributions to any one of them. High-quality research that manages to connect two or all three aspects in a coherent framework is rare, and is therefore looked upon favorably.

When selecting prize worthy contributions (both actual winners and nominees added to the shortlist of individuals evaluated by an outside specialist), the Committee has and will emphasize the *qualitative* aspect of the research contribution. Quantitative methods like citation counts and impact factor adjusted publication volumes will continue to provide important complementary information about candidates, but they will never substitute for qualitative judgment. Nor will the prize be given as a sort of lifetime achievement award to scholars who have managed to publish an extraordinary volume of solid, well-published work, but whose research fails to stand out as original and truly influential. Hence, quantity cannot substitute for quality – it is even possible to give the Award to a scholar for a single landmark contribution.⁷

Presentation and Categorization of Previous Winners

Although entrepreneurship and small business research is a young field and has but a short history, the Award Committee has chosen from a pool of excellent people. In particular, there were several pioneers who are highly visible and readily recognized by virtually every scholar working in the field. Even a cursory look at the list of winners in Table 1 reveals that virtually every winner so far can be labeled a pioneer in some important respect. In most cases, these pioneers have not only contributed in terms of their own research; they have also been active in promoting entrepreneurship education and the field itself by starting journals, organizing conferences, and writing influential surveys setting the agenda for further research.

⁶These three aspects can be seen as one way of operationalizing Venkataraman's (1997, p. 120) definition of entrepreneurship as a scholarly field: it "seeks to understand how opportunities to bring into existence 'future' goods and services are discovered, created, and exploited, by whom, and with what consequences".

⁷This is not without precedent. Among the Nobel Laureates in Economic Sciences this is fairly common. Ronald Coase, John Nash, Michael Spence, Myron Scholes, Bertil Ohlin, Harry Markowitz, George Akerlof, Finn Kydland, and Robert Solow are prime examples. A few of them have fairly long publication lists, but it was one or two fundamental contributions that earned them the Nobel Prize (Lindbeck, 2007).

Table 1 Award winners 1996–2010 (affiliation and country pertains to the situation at the time of receipt of the Award)

Year	Winner(s)	Birth year	Country	Field	Prize citation	Remark
<i>Macro-importance of new and small firms</i>						
1996	David L. Birch MIT/Cognetics, Inc.	1937	USA	Economics/ Management	“For having identified the role of new and small firms for job creation”	Great impact on policymaking
1998	David J. Storey Univ. of Warwick	1947	UK	Economics/ Management	“Responsible for the increased focus in research on unbiased large-scale and high-quality empirical work”	Large impact on policies for regional development; outstanding synthesizer
2001	Zoltan J. Acs Univ. of Baltimore David B. Audretsch Indiana Univ.	1952 1954	USA USA	Economics Economics	“For empirical analyses of an impressive number of important questions concerning the role of small firms in the economy” and “the role of small firms in innovation”	Bridge-builders between economics and related fields; founders of <i>SBE</i> , tireless promotion of the field. Impact on policymaking
2002	Giacomo Beccatini Univ. of Florence Charles F. Sabel Columbia Univ.	1927 1947	Italy USA	Economics Political Science/Law	For revitalizing Marshalls’ ideas of the “advantages of geographical agglomeration of specialized small firms” and furthering “our understanding of flexible specialization of co-operating small firms” and the “importance of networks”	Emphasize the systemic perspective; impact on policymaking

Table 1 (continued)

Year	Winner(s)	Birth year	Country	Field	Prize citation	Remark
2004	Paul D. Reynolds Babson College & London Business School	1938	USA & UK	Sociology	“Has taken entrepreneurship research to new levels, given it new directions and organized several innovative and large-scale empirical investigations into the nature of entrepreneurship and its role in economic development”	Initiator and coordinator of two massive projects: PSED and GEM, impact on policymaking, the importance for the field cannot be overrated.
2003	William J. Baumol New York Univ.	1922	USA	Economics	“His insistence that the entrepreneur should have a key role in the theory of the firm;” “his studies of the role of institutions for the channeling of entrepreneurship into productive use;” “his early formulation of a competition policy emphasizing the disciplinary effect of dynamic entrepreneurship”	A highly reputed mainstream economist who very early on has urged the profession to heed the instrumental role of the entrepreneur in their analyses

Role and aggregate importance of entrepreneurship/the entrepreneurial function

Table 1 (continued)

Year	Winner(s)	Birth year	Country	Field	Prize citation	Remark
2006	Israel M. Kirzner New York Univ.	1930	USA	Economics	“Clarifies the role of the entrepreneur in society and emphasizes that the behavior of a single entrepreneur may be of importance for the renewal and rationalization of markets” . . . “the most prominent contemporary advocate of the Austrian School”	Explains the instrumental role of the entrepreneur in the capitalist system, and why the insistence on general equilibrium in economic modeling makes the entrepreneurial function superfluous
<i>Micro-level analyses of entrepreneurship and small businesses</i>						
1997	Arnold C. Cooper Krannert School of Management, Purdue Univ.	1933	USA	Management	His “pioneering work on technical entrepreneurship, new technology-based firms, and incubator organizations has significantly enhanced our understanding of entrepreneurial phenomena”	Masters both qualitative and quantitative methods; has improved data quality and insisted on use of sophisticated methods.

Table 1 (continued)

Year	Winner(s)	Birth year	Country	Field	Prize citation	Remark
1999	Ian C. MacMillan Wharton School, Univ. of Pennsylvania	1940	USA	Management	“Instrumental in introducing an international perspective to entrepreneurship research, exemplified by the international comparative studies on cultural differences in entrepreneurship and small business behavior;” “the integration of two separate research fields; entrepreneurship/small business research and management/strategy research”	Important pioneer
2000	Howard E. Aldrich Univ. of North Carolina at Chapel Hill	1943	USA	Sociology	“Has generated significant insights into the knowledge of formation and evolution of new and small firms;” “major contributions . . . by integrating the most central research questions of the field into a broader sociological research context”	Leading sociologist highlighting entrepreneurship

Table 1 (continued)

Year	Winner(s)	Birth year	Country	Field	Prize citation	Remark
2005	William B. Gartner Clemson Univ.	1953	USA	Management	For his research on "new venture creation and entrepreneurial behavior;" he has shown mastery in combining "the best of two research traditions;" US style positivism and hermeneutics	Important in promoting entrepreneurship education, and in forming connections between scholars working in different fields
2007	The Diana Group: Candida G. Brush Babson College Nancy M. Carter Univ. of St. Thomas Elizabeth J. Gatewood Wake Forest Univ. Patricia G. Greene Babson College Myra M. Hart Harvard Bus. School	1948 1949 1944 1954 1941	USA USA USA USA USA	Management Management Management Sociology Management	For their unique effort to pool "their competencies to create a research team examining women's entrepreneurship. An important contribution lies in the identification of growth oriented women entrepreneurs and issues of access to and usage of resources"	Impact on policymaking; particularly in creating awareness of gender differences in the availability of external finance; partly also on the macro-importance of women entrepreneurship.
2008	Bengt Johansson Växjö University	1942	Sweden	Management	"The furthering of our understanding of the importance of social networks of the entrepreneur in a regional context; he has also documented and explained how the social networks of the entrepreneur are related to the "life" of the entrepreneur"	Key contributor to the organization of the European entrepreneurship and small business research fields

Table 1 (continued)

Year	Winner(s)	Birth year	Country	Field	Prize citation	Remark
2009	Scott A. Shane Weatherhead School of management Case Western Reserve University	1964	USA	Management	“For publishing significant works that display superior conceptual acumen as well as empirical and methodological sophistication”	Covers all major aspects of entrepreneurship: the individual(s), the opportunity, the organizational context, the environment, and the entrepreneurial process
2010	Josh Lerner Harvard Business School	1960	USA	Economics/Finance	For “the synthesis of the fields of finance and entrepreneurship;” and for “important contributions in the area of entrepreneurial innovation”.	His seminal contributions have changed the way scholars, practitioners and policymakers think about VC financing, innovation and entrepreneurship.

Note: We treat Management and Business Administration as synonyms, writing Management throughout.

The Award was twice shared between two scholars (Acs/Audretsch and Beccatini/Sabel), in addition to once being awarded to a specific research effort (Diana) involving five scholars Brush/Carter/Gatewood/Greene/Hart). Hence, there are 20 award winners. Normally, the prize is given to one person only, but in the case of the Award shared by Acs and Audretsch, the Committee felt that the contribution was inseparably tied to the joint effort of the two scholars. In the case of Beccatini's and Sabel's shared prize, the analysis of a particular phenomenon was rewarded, namely the advantages of a geographical agglomeration of specialized small firms ("Industrial Districts"). The Committee decided to give the Award to those they considered to be the two most influential contributors on this issue. Similar reasoning underlay giving the Award to the five scholars behind the Diana project for their influential contributions to the field of female entrepreneurship.

Bearing in mind the difficulties of drawing a sharp demarcation line between micro- and macro-oriented research on entrepreneurship and small businesses, the Committee tries, nevertheless, to categorize the winners' work in this dimension.⁸ As shown in Table 1, five prizes have been awarded to research dealing with the macro-importance of new and small firms, two prizes (Baumol and Kirzner) to research focusing on the role and aggregate importance of entrepreneurship (viz. the entrepreneurial function) in the economic system, and seven prizes to scholars conducting micro-level analyses of entrepreneurship and small businesses.

In summary, there is great diversity in the work and achievements of previous award winners. Their research showcases both quantitative and qualitative work and micro- and macro-oriented foci, while promoting education and training in entrepreneurship as well. Likewise, their work is vastly diverse: its publication ranges from easily accessible books and reports to highly specialized scholarly articles, its methods span the development of new datasets to conceptual and methodological improvements, and its impact touches both the research community and policymakers.

Concluding Remarks

The development and dynamics of any society, economy, or organization requires micro-level actors – individuals, entrepreneurs, and small businesses – that have the ability and persistence to incite change. Institutions and market and organizational structures do not create change in the absence of human actors. Rather, the unique knowledge, perceptions, and goals of individuals equipped with the drive to take action initiate novelty and create value. However, this is by no means conventional wisdom in mainstream management and economics. Achieving a better understanding of the issues related to entrepreneurship and small businesses requires insights from several disciplines.

⁸This is also done by Landström (2005) for all winners through 2002. Our classification concurs with Landström's in this respect.

The recent, albeit limited, progress in our understanding of entrepreneurship and small businesses stems from varying academic traditions and perspectives. We believe that deepening our insights regarding the conditions, characteristics, drivers, and effects of entrepreneurs and small business in a societal context, and formulating adequate policy recommendations, requires acuity from several disciplines. With the *Global Award* helping to disseminate state-of-the-art research among scholars, practitioners, and people involved in small business development, considerable good can be achieved. It is also our hope that it will provide a source of inspiration for entrepreneurship scholars across the globe.

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Chapter 1

Introduction to the 2nd Edition of the Handbook of Entrepreneurship Research

Zoltan J. Acs and David B. Audretsch

The role of entrepreneurship in society has changed dynamically. Immediately following World War II, entrepreneurship seemingly lost importance fading nearly completely away. In 1968, when J.J. Servan-Schreiber warned Europeans of the American Challenge, it was not from small entrepreneurial firms, but the polar opposite—from the “dynamism, organizational, innovation, and boldness that characterized the giant American corporations.” By then a generation of scholars had systematically documented and supported the conclusion of Joseph A. Schumpeter (1942, 106): “What we have got to accept is that the large-scale establishment or unit of control has come to be the most powerful engine of progress and in particular of the long-run expansion of output . . .”

However, entering into the 21st century, our century, our understanding of the role of entrepreneurship in society was upended (Acs & Audretsch, 2001). Today, entrepreneurship is widely recognized as the engine of economic and social development throughout the world. According to Edward Lazear of Stanford University, “The entrepreneur is the single most important player in a modern economy” (2004, 1). David Hart at George Mason University, discussing the dot-com bubble in the late 1990s, wrote, “The entrepreneurship fad rested on a foundation of fact. New companies made significant contributions to economic growth in the past decade, both directly and by stimulating their more established competitors, as they indeed had in the decades before that” (2003, 1).

Just as our understanding of the economic impact of entrepreneurship is changing, the focus of entrepreneurship research is also evolving. This is especially true since we engaged in a systematic study of entrepreneurial activity starting in the late 1980s. Prior to then literature on entrepreneurship is fragmented, with much of the best research in entrepreneurship situated in disciplinary journals like *the American Economic Review*, *American Sociological Review*, *Administrative Science Quarterly*, *Journal of Financial Economics*, *Strategic*

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Management Journal. While these journals still publish articles on entrepreneurship, during the 1990s journals specific to entrepreneurship emerged and non-disciplinary literature expanded greatly: *Journal of Business Venturing*, *Small Business Economics*, *Entrepreneurship Theory and Practice*, and *Entrepreneurship and Regional Development*.¹ By the end of the initial decade of the 2000s these journals were producing a serious and growing literature on entrepreneurship.

The focus of entrepreneurship research in the first decade of the 21st century also changed significantly, especially with regard to its theoretical contributions and its resulting evolution as a field of study all its own. Broadly speaking, entrepreneurship scholars had not completely developed the theoretical latticework to support substantial cross-disciplinary contribution until the final years of the 20th century (Christensen et al., 2003). While many entrepreneurship scholars believe that the delineation of a distinctive domain has been an important activity, we believe that this distinction is neither as valid, nor as useful, as previously conceived. While it is true that discipline-based research is required to advance the field of entrepreneurship, a community of scholars with a common interest is also required. One cannot advance without the other. Without a community of scholars, research in one field will not be familiar to other researchers and ultimately entrepreneurship may develop as a “distinctive domain” and perhaps as a field of study . . . but perhaps despite all of this striving, at the end of the day with less of import to contribute to broader scholarly endeavors.

We are witnessing a refocusing of entrepreneurship research in the first decade of the 21st century. We foreshadowed this “pruning of the branches” in the first edition of this *Handbook*, and it is a welcome trend. In our view, this *narrowing* of the empirical lens necessitates de-emphasizing samples of different small firms or novel contexts (e.g., small business, the self-employed, international entrepreneurship). Our definition of entrepreneurship embraces all business that are new and dynamic, regardless of size or line of business, while excluding businesses that are neither new nor dynamic, as well as, all non-business organizations. The core topics of this inclusive view of entrepreneurship are the entrepreneurial process, the nature of entrepreneurial opportunity and the process of its exploitation, the emergence of new ventures, as well as the interaction between entrepreneurship and organizations. We call this high-impact entrepreneurship (Baumol et al., 2007). We also suggested a deepening of entrepreneurial research to help us understand these core questions, in particular the relationship between entrepreneurship and economic growth and

¹Most of the early literature appeared in two places. First, the *Frontiers of Entrepreneurship Research* collected the papers from the Babson Conferences starting in 1980. Second, for 20 years Donald Sexton has been a keen observer and expert synthesizer of the latest scholarship and emerging trends. Sexton’s determination to periodically bring together influential scholars in the field to take stock of the “state-of-art” of entrepreneurship and package the outcome of those meetings has done much for advancing the distinctiveness and legitimacy of the entrepreneurship domain (Powers & McDougall, 2000).

regional development, and the inclusion of theoretical perspectives such as evolutionary economics and population ecology (Acs & Armington, 2006; Audretsch et al., 2006).

To create a *bona fide* field of entrepreneurship two conditions had to be met. First, there had to be genuine and broad interest in the fundamental questions addressed by entrepreneurship research. Second, there had to be sufficient (financial) commitment and support to pursue the research agenda posed by those questions. Both of these conditions have been met. Entrepreneurship research experiences both a *narrowing* and a *deepening* of the research agenda. The research community addressed a narrower set of questions, and, at the same time, a greater focus on the dynamics of entrepreneurship. The distinctive domain of the field became “What is the role of entrepreneurial opportunity?”, thus *narrowing* the field and “What is the impact of entrepreneurship on society?” thus *deepening* the field. From around the world, key research projects and organizations have provided the facilities and funding necessary to make research possible. From the United States to Sweden, these projects and organizations have significantly enhanced entrepreneurship research.

The Panel Study of Entrepreneurial Dynamics (PSED), a multi-disciplinary research project started in the 1990s, came to fruition in the United States and several other countries thanks largely to the energy of one man, Paul Reynolds. PSED I and II are among a very few national databases to offer systematic, reliable, and generalizable data on the process of business formation (Reynolds, 2007). Other national studies of the business formation process similar to the PSED efforts were carried out in Australia, Sweden, Norway, and, most recently, China. The PSED includes information on the proportion and characteristics of the adult population involved in attempts to start new businesses, the kinds of activities these nascent entrepreneurs undertake during the business start-up process, and the proportion and characteristics of the start-up efforts that become new firms. As described in later sections of this chapter, research resulting from the analyses of PSED data has generated significant insights into the process of how firms emerge. This rich data set has fueled scores of research papers, dissertations, and conferences.

The Global Entrepreneurship Monitor (GEM), built off PSED methodology, systematically collects internationally comparable data in over 75 countries. Initiated by Paul Reynolds, Michael Hay, and Bill Bygrave, the project spurred interest in entrepreneurship in both developed and developing countries. The GEM project was quantitative in nature, multi-disciplinary in its approach, and international in its orientation. GEM data has been utilized in several dissertations and scores of papers, and also led to major research conferences.²

The Max Planck Institute of Economics, founded in 1994 in Jena, Germany, has a research unit dedicated to the study of entrepreneurship. The Entrepreneurship, Growth and Public Policy group became a major international think tank funded by

² For a full list, see http://www.gemconsortium.org/about.aspx?page=pub_gem_articles

the Max Planck Society. The research goal was to create a field of entrepreneurship. The institute, while interested in both the *narrowing* and the *deepening* issues, took a more active role in developing the *deepening* aspect of the research question. The institute annually sponsors scores of conferences, a summer school, a residence week, working papers, seminars, books, articles, and policy briefs. The work of the center influences entrepreneurship research all over the world.

At the same time the Kauffman Foundation in Kansas City, under the leadership of Carl Schramm and Robert Litan, refocused the mission of the Foundation from practice to research, with the explicit goal of creating a field of entrepreneurship. The foundation courted Nobel Lauriat Edmund (Ned) Phelps, leading economist William Baumol, and a host of other major scholars, including Edward Glaeser from Harvard. The foundation embarked on several initiatives including the support of Ph.D. students, a prize for entrepreneurship, supporting universities to expand entrepreneurship outside of the business school, centers of entrepreneurship, faculty grants, as well as an ambitious initiative to produce and make available world-class data on entrepreneurship. Kauffman collaborated with national governments and international organizations funding not just data collection, but also major initiatives in Washington and at the OECD in Paris.

Started in the early 1990s, the Swedish Entrepreneurship Forum (then the Foundation for Small Business Research, FSF) expanded its role in the 2000s, playing a major role in funding activities in Sweden and across Europe, carrying out a set of studies on entrepreneurship policy and operated in the corridors of the European Union. Swedish Entrepreneurship Forum together with the Research Institute of Industrial Economics (IFN) are principals of the Global Award for Entrepreneurship Research (from 1996 through 2008, known as the International Award for Entrepreneurship and Small Business Research), which helps boost the prestige of entrepreneurship research and produced a community of globally renowned scholars.³

The EIM-Business and Policy Research, an independent research and consultancy in the Netherlands, is another institution focused on entrepreneurship research. In collaboration with scholars in the Netherlands it produced scores of discussion papers in collaboration with Erasmus University Rotterdam. These covered emerging research areas like clusters, innovation, firm size, innovation and entrepreneurship policy. Several outstanding Ph.D.s in entrepreneurship spent time at EIM.

The Academy of Management, the largest academic organization in management with 18,000 members from 106 countries, started an entrepreneurship division in 1985 and it grew into one of the largest divisions of the Academy with over 2,500 members.⁴ The Entrepreneurship division's specific domain includes the creation and management of new businesses, small businesses, and family businesses, as well as the characteristics and special problems of entrepreneurs. Major topics include

³ See Braunerhjelm, Henrekson and Lundstrom (this volume).

⁴ <http://division.aomonline.org/ent/EntprDivNewsletters.htm>

new venture ideas and strategies; ecological influences on venture creation and demise; the acquisition and management of venture capital and venture teams; self-employment; the owner-manager; management succession; corporate venturing; as well as the relationship between entrepreneurship and economic development.

While the Academy of Management supports a broad definition of entrepreneurship, the Strategic Management Society (SMS), takes a more focused approach to entrepreneurship research. SMS addresses the intersection between strategic management and entrepreneurship in an effort to advance the understanding of how the creation of competitive advantage is combined with the pursuit of opportunity (Ireland et al., 2003). Where strategic management research is primarily concerned with the creation and exploitation of competitive advantage, entrepreneurship research is focused on the individual-opportunity nexus to understand how, by whom, and with what consequences opportunities for entrepreneurial action are recognized and exploited (Shane & Venkataraman, 2000). One pertinent question emerging out of strategic entrepreneurship research concerns the susceptibility of strategic entrepreneurial behaviors to institutional and cultural influences (Schendel et al., 2007, 3). In 2005, SMS took a major step forward with the establishment of a new high-quality publication, the *Strategic Entrepreneurship Journal*, edited by Dan Schendel and Michael A. Hitt, two of the world's leading management scholars.

Several universities also played major roles in entrepreneurship. While Babson College, Case Western Reserve University, Purdue University, University of Colorado, Harvard Business School, the University of Pennsylvania, and RPI were important institutions in entrepreneurship in the 1990s, the following decade saw several universities make major moves into entrepreneurship, including London Business School, University of Maryland, Indiana University, George Mason University, Stanford University, McGill University, New York University, Columbia University, Erasmus University Rotterdam, and Ohio State University to name a few. These new institutions formed strong faculties and started to produce a stream of new Ph.D.s focusing on questions of entrepreneurship.

These schools produced a cohort of entrepreneurship scholars now at the forefront of the field. Some of them are involved in this handbook, including Siri Terjesen, Larry Plummer, Samee Desai, and Rob Wuebker. Many of these, and others, have spent significant time at the Max Planck Institute over the years thus facilitating the cross-fertilization of ideas.

We are lucky to have played a role in some of these activities. In addition to being an early member of PSED, Zoltan J. Acs is an active member in GEM, holding several important positions in the organization including founding the Hungarian Team, Research Director and a member of its board of directors. David B. Audretsch is the founding director of the entrepreneurship group at the Max Planck Institute of Economics. He was assisted by many of scholars, including Roy Thurik, Chuck Wessner, Marco Vivarelli, Julie Elston, Enrico Santarelli, Rui Baptista and Erik Lehman, among others. Both of us are visiting scholars at the Kauffman Foundation, working closely with the Foundation both at George Mason University and at the Max Planck Institute. We also have been active in the Swedish Entrepreneurship Forum as board members and active research scholars.

These collective research efforts produced major intellectual breakthroughs. First, because of the *narrowing*, entrepreneurship now has a research question. It was Scott Shane who first focused the research community on the question, “Where do opportunities come from?” This research question is important because it focuses on the distinction between discovery and creation. Second, because of the *deepening*, the relationship between entrepreneurship and economic growth took center stage. This research exploded, especially at the regional and city level. Acs and Audretsch both led research teams examining this question, one in Europe and one in the United States. A breakthrough was the development of Knowledge Spillover Entrepreneurship (KSE). The theory actually has a long history (Acs, 2010) and provides, for the first time, a connection between the emergence of the knowledge economy and entrepreneurship. Entrepreneurs play a leading role because they discover opportunities made possible by new knowledge and bringing it to market. Acs, Audretsch, Braunerhjelm, and Carlsson expanded endogenous growth theory to include entrepreneurship and produced several seminal papers on the role of entrepreneurship in endogenous growth theory (Acs et al., 2009; Braunerhjelm et al., 2010; Carlsson et al., 2009).

This *Handbook of Entrepreneurship Research* provides a distinctive, multi-disciplinary, starting point for entrepreneurship research as defined by the leading scholars in the world. Given the many different directions and approaches there is a need to provide a reference work for this field. Each chapter offers a carefully presented summary in its area and discusses future research needs for different topics. While we do not provide a global summary, the final chapter offers a perspective on future research needs.

This second edition of the handbook reports on the developments of the past decade and suggests how the entrepreneurship field was created. It is a generational story. It includes both leading scholars, like the first edition, but also some of the leading new scholars, many of them our students, who are redefining the field. The chapters are carefully written reviews of the literature focusing on current research and future research directions. The 22 chapters, organized into six parts with a new section on the global context, have five completely new chapters, five major revisions, and seven chapters updated to the state-of-the-art. Five classic chapters are unchanged. The material is organized in such a way as to make it easy to follow by building up from the individual to the firm and finally to larger social units.

Part I, “Opportunity,” examines how a unique defining question emerged in the field of entrepreneurship: Where do entrepreneurial opportunities come from (Alvarez & Barney, 2007; McMullen et al., 2007; Sarasvathy et al., 2003; Shane & Eckhardt, 2003; Shane & Venkataraman, 2000)? This question of where opportunities come generates significant debate (Alvarez & Barney, 2008). This debate is embedded in a larger philosophy of science debate about positivists and constructionist paradigms that has plagued organizational science scholars for decades. On the one hand, positivists assume that reality has an objective existence independent of individual perceptions (Popper, 1979). On the other hand, constructionists argue that reality is a social product based on the social interactions of individuals and does not have an existence independent of individual perception.

The three chapters in this section—“Debates in Entrepreneurship” by Sharon Alvarez, Jay Barney, and Susan L. Young; “The Individual-Opportunity Nexus” by Jonathan Eckhardt and Scott Shane; and “Three Views of Entrepreneurial Opportunity” by Saras Sarasvathy, Nick Dew, Rama Velamuri, and Sankaran Venkataraman—all address the question of opportunity in entrepreneurship research: existence, discovery, evaluation, and exploitation. These chapters are written from the perspective of the philosophy of science, economics, and sociology.

In a new chapter, Alvarez, Barney, and Young discuss the debate in opportunity from a philosophy of science perspective, bringing into sharp relief the two positions of the positivists and the constructionists. While Shane produces a theoretical position on the positivist perspective, this has not been done for the constructionist perspective, although Sarasvathy is typically identified with this. In fact most chapters can be thought of as being in one or the other camp.

The purpose of the chapter is to articulate and explicitly describe assumptions of a realist perspective of opportunity formation, a constructionist perspective of opportunity formation, and an evolutionary realist perspective that includes some elements of realist perspectives and some elements of constructionist perspectives into the discussion of the formation of entrepreneurial opportunities. The chapter then continues by exploring the implications of these opportunities and their ontologies on the effectiveness of business processes during the emergence of organizations. In doing so this chapter suggests that realist views and constructionist views are incomplete without the evolutionary realist perspective. Without fully articulating the evolutionary realist perspective, the analytical richness and promise of the integration of both realist and constructionist views cannot be reaped.

Eckhardt and Shane, in an updated [Chapter 3](#), examine the relationship between the individual agent and opportunity. The purpose of this chapter is to build on Shane and Venkataraman (2000) by first broadening the treatment of the topic, second, by clarifying the dimensions of the organizing framework, and, third, by updating the research with the latest findings. They start with a discussion of disequilibrium to show why it is necessary for entrepreneurship. Their model consists of a two by two matrix that identifies entrepreneurial discovery and exploitation. The four possibilities are, first, independent discovery and start-up. The second possibility is individual discovery with corporate exploitation resulting in an acquisition. Coming third is a corporate discovery and individual exploitation, which calls for a spin-off. Finally, a corporate discovery and exploitation is corporate venturing. The chapter discusses which modes of exploitation are used to exploit entrepreneurial opportunities. Because only individuals are capable of discovering opportunities, the locus of decision-making about exploitation of discovered opportunities lies with people. Two dimensions of this choice appear to be important. First, can the opportunity be effectively pursued through markets? Second, are new or established firms better entities for undertaking the opportunity exploitation process?

In [Chapter 4](#), Sarasvathy, Dew, Velamuri, and Venkataraman present three views of entrepreneurial opportunity. The purpose of this chapter is to challenge the assumption underlying current theories of innovation that if a market can be created,

it will. Instead, the chapter focuses on Arrow's exhortation that researchers should tackle one of the central problems in economics: uncertainty. They begin with a definition of entrepreneurial opportunity. Then they delineate its elements and examine it within three views of the market process: the market as an allocative process; as a discovery process; and as a creative process. Within each literature the assumptions about the knowledge of the decision-maker regarding the future are examined, as are the implications of those assumptions for strategies to recognize, discover, and create entrepreneurial opportunities. The chapter concludes with a set of conjectures challenging the inevitability of technological commercialization, arguing for a more contingent approach to the study of the central phenomenon of entrepreneurship.

Part II, "The Emergence of New Ventures," examines how firms emerge, how we think about them from a theoretical perspective and what strategies firms pursue. Perhaps one of the most important developments in entrepreneurship research over the past decade has been the concept of nascent entrepreneurship pioneered by Paul Reynolds. This concept opens up several research areas and, consequently, greatly increases our understanding of where firms come from and how opportunities are pursued.

The four chapters in this section—"Firm Formation Processes" by William B. Gartner, Nancy M. Carter, and Paul Reynolds; "Corporate Entrepreneurship" by Donald Kuratko; "High Impact Firms" by Zoltan J. Acs; and "Private Equity and Venture Capital" by Paul Gompers and Josh Lerner—all directly address the question of the role of the firm as a unit of analysis in entrepreneurship research. These chapters are written from the perspectives of organization theorists, business strategy, economists, and finance.

In [Chapter 5](#), Gartner, Carter, and Reynolds offer updated insights and evidence about the process of organization formation. They examine the foundation of independent for-profit business for insights into the nature of organization formation. The purpose of this chapter is to focus on research into entrepreneurial behavior that involves activities of individuals creating new organizations, rather than the activities of individuals who are involved with maintaining or changing the operations of on-going established organizations. They view entrepreneurship as an organizational phenomenon and as an organizing process positing that the roots of entrepreneurship are embedded in social processes and consider the process of organizational formation to be the core characteristic of entrepreneurship. They also view entrepreneurial behavior as an individual-level phenomenon, occurring over time, and resulting in an organization as the primary outcome of these activities. As the study of a new organization is not the same as the study of emerging organizations, a sharp distinction is drawn.

In a new [Chapter 6](#), Kuratko examines how in the hyper-competitive global economy corporate entrepreneurship is increasingly recognized as a legitimate path to greater organizational performance. The recognition of corporate entrepreneurship as a valid and important area of research has real and tangible benefits for emerging scholars, as their work will have significant impact on corporate strategy. As an example, Dess, Lumpkin, and McGee (1999) note that, "Virtually all organizations—new start-ups, major corporations, and alliances among global

partners—are striving to exploit product-market opportunities through innovative and proactive behavior”—the type of behavior called for by corporate entrepreneurship. Barringer and Bluedorn (1999) suggest that in light of the dynamism and complexity of today’s environments, “. . . entrepreneurial attitudes and behaviors are necessary for firms of all sizes to prosper and flourish.” Developing an organizational environment that cultivate employees’ interest in and commitment to innovation contributes to success in today’s global economy.

Similarly, in [Chapter 7](#) Acs discusses the importance of high-impact entrepreneurship (HIE). These are firms that will innovate, create jobs, transform the economy, and contribute to productivity. These entrepreneurs—those that Schumpeter described as “the promoters of new combinations”—are individuals who can both see new possibilities and assess market needs (Acs & Audretsch, 2003). The domain of HIE is parallel to the development of other entrepreneurship literatures—social entrepreneurship, ethnic entrepreneurship, family-owned business, international entrepreneurship, gender and entrepreneurship, self-employment. HIE is a “class” of entrepreneurship. As one might expect there are similarities between types, and important differences. The important differences can be best distinguished by examining the literatures that have floated around HIE but have yet to be integrated as a distinct domain: innovation, occupational choice, human capital, venture capital, endogenous growth, knowledge spillovers, capital markets, entrepreneurial rents, and even personality bits of traditional entrepreneurship. The goal of HIE is more than growth and change—it is different from other domains primarily because it operates with leverage as its outcome.⁵

In [Chapter 8](#), Gompers and Lerner explore venture capital and private equity. Venture capital, while financing only a small proportion of new firms, focuses on high-impact firms. The purpose of this chapter is to summarize and synthesize what we know about equity finance from research, and to determine the questions we cannot yet answer. The starting point of their chapter is what constitutes venture capital and angel financing. They define venture capital as independently managed, dedicated pools of capital that focus on equity or equity-linked investments in privately held, high growth potential companies. The primary focus of the chapter is on pulling together the empirical academic research on venture capital and angel financing. The chapter is also important because it raises important public policy issues about what is and should be the role of government in the financing of new ventures. Has venture capital and a robust IPO market been a source of US competitive advantage? This institutional arrangement is unavailable in countries dominated by banks such as Germany and Japan. It is often unclear in which ways countries should duplicate the United States and its policies, institutions, and approaches.

Part III, “The Market Context,” discusses the topics of risk and uncertainty, innovation and technological change, information and market processes as related to entrepreneurship. While these topics are not necessarily only about entrepreneurship, all have something to offer in understanding the entrepreneurial process. These

⁵ Zoltan J. Acs acknowledges and thanks Robert Wuebker for the above definition of HIE.

traditional economic topics are identified at least to some extent in the literature with the works of Frank Knight (1921), Joseph Schumpeter (1911 [1934]), and Frederick Hayek (1937).

For Knight profit is defined as the surplus, which is what remains after wages for labor, the rent for land and the interest on capital are paid out of revenue. In a static competitive economy anyone can purchase factors and combine them to generate output. With free entry and exit, and no economies of scale, competition between producers results in a long-run economic profit of zero. There is simply no need for an entrepreneur. If the assumption of a static environment is relaxed, making the environment unpredictable, we introduce the element of risk and uncertainty. Knight refined this idea by distinguishing between risk and uncertainty. Risk, according to Knight, relates to recurrent situations in which, by repeated observation, it is possible to estimate the relative frequencies with which different outcomes will arise. Knight argued that it is not measurable risk, but unmeasurable uncertainty that constitutes the basis for pure profit.

Schumpeter's view of the entrepreneur as innovator has widespread appeal. His early work, which highlighted the romantic and visionary aspects of business, appeals to artists and individuals (Schumpeter, 1934 [1911]), while his later work appeals to scientists and collectivists because of its claim that innovation can be effectively programmed and coordinated within large organizations (Schumpeter, 1942). Although its visionary nature makes it difficult to model, several writers attempt to do so within an evolutionary perspective. From a Darwinian perspective, innovation is a source of potential diversity analogous to genetic variation. In one version of this analogy, the variation occurs within a population of firms when one adopts a new technology. The innovative firm then competes with the other firms in a competitive survival (Nelson & Winter, 1982).

The four chapters in Part III—"Market Processes and Entrepreneurial Studies" by Roger Koppl and Maria Minniti; "Information and the Theory of the Firm" by Mark Casson; "Entrepreneurship, Innovation and Technological Change" by Zoltan J. Acs and David B. Audretsch; and "Risk and Uncertainty" by Sharon Gifford—all directly address aspects of the entrepreneurial process. All four chapters are written from an economic perspective.

Koppl and Minniti, in [Chapter 9](#), update and examine the role of entrepreneurship from an Austrian perspective. The purpose of this chapter is to show how the Austrian approach helps integrate and organize much of the entrepreneurship literature and how it can be used to create a common theoretical framework for entrepreneurial studies in a disequilibrium analysis. Their concern centers on the lack of a definition for entrepreneurship that captures both aspects of entrepreneurship and the entrepreneur. For them entrepreneurship is primarily alertness to new opportunities. Second, entrepreneurship is seizing an opportunity by taking innovative action. Alertness leads to the discovery of new opportunities. The chapter explains Kirzner's theory and the contribution of more recent Austrians in their proper context. They suggest an Austrian definition of entrepreneurship that addresses the concerns of Shane and Venkataraman (2000).

In [Chapter 10](#), Casson examines the classic relationship between entrepreneurship and the theory of the firm. According to Casson there is a wide gap between economic theories of entrepreneurship, which tend to be abstract, and studies of entrepreneurial behavior, which tend to be about individual behavior. The purpose of this chapter is to bridge this gap by developing a mutually consistent set of hypotheses about entrepreneurial behavior from a parsimonious set of assumptions. The key to bridging the gap according to Casson is to relax some of the highly restrictive assumptions about human motivation and decision-making that underpin conventional economic theory. The main assumptions needing relaxation concern the objectivity of information, autonomy of preferences, and costless optimization. Relaxing these assumptions makes it possible to accommodate theoretical insights originating from other social sciences. Once these assumptions are relaxed, it becomes evident that theories of entrepreneurship are closely related to modern theories of the firm, such as transaction cost theories and resource-based theories. The theory of entrepreneurship emerges as a powerful mechanism for synthesizing the insights of these modern theories of the firm.

In [Chapter 11](#), Acs and Audretsch update and show the innovative potential of new and small firms by serving as a conduit for the spillover of knowledge from the incumbent organization creating that knowledge to a new organization actually commercializing that knowledge through innovative activity. The purpose of this chapter is to suggest that a much wider spectrum of enterprises contribute to innovative activity, and that both, and in particular, small entrepreneurial firms and large established incumbents play an important role in the innovation and technological change process (Acs & Audretsch, 1990). A new understanding about the links between the individual entrepreneur, firm size, and innovative activity results. The chapter begins with the knowledge production function where the firm is exogenous and technology is endogenous. A key finding is that the conventional wisdom regarding the process of innovation and technological change is inconsistent with the new understanding about the role of entrepreneurship and innovative activity. The empirical evidence strongly suggests that, at least in some industries, small entrepreneurial firms play a key role in generating innovations. Recent evidence suggests that scale economies bestowed through geographic proximity and facilitated by spatial clusters are more important than those for large enterprises in producing innovative output. Because of the appropriability problem they propose shifting the unit of observation away from exogenously assumed firms to individuals, agents with endowments of new economic knowledge. When the lens is shifted away from the firm to the individual as the relevant unit of observation, the knowledge is exogenous and embodied in a worker. The firm is created endogeneously in the agents' effort to appropriate the value of her knowledge through innovative activity (Audretsch, 1995). The chapter also introduces an explanation for entrepreneurship suggesting that new firms represent a conduit for turning new knowledge into innovations. Knowledge Spillover Entrepreneurship provides an advancement in our understanding of how and what role entrepreneurship plays in technological change.

In [Chapter 12](#), Gifford illustrates an elementary element of most economic theories of the entrepreneur, uncertainty, and the accompanying risk. The entrepreneur functions in the economic environment only if the environment is uncertain. If all individuals in the economy had perfect information, then all profitable opportunities would be exploited instantaneously and there would be no further entrepreneurial role. Equilibrium is a set of prices at which there are no profit opportunities. Thus, uncertainty and risk, as well as a disequilibrium economy, as opposed to equilibrium, are necessary elements for any economic analysis that explicitly addresses the role of the entrepreneur. The purpose of the chapter is to propose an approach to decision-making under uncertainty that, instead of assuming that individuals are risk-averse, derives risk-averse behavior as a result of limited attention. If we understand the sources of risk-averse behavior, we would be better able to predict entrepreneurial behavior. According to Gifford there is no need to rely on assumptions about unavoidable risk behavior or animal spirits. The question of how entrepreneurs overcome the problem of asymmetric information about their experiences, knowledge and skills, and subsequent effort can be advanced by the implications of the economics of asymmetric information.

Part IV, "The Social Context," looks at social outcomes that are both smaller and larger than individuals: behavior, populations, and communities. If entrepreneurship is important, and an outcome of entrepreneurial behavior is a new organization, then how these organizations relate to each other in the context of larger social groups is important to study. These larger organizations also impact firm formation.

The three chapters in this section—"From Entrepreneurial Cognition to Neuro-entrepreneurship" by Norris Krueger and Meloney Day; "The Social Psychology of Entrepreneurial Behavior" by Kelly G. Shaver; and "Entrepreneurship as Social Construction: An Evolutionary Approach" by Howard Aldrich and Martinez—all directly address issues of larger units of analysis and the simultaneous interaction between the impact of new organization on this environment and the impact of the environment on organization creation. These chapters are written by a social psychologist and four sociologists.

In an updated [Chapter 13](#) Krueger and Day examine entrepreneurial cognition and neuroentrepreneurship. The purpose of this chapter is to focus on a key issue: "What cognitive phenomenon is associated with seeing and acting on opportunities?" Understanding entrepreneurial cognition is imperative to understanding the underlying essence of entrepreneurship. This is especially true if we wish to move from descriptive research to theory-driven research. Cognition research offers rich theory and well-developed methods. What is unique about entrepreneurial thinking? Krueger and Day focus on the most critical distinction between entrepreneurs and non-entrepreneurs, the intentional pursuit of opportunity.

The intent of their chapter is threefold. First, it acknowledges and celebrates what entrepreneurial cognition has continued to bring to our understanding of entrepreneurs and entrepreneurship. Second, it introduces the theories, methodologies, and fresh perspectives that neuroscience offers the ambitious (and tenacious) entrepreneurship scholar. Finally, studying entrepreneurial cognition is in many ways an ideal venue for neuroscientific investigation and vice

versa. They focus attention on what we believe to be the critical components of entrepreneurial cognition research thus far, especially areas that previous research neglected: Entrepreneurial Perceptions, Entrepreneurial Intentions, Entrepreneurial Self-efficacy, Entrepreneurial Deep Beliefs, Entrepreneurial Learning, Promising Research Contexts, while adding some initial (but potent) insights from neuroscience.

In [Chapter 14](#), Shaver suggests that social psychology is important for the study of entrepreneurship because the creation of a new venture is a truly social enterprise. Social psychology is the scientific study of the personal and situational factors affecting individual social behavior. As psychology concentrates on dependent variables smaller than the individual person, sociology concentrates on structures and processes larger than any single individual. Social psychology investigates the socially meaningful actions of individuals. The purpose of this chapter is to examine four major areas of theory and research in social psychology and discuss how each fits into the study of entrepreneurial activity: cognition, attribution, attitudes, and the self. These topics are included because these are the traditional concerns of social psychologists and are the subject of numerous articles in entrepreneurship. The self, “who are you” and “how did you get that way,” both “is” and “does”. In the development of our social selves, we must often choose between accuracy and distortion. We need to know our capabilities, but we wish them to be more extensive than what reality offers. This applies when considering if we have the right stuff to start a new venture as well as in networking from the standpoint of social comparison, among others. Specifically, self-efficacy in the entrepreneurial domain is a replacement for the “perceived behavioral control” that is part of the theory of planned behavior.

In [Chapter 15](#), Aldrich and Martinez review and analyze the multi-level selection process that applies across three different levels of entrepreneurial social construction: organizations, populations, and communities. The purpose of this chapter is to emphasize the tension between selection forces at the three levels that affect variations generated by entrepreneurs. Sometimes these forces work in concert and sometimes they do not. Two concepts are important in their analysis. First, the concept of a “nascent entrepreneur” captures the flavor of the chaotic and disorderly process driving the creation of new firms, and, second, the distinction between an innovator and a replicator. Most new ventures are replications. Reproducing organizational forms constitutes the norm, rather than the exception. Franchising is a classic example of a replication, because from the very start new establishments are intended to be identical. Their main goal is to describe the entrepreneurial process as a form of social construction that goes beyond the firm itself to the creation of populations and communities. In contrast to the view that the best companies will prevail in the economy, they present evidence that collective action early in the life of a population affects which firms prosper and which do not. Following an evolutionary argument, the survival of a firm, population, or community depends as much on the existence of favorable environmental forces as on the effectiveness of individual entrepreneurs. This is especially important for entrepreneurs that are innovators creating new organizations, populations, and communities. They emphasize the

importance of collective action, which depends on social psychology, in providing entrepreneurs with the capacity to shape their environments.

Part V, "The Global Context," is a new section that examines the evolving global knowledge economy as it pertains to entrepreneurship, international business, and economic development. In part it discusses the debate within entrepreneurship between born global and born local; the debate between entrepreneurship and international business; between international new ventures and international business; as well as, indirectly, the debate between international business and international management. The section also examines the evolving role of development, particularly in Brazil, Russia, India, and China, the so-called BRIC countries. The whole development debate is couched in traditional development language with a modern overlay by Richard Florida.

The three chapters in this section—"Entrepreneurship and International Business" by Siri Terjesen, Zoltan J. Acs, and David Audretsch; "The Globalization of Innovation and Entrepreneurial Talent" by Robert Wuebker, Zoltan J. Acs, and Richard Florida; and "Entrepreneurship and Economic Development" by Zoltan J. Acs and Nicola Virgill—all directly address the issue of entrepreneurship and the interconnectedness of the world economy. They are written from the perspective of economics, international business, and development.

In [Chapter 16](#), Terjesen, Acs, and Audretsch explore the two major strands of international entrepreneurship research: Comparative International Entrepreneurship and Cross-border Entrepreneurship, answering a series of key questions about extant research. The conclusion suggests theoretical, methodological, and pragmatic implications for further development of the field. As the study of entrepreneurship has evolved to include the examination of "entrepreneurial" firms that vary in size, age, and other factors, international entrepreneurship research correspondingly responded by encompassing a broad range of "entrepreneurial" activities. The domain of international entrepreneurship can include economic development, financing, and corporate environments, however, these topics are addressed in separate chapters of this handbook ([Chapter 18](#); Gompers & Lerner, 2010; Kuratko, 2010) and considered outside the scope of this chapter.

In [Chapter 17](#), Wuebker, Acs, and Florida examine the changing nature of the world economy with a particular focus on global trends. This builds on [Chapter 8](#), by Gompers and Lerner. Venture capitalists find fund, and assist *high-impact entrepreneurs*—individuals whose firms are prime examples of Schumpeter's (1939) "creative destruction" and the "creation of new economic spaces" (Acs, 2008). High-impact entrepreneurs form firms characterized by a lack of substantial tangible assets, the expectation of several years of negative earnings, and extremely uncertain prospects. Venture capitalists provide these entrepreneurs and their high-potential ventures with capital, advice, contacts, and experience. They bring to the table a host of financial and organizational "technologies" including screening capabilities, due diligence processes, staged financing, syndication of investments, compensation contracts, and corporate governance practices. In so doing, venture capitalists help bring risky, unproven, innovative ideas to market, overcoming the uncertainty and risk associated with new business development.

An examination of recent patterns of venture capital investment suggests that the venture capital industry is in the early stages of a profound transformation catalyzed in part by the globalization of high-impact entrepreneurship (Acs et al., 2001; McDougall & Oviatt, 2000). International participation is an increasing component of venture deals, in particular since 2000, and since 2005 US venture capital firms in cross-border venture capital investment increased substantially. This change has important implications for the financing of young firms, the speed of innovation and technological transformation, and the locus of long-term economic growth.

In Chapter 18 Acs and Virgill, examine the evolution of development policy beginning with the colonial period and the immediate post-colonial era. In both periods there was significant government intervention with a heavy emphasis on government planning. An important cornerstone of the post-colonial period was the use of import substitution programs. Import substitution was an attempt by developing countries to industrialize by producing goods that had been traditionally imported. With the failure of import substitution, many developing countries then switched to outward-oriented strategies, beginning with many of the Asian economies. In particular, many developing countries established export-processing zones—industrial enclaves where export promotion platforms could be built. Again, export promotion relied on strong government intervention.

This chapter also examines the use of entrepreneurship as a development strategy for developing countries creating a link to the previous chapter. The definition of entrepreneurship, with particular reference to developing countries, is examined. Next, a framework to explore the literature on entrepreneurship in developing countries based on the existence of network, knowledge and demonstration, and failure externalities is set out.⁶ Each of these externalities is discussed in greater detail. Finally, this chapter identifies the core policy issues to address these externalities. Internalizing these externalities, it is argued, should increase the level of productive entrepreneurship in developing countries.

Part VI, “*The Entrepreneurial Society*,” examines the question, “What are the consequences of entrepreneurial activity for economic growth and can public policy affect the outcome?” This is the *deepening* question that entrepreneurship needed to examine (Audretsch, 2007). These are important questions, and, as hinted in the opening paragraphs of this introduction, the conventional wisdom is that the formation of new organizations leads to economic growth while public policies aimed at individuals should increase the flow of new organizations in society. Lundstrom and Stevenson (2005) make a distinction between small business policies and entrepreneurship policies. They view small business policies as those focused upon existing enterprises, whereas entrepreneurship policies are directed toward individuals. These individuals are considering, or have recently started, a new business. However, entrepreneurship policies play only a modest role in the policy armory of

⁶ D. Audretsch, Keilbach, M., and Lehmann, E. 2006. *Entrepreneurship and Economic Growth*. Oxford: Oxford University Press.

developed economies. Moreover, Braunerhjelm et al. (2010) demonstrates that new firm formation causes economic growth and not the other way around.

The four chapters in this section—"The Geography of Entrepreneurship" by Larry Plummer and Aviad Pe'er; "The Impact of Entrepreneurship on Economic Growth" by Martin Carree and Roy Thurik; "Entrepreneurship and Public Policy" by Magnus Henrekson, and Mikael Stenkula; and "Entrepreneurship and Capitalist Progress" by Rita McGrath and Samee Desai—address the relationship between entrepreneurial activity and economic growth. These four areas have seen major developments since the dawn of the new millennium. The regional impact of entrepreneurship is the topic of scores of papers and seminars. It was natural if geography and growth were important for entrepreneurship that entrepreneurial policy would follow. In fact an explosion of research on entrepreneurship policy resulted as economists and policy makers all around the world tried to unravel policy secrets. These chapters are written by both economists and management scholars but with an economics flavor.⁷

In a new Chapter 19, Plummer and Pe'er survey the rapidly growing field of entrepreneurship and geography. The purpose of this chapter is to provide an introduction to, and review of, the extant literature concerning the geography of entrepreneurship. This chapter is, of course, not the first review of the relevant entrepreneurship and geography literatures. However, in fulfilling its purpose, this chapter offers a more integrative perspective by highlighting the interconnection between entrepreneurship and spatial economic theories. Throughout this chapter, entrepreneurship refers to the process by which profitable opportunities are discovered and exploited (Shane & Venkataraman, 2000) and to the new organizations that form as a result. In turn, spatial economics concerns the allocation of scarce resources over space, the geographic distribution of economic activity, and—most crucially—the choice of location for business activity.

From a theoretical point of view, the reviewed literature suggests that entrepreneurship and spatial economic theories integrate in one of two ways. The majority view, emphasized especially in entrepreneurship journals, treats geography as a proxy for local contexts. From this perspective, the entrepreneurship process is inherently non-spatial but varies in form, function, and outcome according to the (exogenous) spatial heterogeneity of local determinants and conditions conducive to entrepreneurial activity (e.g., social networks, institutional arrangements, knowledge spillovers, etc.), some of which are difficult to observe. The minority, and more provocative, perspective envisions entrepreneurship as an inherently spatial process. In this view (endogenous), spatial "frictions" (Duranton, 2008) manifest in the "spatial positioning" of entrepreneurs and "the unavoidable spatial consequences of all entrepreneurial actions" (Andersson, 2005, 35).

In Chapter 20, Carree and Thurik update their earlier chapter and observe that since 1990, a wealth of studies analyzing the determinants of entrepreneurship,

⁷ For those interested in the subject we refer you to David M. Hart, ed., "The Emergence of Entrepreneurship Policy: Governance, Start-ups, and Growth in the knowledge Economy."

and the decision to go into business have been conducted. The consequences of this behavior are studied extensively in the literature with, for example, a large literature on firm survival. However, this literature is generally restricted to two units of observation—that of the firm and the region. When it comes to linking entrepreneurship to growth at the national level, there is a relative void despite the recent efforts of the Global Entrepreneurship Monitor research program (Reynolds et al., 2001). The purpose of this chapter is to review the theoretical and empirical literature linking entrepreneurship and economic growth (Wennekers & Thurik, 1999). Explanations for economic growth are generally been restricted to the realm of macroeconomics. A different scholarly tradition linking growth to industrial organization dates back to at least Schumpeter (1934 [1911]). According to this tradition, performance, measured in terms of economic growth, is shaped by the degree to which the industry structure uses scarce resources most efficiently (Schoonhoven & Romanelli, 2001).

In a new Chapter 21, Henrekson and Stenkula examine the difference between entrepreneurship policy, per se, and public policy to promote entrepreneurship.

Public policy is now shifting from SME policy toward entrepreneurship policy, which supports entrepreneurship without directing attention to quantitative goals and specific firms or employment groups. The institutional framework set by public policy affects the prevalence and performance of both productive entrepreneurship and so-called high-impact entrepreneurship in turn. Although varying contexts and economic systems make prescribing a general prescription impossible, a number of relevant policy areas are identified and analyzed. Independent of environment, productive entrepreneurship should be rewarded and unproductive entrepreneurship should be discouraged. Successful ventures must also have incentives to continue renewing themselves just as it must be easy to start and expand a business. In particular, regulatory entry and growth barriers, labor-market regulation, liquidity constraints, and tax policy are analyzed at length.

Finally, in Chapter 22, McGrath and Desai update and discuss future research needs of the field. The purpose of the chapter is to argue that since there is now a significant body of research on entrepreneurship, as evidenced in this handbook, we should now reach out to other fields and tackle bigger questions. The field of entrepreneurship offers a useful vantage point from which to tackle some of the more pressing issues for modern business organizations and the institutional frameworks within which they exist. McGrath and Desai conclude that the insights gained by entrepreneurship scholars through their study of often small, fragile, new entities can be a leveraged to improve our understandings of the workings of the capitalism system. The chapter brings into the entrepreneurship debate the topic of social entrepreneurship but takes a much broader and long-term perspective by looking at entrepreneurship (wealth creating) and philanthropy (wealth reconstitution) to create opportunity and therefore contribute to social value.

The purpose of this handbook, and this introduction, is to provide an up-to-date overview of entrepreneurship theory. We hope that this handbook achieves its objectives. By *narrowing* the question “Where do entrepreneurial opportunities come from?” and *broadening* the consequences of entrepreneurship, “What is the impact

of entrepreneurship on capitalists development?" we have come full circle. Society plays an important role in answering this question. Unless society helps to create and maintain opportunity, equality of opportunity, entrepreneurship cannot flourish. However, it goes much deeper than that. Once equality of opportunity is guaranteed in a society, in a knowledge economy, and the global economy is a knowledge economy, society and/or government has to make sure that knowledge is created, shared, and applied. In essence, learning needs to take place. Only if opportunities have been created by society can we start to think if they are indeed discovered or created by entrepreneurs (McMullen et al., 2007).

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Part I
Opportunity

Chapter 2

Debates in Entrepreneurship: Opportunity Formation and Implications for the Field of Entrepreneurship

Sharon A. Alvarez, Jay B. Barney, and Susan L. Young

The field of entrepreneurship has struggled since the 1970s to define itself as a field and gain legitimacy as a valid academic area of research (Cooper, 2003). Much of the work in entrepreneurship was either theoretical or used the phenomena as a context in which to observe other theories (Alvarez & Barney, 2008). This led to a “land grab” mentality—almost a rapaciousness—regarding entrepreneurship research among many of the established disciplines—economics, sociology, organization behavior, strategy, organization theory—looking for something new to study.

However, during this time there were scholars devoted to entrepreneurship as a core research field. This focused research has led to a unique defining question for the field of entrepreneurship: where do opportunities come from (Aldrich & Fiol, 1994; Aldrich & Kenworthy, 1999; Aldrich & Ruef, 2006; Alvarez & Barney, 2005; Alvarez & Barney, 2007; Alvarez & Parker, 2009; Baker & Nelson, 2005; Casson, 1982; Eckhardt & Ciuchta, 2008; Gartner, 1985; Gloria-Palermo, 1999; McMullen & Shepherd, 2006; Sarasvathy, 2001; Sarasvathy et al., 2003; Shane, 2003; Shane & Eckhardt, 2003; Shane & Venkataraman, 2000; Venkataraman, 1997)? Moreover, there have been at least three special issues on this topic: one by Zoltan Acs in the *Journal of Small Business Economics* and two by Alvarez and Barney in *Strategic Entrepreneurship Journal*.

This question of where opportunities come from has generated significant debate (Alvarez & Barney, 2008). This debate is embedded in a larger philosophy of science debate about realist and constructionist paradigms that has plagued organizational science scholars for at least the past four decades (Moldoveanu & Baum, 2002). Moreover, it is at the core of the debate between discovered realist opportunities and created evolutionary realist opportunities (McMullen & Shepherd, 2006).

On the one hand, realists assume that reality has an objective existence independent of individual perceptions (Popper, 1979). On the other hand,

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constructionists argue that reality is a social product based on the social interactions of individuals and does not have an existence independent of individual perception (Berger & Luckmann, 1967; Kuhn, 1970; Weick, 1979). Recently, scholars have begun to identify ways that apparent conflicts between realists and constructionists can be resolved. One such way is the evolutionary realist approach, which assumes that reality is as individuals perceive it but that it is tested against an objective and external, albeit potentially unobservable, reality which is a reliable guide to action (Azevedo, 2002). For example, Campbell (1974) argues that there is a reality that is independent of an individual's perception and that this reality plays a part in the selection and editing of individual's beliefs and perceptions.

Perhaps not surprisingly, up to this point in the evolution of the field of entrepreneurship the realist perspective of how opportunities are formed and exploited has dominated, while the constructionist and evolutionary realist approaches have received much less attention (Venkataraman, 2003). This is not to say that constructionist (Gartner, 1985) or evolutionary realist (Aldrich & Kenworthy, 1999; Aldrich & Ruef, 2006; Baker & Nelson, 2005) work has not been done in the field of entrepreneurship. However, realist views of entrepreneurship—labeled as either the individual/opportunity nexus approach or discovery—have to this point been more systematically developed as approaches to opportunity formation (Shane, 2003).

The purpose of this chapter is to articulate and explicitly describe the assumptions of a realist perspective of opportunity formation, a constructionist perspective of opportunity formation, and an evolutionary realist perspective that includes some elements of realist perspectives and some elements of constructionist perspectives into the discussion of the formation of entrepreneurial opportunities. In doing so this chapter suggests that realist views and constructionist views are incomplete without the evolutionary realist perspective. Without fully articulating the evolutionary realist perspective, the analytical richness and promise of the integration of both realist and constructionist views cannot be reaped (Azevedo, 1997).

The rest of this chapter is organized as follows. The next section gives a brief summary of the realist, constructionist, and evolutionary realist perspectives, and how these perspectives manifest themselves in the entrepreneurship literature. The chapter then goes on to extend this logic into the organization emergence process.

Epistemological Traditions

A Realist Approach to Opportunity Formation

The realist perspective has its roots in classic positivism and dates back to August Comte (Blanchard, 1855) and Ernst Mach's (Kockelmans, 1968) views that any theory not based on observable fact is meaningless. Moreover, Comte claimed, that the goal of science is prediction based only on observable terms. Unobservable objects, processes, and events in current realist views are ascribed the same properties

as the observable. In this view the unobservable exists objectively and mind-independently. There is a real world existing independent of our attempts to know it; that we humans can have knowledge of that world; and that the validity of our knowledge-claims is, at least in part, determined by the way the world is (Azevedo, 1997). Theory in this view either correctly or incorrectly describes the unobservable and it can be tested as either true or false. In other words, realists know the “truth” about genuinely existing unobservable entities. For realists, the objects of scientific knowledge are phenomena and take the form of general laws that must be testable by experience and show logical links between specific phenomena and these laws.

This realist tradition is manifest, in the entrepreneurship literature, in a set of ideas that has come to be known as discovery opportunities or the individual/opportunity nexus approach. This approach builds on the work of the “Austrian” economists (Hayek, 1945; Kirzner, 1973; Von Mises, 1949). The Austrian economists differed from the more traditional neoclassical economists by assuming markets with imperfect information (Kirzner, 1989; Von Mises, 1949). The notion of opportunity¹ in Hayek’s work is price discrepancies, perceived by agents with particular subjective localized knowledge of the market and thus allowing for arbitrage. While there is no specific role for the entrepreneur in his vision of the market process, Hayek laid the groundwork for the discussion of the opportunity concept (Buenstorf, 2007). The role of the entrepreneur becomes more established in Kirzner (1973, 1989), who extended von Mises’ work on asymmetric beliefs (Von Mises, 1949). Opportunities in this regard stem from imperfect knowledge, subject to the particular knowledge of time, and place possessed by the entrepreneur. In this view, opportunities are there for the taking, but only for those who possess the qualities necessary both to discover and exploit them (Shane & Eckhardt, 2003). Thus, entrepreneurs are considered as possessing an accurate view of “reality” as opposed to non-entrepreneurs (McMullen & Shepherd, 2006).

Indeed, the central assumption of this discovery approach suggests that unobservable opportunities exist objectively and independent of individual perception and by implication that these opportunities can only be seen, and thus “discovered,” by special alert individuals (Kirzner, 1973, 10). Discovery opportunities are treated as if they are clearly definable and identifiable objects. Even if it is acknowledged that there are many aspects and stages to the formation of the opportunity, opportunities are nonetheless represented as if they have material properties and defined parameters that exist independent of the perceptions of individuals. Moreover, the recognition of these opportunities by an individual is viewed as an event. These opportunities exist in an already existing reality and alert individuals are often familiar with the norms and laws or “truth” of this reality.

Opportunities in this view arise from competitive imperfections in markets due to changes in technology, consumer preferences, or some other attributes of the context within which an industry or market exists (Kirzner, 1973, 10). The task of the individual is to become “alert” to the existence of these opportunities and to

¹An opportunity is defined in this chapter as a market imperfection.

“claim” those that hold the greatest potential (Casson, 1982; Shane, 2003). In this view, entrepreneurial opportunities are like lost luggage in a train station; they exist, just waiting to be claimed by alert individuals who know of their existence.

The discovery and exploitation of opportunities often requires individuals to have ex-ante knowledge of the opportunity (Shane, 2000). Consistent with the realist perspective knowledge in this view is highly informative, reliable, and useful. Opportunities are phenomena subject to invariable laws of nature and the task of the individual entrepreneur is to discover these laws. Individuals in this view already possess information and knowledge from previous experience in an industry or market, or they may collect it as they begin to search for possible opportunities in a recently changed market or industry (Casson, 1982). Alert (or just lucky (Barney, 1986)) individuals may even discover opportunities without engaging in a systematic search. Indeed as stated by Kirzner (1973) an alert individual may actually find a \$10 bill on the ground waiting to be picked-up.

The realist perspective of opportunity formation in this view attempts to answer the question: what is an entrepreneur? This perspective asserts that individuals who are entrepreneurs and those that are non-entrepreneurs must differ in some important ways. Without these differences, anyone in an economy could become aware of and then exploit an opportunity. However, if entrepreneurs and non-entrepreneurs differ, then not everyone in an economy will know about particular opportunities, and even if they do, not everyone will be predisposed to exploit them.

Several possible differences between entrepreneurs and non-entrepreneurs have been examined (Kirzner, 1973; Shane, 2003). Most of these differences lead to the development of information asymmetries between entrepreneurs and non-entrepreneurs (Shane, 2000). Kirzner (1973, 67) summarizes the differences between entrepreneurs and non-entrepreneurs by simply asserting that entrepreneurs are more “alert” to the existence of opportunities than non-entrepreneurs.

The basic ontological position of the realist discovery view of opportunities is that these opportunities exist independent of individual’s knowledge of them, and that this knowledge can be acquired. However, the limitation of this view is that it holds the nature of the world, and specifically the opportunity in this case, subject to empirical investigation. It is therefore committed to an ontological unity in that it does not recognize ontologies that are closed to empirical investigation. Thus, in principle, opportunities in this view can be “tested” for validity before an individual entrepreneur provides agency to the opportunity. This perspective of opportunities assumes a “God’s eye” view of opportunities as reality.

A Constructionist Approach to Opportunity Formation

A constructionist perspective is rooted in the work of Berger and Luckmann (1966). The social action, institutions, and conditions that are presented as objective phenomena in a realist perspective are instead constructed through the interactions and interpretations of people in a constructionist perspective. The primary difference then between realists and constructionists is that realists explain observable and

non-observable phenomena as if observable, and constructionists explain non-observable subject matter through interpretive understanding of particular actions (Azevedo, 2002).

These essential insights from a constructionist approach have also manifested in the field of entrepreneurship trying to understand how opportunities are formed and exploited. A constructionist approach to opportunity formation can be seen in effectuation logic (Sarasvathy, 2001) and bricolage (Baker & Nelson, 2005). The central assumption in this view about opportunity formation would suggest that individuals interpret a phenomenon, raw data, or resources and give it a meaning that is different from other's interpretation. In a constructionist approach of opportunity formation individuals create realities and then mold their actions to these realities (Katz & Gartner, 1988). In this approach the individual decides what opportunity to create and then uses available resources to accomplish this task. Resources in this view might not be used in traditional ways but may be put to use in novel service (Penrose, 1959). In this way the entrepreneur "designs the future" based on the environment and the resources available to the entrepreneur (Baker & Nelson, 2005).

In a constructionist view any resources—information and knowledge—are subject to interpretation. Entrepreneurs in this view start "where they are and with what they have" and interpret their idiosyncratic relationship with their resources (Baker & Nelson, 2005; Mahoney & Michael, 2005; Penrose, 1959). The information then available to an entrepreneur in a constructionist view would be their interpretation of their environment and resources and their unique interpretation of what can be accomplished within their environment and with their resources.

The constructionist approach does not predict how opportunities are selected, revised, or whether or not they are valid outside of the individual's reality. This view suggests that perceptual and cognitive mechanisms are generally reliable within the range of the environmental interactions that produced them. This is not to say that what the entrepreneur envisions is a mirror of reality. Instead the entrepreneur's goal is to construct, deconstruct, and reconstruct an existing reality so as to form a new reality and thus opportunity.

Through their actions individuals create a self-fulfilling prophecy, a prediction that is a result of having been made, causes the expected or predicted event to occur and thus confirms its own accuracy (Ford, 1999). Since an essential element of the self-fulfilling effect is an unshakable conviction that everything that has a name actually exists, any time we name something we create an opportunity for a self-fulfilling prophecy (Ford, 1999; Watzlawick, 1984).

Just as the realist perspective of opportunity formation informs the nature of what is an entrepreneur, the constructionist perspective informs the nature of an entrepreneur. Entrepreneurs in this view perceive an opportunity that was not perceived by others thus implying that entrepreneurs must be different than non-entrepreneurs since they perceive and assign meaning to conditions and phenomena differently than non-entrepreneurs (Ford, 1999). In this view the formation of an opportunity and the entrepreneur cannot be separated since it is the differences in the perceptual, cognitive beliefs, and interpretations of entrepreneurs that

construct these opportunities. Moreover, the notion of self-fulfilling prophecy is a strong assumption suggesting that the over-confidence bias plays a significant role (Busenitz & Barney, 1997). In this view entrepreneur's biases are reinforced and may be strengthened as their convictions become accurate.

While the constructionist approach to opportunity formation, knowledge is relative and opportunities exist in the perceptions of individuals, may be appealing, but the constructionist approach also has limitations. Knowledge and opportunities in this view are relative; the problem is that when everything is relative, logical coherence is renounced (Azevedo, 2002). This is a problem since individuals in constructionists' views are participating in a dialogue that pre-supposes a commitment to a minimal logic; i.e., a current market exists, but is then redefined by the enactment of the new opportunity as the opportunity is tested against this existing market through human action. Thus, constructionists have moved to a view of knowledge as the outcomes of functionally oriented behavior and in doing so have ended up with a view of knowledge that resembles Campbell's evolutionary realist approach (Moldoveanu & Baum, 2002).

The next section combines realist perspectives with constructionist perspectives in what has become known as an evolutionary realist approach (Campbell, 1960).

An Evolutionary Realist Approach to Opportunity Formation

The realist and constructionist perspectives both have their strengths; however, the problem is that the two appear to have irreconcilably conflicting assumptions about the nature of the social world (Moldoveanu & Baum, 2002). These differences lead to a fragmented perspective, which in turn leads to a general lack of consistency and coherence. What scholars such as Azevedo (1997, 2002), McKelvey (1999), Campbell (1974) have suggested is a perspective that maintains the strengths of both the realist and constructionist perspective and at the same time avoids the problems of fragmentation (Azevedo, 1997). They note that such a perspective might be an evolutionary realist perspective, a perspective that does not deny a constructionist perspective of knowledge as well as an objective external reality that serves as an ultimate criteria (McKelvey, 1999).

Campbell (1974) built on the strengths of realist and constructionist approaches by arguing that there is a reality independent of the individual and this reality imposes constraints on the individual's actions. In this approach, knowledge may be constructed by individuals but it is validated through social cross-validation. In Campbell's evolutionary approach individuals begin to act through blind variation, then through a trial and error approach these actions are then selected for or against based on the environment or culture which embodies the variation. Campbell contends that the blind-variation and selection-retention process are fundamental to all inductive achievement, to all genuine increases in knowledge, and to all increases in fit of a system to its environment (Aldrich & Kenworthy, 1999).

It is the action component that differentiates the constructionist approach from the evolutionary realist approach to opportunity formation. A pure constructionist approach does not require action, *per se*, but the evolutionary realist approach requires not only the social construction of the action, but also the action itself, as well as selection for or against the action by the market.²

Campbell's evolutionary approach has been extended to organization science primarily by McKelvey (1997) and to entrepreneurship specifically by Aldrich and Kenworthy (1999) and Aldrich and Ruef (2006). Recently, this evolutionary realist approach in entrepreneurship of opportunity formation has been labeled creation opportunities by Venkataraman (2003). Creation theory is a logical theoretical alternative to discovery theory for clarifying the actions that entrepreneurs take to form and exploit opportunities (Aldrich & Kenworthy, 1999; Aldrich & Ruef, 2006; Gartner, 1985; Venkataraman, 2003). Aspects of creation theory have been described by a variety of authors (Aldrich & Kenworthy, 1999; Alvarez & Barney, 2005; Baker & Nelson, 2005; Gartner, 1985; Langlois & Cosgel, 1993; Loasby, 2002; Sarasvathy, 2001; Schumpeter, 1934) and Alvarez and Barney (2007) in particular delineate the differences between the discovery and creation theories of opportunity.

The roots of creation theory can also be seen in the work of Joseph Schumpeter. Schumpeter does not explicitly promote the concept of opportunity; he instead espouses the notion of innovation, where the entrepreneur creates new combinations of resources, which results in a new product and brings it to market (Schumpeter, 1934). This act of creating a new combination can be interpreted as the creation of an entrepreneurial opportunity (Buenstorf, 2007). As Buenstorf further explains: "If interpreted in this way, Schumpeter's approach differs from the Hayek-Mises-Kirzner tradition in that opportunities are not pre-supposed for entrepreneurial activity to occur, but are created by the innovative entrepreneur" (2007, 325). Further, in the Kirznerian view, entrepreneurs discover and pursue opportunities that are reflected within the price system and thus exist within markets, while Schumpeterian entrepreneurs exploit an opportunity found outside the economic sphere and bring it to market. In essence, the Schumpeterian entrepreneur "creates" the opportunity.

The Austrians and evolutionary economists are not the only disciplines concerned with opportunities. In philosophy of science the debate among realists, constructionists, and evolutionary branches can also be understood as whether or not opportunities are discovered or created. This next section is an explicit consideration of the dimensions along which an evolutionary realist approach that incorporates constructionist and realist philosophical roots can be used to understand opportunity formation in entrepreneurship.

Incorporating the constructionist perspective, the first assumption is that opportunities in this view do not exist independent of individual action. The second

² Markets are socially constructed entities.

assumption is that the process of enactment, an entrepreneur's actions and reactions, will not only form new opportunities, but also will bring about changes in the individual. However, incorporating a realist perspective, these actions are then tested against an objective reality for validity. In this case, even though we acknowledge that markets are socially constructed, the reaction of the market will be viewed as a check on opportunity validity.

Creation opportunities to produce and sell new products or services do not exist until entrepreneurs act to create them (Baker & Nelson, 2005; Gartner, 1985; Sarasvathy, 2001; Weick, 1979). In opportunity creation neither the supply nor demand exists prior to individual action: instead the individual through their actions develops both the opportunity and the market (Miller, 2007b). Individuals do not recognize opportunities first and then act; rather, they act, wait for a response from their actions—usually from the market—and then they readjust and act again (Weick, 1979). And in acting, individuals create opportunities that could not have been known without the series of actions they took. In this sense, the formation of opportunities is both a path dependent (Arthur, 1989) and emergent process (Mintzberg & Waters, 1985). In acting and reacting, entrepreneurs enact the opportunities they ultimately exploit (Weick, 1979).

This enactment process is consistent with evolutionary realist perspectives of individual action (Aldrich & Ruef, 2006; Campbell, 1960; Weick, 1979). In both evolutionary realist approaches and in creation opportunity approaches blind variation can begin a process of action and reaction that leads to the formation of opportunities. In evolutionary terms, the role of blind variation emphasizes how social systems can emerge without any self-conscious planning or foresight for action (Aldrich & Kenworthy, 1999). Blind variations are the raw materials from which selection processes cull those that are most suitable (Aldrich & Ruef, 2006).

Of course, in creation opportunities, individual actions need not be “completely blind” they may be the result of an individual's perception such as in the constructionist approach. However, they are likely to be quite myopic. Individuals may have hypotheses about how a market will react to their efforts, but rarely will entrepreneurs be able to see “the end from the beginning.” In this view the future is contingent upon the non-deterministic individual actions and choices. There is no “end” until the creation process has unfolded, i.e., opportunities cannot be understood until they exist, and they only exist after they are enacted in an iterative process of action and reaction (Aldrich & Kenworthy, 1999; Berger & Luckmann, 1967; Weick, 1979).

In this view, individuals do not become aware of new opportunities by recombining existing knowledge in new ways. This conception takes the “new combination” perspective advocated by Schumpeter and extends it. Rather, in this theory, entrepreneurs create new knowledge about previously non-existent opportunities by acting, then closely observing the market's responses to those actions, learning, and then acting again (Choi, 1993). Failure to learn from these entrepreneurial

experiments will almost certainly prevent entrepreneurs from ever creating opportunities, unless they are lucky. More frequently, this enactment process is characterized by numerous failed experiments, failures that suggest only the next experiment in a process of unknown duration (Nelson & Winter, 1977). Indeed, after several iterative actions, evaluations, and reactions, entrepreneurs may even decide that they misinterpreted the results of previous actions and go back several sequences and start again, or even abandon the process altogether (Cyert & March, 1963; March & Simon, 1958; Mosakowski, 1997). In general, the more novel the opportunity that is ultimately created by this process, the more new knowledge and information the entrepreneur will need to create through this series of experiments (Galbraith, 1977).

In this enactment process, prior industry or market experience, far from being a benefit, may actually hinder entrepreneurial learning (March, 1991; Sine et al., 2005; Weick, 1979). This is because, according to Creation Theory, opportunities do not necessarily emerge out of competitive imperfections in pre-existing industries or markets—where prior industry or market experience may actually help entrepreneurs combine pre-existing knowledge in new ways—but, instead, may emerge out of the enactment process itself. In Creation Theory, entrepreneurs are breaking away from established forms and face the challenge of creating new knowledge themselves (Aldrich & Ruef, 2006). Being too closely tied to prior industries or markets may make it difficult for individuals to recognize the creation of new industries or markets (Aldrich & Kenworthy, 1999; March, 1991; March & Simon, 1958; Mosakowski, 1997; Simon, 1973).

On the other hand, experience in the enactment process—the process of acting, observing, learning, and acting—can be very valuable. Thus, Creation Theory suggests that “serial entrepreneurs”—i.e., entrepreneurs with experience in the opportunity enactment process—need not confine their efforts to exploiting a series of new opportunities in a single industry or market, but may, instead, repeat the enactment process in creating what turn out to be very different new opportunities.

The enactment of entrepreneurial opportunities will often be a messy, non-linear process. However, if an entrepreneur is able to complete this enactment process and create an opportunity—and this is far from certain—the knowledge that has been created while this opportunity was being enacted may be specific to this entrepreneur. It may be tacit, and socially complex, and thus not likely to rapidly diffuse among potential competitors (Dierickx and Cool, 1989). Thus, even though information about the existence about an enacted opportunity may become widely known after it has been exploited, knowledge about how to exploit such an enacted opportunity may be less widely known. In this sense, exploiting enacted opportunities is more likely to be a source of sustained competitive advantage than exploiting opportunities formed by competitive imperfections to pre-existing industries or markets (Barney, 1986).

Opportunity Formation and Organizational Forms

It may seem that the study and interpretation of the ontological status of organizational forms³ is independent from studying the ontological status of opportunities, as if it is possible to gather the information needed to form an organization independently from the knowledge about opportunity formation. What we know about organization formation may possibly be a function of how we frame the existence of opportunities as either objective phenomena, constructed phenomena, or phenomena as a result of evolutionary forces. Yet, questions of determinates of variations of organizational forms have typically not connected to how variation in opportunity type might affect the differences or similarities of organization forms. The next section explores the relationship between opportunity formation and organizational form along the dimensions of informational environment and planning and goals (Scott, 1981) and decision-making processes for accomplishing goals (Aldrich & Mueller, 1982).

Organizational Forms that Originate from Discovery Opportunities

Stinchcombe (1965) posited that the formation of organizations was culturally embedded and historically specific, reflecting societal conditions at a particular historical conjecture. This view of organization formation focuses on dynamics within existing populations, noting that most founding attempts reproduce existing organizational forms and comprise incremental and perhaps even novel additions to the organizational landscape (Carroll & Hannan, 2000). These organizations typically do not create a new landscape. This type of organization would be consistent with exploiting a discovery opportunity.

Environment and Information

Discovery opportunities generate new organizational forms that are the result of opportunities that are specific responses to specific environmental conditions. At founding these new organizations exhibit a tight association in time between changes in environmental conditions that initiate an opportunity and the innovation of a new organization that exploits this opportunity (Kimberly, 1975). These new organizational forms that result from a particular time in history often depend upon the social technology available at that particular time and take on the characteristics of the environment that surround their early establishment (Stinchcombe, 1965). Indeed, the environment in this view may actually constrain the basic structure of

³There are several definitions of the term organizational form; we mean it in its most general sense. We view the organizational form as a distinct social entity Scott, W.R. 1987. The adolescence of institutional theory. *Administrative Science Quarterly*, 32: 493–511.

the new organizational form (Selznick, 1957). These forms tend to become institutionalized and the basic structure of the form remains relatively stable over a very long time (Kimberly, 1975; Romanelli, 1991; Stinchcombe, 1965).

In the discovery view established and accepted societal norms and values make possible the availability of useful information. In this view it is possible for entrepreneurs to collect information and use personal knowledge and information gained from experience to search and exploit opportunities (Shane, 2000). In particular, the information asymmetries that allow “entrepreneurs to see opportunities that others cannot” are also likely to help entrepreneurs anticipate the effectiveness of their actions in exploiting these opportunities. Information about an industry or market may be very helpful in understanding the nature of a new opportunity and the best ways to exploit it.

In order for entrepreneurs in this view to effectively use the information that they collect about opportunities they must form organizations that incorporate well-understood norms and shared values that manifest themselves as knowledge, laws, and forms of application (Kuhn, 1970). Similar to a well-established research paradigm, these norms and values would result in well-established and familiar markets or industries.

Decision-Making Tools

The tools of decision-making used for discovery opportunities are tools that are appropriate under conditions where current and historical information and knowledge are available and well-accepted in describing and exploiting opportunities (Casson, 1982; Fiet, 2002; McKelvey, 1997). To collect information in these settings, entrepreneurs can use government reports, trade association reports, customer surveys, focus groups, and direct observation (Christensen et al., 2004; Timmons, 1999). They can also rely on their own experience in a market or industry as a source of important information (Johnson, 1986; Shane, 2000; Von Mises, 1949). To determine if an opportunity is worth pursuing, entrepreneurs can apply any of a variety of risk-based decision-making tools—including net present value analysis (Brealey & Myers, 1988), real options analysis (McGrath, 1997), and scenario planning (Schoemaker, 1995)—to the information they have collected.

Planning and Goals

Planning and goal setting are important in realist contexts and for the exploitation of discovery opportunities (Castrogiovanni, 1996; Delmar & Shane, 2003). Planning in this setting, helps the entrepreneur integrate information and knowledge in novel ways to both describe what an opportunity is, and how that opportunity is to be exploited (Delmar & Shane, 2003; Van de Ven et al., 1989). Once in place, it will usually not be necessary for entrepreneurs to fundamentally alter the assumptions of their plans since, in this informational context, there will typically be enough information to make reasonably accurate predictions about the nature of an

opportunity and how it can be exploited. Changes in these plans may reflect changes in competition or market analysis—but the fundamental opportunity should remain constant.

Organizational Forms that Originate from Constructionist Opportunities

In a constructionist approach organizational forms do not necessarily reflect societal conditions or are embedded in current institutions. Instead, in a constructionist approach new organizational forms reflect the construction, deconstruction, and reconstruction that result in the new opportunities that the entrepreneur is trying to exploit. Entrepreneurs in this setting have resources available to them that might in fact be in use or are embedded in current institutions. However, in this approach instead of viewing resources as having a set value and use, these entrepreneurs put resources to service in a heterogeneous and unique variety of ways (Baker & Nelson, 2005; Mahoney & Michael, 2005; Penrose, 1959; Sarasvathy, 2001).

Informational Environment

Constructed opportunities are the responses to different interpretations of the environment in which the entrepreneur is currently embedded (Berger & Luckmann, 1967; Romanelli, 1991; Weick, 1979). The organizational form variations that result from constructed opportunities are directly linked to the entrepreneur's perceptions of the opportunities and of their skills in forming the opportunity. Therefore, we might expect constructed opportunities to generate new organizational forms that accomplish existing tasks or goals using different resources or resources in a different manner. While at founding these organizations may represent a new way of accomplishing goals, these new forms are restricted by the limitations of the entrepreneur's experience and the information they possess when constructing the new opportunity (Freeman, 1986).

In populations of established organizations, where the forms and the organization's networks and relationships are stable, these organizations will tend not to exploit new resources that may become available (Romanelli, 1991). These resources may include technical innovations, changes in society, discovery or depletion of natural resources, etc. (Romanelli, 1991). These changes in resources make it possible for entrepreneurs to exploit these resources to accomplish goals in different ways from the established organizations. Entrepreneurs in this setting start where they are in time and space and with the resources they have at hand (Baker & Nelson, 2005).

There are two important differences between a constructed approach and a realist discovery approach. The first is that while in discovery opportunities raw data are understood to mirror and represent an objective reality, in a constructionist approach raw data are attached meaning and subject to interpretation. The difference between

the realist and the constructionist thus lies in the interpretation and meaning attached to the raw data. The second is that the organizational forms that result from a discovery opportunity are likely to mirror the organizations already in the population, while the constructed opportunities are likely to lead to organizational forms that differ from those in the population in which they exist.

Decision-Making Tools

To collect information in these constructionist settings, entrepreneurs can use many of the same resources that are used in a realist discovery perspective, government reports, trade association reports, customer surveys, focus groups, and direct observation; they can also rely on their own experience in a market or industry as a source of important information. Indeed, these entrepreneurs are often embedded in the networks and organizational environment that existing organizations occupy. Should the new resources or information available enhance the established competencies of existing organizations they may adopt the resources. However, should these resources be competency destroying, the established organizations may choose to ignore these new resources creating a new resource space (Tushman & Anderson, 1986). While the existing organizations may not wish to adopt new resources or ways of accomplishing tasks, they still may wish to be informed about new innovations in their environment making much of the information and raw data available.

Goal Setting

Goal setting is important in a constructed reality since outcomes are stated a priori, which direct the actions of the entrepreneur in the present and enable the accomplishment of that outcome. Goal setting helps the entrepreneur process information, perceive their environment and apply their available resources in new forms of service (Baker & Nelson, 2005; Daft & Weick, 1984; Mahoney & Michael, 2005). In a constructionist view the goal is determined, the environment is scanned which determines how and what kind of data is collected, the data are interpreted or given meaning, and then a new action or response occurs as a result of the interpretation (Argyris & Schon, 1978; Daft & Weick, 1984). In this way the goal becomes a self-fulfilling reality.

Organizational Forms that Originate from Evolutionary Realist Opportunities

Few researchers have addressed the emergence or creation of new organizational populations (Baum, 1996). Indeed, most studies presuppose the existence of the population and ask how do emerging organizations imitate, mimic, or gain legitimacy within this population (Aldrich & Fiol, 1994; Etzioni, 1963). Emerging

organizations from creation opportunities are likely to be the first organizations in a population. These organizations typically do not have existing organizational forms to imitate and the challenge of the organization here is to establish itself as a new form (McKelvey, 1982) in what is often an emerging population. Therefore, to understand the emergence of an organization from a creation opportunity, it is important to understand the emergence of a population and not just that of a single organization in an already established population.

Informational Environment

In creation opportunities well-established norms in society and the use of historical or current knowledge and information may not be useful. Indeed mimicking or imprinting based on existing routines or competencies of existing organizations may actually be damaging and hinder those trying to exploit an opportunity. Forming an organization in this view often means deviating from established organizational forms and organizational templates that might help give information and knowledge form and meaning (Aldrich & Ruef, 2006). Indeed, the formation of these new opportunities may necessitate the rejection of what is currently known for what is unknown and can only be known with time. These opportunities often require the development of new resources, commitments, routines, networks, and societal norms that are distinctly different than what was previously accepted.

In a creation view new organizational forms do not take on the characteristics of people and environments that surround their early establishment. Instead these opportunities and the organizational forms used to exploit them shape the people and the environment. The organization in this view is not imprinted by its environment as suggested by Stinchcombe (1965), but instead imprints the environment. The environmental conditions are the result of the new organizational form.

In this view the new organizations may be isolated from competitors since there will only be a few organizations that have the newly created knowledge or resources. If the new organizational forms succeed in establishing a new population those organizations will have a relative advantage based on their path dependent abilities to exploit evolving resource conditions and competencies. Indeed, the new resources, routines, and competencies that emerge from these successful organizational forms may destroy the established resources and competencies of existing organizations (Christensen et al., 2004; Schumpeter, 1939).

Creation opportunity formation is often the result of a blind variation that starts the formation process. In this view, the opportunity is not necessarily trying to solve a problem or even to respond to a technical or regulatory change, but instead is the result of a blind variation that leads to a new understanding—a solution that has not yet identified a problem—and potentially transformations of how things are done. The process of creation opportunity formation, if successful, will lead to a new organizational form that evolves, is not designed, and will stimulate the evolution of new organizational populations. In this view these new organizational forms are distinctive and are the eventual culmination of a cumulative series of interrelated acts of variation, selection, and retention that initiate new populations (Aldrich & Ruef, 2006; Dosi, 1988; Van de Ven & Garud, 1994).

Decision-Making Tools

Creation opportunities are created endogenously by entrepreneurial actions and that the decision-making context is either ambiguous or uncertain. Not surprisingly, if the assumptions of creation opportunities hold in a particular entrepreneurial setting, tools for collecting information for a discovery opportunity—including the use of focus groups and government reports—and making decisions—including present value techniques—are significantly limited. However, some of the decision-making tools found in a constructionist approach may also be useful in a creation approach.

Entrepreneurs in creation settings do make decisions. Under conditions of uncertainty—typical of this setting since the future has not yet evolved—entrepreneurs can make decisions using at least two methods: By applying biases and heuristics (Busenitz and Barney, 1997; Hayward et al., 2006) or by engaging in a decision-making process that acknowledges informational limits, and lets more rational decisions emerge over time.

Biases and heuristics can be used to make decisions when rational decision-making models do not apply (Kahneman et al., 1982). Indeed, cognitive psychologists have emphasized the utility of biases and heuristics in enabling people to make decisions under conditions where the amount of information available is less than what is required by more rational decision-making approaches (Bazerman, 2002). As suggested earlier, Busenitz and Barney (1997) identified two cognitive biases that are particularly functional for entrepreneurs making decisions under conditions of uncertainty: the over-confidence bias and the representativeness bias—or the willingness of decision makers to generalize from small samples. In the uncertain conditions assumed to exist in creation settings, entrepreneurs may use these (and other) biases to enable them to make decisions about whether or not to engage in specific entrepreneurial activities (Fischhoff et al., 1977; Hayward et al., 2006).

A second set of tools for decision-making can be applied in ambiguous or uncertain settings and does not require the adoption of biases or heuristics. This process has been studied in many different fields, and goes by several different names. In organization theory, it is known as logical incrementalism (Quinn, 1980), in anthropology it is known as bricolage (Baker & Nelson, 2005), in entrepreneurship it is known as effectuation (Sarasvathy, 2001), in mathematics it is known as Bayesian updating (Bayes, 1764), and in political science it is known as “muddling through” (Lindblom, 1959).

Whatever its name, this decision-making process has several features in common. For example, this process is incremental—entrepreneurs make small decisions based on their current resources and capabilities. It is iterative—it involves making and remaking decisions until desired outcomes are achieved. And finally, this process is inductive—data to evaluate the quality of decisions is collected *after* decisions are made.

Not surprisingly, those that have studied this process have most frequently documented its existence when individuals or organizations are trying to make decisions in very uncertain settings (Quinn, 1980), when entrepreneurs are trying to create new opportunities to exploit (Baker & Nelson, 2005; Sarasvathy, 2001), when strong priors about the distribution of outcomes associated with a decision do not exist

(Alvarez & Parker, 2006), and when bureaucrats and politicians are confronted with complex and unpredictable decision-making settings (Lindblom, 1977). These are all conditions that are more closely aligned with the conditions described by creation approaches than they are with discovery approaches. March (1982, 75) suggests that these decision-making modes are most effective when “decisions about which actions to take exist in the face of unknown future values” (March, 1982).

Planning and Goal Setting

Planning plays a very different role in the conditions under which creation approaches apply, conditions where current and historical information and knowledge are not available or not useful in describing the nature of an opportunity. Indeed, entrepreneurs in this setting may not find traditional forms of planning to be beneficial. In creation approaches, the task facing entrepreneurs is not so much combining information and knowledge in novel ways, but, rather, asking the right questions, designing new experiments, remaining flexible, and learning (Mintzberg, 1994). In the same way that formal strategic plans under conditions of uncertainty can inappropriately constrain an established firm’s strategic choices (Fredrickson, 1983, 1986; Mintzberg, 1994), too rigorous business planning under conditions of Knightian uncertainty can short circuit the opportunity enactment process (March, 1991; Weick, 1979). Only as this enactment process reaches its conclusion—i.e., when the level of uncertainty facing an entrepreneur shifts and new information and norms become accepted—are more traditional forms of business planning likely to be helpful to these entrepreneurs.

Under these uncertain conditions, learning is generally more important than planning (Argote, 1999). Opportunities in these settings have few, if any, precedents. Entrepreneurs in this setting can only very imperfectly anticipate the nature of the opportunities they may ultimately form and exploit and must learn about those opportunities as they emerge. When entrepreneurs do not have well-understood and deep knowledge of the opportunities they are enacting, learning by doing is a more effective guide to entrepreneurial action than detailed planning (Argote, 1999). Entrepreneurs in highly uncertain conditions develop their own knowledge structures through repeated experiments and then use those knowledge structures to give the information they create form and meaning.

These conclusions do not mean that entrepreneurs operating under conditions of high uncertainty do not plan. However, rather than elaborate documents that include sophisticated financial projections and customer segmentation analyses, Creation Theory suggests that business plans developed in highly uncertain settings will be simpler guides to entrepreneurial behavior. In this perspective, optimization and sharply defined goals are replaced with an approach that acknowledges that each point along the way of enacting an opportunity may be unique. Planning in this setting may suggest the general direction entrepreneurs think they are likely to be heading, but are subject to numerous fundamental changes. Indeed, it would not be uncommon for successive business plans of entrepreneurs operating under high uncertainty conditions to have remarkably little in common (Buehler et al., 1994).

As the emergent creation process unfolds, entrepreneurs might not only be forced to redefine their potential customers, but also they might have to redefine the industry or market within which they are operating, their core technologies, and the opportunities they are looking to exploit (Bhide, 1992, 1999; Christensen et al., 2004).

These numerous and fundamental changes, of course, do not imply that entrepreneurs in this setting are “poor planners.” Instead, these changes reflect the lack of information entrepreneurs have about the business opportunities they will ultimately exploit. Moreover, these changes imply flexible decision-making that is adaptive to the changes required from new information and knowledge that is created through the enactment process (Garud & Kotha, 1994). Under conditions of high uncertainty, flexibility, adaptability (March, 1991; Weick, 1979), and absorptive capacity (Cohen & Levinthal, 1990) are more valuable than detailed strategic, financial, and market analyses (Bhide, 1999; Mintzberg, 1994).

Discussion

This chapter presents a typology of entrepreneurial opportunity formation grounded in philosophy of science paradigms. Given the relatively young theoretical progress in the field of entrepreneurship it is important that theories of entrepreneurship evolve in ways that are consistent with the basic assumptions of each paradigm. Articulating and being specific about these paradigms is important in the field of entrepreneurship since paradigms help to organize the process of science and further the development of a field through the efficient cumulative growth of knowledge.

Paradigms provide direction for a field’s development and help sort out facts in terms of their relevance. In the absence of paradigms, all facts are more or less relevant and this gives the appearance of randomness to those gathering the facts. The accumulation of knowledge requires an organizing framework upon which the facts and ideas are organized.

Theory, particularly in the early stages, involves trade-offs between its strengths and its unavoidable weaknesses. The formation of opportunities may be considered a balancing act on a multi-dimensional seesaw of theory. Thorngate (1976) postulates that a theory of social behavior cannot be simultaneously general, accurate, and simple. Two of the three characteristics are possible, but only by sacrificing the third. Creation approaches are general and simple, and the trade-off may be a theory that is not very accurate at specifying detail. However, this lack of precision may not be bad since creation approaches are a complex model of human actions and interactions that may not be amenable to precise measurement at this point of development. To design a model that is precise and accurate may be to lose the phenomenon of interest (Daft & Weick, 1984).

In some fields the paradigm debates have raged and the goal is to get past the debates (Azevedo, 2002; McKelvey, 1999). However, in the field of entrepreneurship there has been little if any debate, as the perspectives in entrepreneurship have

not been articulated as internally consistent with underlying structures, assumptions, and differences that can be related to each other. This chapter makes no recommendations as to whether any one theory is superior, but instead suggests the need for ongoing debate and dialogue to sharpen the boundaries and explanatory power and the precision of these different ontological perspectives. The approach in this chapter allows the field of entrepreneurship to have these debates. The use of multiple perspectives in entrepreneurship, then, need not be seen as a problem; instead it is currently an essential part of understanding entrepreneurship.

Finally, the formation of entrepreneurial opportunities is a particularly fruitful area in which to understand the differences and implications of the different philosophy of science approaches, realist, social constructionist, and evolutionary realist. Scholars realize that theory provides no “God’s eye” view of reality, but is rather an epistemology and uses assumptions about the nature of the social world to simplify the reality studied. Depending on the properties of the context, whether knowledge and information are well-accepted and stable or whether knowledge and information need to be created and the context is unstable different philosophical approaches may be needed.

Two essential characteristics qualify a research strategy as a paradigm development strategy: first a commitment to theory building and second a commitment to a program of research (Mackenzie & House, 1978). In the field of entrepreneurship, scholars have begun the conversation (Aldrich & Ruef, 2006; Alvarez & Barney, 2007; Baker & Nelson, 2005; Miller, 2007a; Sarasvathy, 2001; Sarasvathy et al., 2003; Venkataraman, 1997), etc., but there is still much work to be done. Effective theory building efforts require a long-term commitment and research programs are often limited to the laboratory in social sciences. Opportunity formation provides a natural context in which to apply the knowledge already gained to the structure of society, its effects on individuals, and the individual’s effect on society as the process of forming the opportunity evolves. These conditions are ripe for studying the relationships between individuals and society. By varying the assumptions about the context—either stable or unstable—scholars can gain knowledge of the social world by understanding how entrepreneurs interact with this world. The complex problems encountered in opportunity formation can be a source of stimulus to improve and inform current theories about interactions between individuals and the social world.

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Chapter 3

An Update to the Individual-Opportunity Nexus

Jonathan T. Eckhardt and Scott Shane

Introduction

In their efforts to define a distinctive domain for the field of entrepreneurship, researchers have shifted attention away from person-centric approaches, which focus on identifying those people in society who prefer to become entrepreneurs, and towards understanding the nexus of enterprising individuals and valuable opportunities (Venkataraman, 1997). This new focus has been prompted by the need for scholars to explain the existence, identification, and exploitation of opportunities.

In this chapter, we provide an overview of the individual-opportunity nexus, which is a developing theory of entrepreneurship. First, we broaden the treatment of the topic. Second, we clarify dimensions of the organizing framework that were unclear in these earlier efforts. Third, we update the earlier works by reviewing more recent contributions.

Following Venkataraman (1997), we define entrepreneurship as the discovery, evaluation, and exploitation of future goods and services. This definition suggests that, as a scholarly field, entrepreneurship incorporates the study of the “*sources* of opportunities; the *processes* of discovery, evaluation and exploitation of opportunities; and the set of *individuals* who discover, evaluate and exploit them” (Shane & Venkataraman, 2000, 218).

Our perspective does not require several features common to other theories of entrepreneurship. First, we do not view the creation of new organizations as a defining characteristic of entrepreneurial activity. Although entrepreneurship can include firm formation, it can also occur within previously established firms or through market mechanisms such as contracting (Amit et al., 1993; Casson, 1982; Shane & Venkataraman, 2000). In later sections of the chapter, we explore the implications of this possibility for discovery and exploitation within and outside existing firms, as well as the role of markets as a mode of opportunity exploitation.

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Second, our perspective does not assume that the same person or firm engages in all parts of the entrepreneurial process. One person may discover an opportunity and sell it or lose it to others. The discoverer may also enlist the help of others in the exploitation parts of the process, making varied the set of people involved in the different stages of the process.

Third, our perspective does not assume that any consistent relationship exists between effort or skill at discovery and exploitation, and entrepreneurial profits earned. For example, people who engage frequently in entrepreneurial discovery could be more likely to discover opportunities, but less likely to reap entrepreneurial profits from those discoveries than those who engage less frequently in discovery.

Fourth, our perspective assumes that entrepreneurial opportunities exist independent of human cognition. As Baron and Ensley (2006, 1333) write, "Opportunities, as a potential, come into existence as a result of changes in knowledge, technology, markets, and a wide range of political and social conditions; however, they remain merely a potential until they emerge in specific human minds as the result of active cognitive processes." In other words, as opportunities are created by fundamental social and technological processes involving the interaction of multiple actors, they exist independent of the cognitive perception of any given individual. For example, advances in science can foster commercial applications that are often quite different from those that were perceived by the initial inventor, and therefore they can be used to alter terms of exchange in ways that are not immediately apparent.

Fifth, our perspective acknowledges that the exploitation of opportunities requires human creativity. Opportunities are not businesses, business models, organizations, or products. Opportunities are an economic circumstance where if the correct good or service were to be properly organized and offered for sale that the result would be profitable. To exploit an opportunity, entrepreneurs must create physical products or processes to provide services, devise business models, and in some cases construct new organizations. These are risky and uncertain activities that generally require significant creativity on the part of entrepreneurs (Knight, 1921).

Sixth, our perspective recognizes that not all successful entrepreneurs earn economic rents. Rents are different from profits, as rents refer to financial profits paid to the owner of a factor of production that exceed that which is necessary to keep it in its present employment (Pearce, 1992). In other words, rents represent payments that more than compensate an entrepreneur for the costs of exploitation, including the costs of risk and uncertainty. Successful entrepreneurs do not necessarily earn rents, as the reasons why individuals engage in entrepreneurship are highly idiosyncratic (Venkataraman, 1997). While some individuals engage in entrepreneurship to pursue financial rewards, others select into entrepreneurship for other non-financial benefits, such as personal independence and control. As a result, an entrepreneur may view themselves as highly successful, even if their total financial returns from entrepreneurship are lower than what they would receive if they pursued an occupation as an employee of a larger firm (Shane, 2008).

As Fig. 3.1 indicates, our perspective suggests that entrepreneurship involves a sequential process. While this process may have feedback loops and certainly is not linear, we theorize that it is directional. In general opportunities exist prior to their



Fig. 3.1 The direction of the entrepreneurial process

discovery and opportunities are discovered before they are exploited. The opposite direction is not possible because opportunities cannot be exploited before they exist.

This chapter proceeds as follows: In the second section, we discuss the existence of entrepreneurial opportunities. The third section offers some typologies of entrepreneurial opportunities. The fourth section discusses the identification of opportunities. The fifth section considers the locus of that identification. The sixth section discusses the exploitation of opportunities. The seventh section considers the locus of exploitation. The final section offers a conclusion.

Existence of Opportunities

In this section, we discuss the presence of entrepreneurial opportunities. To do this, we first define entrepreneurial opportunities and contrast them with other opportunities for profit. We then explain why prices are incomplete indicators of profitable opportunities. We finish the section with an exploration of the lifecycle of entrepreneurial opportunities.

Entrepreneurial Opportunities Defined

Following Casson (1982) and Shane and Venkataraman (2000), we define entrepreneurial opportunities as situations in which new goods, services, raw materials, markets, and organizing methods can be introduced for profit. As entrepreneurial opportunities are situations in which goods and services can be sold for profit, not all technologies are opportunities. This is the case, because not all scientific and technological advances have commercial applications. Therefore, important social, political, and technological change that are important antecedents to the process of entrepreneurship yet occur outside the commercial system are not directly addressed by the IO-nexus.

Opportunities have specific characteristics. These characteristics influence almost all aspects of the entrepreneurial process. For example, some opportunities—such as those based on novel science—may be sufficiently complex such that only a limited number of individuals will be able to formulate conjectures about their potential existence (Zucker et al., 2002). Characteristics of opportunities also

influence the organizing processes. For example, capital-intensive opportunities—such as the creation of a car manufacturer—require the raising of significant capital to bring a product to market whereas a t-shirt marketing company that requires less capital might not. Therefore, the capital-intensive venture is likely to require contracts with funding providers, the creation of specific policies and procedures, and a path to market that will differ significantly from the organizing process of the t-shirt marketing company. In addition, the characteristics of opportunities also influence their economic value. The economics of some opportunities may be sufficiently large that they can fund the creation of a Fortune 500 company in just a few years, while other opportunities may ultimately provide for the financial welfare of only a single individual.

The decision-making context for opportunities is uncertain. Alvarez & Barney (2007) describe the decision-making context of an opportunity as risky if entrepreneurs can assign probabilities to possible outcomes for the opportunity. The context is uncertain, if feasible outcomes cannot be identified, or if corresponding probabilities cannot be assigned (Knight, 1921). For entrepreneurs seeking to accomplish specific ends with an opportunity, it is not possible to identify all possible outcomes and the associated probabilities. Much of the uncertainty is derived not from the opportunity itself, but instead it arises from the lack of objective information about the opportunity from which they form conjectures. However, two other dimensions of opportunities render the decision-making context uncertain, time and selection criteria. As the exploitation of an opportunity is rarely instantaneous, a given opportunity that is being pursued by an individual may not exist by the time the entrepreneur is able to complete organizing activities that are necessary to bring a product or service to market. Secondly, until an opportunity is successfully exploited, the characteristics of market selection criteria are unknown. This fundamental lack of information regarding the value of the opportunity, the nature of the organizing process, the inability the actions of other entrepreneurs who may be organizing the same or substitute opportunities, as well as the characteristics of demand, render the decision environment to be uncertain.

Why Prices are Incomplete Indicators of Opportunity

The market system is a powerful means of coordinating economic activity because prices simultaneously coordinate the production plans, resource availability, and resource requirements of market participants in a way that limits the cognitive demands on any individual agent. By efficiently transmitting information, the invisible hand of the market coordinates of the actions of millions of people who never have to interact, or even know why or how others produce goods and services (Smith, 1776).

As valuable as the price system is to the coordination of economic activity, it has one major weakness. Prices do not accurately convey all information necessary to coordinate economic decisions. In particular, prices do not accurately guide the discovery and exploitation of entrepreneurial opportunities.

For entrepreneurial opportunities to exist, people must not all agree on the value of resources at a given point in time. For an entrepreneur to exploit an opportunity, he or she must believe that the value of resources, recombined according to a new means-ends framework, would be higher than if exploited in their current form. In addition, profits are limited if the belief is universally shared and resources are scarce (Casson, 1982). If all of the current resource owners and other potential entrepreneurs shared the entrepreneur's belief in the correctness of the proposed new means-ends framework, then they would hold the same beliefs about the value of resources as the focal entrepreneur. If they based their decisions on these beliefs, this situation would preclude the focal entrepreneur from obtaining the resources at a price that would allow profitable recombination (Shane & Venkataraman, 2000).

But why, in a market economy, should people hold different beliefs regarding the value of resources if the price system provides an efficient means of transmitting information about changes in beliefs between disconnected individuals? The answer is that prices fail to provide all of the necessary information to make all decisions about resources.

First, prices convey only part of the information necessary to direct opportunities to serve markets. Producers are unable to make production decisions and allocate resources simply by producing quantities that set prices to marginal cost, as costs are unknown and must be estimated (Gordon, 2004). Prices also fail to provide information on how new markets could be served, how a new technology could be used to improve a production process, or how a new way of organizing will generate value. In addition, prices do not contain information about prior failures at that effort, or articulate how one's approach to recombining resources would stand vis-à-vis the approaches of potential competitors.

Second, prices convey even less information to direct opportunities to serve markets that do not yet exist. While market participants might be satisfied today, a future condition might emerge that would lead them to desire a new good or service. However, as Arrow (1974) explained, there are no contingent prices for future goods and services. In the absence of futures markets for goods and services, there is no way to use current prices to determine if there would be an opportunity to serve a market that is not yet in existence. Similarly, there is no way for current prices to guide the allocation of resources in the current period in anticipation of resource needs of markets that will exist in the future, but that do not currently exist.

Evidence of the latter problem is most prevalent during periods of technological change, which do not appear to be well-anticipated by markets. As Rosenberg (1976) explains, after the introduction of superior products, improvements often continue to be made to products that are ultimately replaced by new products. For example, improvements were made to sailing ships after steam-powered iron-hull ships were introduced, and improvements were made to the steam engine in response to the arrival of the internal combustion engine (Rosenberg, 1976).

Given that prices do not convey what future demand will be, they provide limited information about marginal costs or revenues. Similarly, because markets set

prices on known technology, not new methods that may be discovered in the future, prices do not reflect the relative benefits of different innovations if they would be introduced in the future. However, the appropriateness of resource allocation decisions in the current period, such as investments in durable plant and equipment, are contingent on the characteristics of future markets for goods and services.

Thus, even Hayek's (1945, 526) important example of the value of the price system in the tin market shows the limitations of the price system for allocating resources for entrepreneurial opportunities. He wrote, "assume that somewhere in the world a new opportunity for the use of some raw materials, say tin, has arisen, or that one of the sources of supply of tin has been eliminated. It does not matter . . . which of these two causes has made tin more scarce. All that the users of tin need to know is that some of the tin they used to consume is now more profitably employed elsewhere, and that in consequence they must economize tin." To Hayek, producers need only to look at the prevailing price of tin when making production decisions.

However, Hayek's account only describes how prices guide the decision process of tin producers who are selecting what quantity of a standardized good currently under production to produce. Prices provide little information to guide producers who have developed a novel use for tin or even if they should invest resources in developing such novel uses.

To the entrepreneur seeking to profit from this change by supplying tin, which of the two causes makes tin scarce is of fundamental importance. If an entrepreneur believes that the shortage of tin has resulted from the new use of tin, she may conjecture that the increase in price is likely to be permanent and therefore believe that costs she would need to incur to meet demand would be recovered. Therefore, purchasing the tin, creating a new product, and then selling it would result in a profit. On the other hand, if the true cause of the tin shortage were a temporary elimination of a source of supply, then she may experience losses if she incurs costs to produce tin at higher prices if the prices return to a lower equilibrium price after the temporarily disabled producer returns to market. The difference between entrepreneurial profit and loss in this case lies not in the information about the shortage of tin indicated by the price change, but in the entrepreneurial conjecture as to the *cause* of that shortage.

Discovery Defined

Although price coordination has its shortcomings, the market system remains an extremely efficient means of simultaneously coordinating the unique production plans and preferences of millions of individuals. However, situations arise in which prices provide insufficient information to allocate resources. In these situations, individuals must make decisions based on information not incorporated in prices. Entrepreneurial discovery defined as the definitive confirmation that an opportunity exists.

Entrepreneurs bring new decision-making frameworks into the price system by forming perceptions and beliefs about how to allocate resources better than they are currently allocated or would be allocated in the future on the basis of information other than prices. By leading entrepreneurs to buy resources, recombine them, and sell the outputs, these perceptions create new markets or update old ones. The prices that are updated or created through this process of recombination increase the accuracy of decisions of others who coordinate resources by optimizing within the price-based market system.

Formulating a profitable conjecture about an opportunity is far from the trivial exercise of optimizing within existing means-ends frameworks because it requires forming expectations about the prices at which goods and services that do not yet exist will sell (Arrow, 1974; Venkataraman, 1997). When these conjectures prove correct, entrepreneurs earn profits, but when they prove incorrect, entrepreneurs incur losses (Casson, 1982).

The process of discovery describes how individuals acting alone, or within firms, prove the existence of a previously unseen or unknown way to create a new means-ends framework. Although we have used the term “discovery” to maintain consistency with prior literature, individual discovery is a misleading concept, as it implies that sufficient information exists at the moment of initial perception to assess whether an opportunity does in fact exist. Instead, individuals *perceive* that they have become aware of a profitable opportunity. Whether in fact they have discovered such an opportunity is unknowable at the time of initial perception, as it involves the ability to predict factors such as the characteristics of future market demand, the actions of potential competitors, or the extent to which individuals can be convinced to commit resources sufficient to sustain the effort to pursue the opportunity.

Suppose an individual has perceived, or discovered, that she can produce a new item by a previously unknown means. To establish if the opportunity has value in the first case, the individual must conjecture that a positive probability exists that the future price of the item will exceed its costs and that future demand will exist. In the latter case, the individual will need to conjecture that once others are presented with the actual product, they will respond positively to it. In both cases, the individual must attempt to foresee the characteristics of future markets to determine *ex ante* if the opportunity has potential value.

Predicting such things with certainty is not possible, as it requires individuals to possess information that does not yet exist at the time of individual discovery. For example, current customers are unlikely to provide accurate forecasts of their own future demand for new products even when working prototypes exist (Christensen & Bower, 1996). In addition, individuals may be mistaken in their analysis of the characteristics of the usefulness of new items. Therefore, individuals, operating alone or within firms, lack sufficient information to establish if a discovery has been made.

In the process of the exploitation of opportunities, individuals acquire resources and engage in market-making activities that change prices and provide information to others. The process of exchange and interaction provides information that increases the mutual awareness among market participants about the characteristics

of the opportunity (Arrow, 1974; Jovanovic, 1982; Venkataraman, 1997). This information may either encourage, or discourage the individual pursuing the opportunity from continuing.

However, the only reliable confirmation that a previously unseen or unknown valuable opportunity has in fact been discovered occurs when a product has been sold and market has been created for the new item. This is the hypothesis test of the existence of an opportunity (Harper, 1996). In the absence of market confirmation, the validity of the entrepreneur's perception is unknown; no knowledge is recorded in prices, and therefore the production plans and preferences of individuals are not updated.

The Life Cycle of Opportunities

If an entrepreneur does discover a valuable opportunity and that opportunity generates profit, that profit is transient due to external and internal factors. First, the disequilibrating shocks that initially generated the opportunity are often replaced by other shocks that open up new opportunities and close up the existing ones (Schumpeter, 1934). Second, even when new shocks are not triggered, the opportunities become exhausted by entrepreneurial competition. The information asymmetry that creates the opportunities in the first place is subsequently reduced by the diffusion of information about the opportunity. When entrepreneurs exploit opportunities, they transfer information to others about what the opportunity is and how to pursue it. Although this imitation might initially legitimate an opportunity, it also generates competition that exhausts the discrepancy (Schumpeter, 1934; Shane & Venkataraman, 2000). Third, information about the opportunity diffuses to resource owners, who seek to capture profits by raising the price of their resources in response to information generated by the actions of the entrepreneurs about the new value of their resources (Kirzner, 1997).

However, the opportunity half-life can last longer or shorter depending on a variety of factors. First, mechanisms that limit imitation by other entrepreneurs, such as trade secrecy, patent protection, or monopoly contracts prolong the life of the opportunity (Shane & Venkataraman, 2000). Second, mechanisms that slow the transmission or recognition of information about the opportunity hinder imitation, thereby extending the life of the opportunity. The latter include the concepts of causal ambiguity commonly discussed in the resource-based view of strategy (Barney, 1991). They also include situations in which few parties have the requisite knowledge to copy a way of exploiting an opportunity, despite its demonstration (Junkkunc & Eckhardt, 2009; Zucker et al., 1998).

Types of Opportunities

Entrepreneurial opportunities manifest themselves in a variety of different ways. We believe that the prior literature has offered three valuable ways of categorizing

opportunities: By the locus of the changes that generate the opportunity; by the source of the opportunities themselves; and by the initiator of the change. In the sections below, we consider these different dimensions.

Locus of Changes

Although most entrepreneurship research implicitly assumes that entrepreneurship involves changes in products or services, entrepreneurial opportunities can, in fact, occur as a result of changes in a variety of parts of the value chain. Schumpeter (1934) suggested five different loci of these changes: those that stem from the creation of new products or services, those that stem from the discovery of new geographical markets, those that emerge from the creation or discovery of new raw materials, those that emerge from new methods of production, and those that are generated from new ways of organizing.

Certainly, the creation of a new good or service can create an opportunity for entrepreneurial profit, as is the case when the development of accounting software or a surgical device makes possible a recombination of resources that can be sold for greater than its cost of production. However, as we have seen from the development of the Internet, new modes of organizing that do not require bricks and mortar locations also generate opportunities for entrepreneurial profit. Similarly, the discovery that seaweed could be sold as a food in the United States as well as Japan generates the opportunity for entrepreneurial activity, as did the discovery that oil provided a better fuel than many other raw materials previously discovered. Finally, new methods of production, such as the assembly line or computer-aided drug discovery, have provided opportunities for entrepreneurial profit.

In Fig. 3.2, we show that Schumpeter’s loci of changes can be arrayed along the value chain. We suggest that considering the relationship between these types of changes and the parts of the value chain would provide an interesting domain for entrepreneurship researchers to explore. For example, are the relationships one-to-one, as our figure suggests, or are they overlapping? If they are overlapping, are

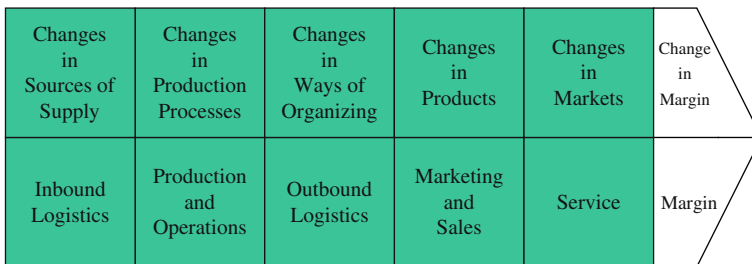


Fig. 3.2 The relationship between types of Schumpeterian opportunities and the value chain
 Source: Adapted from Porter, M. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press

some Schumpeterian changes more powerful instigators of changes on certain parts of the value chain than on others?

In addition, we think that documenting the frequencies of different types of opportunity-creating changes and their relative causes and effects would be useful. For example, researchers should examine whether the opportunities generated by some types of changes are more long lasting or valuable than others and whether the factors that lead to them are different. Furthermore, researchers may find that the processes by which opportunities are discovered, evaluated, and exploited differ across loci. Exploration of the potential contingencies between these loci of changes and the three parts of the entrepreneurial process would be a valuable addition to the field of entrepreneurship.

Sources of Opportunities

Opportunities also vary as to their source. We believe that prior research suggests four important ways of categorizing opportunities by sources: First, considering differences between opportunities that result from asymmetries in existing information between market participants and opportunities that result from exogenous shocks of new information; second, comparing supply and demand side opportunities; third, comparing productivity-enhancing and rent-seeking opportunities; and fourth, identifying the agents that initiate the change which generates the opportunity.

Information Asymmetry vs. Exogenous Shocks

Kirzner (1973) and Schumpeter (1934) disagreed over whether exogenous shocks of information are the primary catalyst of entrepreneurship. In what Venkataraman (1997) termed the strong form of entrepreneurship, Schumpeter (1934) held that periods of market efficiency are punctuated by periods of upheaval. Changes in technology, regulation, and other factors generate new information about how resources might be recombined into more valuable forms. This information changes the equilibrium price for resources, thereby allowing economic actors who have early access to the new information to purchase resources at below-equilibrium prices, use the information to recombine them into a more valuable form, and sell them at an entrepreneurial profit (Schumpeter, 1934; Venkataraman, 1997).

In contrast, Kirzner (1973, 1985, 1997) holds that opportunities exist even in the absence of this new information. In the absence of prices, he argues, people form beliefs in response to information they possess. Because those beliefs are influenced by a wide variety of ceaselessly changing factors, they are never 100% accurate. As a result, market actors make mistakes in their decisions, creating shortages and surpluses of resources (Gaglio & Katz, 2001). People alert to these mistakes can buy, recombine, and resell resources for a profit (Shane & Venkataraman, 2000).

Supply vs. Demand Side Changes

Opportunities can also be classified on whether the changes that generate them exist on the demand or on the supply side. In general, the entrepreneurship literature implicitly focuses on supply side changes. For example, most discussions of opportunity concern changes in inputs, ways of organizing, production processes, or products (Schumpeter, 1934). But changes in demand alone can generate opportunities. Customer preferences influence the allocation of resources because producers need to respond to the preferences and purchasing habits of consumers. Thus, demand changes from exogenous shifts in culture, perception, tastes, or mood can open up opportunities (Kirzner, 1997; Schumpeter, 1934), as in the case of demand for American flags in response to a terrorist attack. The opportunity is created if the increase in demand outpaces investments in production capacity, generating opportunities to add more capacity, perhaps on more economic terms (Drucker, 1985). In addition, growing markets might create new niches as well as the opportunity to specialize (Geroski, 2001).

To the extent that observed entry corresponds with the existence of opportunities, some empirical support exists for the existence of opportunities in growing markets. For example, Romanelli (1989), Shankar et al. (1999), and Highfield and Smiley (1987) all find a positive correlation between market growth and firm entry. However, the research to date addresses this topic only indirectly and more studies should explore demand-driven entrepreneurial opportunities.

Productivity-Enhancing vs. Rent-Seeking Opportunities

Much of what researchers imply when they discuss entrepreneurship is productive entrepreneurship. In the standard view, the pursuit of entrepreneurial opportunity has productivity-enhancing outcomes, as economies are made more efficient. However, it is also possible to think of entrepreneurial actions as rent seeking, which Baumol (1990) has defined as opportunities that generate personal value, but no social value. He points out several types of entrepreneurial opportunities that are not productivity enhancing, including crime, piracy, and corruption.

Merger activity provides a good example of the potential for both productive and unproductive entrepreneurship. The recombination of resources through the merger or break-up of firms can create productive opportunities as new customer relationships or economies of scale are generated. However, mergers may also generate unproductive opportunities, as would be the case if a merger merely shifts wealth from consumers to producers by reducing competition.

Researchers would provide a valuable contribution to understanding entrepreneurship by examining several facets of this categorization of opportunities. Venkataraman (1997) suggests that researchers investigate the social, legal, and political factors that influence the relative distribution of productive and unproductive opportunities across locations. Baumol (1990) suggests that researchers

also examine relative distribution over time, arguing that, in the same location at different points in time, the potential to add value from new combinations of resources might be higher or lower than the potential to shift value from others via new combinations of resources.

Initiator of the Change

A final dimension on which opportunities have been classified is by the actor that initiates the change. Different types of entities initiate the changes that result in entrepreneurial opportunities, and the type of initiator is likely to influence the process of discovery and evaluation as well as the value and duration of the opportunities. Among the different types of actors that researchers have identified are non-commercial entities, such as governments or universities; existing commercial entities in an industry, such as incumbents and their suppliers and customers; and new commercial entities in an industry, such as independent entrepreneurs and diversifying entrants (Klevorick et al., 1995).

Although researchers have not often examined the actors that generate opportunities outside the area of technological opportunities, work in that area is instructive. Researchers have shown that two sets of actors are very important to the creation of technologies opportunities: specialized knowledge creating agencies, such as universities or research laboratories, that lie outside the industrial chain, and firms within the industrial chain, including suppliers and customers (Klevorick et al., 1995). The two sets of actors have a different likelihood of generating opportunity-creating changes under different industry knowledge conditions. Researchers have also examined the conditions under which the actors within the industrial chain that generate opportunity-inducing changes are most likely to be users (Von Hippel, 1988), upstream suppliers, or the incumbent firms themselves (Klevorick et al., 1995). Additional research in this area would increase our understanding of the factors that influence the prevalence of economic opportunities in market economies.

Identification of Opportunities

To profit from the existence of an entrepreneurial opportunity, a person must first develop a conjecture that such an opportunity exists (Shane & Venkataraman, 2000). The information asymmetry that under-girds entrepreneurship assumes that only a portion of the population will identify a particular opportunity at a specific moment (Hayek, 1945; Kirzner, 1973). This observation begs the question: why do some people and not others identify particular entrepreneurial opportunities at a particular point in time? Separate streams of research about access to information and cognitive properties offer insight into this question.

Access to Information

Information is unevenly distributed across economic actors (Hayek, 1945) because of limits in the ability of prices to transmit information (Akerlof, 1970), because people specialize in information (Becker & Murphy, 1992), and because the codification of information is not costless. As a result, only some portion of the population will possess information about errors in market processes or exogenous shocks to equilibrium conditions at any moment in time. For example, only scientists at MIT might know about the creation of new technology in biologically based computing, while only housewives in Topeka, Kansas might know about unmet demand for bakery goods on the north side of the city.

Three mechanisms appear to underlie the variation across people in access to information: Knowledge corridors, search processes, and social networks. We review the implications of these three mechanisms for entrepreneurial discovery in the subsections below.

Knowledge Corridors

Much of the ability to gather information about opportunities “is acquired through each individual’s own circumstances including occupation, on-the-job routines, social relationships and daily life” (Venkataraman, 1997, 122), or occurrences termed knowledge corridors (Ronstadt, 1988). These experiences allow people to know about resources that are unused, new technological developments, regulatory changes, or other information before others know about them. Hayek (1945) explained that everyone has superior information over others about some dimension of time and place that provides an advantage in discovering entrepreneurial opportunities. For example, the shipper knows which vessels are half empty before the real estate agent, whereas the real estate agent knows which houses are for sale before the shipper. Because this information advantage allows certain people to learn about the disequilibrium that makes an entrepreneurial opportunity possible before other people can see it, the advantage facilitates the discovery of that opportunity.

Search

People might also possess information before others because they search for it. Search theories argue that an individual searches for information as long as the marginal benefit of searching is anticipated to exceed the marginal cost of search (Stigler, 1961). Because individuals possess different information as a result of experiences transacting in diverse markets, some people can search for specific information more inexpensively than others. Moreover, searching for information closer to what one already knows increases the likelihood of gathering that information. Because information influences the probability of entrepreneurial discovery, and because local search is cheaper than distant search, individuals are likely to discover opportunities within a close proximity to their knowledge base.

Social Ties

Social network theorists postulate that individuals uncover information through the structure and content of the relationships with other members of society (Burt, 1992; Granovetter, 1973). The structure of social relationships determines the quantity of information, the quality of information, and how rapidly people can acquire information necessary to discover opportunities for profit. Further, social capital theorists believe that people are able to purposefully design the structure of their social relationships to enhance their chances of discovering opportunities.

Social relations are depicted as clusters of frequently interacting groups of individuals linked by weaker ties to other clusters of individuals. The interconnectedness of relationships within clusters of individuals leads to redundant ties where information from a single source can be received from a variety of individuals. As a result, information flows rapidly among members of these groups, thereby providing all members with access to the same information.

However, non-redundant social ties with members of other social clusters provide people with information not available to others lacking these ties. These non-redundant ties allow people access to information not broadly shared with others in their group, thereby facilitating the discovery of opportunities (Johannisson, 2000; West & Meyer, 1997).¹

Although the use of social networks to discover information that facilitates the identification of opportunities is detailed in the theoretical research on social capital, research attempting to measure the connection between the structure of social networks and the discovery of entrepreneurial opportunities is limited. However, in an analysis of 308 responses of a survey of 1,402 founders of IT consulting firms, Singh et al. (1999) find that the structure of social networks influences the number of new ideas identified by entrepreneurs.

Cognitive Abilities Including Prior Knowledge

Access to information is likely to be an incomplete explanation of the identification of opportunities, because opportunities are identified only when people formulate a conjecture regarding the existence of an opportunity in response to that information. As a result, recognizing opportunities from information about changes also involves determining the meaning of that information (Baron, 2002). This raises the question, are some people better able than others to create new means-ends frameworks from information about changes?

¹Social network theories differ from search theories about access to information. In the latter, individuals who gather information search locally for it; whereas, in the former, individuals who build connections to information possessed by individuals with market experience much different than their own are more likely to gather novel information. Therefore, social capital theory implies that local search is of little value for entrepreneurs seeking to discover opportunities for profit that are not yet reflected in market prices.

One factor that is likely to explain why some individuals in specific situations will develop a conjecture that an opportunity may exist while others will not in the same situation is differences in knowledge between two individuals. As prior knowledge is derived in part from heterogeneous life experiences including education and employment, individuals are unlikely to each have the same prior knowledge. For example, individuals acquire an understanding of specific intellectual domains through study and experimentation. As a result, two individuals who possess the same academic degree may have acquired very different stocks of knowledge (Junkunc & Eckhardt, 2009; Pellmar & Eisenberg, 2000).

Another answer might lie in relative superiority across individuals in this cognitive process. Gaglio and Katz (2001) suggest that alertness to opportunity is a function of variation across people in their ability to deconstruct causal relationships; to see cross-linkages between pieces of information; to understand the workings of economic, social, and physical processes; to critically evaluate information; to challenge assumptions; to re-label categories; to use analogies; to identify counterintuitive patterns; or to engage in counterfactual thinking. Sarasvathy, Simon and Lave (1998) suggest that it is a function of variation in people's cognitive schema so that some people view new information in terms of opportunities rather than risks. Shackle (1982) suggests that it is a function of variation in people's creativity or imagination.

However, very little empirical research has supported these arguments. In a pilot study of 20 managers and small business owners, Gaglio and Taub (1992) found evidence that managers approached the evaluation of a series of business case studies differently from owners. Although they interpreted the results as an indication that the cognitive process of trained business managers differs from that of small business owners, the authors did not detect a difference in their construct of alertness between the two sets of individuals.

One reason for this null finding may be that alertness is not an attribute of specific people. Rather, everyone may be alert to certain kinds of information, but not other kinds of information, according to the circumstances. Prior knowledge about a topic might generate an absorptive capacity that allows people to recognize the value of information on that topic (Cohen & Levinthal, 1990). Specifically, prior knowledge about such things as markets, technologies, production processes, industries, and customers influences the ability of people to comprehend or interpret new information as it relates to other information.

Shane (2000) provides empirical evidence in support of this argument. He shows that, in response to a single MIT invention, eight individuals discovered different opportunities that were related to their prior knowledge and experiences, but each did not recognize the opportunities identified by the others.

Another potential reason for this null finding is that there might be a contingency between types of opportunities and the cognitive schema that generate alertness. For example, Gaglio and Katz (2001, 100) suggest that "mental models for detecting the 'herd mentality' of other market actors and for developing contrarian positions as the initial reference point" will be likely to identify opportunities that result

from information asymmetry between market actors. But, would such dimensions of alertness help to identify opportunities based on new knowledge? A valuable area for future research would be to map the relationship between cognitive schema and types of opportunities.

Locus of Opportunity Discovery

Our earlier discussion suggested that new firm creation is not a necessary characteristic of entrepreneurial activity. Individuals within existing firms could also discover opportunities. In fact, we expect that individuals within existing firms frequently discover opportunities.

To date, no research explores whether people within organizations are more or less likely than people outside those organizations to identify particular opportunities. Moreover, we know nothing about the types of opportunities that might be more or less likely to be discovered by people within organizations. However, information flows are likely to influence the probability of entrepreneurial discovery, and people within existing organizations receive different information than those outside of organizations. Therefore, the opportunities that people within organizations will discover likely will differ from the opportunities that people outside organizations discover. Similarly, if filters in the hiring process lead people within organizations to have a different distribution of cognitive properties than people outside organizations, then people within organizations are likely to discover different opportunities than those outside organizations.

Another important issue about the locus of opportunity discovery concerns its effect on other stages of the entrepreneurial process. If people within existing organizations are more likely to identify certain opportunities, and mechanisms exist to deter those individuals from exploiting those opportunities on behalf of a new entity (e.g., intellectual property or labor constraints), then the exploitation process becomes path dependent. Exploitation processes that are more common within established organizations will become associated with certain opportunities, and the range of observed approaches to exploitation outside of existing firms will become truncated.

Exploitation

After an entrepreneur has discovered an opportunity, he or she may decide to exploit it, which we define as taking action to gather and recombine the resources necessary to pursue an opportunity, as opposed to the mental activities of recognition and evaluation. This exploitation process depends on several factors, including the attributes of both entrepreneurs and the opportunities that they pursue.

The attributes of opportunities are themselves important to the exploitation process because the asymmetric information that makes entrepreneurial opportunities

possible influences the process of exploitation (Venkataraman, 1997). To exploit an opportunity, an entrepreneur must gather and recombine resources to pursue a perception of an opportunity that may or may not prove valuable. As a result, resource owners must provide resources to the entrepreneur despite significant uncertainty about the accuracy of the entrepreneur's conjecture. Moreover, because the identification of opportunities is influenced by the possession of information that others do not possess, significant asymmetries of information exist between entrepreneurs and resource providers (Venkataraman, 1997).

These information asymmetries raise the threat of moral hazard and adverse selection problems that could undermine markets for resources (Amit et al., 1990). Moreover, these problems are exacerbated by the behavior of entrepreneurs. To reduce the likelihood that others will imitate their approach to pursuing opportunities, entrepreneurs seek not to disclose the information that allowed them to identify their opportunities or their strategies for pursuing them. This reluctance to disclose requires resource providers to make decisions about supporting the opportunity with less information than the entrepreneur possesses (Shane & Cable, 2002), making it difficult for resource providers to avoid problems of adverse selection.

The entrepreneurs' reluctance to disclose information about their opportunities or exploitation strategies also makes it difficult to monitor them against opportunistic behavior (Cable & Shane, 1997). Therefore, the information asymmetry between entrepreneurs and resource providers raise the potential for moral hazard on the part of entrepreneurs. These conditions suggest three very important factors in the exploitation of opportunities: access to financial capital, contracting solutions, and social capital. We discuss these factors below.

Financial Capital

One solution to the problem of information asymmetry between entrepreneurs and resource providers is for entrepreneurs to invest their own capital in their ventures. By self-financing, entrepreneurs can overcome the information asymmetry problem by placing the financing decision in the hands of those people who have all the information about the opportunity. Thus, people with greater financial capital are more likely to exploit opportunities than people with lesser financial capital (Evans & Leighton, 1989).

The question of whether or not entrepreneurs need to self-finance provides an important distinction between the entrepreneurship theories of Schumpeter (1934) and Knight (1921). Schumpeter (1934) did not consider the importance of information asymmetry to resource acquisition, and thus argued that entrepreneurship involved only the identification and exploitation of opportunity. To Schumpeter (1934), entrepreneurs do not have to provide capital, and thus, do not bear uncertainty. Knight (1921), however, presaged modern finance theory when he recognized the information problems that would occur if entrepreneurs formulated their opportunities on the basis of information that resource providers did not have. Given

these problems, Knight (1921) explained that entrepreneurs must provide capital to exploit their own opportunities, thereby making them bearers of uncertainty.

Contracting Solutions

Another way to mitigate the problems of information asymmetry and uncertainty lies in the allocation of ownership rights between entrepreneurs and resource providers (Gompers & Lerner, 1999; Kaplan & Strömberg, 2003). Because entrepreneurial opportunities are uncertain, much of the information necessary to separate successful from unsuccessful ones is not available at the time that the entrepreneur identifies the opportunity. Under these circumstances, resource providers want to make only those investments that are necessary to gather needed information and postpone other investments until later (Dixit & Pindyk, 1994). Thus, resource providers supply resources in stages. These investment options give them the right, but not the obligation, to continue their financial support (Sahlman, 1990).

Resource providers also protect themselves against problems of information asymmetry and uncertainty by limiting entrepreneurs' control rights. Gompers (1999) explains that venture capitalists often write covenants that preclude the entrepreneur from receiving compensation until the investors have earned their return. Hoffman and Blakely (1987) point out that many resource providers force entrepreneurs to lose part of their ownership if the venture does not meet investor return targets. Resource providers also contractually require entrepreneurs to bear a significant portion of the risk in their ventures (Gompers & Lerner, 1999; Kaplan & Strömberg, 2003).

Social Capital

Unfortunately, explicit contracts can rarely completely eliminate the problems engendered by information asymmetry and uncertainty (Arrow, 1974). Therefore, investors also use social capital to manage these problems (Aldrich & Zimmer, 1986; Venkataraman, 1997). Social ties provide two benefits that mitigate adverse selection and moral hazard. First, social ties link the provision of resources to social obligation and social norms of fairness and trustworthiness (Gulati, 1995). This leads parties to avoid exploiting information asymmetries that might exist in their favor. Social ties also provide a way to gather information quickly and cheaply, thereby reducing the information asymmetry itself (Aldrich & Zimmer, 1986; Gulati & Gargiulo, 1999).

Some empirical support currently exists for the importance of social capital in the resource acquisition process. Shane and Cable (2002) show that investors are more likely to make seed stage investments if they have direct or indirect social ties to the entrepreneurs who bring them the investment. Shane and Stuart (2002) show that

spin-offs from MIT are significantly more likely to have raised venture capital if they had pre-existing social ties to investors at the time of firm formation. Larson (1992) shows that other resource providers, such as strategic alliance partners, are also more likely to provide those resources if social ties exist between the entrepreneur and the resource provider.

The Characteristics of the Opportunity

Another factor that influences opportunity exploitation is the characteristics of the opportunity itself. The exploitation of opportunities is endogenous to their identification because people discover opportunities of varying value in response to a given change. For example, in response to a single MIT invention, entrepreneurs identified opportunities with markets as small as a few million dollars and as large as several billion (Shane, 2000). The perceived value of the opportunity will influence the exploitation decision because entrepreneurs have other options for their time, such as wage employment. As a result, empirical research has shown that opportunities will be more likely to be exploited when markets are larger (Schmookler, 1965; Schumpeter, 1934), profit margins are higher (Dunne et al., 1988), levels of competition are lower (Hannan & Freeman, 1984), and capital is cheaper (Shane, 1996).

Another factor that influences the perceived value of opportunities is the appropriability regime related to a given opportunity. Appropriability is the condition under which one party can prevent others from capturing the returns from the exploitation of an opportunity (Levin et al., 1987). If the entrepreneur cannot appropriate the returns from exploiting an opportunity, the entrepreneur will likely abandon that opportunity or fail to initiate exploitation.

The Fit with the Person

Several characteristics of the entrepreneur will also influence the exploitation process. Venkataraman (1997) points out that entrepreneurs do not evaluate opportunities on the basis of relative performance. Rather, they evaluate opportunities relative to their personal alternatives. In particular, entrepreneurs look at their opportunity cost, and their premia for uncertainty and illiquidity, and compare those factors to their conjecture of the expected value of their opportunity.

This process of opportunity evaluation has important implications for opportunity exploitation. Given variation in the characteristics of the discoverer of opportunity, not everyone will be willing to exploit a given discovery. For example, the discovery of a need for a hot dog stand on a particular corner in Manhattan might lead an unemployed and illiterate individual to exploit it, but is unlikely to lead an investment banker on Wall Street to act. The magnitude of the opportunity cost will likely be a major deterrent to entrepreneurial exploitation by the investment banker (Venkataraman, 1997).

In addition, the fit with the person extends to skills necessary to exploit an opportunity that has been discovered. An individual may have the ability to recognize that a given opportunity exists, but may lack the managerial ability or social connections necessary to implement a business based on the concept. As a result, a particular opportunity that has been discovered may not be exploited, or a different person may exploit it.

Psychological Differences

Psychological differences between people also influence their decisions to exploit opportunities. For example, McClelland (1961) argued that individuals high in need for achievement will be more likely to exploit entrepreneurial opportunities because they prefer to take responsibility for finding solutions to problems, master complex tasks, take risks based on goals and skills, and seek financial rewards for success. In fact, Collins et al. (2004) conducted a meta-analysis of 63 need for achievement studies in entrepreneurship and found that individuals high in need for achievement appear to be more likely to be entrepreneurs than the general population.

People higher in internal locus of control are more likely to exploit entrepreneurial opportunities. Individuals with a strong internal locus of control believe that they can understand and control the outcome of events, while individuals with a strong external locus of control perceive the outcomes of events as beyond their personal control (Rotter, 1966; Spector, 1992). Individuals with a greater internal locus of control are more likely to exploit entrepreneurial opportunities because it leads them to believe that their actions to recombine resources will have positive outcomes.

People higher in risk-taking propensity are more likely to exploit entrepreneurial opportunities (Khilstrom & Laffont, 1979; Knight, 1921). Entrepreneurs must make decisions that involve bearing true uncertainty (Knight, 1921) because they must invest resources before they know the outcome of those investments (Venkataraman, 1997), in the absence of insurance, futures markets, or strategies for diversification (Arrow, 1974). Begley (1995) as well as Sexton and Bowman (1996) found differences in risk preferences between entrepreneurs and managers, and Brockhaus (1980) reported differences in risk preferences between entrepreneurs and the overall population. Stewart and Roth (2001) conducted a meta-analysis of risk-taking propensity and found that entrepreneurs have a higher risk-taking propensity than managers.

People higher in tolerance for ambiguity are more likely to exploit entrepreneurial opportunities. Tolerance for ambiguity is the tendency for individuals to accept ambiguous circumstances as attractive in contrast to intimidating (Budner, 1982). As the process of entrepreneurship is uncertain and fraught with alternatives without clear solutions, individuals with higher tolerance for ambiguity will be more likely to become entrepreneurs. For example, in a review of

four studies, Sexton and Bowman (1996) reported that entrepreneurs have a higher tolerance for ambiguity than managers. Further, Begley and Boyd (1987) and Miller and Drodge (1986) similarly find evidence that entrepreneurs have higher tolerance for ambiguity than managers.

People higher in self-efficacy are more likely to exploit entrepreneurial opportunities. Self-efficacy is a measure of individual task-specific confidence, formally defined as the degree to which an individual believes he or she has the ability to achieve a certain level of achievement for a given task (Bandura, 1997). Those high in self-efficacy will have a greater probability of exploiting opportunities because that activity demands such confidence in one's ability to execute the exploitation successfully (Chen et al., 1998).

Locus of Opportunity Exploitation

What modes of exploitation will be used to exploit entrepreneurial opportunities? Because only individuals are capable of discovering opportunities, the locus of decision-making about exploitation of discovered opportunities lies with people. As Audretsch (1997) has argued, this means that decisions about the locus of opportunity exploitation can be attributed to decisions that entrepreneurs make about how best to appropriate the returns from their discovery. Two dimensions of this choice appear to be important. First, can the opportunity be effectively pursued through markets? Second, are new or established firms better entities for undertaking the opportunity exploitation process? In the sections below, we review factors that might influence these decisions.

Markets or Firms?

Sometimes entrepreneurial opportunities are pursued through market mechanisms, as in the case of franchising and licensing. However, much of the time, entrepreneurial opportunities are pursued through firms. The exploitation of entrepreneurial opportunities through market mechanisms is influenced by three sets of factors: cost, timing, and information (Venkataraman, 1997).

Entrepreneurial opportunities are often pursued through market mechanisms because such mechanisms prove less expensive than hierarchical arrangements. New organizations lack existing cash flow, which requires them to raise capital from external entities to pursue opportunities. Not only capital that must be raised through market mechanisms more costly than internal capital, the rationing of financing for new entities makes it difficult for entrepreneurs to raise the total amount of capital they need (Evans & Leighton, 1989). As a result, capital strapped entrepreneurs often seek to use market mechanisms to pursue opportunities. Not only does the use of franchising and licensing allow them to use others' capital (Shane, 1998), but also exploitation through markets requires the ownership of fewer

assets, reducing capital intensity (Martin, 1988). This argument suggests that the use of market-based mechanisms to pursue opportunities increases with the capital constraints of entrepreneurs, as well as with the capital intensity of the opportunities themselves.

Entrepreneurial opportunities are often pursued through market mechanisms because such mechanisms prove faster to implement than hierarchical arrangements. Because entrepreneurial opportunities are often short-lived, the rapid establishment of the infrastructure necessary to pursue those opportunities depends on the quick implementation of the value chain necessary to pursue the opportunity (Venkataraman, 1997). This argument suggests that the use of market-based mechanisms to pursue opportunities increases with the shortness of the life span of the opportunity. In addition, it suggests that market-based mechanisms will be more common when the entity pursuing the opportunity needs to create the value chain from scratch, as is the case with independent entrepreneurs.

Entrepreneurial opportunities are also more likely to be pursued through market-based mechanisms when information conditions suggest that such approaches are effective. As the literature on franchising suggests, when shirking problems are more severe than free-riding problems in the exploitation of opportunities, market-based mechanisms will be preferred (Shane, 1998). In contrast, when hold-up problems plague market-based transactions, entrepreneurs will be more likely to use hierarchical arrangements (Azoulay & Shane, 2001).

Several characteristics of the opportunities themselves also influence the use of markets. First, markets are more likely to be employed when the opportunity can be well-codified, as is the case for the economic sectors in which franchising typically occurs (Michael, 1996). An inability to describe the characteristics of an opportunity in written form will make the opportunity much harder to sell through markets because of the difficulty of executing contracts.

Second, markets for opportunities are facilitated when patents are effective means of protecting intellectual property. Patent protection mitigates the disclosure problem for opportunities by ensuring that the buyer will have to pay for the opportunity once its value is demonstrated (Arrow, 1962). Moreover, patent protection mitigates moral hazard problems, in which the buyer shirks in their commitment to pay the seller, by making the opportunity and its exploitation process more easily verified by third parties (Anand & Khanna, 2000). Finally, patents mitigate hold-up problems by codifying information about opportunities, thereby facilitating the writing of explicit contracts about them (Teece, 1981).

Third, market mechanisms are more likely to be used to exploit routine opportunities. When different parties are more likely to agree on the value of opportunities, transactions are less likely to break down due to disagreements over price (Audretsch, 1997). However, when knowledge conditions increase the variance in people's perception of the value of an opportunity, as is the case when the opportunity is technically radical, market-based mechanisms may fail because transactors cannot agree on value.

New or Established Firms

Another question about the locus of opportunity concerns whether new or established firms are the entities that exploit those opportunities. To date we have several types of evidence about factors that influence whether opportunities are better exploited by new or established firms. We categorize this evidence in three sets: those that are a function of industry characteristics, those that are a function of opportunity characteristics, and those that are a function of firm characteristics.

Industry-Level Factors

Several industry conditions increase the likelihood that new firms will be a mode of opportunity. First, new firms are more common models of exploitation when industries have more capital available for start-up activity, as is the case when they have easier access to venture capital or angel financing (Cohen et al., 1987). Second, new firms are more common models of exploitation when industries do not have high economies of scale or powerful first mover advantages, because these factors favor established producers (Shane & Venkataraman, 2000). Third, new firms are more common modes of exploitation when the opportunities are less reliant on complementary assets in manufacturing, marketing, or distribution, because established firms can compete with innovators more easily when the basis of competitive advantage lies in assets other than the innovation itself (Teece). Fourth, new firms are more common modes of exploitation when industries are new, because new markets are generally initially too small to interest established firms with a higher opportunity cost (Shane, 2001a) and a focus on serving their major customers (Christensen & Bower, 1996), and because learning curve advantages do not yet exist (Nelson, 1995). Fifth, new firms are more likely to be a mode of opportunity exploitation when patents are effective means of preventing competition, because patents allow entrepreneurs to establish an organization and value chain before the means of opportunity exploitation is imitated (Teece, 1987); because effective patents will give the entrepreneur time to adjust the product or service to market needs (Shane, 2001b); and because strong patents will allow competition on the basis of factors other than cost, in which established firms will be advantaged due to the benefits of size and experience.

Opportunity-Level Factors

Several dimensions of an opportunity itself may make opportunities more likely to be exploited by new firms. First, radical opportunities will be more likely to be exploited by new firms because such opportunities undermine the competence advantages of existing firms (Tushman & Anderson, 1986), because established

firms do not like to invest in opportunities that cannibalize their existing operations (Arrow, 1962), and because the routines of established firms focus their attention away from new information and new activities (Henderson, 1993). Second, low capital demands to exploit an opportunity will increase the likelihood that a new firm will be used to exploit the opportunity as new firms lack existing cash flow necessary to finance capital-intensive projects. Third, stronger intellectual property protection for an opportunity, as is the case with broad scope patents, will facilitate exploitation by a new firm because that protection allows the entrepreneur to get the value chain in place before the means of exploiting the opportunity are imitated by others (Shane, 2001b).

Firm-Level Factors

Several firm-level factors also influence the locus of opportunity exploitation. The first is structure of the organization. The exploitation of entrepreneurial opportunities often requires organizational flexibility to manage their uncertainty. However, established organizations often seek to minimize flexibility in order to enhance their monitoring of existing operations, thereby undermining the willingness to engage in entrepreneurial exploitation within the firm (Holmstrom, 1989). Thus, organization design will influence the willingness of people to exploit opportunities within the confines of an existing organization, especially when managers are monitored closely and held strictly accountable for variance from their targets.

Second, organization scholars assert that institutional arrangements and organizational structures within mature firms spawn inertial forces that inhibit the ability for these firms' to rapidly respond to changes (Hannan & Freeman, 1977, 1984). Because the exploitation of entrepreneurial opportunities often demands speed, organizations that have high levels of inertia will be less likely to be exploiters of such opportunities.

Third, the stronger the reputation of an existing firm, the less likely it will be to exploit entrepreneurial opportunities. Because the established firm has a reputation that it might not want to risk losing, it will be unwilling to make necessary decisions about entrepreneurial opportunities for fear that those decisions would prove incorrect and hinder the firm's reputation (Holmstrom, 1989).

Fourth, the greater the importance of existing customers to the organization, the less likely it will be to exploit entrepreneurial opportunities. Christensen and Bower (1996) argue that industry incumbents respond to contemporary expectations of established customers. They provide evidence that established customers do not seek new products or services, because those products or services are initially inferior to prevailing alternatives. As a result, established firms cede new market niches to new firms.

Fifth, the organizational reward structure might influence the locus of exploitation. An entrepreneur might perceive a greater expected value from exploiting the opportunity independently, rather than through a firm, if the incentive structure in

the firm would not let the entrepreneur share as fully in the potential returns. This would be the case if the organization did not allow the individual sufficient stock ownership to replicate that of independent firm ownership (Audretsch, 1997).

The Relationship Between the Locus of Discovery and Exploitation

In Fig. 3.3, we consider a matrix that compares the discovery and exploitation of opportunities by new and established firms. This figure identifies four different types of efforts to pursue opportunity that depend on whether the discoverer was within or outside an existing firm and whether the exploiter is within or outside an existing firm.

Fig. 3.3 Types of entrepreneurial efforts as a function of the locus of discovery and exploitation

		Discovery	
		Independent Individual	Corporation Member
Exploitation	Independent Individual	Independent Start-up	Spin-off
	Corporation Member	Acquisition	Corporate Venturing

This matrix provides several issues for researchers to consider. First, it raises the question of whether entrepreneurship researchers should focus their attention on the independent start-up cell, as they tend to do. The absence of research on the demographics of this matrix means that we do not know how common the different cells are. Without information on what proportion of efforts to pursue opportunities fall in each of the four cells, we do not know whether concentrating research efforts on explaining independent start-ups makes sense.

Second, we do not know how the processes of pursuing these opportunities differ across each of the four cells. Casual empiricism alone indicates that pursuing opportunities through independent start-ups must differ in fundamental ways from pursuing them through corporate venturing. But we lack systematic empirical evidence that explains how these processes differ. For example, are resources acquired in the same way? Are the tools to evaluate the opportunities different? Future research is necessary to explain the ways in which independent start-ups, corporate venturing, acquisitions, and spin-offs are similar and different.

Third, we lack information on what factors lead opportunities to be pursued in each of the four ways described in the cells. Most of the problem lies in our lack of

information about the locus of discovery. So far, we have information only about new firm vs. existing firm exploitation, regardless of the source of opportunity discovery. To compare opportunities across the four cells, we need the additional information about discovery.

Nevertheless, some researchers have considered the relationship between the corporate venturing cell and the spin-off cell, both theoretically and empirically. When the opportunity depends more on human capital than on physical assets, spin-offs are more common, because entrepreneurs cannot move physical assets with them when they exit a firm.

In addition, several authors have attributed an increase in spin-offs to characteristics possessed by the firms in which the discovery was made. When innovations are architectural and therefore reconfigure the way in which products are developed, spin-offs will be more common because established firms have a hard time exploiting such innovations (Henderson & Clark, 1990). Similarly, when a new product or service is appropriate primarily to a small market niche, spin-offs are more common because an existing customer base will restrict an incumbent firm from focusing attention on the new niche (Christensen & Bower, 1996).

A third line of reasoning attributes the frequency of spin-offs to characteristics of the discoverer. For example, Bankman and Gilson (1999) attribute the variance in the locus of exploitation between corporate venturing and spin-offs to the nature of the person discovering the opportunity. More risk-averse people will not launch spin-offs to pursue the opportunity.

Conclusion

The purpose of this chapter was to extend and elaborate on the individual-opportunity nexus framework on entrepreneurship presented in Shane and Venkataraman (Shane, 2000) and Venkataraman (1997). We discussed the existence of entrepreneurial opportunities, particularly as they relate to the limits of the price system. The chapter also reviewed several typologies of opportunities. We discussed the process of opportunity discovery and explained why some actors are more likely to discover a given opportunity than others. We considered the opportunity exploitation process from the perspective of the individual-opportunity nexus. Finally, we considered the locus of opportunity discovery and exploitation. For all of these topics, we presented the logical arguments for the individual-opportunity approach to entrepreneurship and the empirical evidence gathered to date in support of the dimensions of this approach. Given the limited empirical evidence to date, we suggested many areas for future research. We hope that this chapter stimulates other scholars to join the effort to refine this framework and gather robust empirical evidence to examine the validity of it.

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Chapter 4

Three Views of Entrepreneurial Opportunity

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Although we are not usually explicit about it, we really postulate that when a market could be created, it would be.

Kenneth Arrow (1974a)

For almost 50 years now, following the trail of issues raised by economists such as Hayek, Schumpeter, Kirzner, and Arrow, researchers have studied the economics of technological change and the problem of allocation of resources for invention (invention being the production of information). The bulk of this literature simply assumes that new technical information will either be traded as a commodity or become embodied in products and services (hereafter called “economic goods”), without addressing any specific mechanisms or processes for the transformation of new information into new economic goods or new economic entities (such as new firms and new markets). It is inside this gap that we begin our quest for the concept of an “entrepreneurial opportunity.”

In a recent interview with CNN, Whitfield Diffy, the inventor of public key encryption (currently an employee of Sun Microsystems), explained that although his entire subsequent career had benefited from his invention and he had done very well financially in the process, it did not occur to him to start a company to commercialize his invention. In fact he expressed astonishment at the “hundreds and hundreds of people trying to turn a buck on it.” The designers of the MIR space station would no doubt express similar astonishment at the venture capitalists that recently bid (in vain) several million dollars to turn it into an advertising/tourist resort – just as the scientists working with DARPA did not foresee the age of e-commerce. The history of technological invention is full of unanticipated economic consequences. And, yet, the study of the economics of technological change is full of “just-so” stories¹ that seemingly demonstrate the inevitability of

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¹ *Just so stories* (based on Rudyard Kipling’s (1909) collection of short stories of the same title) are stories that explain why things are the way they are. Such stories also tend to celebrate things

commercialization of all new technologies through familiar recurring patterns such as the technology adoption curve. Unfortunately, of course, we do not have any data on all the new products and markets that were *not* created to commercialize new technologies in the past.

This chapter challenges the assumption underlying current theories of technological change, laid out so pithily by Arrow in the initial quote, viz., “when a market could be created, it would be.” Instead, it focuses on Arrow’s exhortation to researchers to tackle one of the central problems in economics today: “. . . the uncertainties about economics are rooted in our need for a better understanding of the economics of uncertainty; our lack of economic knowledge is, in good part, our difficulty in modeling the ignorance of the economic agent.” The central premise of this chapter is that there exists an important area for research in the conceptual gap between a technological innovation and the markets that come into existence based on that innovation—a gap in our understanding of economics that is filled by the notion of “entrepreneurial opportunity.” In this chapter, we outline some initial steps in the study of entrepreneurial opportunity by summarizing how existing literature instructs us to proceed and then making a conjectural leap toward grappling with the complexities inherent in this phenomenon.

We begin our exposition with a definition of entrepreneurial opportunity. Then we delineate its elements and examine it within three views of the market process: i.e., the market as an allocative process; as a discovery process; and as a creative process (Buchanan & Vanberg, 1991). Within each stream, we examine the assumptions about the knowledge (ignorance) of the decision-maker with regard to the future, and the implications of those assumptions for strategies to recognize, discover, and create entrepreneurial opportunities. We end the essay with a set of conjectures that challenge the inevitability of technology commercialization and argue for a more contingent approach to the study of the central phenomena of entrepreneurship.

Entrepreneurial Opportunity

The Oxford English Dictionary defines opportunity as “A time, juncture, or condition of things favorable to an end or purpose, or admitting of something being done or effected.” If we believe that that ends are not always specified prior to the pursuit of an entrepreneurial opportunity, but may emerge endogenously over time, we can unpack the constituents of an entrepreneurial opportunity from the

the way they are – subscribing to the fallacy that because certain things came to be, there is some element of “optimality” or “correctness” attached to their origin and structure. This approach leads us to discount the significance of pre-histories because if existence by itself is the starting point of theory building, almost *any* story could ex-post serve as sufficient explanation for the pre-history. One delightful example is the story of an arbitrage struggle between an elephant and a crocodile that explains how the elephant came to have a long trunk! Relatedly, almost all the social sciences seem perfectly capable of explaining every creation after the fact, but can predict nothing before the creation.

second part of the above sentence. An entrepreneurial opportunity, therefore, consists of a set of ideas, beliefs, and actions that *enable* the creation of future goods and services in the absence of current markets for them (Venkataraman, 1997). For example, the entrepreneurial opportunity that led to the creation of Netscape involved (a) the idea of a user-friendly Web browser (Mosaic); (b) the belief that the Internet could be commercialized; and, (c) the set of decision-actions that brought together Marc Andreessen (the creator of Mosaic) and Jim Clark (the ex-founder of Silicon Graphics) to set up base in the small town of Mountain View.

In sum, our notion of an entrepreneurial opportunity consists of:

1. New idea/s or invention/s that may or may not lead to the achievement of one or more economic ends that become possible through those ideas or inventions;
2. Beliefs about things favorable to the achievement of those possible valuable ends; and,
3. Actions that generate and implement those ends through specific (imagined) new economic artifacts (the artifacts may be goods such as products and services, and/or entities such as firms and markets, and/or institutions such as standards and norms).

Our ontological stance in defining an entrepreneurial opportunity in this manner transcends purely subjective and purely objective notions. An opportunity presupposes actors *for whom* it is *perceived* as an opportunity; at the same time, the opportunity has no meaning unless the actor/s actually act upon the real world within which the opportunity eventually has to take shape. As is made clear in the rest of the chapter, this ontological stance enables us to take a pluralistic approach toward the phenomenon without falling into the mire of naïve relativism.

Three Views of Entrepreneurial Opportunity

Drawing upon three streams of economic literature pertinent to entrepreneurial opportunity—i.e., market as an allocative process, market as a discovery process, and market as a creative process – we could model an entrepreneurial opportunity as a function, or a process or a set of decisions, respectively. The antecedents for the three views presented here specifically draw upon three works, i.e., Hayek (1945), Knight (1921), and Buchanan and Vanberg (1991) – all of which grapple with the central problem demarcated by Arrow (quoted earlier) in terms of understanding uncertainties in the economy and modeling the ignorance of the economic agent.

In an important essay in 1945, Hayek postulated the concept of dispersed knowledge where no two individuals share the same knowledge or information about the economy. Hayek distinguished between two types of knowledge: first, the body of scientific knowledge, which is stable and can be best known by suitably chosen experts in their respective fields; second, the dispersed information of particular time and place, whose importance only the individual possessing it can judge. Hayek

pinpointed the harnessing of this latter type of knowledge as a key and underestimated element in the economic development of society. This dispersion has two extremely important implications as far as entrepreneurial opportunities are concerned. First, dispersion of knowledge is a root explanation for the presence of uncertainty, which gives rise to opportunities in the first place. Second, dispersion of knowledge is another root explanation of the nexus of the enterprising individual and the opportunity to discover, create, and exploit new markets (Shane, 2000; Venkataraman, 1997). Without this nexus of the individual and the opportunity, most inventions will lie fallow. Frank Knight (1921) clearly realized the implications of uncertainty for economic organization.

In his seminal dissertation, *Risk, Uncertainty, and Profit*, Knight distinguished between three types of uncertainties about the future that an economic agent may face:

- The first consists of a future whose distribution exists and is known, and, therefore, decisions would only involve calculating the odds of a particular draw and placing one's bets based on the analysis. In this case, risks can be reduced through diversification. This assumes that all the possible outcome scenarios are all equally likely, *ex ante*.
- The second consists of a future whose distribution exists but is not known in advance. The agent, in this case, has to estimate the distribution through repeated trials and can then treat it the same as the first case. Furthermore, as the environment changes dynamically, successful strategies evolve through adaptive processes including careful experimentation and learning over time. Although we do not know the probabilities attached to each of the outcome scenarios, the probabilities do exist, and their distribution can be uncovered over time.
- The third type of uncertainty, which Knight called true uncertainty, consists of a future that is not only unknown, but also unknowable – with unclassifiable instances and a non-existent distribution. The economic agent, or entrepreneur, who takes on this true uncertainty, gets compensated for it through “profit” – a form of residual return after the normal factors of production are paid for and all market contracts fulfilled.

Knight did not explicate how the entrepreneur deals with this true uncertainty. But, instead he argued that

The ultimate logic, or psychology, of these deliberations is obscure, a part of the scientifically unfathomable mystery of life and mind. We must simply fall back upon a “capacity” in the intelligent animal to form more or less correct judgments about things, an intuitive sense of values. We are so built that what seems to us reasonable is likely to be confirmed by experience, or we could not live in the world at all.

In this third case of Knightian uncertainty, there is no meaning to the attachment of probabilities to the opportunity vectors. Instead, we need to understand the process through which the different levels of actors interact. The benefits get created endogenously, in the very unfolding of those interactions.

Later researchers, especially Austrian economists such as Von Mises (1949) and Kirzner (1997), and subjectivists such as Lachmann (1976) and Shackle (1979),

have tried to tackle this problem of Knightian uncertainty. Fixing a rather penetrating philosophical gaze on the works of these economic theorists since Hayek and Knight, Buchanan and Vanberg (1991) contrast the three views of economic theory presented here as follows: “The market as an allocative process, responding to the structure of incentives that confront choice-makers; the market as a discovery process, utilizing localized information; or the market as a creative process that exploits man’s imaginative potential . . .” They argue that “the perceptual vision of the market as a *creative process* offers more insight and understanding than the alternative visions that elicit interpretations of the market as a *discovery process*, or, more familiarly, as an *allocative process*. In either of the latter alternatives, there is a telos imposed by the scientist’s own perception, a telos that is nonexistent in the first instance. And removal of the teleological inference from the way of looking at economic interaction carries with it significant implications for any diagnosis of the failure or success, diagnosis that is necessarily preliminary to any normative usage of scientific analysis.”

But, for the purposes of this chapter, the key issue is not which of the three views is “right,” but rather which view is more useful under what conditions of uncertainty. Such a pragmatic approach allows us to *utilize* the three views explicated so far to construct a rather simple typology of entrepreneurial opportunities based on the pre-conditions for their existence, as follows.

Opportunity Recognition

If both sources of supply and demand exist rather obviously, the opportunity for bringing them together has to be “recognized” and then the match-up between supply and demand has to be implemented either through an existing firm or a new firm. This notion of opportunity has to do with the exploitation of existing markets. Examples include arbitrage and franchises.

Opportunity Discovery

If only one side exists – i.e., demand exists, but supply does not, and vice versa – then, the non-existent side has to be “discovered” before the match-up can be implemented. This notion of opportunity has to do with the exploration of existing and latent markets. Examples include: Cures for diseases (demand exists; supply has to be discovered); and applications for new technologies such as the PC (supply exists, demand has to be discovered).

Opportunity Creation

If neither supply nor demand exist in an obvious manner, one or both have to be “created,” and several *economic* inventions in marketing, financing, etc. have to be made, for the opportunity to come into existence. This notion of opportunity

has to do with the creation of new markets. Examples include Wedgewood Pottery, Edison’s General Electric, U-Haul, AES Corporation, Netscape, Beanie Babies, and the MIR space resort.

Table 4.1 presents a summary comparison of the three views along several different dimensions. In the next three sections, we trace the implicit notions

Table 4.1 Comparing the three views of entrepreneurial opportunity

View	Allocative view	Discovery view	Creative view
What is an opportunity	Possibility of putting resources to good use to achieve given ends	Possibility of correcting errors in the system and creating new ways of achieving given ends	Possibility of creating new means as well as new ends
Focus	Focus on <i>system</i>	Focus on <i>process</i>	Focus on <i>decisions</i>
Method	Opportunities “recognized” through deductive processes	Opportunities “discovered” through inductive processes	Opportunities “created” through <i>abductive</i> processes
Domain of application	When both supply and demand are known	Only one or the other (supply or demand) known	When both supply and demand are unknown
Distribution of opportunity vectors	Opportunity vectors are equally likely	Existent, but unknown probability of opportunity vectors	Probabilities for opportunity vectors are completely non-existent
Assumptions about information	Complete information available at both aggregate and individual levels	Complete information at the aggregate level, but distributed imperfectly among individual agents	Only partial information even at the aggregate level, and ignorance is key to opportunity creation
Assumptions about expectations	Homogeneous expectations both at the micro- and macro-levels	Homogeneous expectations at the macro-level; heterogeneous expectations at the micro-level	Heterogeneous expectations at both micro- and macro-levels
Management of uncertainty	Uncertainty managed through: Diversification	Uncertainty managed through: Experimentation	Uncertainty managed through: Effectuation
Definition of success	Success is a statistical artifact	Success is outliving failures	Success is a mutually negotiated consensus among stakeholders
Unit of competition	Resources compete	Strategies compete	Values compete
Outcomes	Strategies for: Risk management	Strategies for: Failure management	Strategies for: Conflict management

of entrepreneurial opportunity through each of the three literature streams on market process and develop key characteristics of the nature of entrepreneurial opportunities based on each of these perspectives.

The Allocative Process View

Neoclassical economic theory discusses several efficiency properties of markets—allocative, productive, coordinative, and informational. We will focus in this section on the allocative efficiency of markets and its implications for opportunity recognition. Allocative efficiency is achieved when: (a) the income of consumers is optimally allocated to consumption, i.e., they are able to buy the goods and services that they value most; and (b) resources (factors) are optimally allocated to production, i.e., they are used to produce the goods and services that consumers desire.

Allocative efficiency is achieved in a perfectly competitive market, whose characteristics are as follows: there is a very large number of buyers and sellers, all of whom are so small that none of them individually can affect prices; prices of homogeneous goods and factors are uniform throughout the economy; all factors are perfectly mobile; returns to scale are constant; and all economic agents have perfect knowledge about available alternatives. There is an assumption of complete markets, i.e., there are markets for all possible products and services. Furthermore, agents are free to enter and exit the market. Disequilibria are short-term phenomena, and are quickly cleared to bring the situation back to equilibrium through the tatonnement process – prices go up when demand exceeds supply and down when supply exceeds demand—which functions through the mythical figure of the Walrasian auctioneer. There are further requirements for the achievement of an optimal allocation of resources, such as the absence of any divergence between private and social costs and the existence of perfect competition in all sectors of the economy. When a market has achieved allocative efficiency, it complies with two conditions: first, price is equal to marginal cost, which is also equal to minimum average cost ($P = MC = \min AC$); and second, Pareto optimality is achieved, which means that resources cannot be redistributed to make anyone better off without making someone else worse off.

The allocative view concerns itself with the optimal utilization of scarce resources. In this view, an opportunity is any possibility of putting resources to better use. At equilibrium, there are no opportunities, because resources have been optimally allocated. However, profits can arise in two ways. First, to the extent that a perfectly competitive market is not in equilibrium, opportunities for short-term profits are available, but they quickly disappear when new firms enter the market attracted by the profits. Second, if we assume that all information is available in the system but is randomly distributed, and, therefore, acquiring information involves a costly search process, then the opportunity for profit is simply the difference between the benefit of the information and its cost. However, the random

distribution of information means that no agent has the possibility of systematically benefiting from superior information. The core idea is that all products and ideas that can potentially exist are all known to be feasible but costly to produce. When the cost problem is solved (for example, due to scientific breakthroughs in laboratories), opportunities arise. However, opportunity is not specific to any one person because there is no informational advantage within this view. Thus, there is no heterogeneity between economic agents that enables one agent to be systematically better than another in acquiring information, and consequently in the recognition and pursuit of opportunities. Which agent recognizes the opportunity is, therefore, a purely random variable. Moreover, since there is no divergence between private cost and social cost (i.e., the opportunity cost for an individual agent of a resource in a particular use is the same as the social opportunity cost of the resource in that use), any possibility of a Pareto improvement at the system level is equivalent to an opportunity at the individual agent level.

Arrow (1962) discussed three reasons why a perfectly competitive market could lead to a sub-optimal allocation of resources to invention: *inappropriability*, *indivisibility*, and *uncertainty*. In what follows, we analyze how allocative efficiency is compromised as a result of these three reasons.

Inappropriability

An issue that has been debated for many decades is whether there is any incentive to innovate in a perfectly competitive market, because it does not, by definition, permit the appropriation of rents in a sustained fashion. Kamien and Schwartz (1975) study the relationship between market structure and innovation, and conclude that “few, if any, economists maintain that perfect competition efficiently allocates resources for technical advance” (p. 2). Arrow (1962) argued that the incentive to innovate could exist even in perfectly competitive markets: “It may be useful to remark that an incentive to invent can exist even under perfect competition in the product markets though not, of course, in the ‘market’ for the information contained in the invention. This is especially clear in the case of a cost reducing invention. Provided only that suitable royalty payments can be demanded, an inventor can profit without disturbing the competitive nature of the industry. The situation for a new product invention is not very different; by charging a suitable royalty to a competitive industry, the inventor can receive a return equal to the monopoly profits” (p. 619).

For Arrow’s point to be valid, the assumption of all sectors of the economy being in a perfectly competitive equilibrium must be relaxed. Schumpeter (1976) was of the opinion that the propensity of a firm to innovate was directly proportional to its size and market share. He based his view on the considerable resources required to innovate and the incentive of adequate return. Nutter (1956) disagreed—“Desire and necessity drive competitive and monopolistic producers alike to innovate: desire for better-than-average profits motivates the venturesome and industrious to introduce new products and techniques; loss of profits forces the cautious and passive to imitate or perish” (p. 523).

Villard (1958) offered a view that ran counter to that of Nutter, concluding that innovation was unlikely at both extremes. “Industries where ‘competitive oligopoly’ prevails are likely to progress most rapidly and that therefore ‘competitive oligopoly’ may well be the best way of organizing industry. The basic point is that progress is likely to be rapid (1) when firms are large enough or few enough to afford and benefit from research and (2) when they are under competitive pressure to innovate—utilize the results of research” (p. 491). Scherer (1967) agreed with Villard, arguing that moderate levels of concentration lead to the highest levels of innovation.

Indivisibility

Blaug (1985) defines indivisibility as follows: “If two productive agents are perfect substitutes of each other when used in combination to produce a given output, they are necessarily infinitely divisible: the isoquants in this case are straight lines, meaning that the marginal rate of substitution of the two factors is a constant” (454).

Arrow (1962) argues that “a given piece of information is by definition an indivisible commodity, and the classical problems of allocation in the presence of indivisibilities appear here” (p. 615). He goes on to explain the problems: “In the absence of special legal protection, the owner cannot, however, simply sell information on the open market. Any one purchaser can destroy the monopoly, since he can reproduce the information at little or no cost. Thus the only effective monopoly would be the use of the information by the original possessor. This however, will not only be socially inefficient, but also may not be of much use to the owner of the information either, since he may not be able to exploit it as effectively as others” (p. 615).

Economic theory assumes that in the absence of property rights, the original creator or discoverer of particular information would lose control of it once it was reproduced and accessible to other parties. Thus, a large part of the discussion on appropriate institutional structures revolves around establishing the right incentives—copyright laws, patent laws, etc. – for agents to innovate. However, there may be some classes of information that can be used only in combinations with other assets, such as human and physical capital. For this reason the rents from the use of such information may not accrue to parties who do not possess these assets, and this difficulty may provide adequate protection for the innovator, even in the absence of specific legal protection. There are many industries in which firms do not patent inventions in spite of the existence of patent laws. The distinction between information and knowledge becomes relevant here. Brown and Duguid (2000) argue that knowledge differs from information in three ways: first, knowledge is tied to a knower; second, it is harder to detach than information; and third, it is hard to give and receive because it requires more by way of assimilation. They also distinguish between the explicit and tacit dimensions of knowledge. “[S]trategy books don’t make you into a good negotiator, any more than dictionaries make you

into a speaker or expert systems make you into an expert. To become a negotiator requires not only knowledge of strategy, but skill, experience, judgment, and discretion. These allow you to understand not just how a particular strategy is executed, but when to execute it. The two together make a negotiator, but the second comes only with practice” (Brown & Duguid, 2000, 133–134).

Thus, although information is indivisible and the costs of reproducing it are close to zero, we may relate it to a resource, as defined in the resource-based view of the firm. Knowledge, on the other hand, would be a capability in that it represents a combination of information, physical capital, and human capital. Focusing exclusively on raw information makes us view opportunities as arbitrage possibilities, which are not agent specific. On the other hand, focusing on knowledge opens up rich vistas of agent specific opportunities, whose recognition depends upon already owned knowledge and other assets (Shane, 2000).

Uncertainty

Akerlof (1970) argued in his famous “lemons” paper that an extreme case of information asymmetry could lead to a complete market failure. Information asymmetry leads to uncertainty that causes a downward bias in demand and supply. This is because, at very high levels of uncertainty, agents will need concessions so large from the other party to the transaction that neither will recognize any opportunity in the exchange. Institutional support is then often needed to overcome the uncertainty and to restore trade in the market. For example, organizations such as the SEC ensure certain minimum levels of transparency and fair play, which benefit all participants in the form of an increase in the volume of trade. Markets themselves can correct for this asymmetry—firms specializing in information gathering, analysis, and dissemination pervade all markets. These firms lower an individual agent’s search costs while increasing the quality of information. Institutions such as guarantees, brand names, and licensing practices are some of the other ways of overcoming the uncertainty caused by information asymmetry.

The other major reason for uncertainty according to Arrow (1974a) is the nonexistence, except in a very limited number of commodities, of futures goods markets

Hence, the optimizer must replace the market commitment to buy or sell at given terms by expectations: expectations of prices and expectations of quantities to be bought or sold. But he cannot know the future. Hence, unless he deludes himself, he must know that both sets of expectations may be wrong. In short, the absence of the market implies that the optimizer faces a world of uncertainty. (p. 6).

According to Arrow, this uncertainty leads to the economic agent taking steps to reduce risks, such as the holding of inventories, preference for flexible capital equipment, etc. It also leads to the creation of new markets for the shifting of risks, such as the equity market. However, while conceding that probabilities are subjective, because different agents have access to different information, he implies that

each agent can know his own distribution of probabilities from his own past. He states that uncertainty means

[T]hat we do not have a complete description of the world which we fully believe to be true. Instead, we consider the world to be in one or another of a range of states. Each state of the world is a description that is complete for all relevant purposes. Our uncertainty consists in not knowing which state is the true one. (1974b)

The views of Frank Knight (and perhaps more importantly, the different interpretations of what he actually meant) on the distinction between risk and uncertainty become very relevant here.

In summary, there are several implications of viewing the market as an allocative process. First, the focus is on the system and not on individuals or firms, which are all homogeneous in their access to technology and in their cost structures. Second, *ex ante*, all economic agents are equally likely to detect a given opportunity. Opportunity recognition is thus a purely random process. Third, the term competition is as appropriately applied to factor markets as it is to the market for goods and services. In both cases, the markets are assumed to be in competitive equilibrium.

The Discovery Process View

Two factors influencing the distribution and use of new information have, therefore, attracted attention from researchers. The first is that access to information sources is extremely important, leading some researchers to suggest that the prime determinant of entrepreneurship is whether the entrepreneur has an advantageous network position from which informational advantages accrue (Burt, 1992). For instance, information is often “sticky” (von Hippel, 1994), in that it is tacitly accumulated by users, which means that access to the relevant information for discovery to occur is only available to a few individuals who have direct and intimate contact with users. Second, new information or knowledge often requires complimentary resources in order to be useful, such as a prior knowledge (Shane, 2000; Venkataraman, 1997) that is also often tacit in nature. Such prior knowledge creates the “absorptive capacity” necessary for an individual to make use of new information (Cohen & Levinthal, 1990).

The second reason why people possess different beliefs about the prices at which markets should clear is because, as Kirzner (1997) has observed, the process of discovery in a market setting requires the participants to guess each other’s expectations about a wide variety of things. However, the regular supply of new information from endogenous sources creates uncertainty (Knight, 1921) owing to the fact that the discovery of genuinely novel information by other agents can affect the value of resources. Such discoveries cannot be known ahead of time and may add previously unimagined categories of usage for particular resources, thus changing the structure of the decision problem the entrepreneur faces (Langlois, 1984). Since it is impossible to have accurate expectations about inventions that have yet to be

made, people form expectations based on hunches, intuition, heuristics, and accurate and inaccurate information, leading their expectations to be incorrect some of the time.

The problem of forming accurate expectations given the genuine uncertainty caused by the endogenous supply of novel information is compounded by some characteristics of human decision-making. All individuals utilize knowledge that is subjectively held, incomplete, and tacit. Entrepreneurs, therefore, form beliefs and expectations about future events that are indeterminate for at least three reasons. First, because much knowledge is tacit (Polanyi, 1966) other individuals – upon whose actions the correctness of the entrepreneur’s expectations depend – often base their decision-making on invisible elements of experience that are hard to verbalize, but are observed instead only as hunches, intuition, and judgement. Second, situations calling for prediction are not given self-evidently because the essence of any situation is how it is enacted by individuals (Weick, 1979). People often produce part of the situation they face (they “enact” it). The dependency of enactment on tacit cues imposed on a situation by individuals means that there is an indeterminacy in how individuals produce situations, just as there is an indeterminacy to how they react to them. This is especially so when multiple actors interact, making the production of a situation dependent on an “inter-enactment” process. The third reason why outcomes are indeterminate is because interaction among individuals gives rise to emergent outcomes. One example of an emergent outcome of the interaction of many individuals in a market is a structure of prices, but many other emergent outcomes are not so predictable, hence their discovery as an aspect of market processes. One of the traits of complex adaptive systems such as market processes is level differences: observed patterns of behavior differ dramatically between the micro- and macro-levels. In other words, macro-level phenomena are often indeterminate from micro-level observations. Hence the opportunity to discover is an outcome of the very inability to predict, or form accurate expectations, about such complex dynamic phenomena.

Since entrepreneurial opportunities depend on asymmetries of information and beliefs, entrepreneurs’ buying and selling decisions are not always correct and this process leads to “errors” that create shortages, surpluses, and misallocated resources. An individual alert to the presence of an “error” may buy resources where prices are “too low,” recombine them and sell the outputs where prices are “too high.” The notion that individuals can make these genuine discoveries about misallocated resources has led some researchers to stress the role of “surprise” (Kirzner, 1997) in this process. The nature of overlooked profit opportunities is that they are *completely* overlooked, and, therefore, individuals are genuinely surprised when they identify a hitherto unexpected profit opportunity. Such surprises are not searched for at the cost of a deliberate search process. Instead, individuals are totally ignorant of these misallocated resources and their total ignorance precludes a deliberate search process. Given that uncertainty and indeterminacy make expectation formation difficult, it is reasonable suggest that regular surprises will be a feature of the discovery process.

One factor that leads to stability in expectations is the role of institutions, which are routinized patterns of action. The presence of routines makes expectation

formation a possibility, since certain patterns of human behavior can be reasonably predicted based on the observation of routines. Given the limitations pertaining on human cognition (Simon, 1997), routines are an essential aspect of human action for two reasons: first, because they allow each particular individual to preserve scarce decision-making resources for application to non-routine decisions; and second, because they allow all other individuals to economize on scarce decision-making resources because they can make reasonable predictions about the actions of others based on observation of their routines.

Routines are, therefore, pervasive at the individual level, where we usually describe them as habits, as well as at the organizational level. Every individual has a particular regime of unreflective habits that are accumulated over a lifetime of experience and experimentation (James, 1907). The particular habits of an individual amount to a specialized collection of routines. Organizations such as firms also accumulate specialized collections of routines (Nelson & Winter, 1982). In fact, one example of a predictable routine is the entrepreneurial process described here: people can reasonably forecast that some other people conjecturing resources are undervalued in their current use and can be purchased and recombined and put to more valuable use. On the other hand, people can also reasonably forecast that many other individuals are simply carrying on with their daily lives: being a fireman, or minding their children, or relaxing in their old age. In fact, were it not for the presence of imperfect information and a wide variety of routine modes of behavior (i.e., non-alert, non-entrepreneurs) the entrepreneurial discovery process would not work (Loasby, 1999).

Institutions are important because they impose structure on the world, and as we have already seen, an absence of structure creates the kind of uncertainty that makes forming accurate expectations an impossibility. But to the extent that institutions do exist, expectation formation is a reasonable possibility. Institutional routines, therefore, are an important part of the discovery process in two ways: first, because routines create a stable interpretative scheme, they enable the entrepreneur to impose order on and make sense out of the “bloomin’ buzzin’ confusion” of experience (James, 1907); and second, because individuals know what a stable structure is, they are able to notice exceptions. In essence, the notion of surprise only makes sense because an individual knows when he/she is *not* surprised. Since cognitive limits mean individuals cannot be attentive to everything at once, entrepreneurial alertness (Kirzner, 1997) is a function of what is *not* given attention; i.e., it is a function of other routinized modes of behavior. In other words, entrepreneurial alertness is a scarce resource that comes with the opportunity cost of that which has been taken for granted. Given that opportunity cost is the essential feature of resource use in choice, this economic calculation ought to come as no surprise to us.

Of course, as the structure of a particular market becomes well-established and routinized, eventually entrepreneurial opportunities become cost inefficient to pursue. This occurs for two reasons. First, the opportunity to earn entrepreneurial profit will provide an incentive to many economic actors. As opportunities are exploited, an externality is created: information diffuses to other members of society at no cost or low cost, and these individuals can imitate the innovator and appropriate some of the innovator’s entrepreneurial profit. This diffusion through imitation is

one of the most important, yet, under-researched aspects of the entrepreneurial process (Nelson & Winter, 1982). Although the entry of imitating entrepreneurs may initially validate the opportunity and increase overall demand, eventually competition begins to dominate (Hannan & Freeman, 1984). When the entry of additional entrepreneurs reaches a rate at which the costs from new entrants exceeds the benefits, the incentive for people to pursue the opportunity is reduced because the entrepreneurial profit becomes divided among more and more actors (Schumpeter, 1934).

The second reason entrepreneurial opportunities eventually become cost inefficient to pursue is that the exploitation of opportunity provides information to resource providers about the value of the resources that they possess, leading them to raise resource prices over time to capture some of the entrepreneur's profit for themselves (Kirzner, 1997). In short, the diffusion of information and learning about the accuracy of decisions over time, combined with the lure of profit, will reduce the incentive for people to pursue any given opportunity.

The duration of any given opportunity depends on a variety of factors. The duration is increased by the, "inability of others (due to various isolating mechanisms) to imitate, substitute, trade for or acquire the rare resources required to drive down the surplus" (Venkataraman, 1997, 133). For instance, the provision of monopoly rights, as occurs with patent protection or an exclusive contract, increases the duration. Similarly, the slowness of information diffusion, or lags in the timeliness with which others recognize information, also increase the duration, particularly if time provides reinforcing advantages, such as occur with the adoption of technical standards (network externalities) or learning curves.

What makes the discovery process metaphor powerful is that the dual premises of a continuous supply of new information and a continuous process of realizing information about the "errors" of prior expectations suggest the market process will be a continuous one. This view of the market as a process distinguishes the discovery view from the allocative view, where the metaphor of equilibrium leads to the perception of markets in static terms. In contrast, the discovery process illustrates how the market is necessarily "alive" and a hive of human activity.

The Creative Process View

The origins of the creative process view are more recent than the older views based on the market as a discovery process and the even older and established view of the market as an allocative process. Consequently, this view is not yet as well-developed as the other two. The key idea in this view, as Buchanan and Vanberg (1991) point out, is that *telos* is neither ignored nor imposed on the phenomena concerned. Instead, ends emerge endogenously within a process of interactive human action (based on heterogeneous preferences and expectations) striving to imagine and create a better world.

The origins of the allocative process view lie in the philosophy of Adam Smith and the equilibrium-based calculus of Marshall (1920), Walras (1954), Arrow (1984), and Debreu (1991) and others; the development of the discovery process view owes its origins to the philosophical roots of evolution going back to Darwin (1859), and is steeped in the calculus of asymmetric information explicated by Hayek (1945), Nelson and Winter (1982), and others; similarly, the creative process view originates in the philosophy of pragmatism professed by James (1907) and Dewey (1917), and takes its cue for shedding a large portion of historical and even evolutionary determinism, instead moving toward a calculus of *contingency* based on the notion of human “free will.”

In 1996, founding his arguments on the work of pragmatic philosophers, and drawing from reputed scholars in a variety of social sciences, Hans Joas (1996) sought to establish the creative nature of all human action. Key to his theorizing is a triad of arguments that demonstrate that action (as an empirical fact) is: (a) always situated (i.e., cannot presuppose purposes or be divorced from the sources of the actor’s intentions); (b) intrinsically corporeal (i.e., cannot be freed from the constraints and possibilities of the body of the actor); and (c) essentially social (i.e., cannot originate or occur meaningfully in the absence of others). The three sets of arguments challenge the existing conceptions of human action based on formal or normative models of “rationality” (for example, models of subjective expected utility). In Joas’ own words, “. . . I have argued that some approaches towards a conceptualization of human creativity have actually drawn an artificial rift between creative action and the totality of human action. My intention is therefore to provide not a mere extension to, but instead a fundamental restructuring of the principles underlying mainstream action theory.” (1996, 145).

Joas shows that to the extent that an actor is incapable of purposive action, lacks control over his own body, and is not autonomous vis-à-vis his fellow human beings and environment, his actions are creative. In other words, they end up creating novelties in our world. Hence, in Joas’ conception, instead of being anomalies to be explained, surprise and novelty become natural desiderata of a theory of human action that is not confined to so-called “rational” action.

The creative process view urged by Buchanan and Vanberg (1991), although developed independently of Joas’ work, asks us essentially to speculate on an alternative model of human action, and to develop non-teleological theories of economics. In other words, if human beings are not assumed to be “rational” actors, but instead if human behavior is deemed inherently creative, what kind of an economics (or any other social science, for that matter) would we get?

Joas (1996) and Buchanan and Vanberg (1991) are not isolated in their exhortation to scholars to pursue this line of inquiry. March’s garbage can model of decision-making contains one such set of attempts (March, 1994). In his own words, “In a garbage can process, it is assumed that there are exogenous, time-dependent arrivals of choice opportunities, problems, solutions, and decision makers. Problems and solutions are attached to choices, and thus to each other, not because of any means-ends linkage but because of their temporal proximity” (1994, 200). Examples of garbage cans include committee and board meetings where a variety of problems,

solutions, and decision-makers come into temporal proximity with or without particular means-ends chains being involved in the coming into being of particular choices. Building further upon such attempts, March urges us to build a “technology of foolishness” or theories of decision-making in the absence of pre-existent goals (March, 1982).

Other attempts in this direction include the empirical work based on Weick’s theories of enactment and sensemaking (Weick, 1979). Just as March’s oeuvre on decision-making highlights the endogeneity of goals, Weick in his theory of enactment focuses on the endogeneity of the environment. He points out how theorizing about “organization” and “environment” as two separate entities prevents organizational scholars from asking important questions. In his own words, “But the firm partitioning of the world into the environment and the organization excludes the possibility that people *invent* rather than discover part of what they think they see.” (1979, 166).

As early as 1969, Simon (1996) had talked about designing or planning without final goals and the *artificial* nature of the world we live in. His exposition brought out the role of current action in the design of future environments. In his own words, “The real result of our actions is to establish initial conditions for the next succeeding stage of action. What we call ‘final’ goals are in fact criteria for choosing the initial conditions that we will leave to our successors.” Therefore, how we want to leave the world for the next generation becomes an important question in theories based on the creative view.

In sum, the crux of the creative process view is the need to build non-teleological theories of human action, wherein values and meaning emerge endogenously. Recent empirical work in expert entrepreneurial decision-making (Sarasvathy, 2001b) has led to the development of such a non-teleological theory in entrepreneurship. This theory posits an alternative to predictive (causal) rationality, called effectuation, that underlies decisions made by entrepreneurs in bringing new firms and markets into existence (Sarasvathy, 2001a). Starting without any given goals, effectuation inverts the key principles and logic of predictive rationality to carve out an alternative paradigm to rational choice. In this view opportunities do not pre-exist—either to be recognized or to be discovered. Instead they get created as the residual of a process that involves intense dynamic interaction and negotiation between stakeholders seeking to operationalize their (often vague and unformed) aspirations and values into concrete products, services, and institutions that constitute the economy.

Integrating the Three Views

In the foregoing exposition we have outlined and briefly discussed three views of entrepreneurial opportunity under the broader umbrella of the three views of the market process as allocative, discovery, and creative. We now turn to the question of how to integrate the three views into our practice and pedagogy and future scholarship, particularly in the area of entrepreneurship.

One way to look at the three views would be to simply consider them three equally valid and non-overlapping modes of thinking about entrepreneurial opportunities. Such an approach focuses only on the distinctions between the views and overlooks both the possibilities of relationships and interactions between them, and also the fact of empirical confounding in the way they are embodied in economic phenomena. Table 4.1 sets out all three views along certain key dimensions and allows us to discuss from a bird's eye view, as it were, both distinctions and overlaps.

For example, looking at the operationalization of the three views as the recognition, discovery, and creation of opportunities suggests that the creative view might be more general than and prior to the other two views. This is because creative processes contain recognition and discovery as necessary inputs, while recognition and discovery can do without most key aspects of creativity. A simple example of this point is that before we can “recognize” or “discover” great art, that art has to have been created. Similarly, entrepreneurial opportunities may be posited to have been “created” through the decisions and actions (conscious or unintended) of economic actors before someone can “recognize” or “discover” them. For instance, once specific goals, values, and preferences have been formed through the creative process, discovery processes can discover various means to achieve the goals. And when both ends and means become manifest, allocative processes figure out which particular means can best achieve which particular ends.

We could argue the case of Starbucks as an illustration. The original founders (before Howard Schultz came into the picture) acted effectually to create a shop selling fresh roasted beans in Seattle, mostly because one of the founders happened to love coffee from fresh ground beans. It did not even strike them to brew coffee and allow customers to taste it, let alone a vision of the Starbucks coffee bar market as it exists today. After customers actually asked to taste the coffee, the firm turned into a coffee shop that then allowed Schultz to “discover” the potential market for coffee bars and franchise the idea nationally. Today, almost anyone with the basic resource requirements can open up a Starbucks franchise. In this particular case, we can see how each of the three views of entrepreneurial opportunity is empirically valid at different stages of market creation.

Another way to integrate the three views would be to recognize that they are extremely context-dependent. In other words, each view is useful under different circumstances, problem spaces, and decision parameters. For example, when resources are clearly specified and goals are given, the allocative view will be the most appropriate. In contrast, when the problem spaces are characterized by enormous uncertainties, and value criteria for making choices are highly ambiguous, a creative approach might be called for.

The essence of our exposition is not to establish the superiority of any one of the three views or even to completely characterize them in all their possible relationships. Rather, our explicit intention here is to demonstrate that the study of entrepreneurial opportunity is a far richer and substantially more textured and interesting area of inquiry than it has hitherto been supposed to be. Furthermore, it derives its interest and promise as much from the practitioner's desire to earn higher

profits as from the philosopher's and artist's dreams of creating a better world. But perhaps *most importantly*, an inquiry into entrepreneurial opportunity has the potential to unlock one of the greatest intellectual puzzles of our time, namely the creation of new value in society.

Summary and Conclusion

In conclusion, every invention² engenders opportunities for the creation of several possible economic (as well as other types of socially significant) effects. In the foregoing sections we have examined three sets of views with regard to how these effects come to be. Approaches based on the view of the market as an allocative process focus entirely on the final effects of opportunity creation, treating the processes leading to these final effects as mere detail; approaches based on the view of the market as a discovery process emphasize only the origins of the opportunity for creation, treating the final effects as inevitable products of competitive markets; and finally, approaches based on the view of the market as a creative process emphasize the decisions and actions of the agents, making both origins and final effects contingent upon those decisions and actions.

In our view, if we are to deepen our understanding of entrepreneurial opportunity, we need to integrate these three approaches, emphasize contingencies rather than inevitabilities in each. As a first step in that direction, we offer the following fundamental argument for the study of the central phenomena of entrepreneurship—viz., entrepreneurial opportunities.

Conjecture 1:

The set of all possible economic goods based on any invention is larger than the set of economic goods actually created within a finite period of time after the invention.

Conjecture 2:

Not all actual economic goods created from an invention will be created by existing economic entities. In other words, the creation of new economic goods often entails the creation of new economic entities such as new firms and new markets.

Conjecture 3:

From the point of view of economic welfare, not all actual economic goods and economic entities arising out of any invention are equally “desirable.”

Ergo, the lags (temporal and otherwise) between any invention and the creation of new economic welfare enabled by it, require not only the ability and alertness to recognize, and the perception and perseverance to discover opportunities for the achievement of pre-determined goals such as increasing profits and larger market

²The term “invention” need not be limited to technological (i.e., science-based) inventions. Inventions can occur in all spheres of human activity – in the arts (surrealism), in sports (snowboarding), and in philosophy (pragmatism), to name only a few.

shares, but also necessitate decisions and actions based often only on human imagination and human aspirations, that may or may not in time lead to new products, firms, and markets.

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Part II
The Emergence of New Ventures

Chapter 5

Entrepreneurial Behavior: Firm Organizing Processes

William B. Gartner, Nancy M. Carter, and Paul D. Reynolds

Introduction

The purpose of this chapter is to offer some ideas and evidence about the processes of organization formation. We look at the founding of independent for-profit businesses for insights into the nature of organization formation, in general, realizing that other kinds of organizations, such as voluntary organizations, non-profit organizations, and governmental organizations, may be founded in different ways (Aldrich & Reuf, 2006; Gartner, 1993; Gartner & Gatewood, 1993; Scott, 1997). The focus of research on entrepreneurial behavior is about exploring “how” various activities undertaken by individuals emerge into organizations. Entrepreneurial behavior is a type of organizational behavior (Bird, 1989). Entrepreneurial behavior involves the activities of individuals who are associated with creating new organizations rather than the activities of individuals who are involved with maintaining or changing the operations of on-going established organizations (Gartner et al., 1992; Gartner & Starr, 1993). This chapter does not attempt to investigate the factors and causes that might lead to the initiation of organization formation activities. Discussions of theory and evidence about “why” organizations are likely to be formed have been addressed by a number of scholars (Aldrich & Reuf, 2006; Kirchoff, 1994; Reynolds, 1992; Reynolds & White, 1997; Reynolds et al., 2000; Schoonhoven & Romanelli, 2001; Storey, 1994), and were also the subject of two special issues of *Entrepreneurship Theory and Practice* (1992, 1993).

We view entrepreneurship as an organizational phenomenon, and more specifically, as an organizing process. Without belaboring the etymology of the word “entrepreneurship,” [see, for example, Baumol (1993), Bull and Willard (1993), and Herbert and Link (1988), for discussions of a history of entrepreneurship definitions; and Amit, Glosten and Muller (1993) and Gartner (1990, 1993, 2001) for

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recent interpretations], its root, *entreprendre* [i.e., go ahead, take in hand, undertake, take a hold of (Crookall, 1994, 333)] is fundamentally about organizing [as in a “generic category of assembly rules,” (Weick, 1979, 235)]. *Organizing* involves the coordination and establishment of routines, structures, and systems (Becker & Gordon, 1966; Nelson & Winter, 1982; Ronen, 1982). Organizing processes are accomplished through interactions among people, continually re-accomplished and renewed over time (Pfeffer, 1982). We posit that the roots of entrepreneurship are, therefore, embedded in social processes (Katz, 1993; Katz & Gartner, 1988) and we consider the processes of organization formation to be the core characteristic of entrepreneurship (Carter et al., 1996; Gartner, 1985, 1988, 2001).

Parts of this chapter are devoted to defining the scope and boundaries of entrepreneurial behavior, as a topic area in the field of entrepreneurship. In the next section of this we attempt to alert the reader to what we consider to be some of the primary characteristics of the phenomenon of entrepreneurial behavior. We believe that entrepreneurial behavior is an individual-level phenomenon, which occurs over time (is a process), and results in an organization as the primary outcome of these activities. We then identify an issue that we believe has caused considerable confusion in the entrepreneurship field: namely the assumption that the study of new organizations is comparable to the study of emerging organizations. We argue that the information gained from the retrospections, insights, or the current behaviors and thought processes of individuals who are operating established new businesses are not comparable to the experiences of individuals actually in the process of organization creation. Research on individuals already in business tells only one side of the story about the process of organization creation—about outcomes of emergence. We will argue that research based on samples of individuals in new firms are biased in a way that renders them unusable for answering fundamental questions about how entrepreneurs create organizations. If the reader accepts our point of view about the need to use samples of individuals in the process of starting businesses for research on organization formation, then, prior empirical research that is germane to this literature review dramatically decreases.

The third part of this chapter specifies the outcomes of entrepreneurial behavior: the characteristics of new organizations. We believe the reader gains some important insights into the process of entrepreneurial behavior through this exploration of the kinds of organizational characteristics that can be used to manifest a “new organization.” It is not apparently easy to specify the characteristics of a new organization, and since (as will be shown) new organizations manifest themselves, over time, in various ways, appreciating the variety of characteristics that constitute the existence of a new organization suggests the variety of behaviors that might lead to generating these characteristics.

The fourth section of this chapter offer ideas and empirical evidence about whether specific entrepreneurs influence the likelihood of success in creating new organizations and insights into the overall “gestalt” of entrepreneurial activities and possible ways these sequences of activities might be combined in order for an organization to emerge. We identify a growing number of empirical studies that focus on the activities of individuals involved in founding organizations. In the fifth section,

we suggest a few possible ways that research on entrepreneurial behavior might be approached. Finally, the chapter ends with some recommendations for future research in this area.

Characteristics of Entrepreneurial Behavior

There are a number of assumptions that influence this overview of research on entrepreneurial behavior that differs dramatically with assumptions that guide the work of other scholars who focus on other aspects of organization creation. First, the process of creating a new organization is, inherently, an individual-level phenomenon. Individual behaviors are the principal necessary ingredients for organization formation to occur. Without the organization creation activities of individuals, there are no organizations. So, while organization formation occurs within a particular context (Aldrich & Ruef, 2006; Gartner, 1985; Schoonhoven & Romanelli, 2001)—environmental, economic, social, community, political—organizations are not created by their context. Entrepreneurs are necessary for entrepreneurial behavior, and it is through the actions of entrepreneurs that organizations come into existence. We see entrepreneurial behavior as something that individuals engage in, rather than firms (Lumpkin & Dess, 1996). We are not suggesting that entrepreneurs, as firm organizers, are inherently unique, *per se*, compared to individuals undertaking other kinds of activities. Rather, we stipulate that organization formation requires activity, and that activity occurs through the actions of individuals. From the entrepreneurial behavior perspective, it is the behaviors that matter (as the primary way in which variation among individuals would be ascertained) not the characteristics of these individuals, themselves (Gartner, 1988). This perspective assumes that there are individual differences both between new firm founders (nascent entrepreneurs) compared to non-founders and among firm founders, themselves. The study of individual differences are of interest in ascertaining those factors that might prompt some individuals to engage in firm formation activities (compared to others), as well as specifying why nascent entrepreneurs engage in different entrepreneurial activities. Individual characteristics matter, therefore, in that they are likely to be associated with differences in individual behaviors. But, it is the behaviors, themselves, that produce organizations. It should also be pointed out that the behaviors involved in organization formation are likely to be imbedded in the actions of many individuals, rather than through a single individual. A significant percentage of firm formation activities involve teams of individuals (Ruef et al., 2003). Therefore, it would be the behaviors of all individuals involved in the formation of a firm that would comprise the process of organization creation.

Second, entrepreneurial behavior is a process. When we discuss the activities of individuals engaged in entrepreneurial activities, we hope the reader realizes that these activities occur over a period of time. While the ways in which we observe and report on entrepreneurial activities might lead one to think that these activities are

concrete and limited events, we recognize that most entrepreneurial activity requires a set of actions or series of actions, over time.

Third, the creation of an organization is the principal outcome of entrepreneurial behavior, that is, our primary dependent variable for research on entrepreneurial behavior is determining whether an organization comes into existence, or not. While a number of other outcomes of entrepreneurial activity might occur in the organization formation process (e.g., the creation of new products, the identification of new markets, new customers and groups of customers, the acquisition of new skills and knowledge) the fundamental outcome of entrepreneurial behavior is the organization, itself. We are cognizant that there are numerous quantitative and qualitative differences in the kinds of organizations that are created. Such organizational characteristics as size (in sales and employees), rate of growth, profitability, and innovativeness are certainly important to recognize when making judgments about the subsequent value of the outcomes of entrepreneurial behavior.

Finally, we note that the process of entrepreneurial behavior is a multi-level phenomenon and that it is often difficult to separate what constitutes an independent variable (an entrepreneurial activity) from a dependent variable (a characteristic of a new organization). For example, the activity of “making sales” is both an important individual-level entrepreneurial behavior and an important characteristic that indicates that an organization exists. An individual is actually involved in creating a sales transaction, that is, an organization cannot actually sell: an individual must undertake those activities. Yet, “making sales” is a critical signifier of an important organizational characteristic (Brush et al., 2008; Katz & Gartner, 1988; Kim, 2006; Reynolds & Miller, 1992). Is “making sales” an individual-level or an organization-level phenomenon? It is difficult to keep separate what appear to be individual-level activities and events from what essentially is something that is, or becomes, the organization, itself. This problem is omnipresent in research on entrepreneurial behavior: at some point individual entrepreneurial activity emerges into organizational behavior. Demarcating when this transition actually occurs is surprisingly difficult to do (Kim, 2006; Reynolds & Miller, 1992).

Much of our discussion about the current state of knowledge on the topic of entrepreneurial behavior and possible directions for future research on entrepreneurial behavior is informed by our insights and experiences with developing the Panel Studies of Entrepreneurial Dynamics—PSED I (Gartner et al., 2004; Reynolds, 2000, 2007; Shaver et al., 2001) and PSED II (Reynolds & Curtin, 2008). PSED I is detailed longitudinal survey information on 830 individuals that were identified while they were in the process of starting new businesses (from 1998 to 2002 depending on when they were contacted). This sample of nascent entrepreneurs was generated from a random sample of 64,622 working age adults in the United States. PSED II began in 2005 with the selection of a cohort of 1,214 nascent entrepreneurs chosen from a representative sample of 31,845 adults. Both PSED I and II are representative, generalizable samples of all entrepreneurial activity in the United States. There are now, also, other national PSED-like generalizable surveys of nascent entrepreneurs in other countries: Australia (Davidsson et al., 2008a, 2008b), Canada (Diochon et al., 2005; Menzies et al., 2006), Germany

(Brixy & Hessels, 2009). Latvia (Baltrušaitytė-Axelsson et al., 2008), Netherlands (Van Gelderen et al., 2006), Norway (Alsos & Kolvareid, 1998; Alsos & Ljunggren, 1998; Rotefoss & Kolvareid, 2005), and Sweden (Delmar & Davidsson, 2000).

PSED I and II are among the very few national databases to offer systematic, reliable, and generalizable data on the process of business formation. Other national studies of the process of business formation similar to the PSED efforts have also occurred in Australia, Sweden, and Norway. The PSED includes information on: the proportion and characteristics of the adult population involved in attempts to start new businesses, the kinds of activities these nascent entrepreneurs undertake during the business startup process, and the proportion and characteristics of the startup efforts that become new firms. As will be described in later sections of this chapter, research results from analyses of the PSED have generated significant insights into the process of how firms emerge.

“New” Organizations Are Not “Emerging” Organizations

Before the existence of the PSED studies, there are very few “facts” about the process of organization formation as it actually occurs, and, a great deal of speculation. Most studies of firm organizing activities have been retrospective explorations of the startup behaviors of individuals who are already in business. This is a significant problem. As pointed out by other scholars, surveying only entrepreneurs who have successfully started firms introduces significant selection bias into any research program attempting to explore issues involved with the creation of organizations (Aldrich & Ruef, 2006; Aldrich et al., 1989; Delmar & Shane, 2003; Katz & Gartner, 1988). Obviously, when only those individuals who have successfully started businesses are surveyed, no information on startup activities is provided on those individuals who failed in their startup attempts. Indeed, it is the knowledge gained from studying the “failures” that provides reasonable contrasts for making sense of the “successes.” Information gleaned from the individuals who successfully started new businesses cannot be used to infer whether the unsuccessful nascent entrepreneurs behaved differently. For example, if a survey of individuals who successfully started a new business indicates that 75% of these individuals initiated a particular organization creation activity, this finding cannot be used to imply that individuals who did not successfully start a new business did not undertake this activity. It could be plausible that the same percentage of the unsuccessful nascent entrepreneurs also initiated this same activity. It is very difficult to ascertain whether a behavior undertaken by a successful entrepreneur, is indeed, important, without information from the unsuccessful nascent entrepreneurs on whether they undertook such behaviors, or not. If the outcome of entrepreneurial behavior is an organization, then, exploring the behaviors of entrepreneurs who all had successful outcomes (new organizations) does not really seem to address the variation between those that were successful and those that did not start organizations.

Some scholars have assumed that the identification of all new organizations in a particular population of organizations are likely to represent all of the variation that occurred during prior attempts at founding, and that studies of new organizations would likely be an adequate surrogate for speculations about the creation of variation in organization populations (Carroll & Hannan, 2000). We suggest that the activities involved with attempts at creating organizations are likely to be where the majority of possible variations, and sources of variations in possible new organizations are likely to occur (Aldrich & Ruef, 2006; Katz & Gartner, 1988). The process of attempting to start businesses are experiments that are conducted by millions of nascent entrepreneurs to test their hypotheses about whether their ideas, skills, capabilities, and actions might result in successful outcomes (e.g., establishing an on-going organization). It is in the process of organization formation that there are likely to be more degrees of freedom to generate a variety of organizations and new types of organizations. To assume that samples of individuals who had successful solutions to the problem of organization creation represent all of the possible ways that nascent entrepreneurs might have engaged in organization creation is a substantial leap of faith. We believe that scholarship on entrepreneurial behavior should be based, primarily, on studies that observe individuals in the process of organization creation.

Our inclination is to focus only on studies that have used samples of nascent entrepreneurs, that is, to look at individuals in the process of starting businesses, and to ignore evidence from studies that survey founders of new on-going organizations. We try to point out, in our overview of research on entrepreneurial behaviors, on the composition and characteristics of the individuals in the samples analyzed. We believe that the evidence provided in the following sections of this chapter support the view that research on organization formation processes needs to study these activities while they occur. Samples used in research on organization creation need to reflect all possible attempts at organization creation, not just those attempts that resulted in new firms.

The Characteristics of Emerging Organizations

If entrepreneurial behavior involves creating organizations, then, an important aspect of scholarly study of the organization creation process involves specifying, what, exactly, is being created. Identifying when a new organization occurs, as well as what constitutes a new organization, is a challenge. For example, one way to measure the successful creation of a new business is whether a business license exists. It is entirely possible for an individual to acquire a business license without an idea about what the business is going to do, without any sales, without any specific resources, and without a physical location. In fact, the first activity an entrepreneur could engage in could be the acquisition of a business license. Is the possession of a business license an organization? Should a business license, then, be the primary measure of whether an organization has been created? Every measure that can be used to indicate whether an organization exists has both benefits and problems.

There are numerous ways in which organizations can demonstrate their existence (Schoonhoven et al., 2009). In a review of theory and empirical research on the characteristics of organizations in the process of creation, Katz and Gartner (1988) suggested that there are four “properties” that could be used to identify their emergence: *intention* (characteristics that demonstrate purpose and goals), *resources* (physical components, such as human and financial capital), *boundary* (barrier conditions that distinguish the organization, as such—incorporation, phone listing, a tax identification number), and *exchange* (transactions between the emerging organization and others, such as sales, loans, or investment). They indicated that an emerging organization would “reveal” itself in different ways, and that a focus on any one of these four properties would result in an observer noticing, at different times, the newly created organization. As a way to explore the emergence of these four properties, we will first look at the problems involved in finding organizations *that are already in existence* as a way to see whether these properties might be useful to identifying organizations in the process of emergence.

Scholars who have attempted to find organizations (new and “old”) have found that different data sources of organizations and different methods for finding organizations result in substantially different numbers and types of organizations identified (Aldrich et al., 1989; Birley, 1984, 1986; Kalleberg et al., 1990; Busenitz & Murphy, 1996; Murphy, 2002). For example, Kalleberg et al. (1990) demonstrated that in a comparison of five methods for identifying organizations in a specific geographical area (enumeration—physically canvassing an area, telephone white pages, ES202—state unemployment insurance files, DMI—Dun and Bradstreet Market Identifier Files, and Chamber of Commerce listings), using telephone white pages revealed the largest number of businesses (6,220) and using Chamber of Commerce listings revealed the least (1,131). Only 52.6% of the businesses identified by these methods were listed in more than one data source, and only 5% of the businesses identified were found in all five data sources. Other studies have found little overlap among the businesses identified using different data sources, as well as indications that each data source of organizations has certain inherent biases towards certain kinds of organizations by type of industry, size, and ownership (Aldrich et al., 1989; Birley, 1986; Busenitz & Murphy, 1996; Murphy, 2002). These studies implicitly assume that organizations “exist” and that the only difficulty for scholars is in finding them. But, in fact, the measures used for identifying organizations “defines” whether they actually “exist.” Recognizing that these studies were intended to find organizations in existence, rather than organizations in the process of coming into existence, suggests that the problem of identifying when an organization has been created is likely to be even more difficult. We believe that there are a number of different “birthdays” for an emerging organization. These “birthdays” depend on the measures used to indicate “birth.”

Some studies have attempted to trace the various properties of firm emergence over time. Reynolds and Miller (1992) used samples derived from DMI files in Minnesota and Pennsylvania to identify firm founders who were interviewed about the occurrence (month and year) of four “gestation markers” in the creation of their businesses: *personal commitment* (when members of the startup team first made an investment of personal time and resources), *financial support* (when first outside

financial support was obtained), *sales* (when first sales income received), and *hiring* (when firm first hired anyone, full or part time). They found that

... *none* of these features of gestation in living systems are shared by new firms. Not all events occur. Every possible sequence of events was present. There is substantial variation in length of the gestation period. (Reynolds & Miller, 1992, 408)

Firms do not “signal” their emergence in the same way. About one-half of all of the firms in their sample did not report all four events. When computing the time between the first events reported and the last event reported (irregardless of how many events were reported) they found that about 80% of all of the firms underwent the gestation process within 2 years. The first event for over 80% of new firms is personal commitment. In addition, the first event for 40% of new firms is sales. About half of all firms reported simultaneous first events of two or more activities. Last events reported ranged from 50% of firms indicating hiring employees or receiving sales income, 40% of firms indicating receiving financial support, and 25% indicating personal commitment. After a number of analyses to explore various sequences of startup events, Reynolds and Miller (1992) summarize their findings by suggesting that

The most important implication is the importance of separating the founding process into two parts. The gestation period, from conception to birth, should be treated separately from the post-birth period. (p. 416)

In studies using the PSED I dataset, both Brush et al. (2008) and Kim (2006) generated insights similar to Reynolds and Miller (1992) regarding patterns of emergence. Brush et al. (2008) found that all four properties identified in the Katz and Gartner (1988) framework were necessary for firm survival in the short term, the

Table 5.1 Interview items used to infer current status of the startup: PSED I + II

	PSED I	PSED II
New firm	(1) How would you describe the current status of this startup? Is it ... an operating business?	(1) Received income in 6 of part 12 months (2) Income covered all expenses (3) Owner’s wages and salaries included in expenses
Startup active	(1) How would you describe the current status of this startup? Is it ... still an active startup phase, still a still a startup but currently inactive?	(1) Devoted more than 160 h in past 12 months to startup (2) Expect to spend 80 or more hours in next 6 months on startup OR (3) Startup is a major focus of work career over the next 12 months
Quit	(1) How would your describe the current status of this startup? Is it ... no longer being worked on by anyone?	(1) Would you consider yourself disengaged from the business effort discussed a year ago?

sequence in which these properties manifest themselves varied, and that the property of intention did not necessarily precede the other three properties or increase the likelihood of venture creation. Kim (2006) in an exploration of three emergent properties (goal orientation, boundedness, and interorganizational exchange) found that the sequences in which these properties manifest themselves differed for various industrial sectors.

In Table 5.1, we identify the items used in PSED I and II to determine the status of an emerging organization. For PSED I, respondents provided their personal judgments about the status of the organizing effort. In PSED II, specific criteria were used to infer that a new firm had been established. In both projects, the respondent provided a determination of when the respondent stopped engaging in the startup process.

Entrepreneurial Behaviors: Firm Formation Activities

A number of scholars have suggested a variety of activities that are necessary for organization creation, as well as an explicit, or sometimes implied sequence of how these activities will occur. For example, Gartner and Starr (1993) identified 24 different lists of entrepreneurial activities taken from various scholarly books and articles when they attempted to generate a comprehensive list of entrepreneurial behaviors and sequences of entrepreneurial behaviors. It should be noted that most of these lists of activities were based on anecdotal evidence, rather than on systematic research studies. Gartner and Starr (1993) indicated that the predominant way in which entrepreneurial activity was construed involved viewing the process of organization creation in a mechanistic way (Morgan, 1996), that is, seeing entrepreneurial activity as a set of behaviors involved with assembling various resources that can ultimately be combined into an organization. Van de Ven et al. (1989) describe this process of assembly as an accumulation or epigenetic model of change: “Over time, these entrepreneurs accumulate the external resources and technology necessary to transform their ideas into a concrete reality by constructing a new business unit” (p. 225). For example, Vesper (1990, 109) specifies that the process of organization creation involves the acquisition of five key ingredients: (1) *technical know-how* to generate the company’s product or service, (2) the *product or service idea* which provides direction for the organization’s efforts, (3) *personal contacts*, “because ventures are not started in isolation,” (4) *physical resources*, and (5) *customer orders*. He then presents anecdotal evidence to indicate that these five key ingredients can be combined in a variety of differences sequences (e.g., 1-2-3-4-5, 4-1-5-2-3, 5-3-1-4-2, etc.). As was shown earlier in the Reynolds and Miller (1992) study, Vesper’s suggestion that the sequence of startup activities may not follow, what appears to be a logical progression (e.g., 1-2-3-4-5), seems to have systematic empirical support. Yet, most lists of entrepreneurial activities do suggest a particular sequence of activities, such as Birley (1984) who assumes that the venture creation process will occur in the following order: (1) decision to start a business,

(2) quit job, (3) incorporate, (4) establish bank account, (5) acquire premises and equipment, (6) receive first order, (7) pay first tax, (9) hire full-time employees.

Since the Gartner and Starr (1993) overview of entrepreneurial behavior research, there have been a number of systematic empirical studies of how entrepreneurial activities might lead to the formation of an organization. The empirical studies that have explored a comprehensive view of the constellation of activities that might result in organization formation can be identified as those involved with in-depth event histories of a few organizations created while studying the innovation process (Garud & Van de Ven, 1992; Van de Ven & Polley, 1992; Van de Ven et al., 1989; Venkataraman & Van de Ven, 1989) and studies that have explored whether a specified list of entrepreneurial activities are involved in creating a broad range of different types of firms (Carter et al., 1996; Gatewood et al., 1995; Lichtenstein et al., 2007; Reynolds, 2007; Reynolds & Curtin, 2008). There have also been numerous studies that have focused on specific behaviors (such as business planning), or sets of behaviors, and the influence of these specific behaviors on success at starting a business (e.g., Delmar & Shane, 2003; Honig & Karlsson, 2004; Liao & Gartner, 2006; Shane and Delmar, 2004). A discussion of the findings of these studies will be discussed in the following section.

Since Van de Ven and his colleagues have primarily focused on the nature of innovation within established organizations as a way to understand entrepreneurial behavior, and since their line of research has been discussed, in detail, elsewhere (Poole et al., 2000), we will summarize their efforts by suggesting that their findings indicate a multitude of different entrepreneurial activities and a variety of sequences of these activities can result in the formation of a new business. Indeed, in a very thoughtful reanalysis of data from two of their previous innovation studies (Cheng & Van de Ven, 1996), what appear to be random events and activities in the initial stages of a venture's development can be understood as following a chaotic pattern. Overall, the findings from these innovation studies indicate that the pattern of activities that might lead to organization formation does not appear to follow the same sequential process.

Gatewood et al. (1995) studied 147 nascent entrepreneurs who had contact with a Small Business Development Center between October 1990 and February 1991, and explored whether certain cognitive factors as well as certain entrepreneurial activities led to the formation of a business (measured by whether sales had occurred) 1 year later (by February 1992). After a review of previous literature to identify specific entrepreneurial activities, and the use of a focus group of SBDC counselors to enlarge and revise this list, 29 separate entrepreneurial activities were generated that were grouped into five categories of behavior: gathering market information, estimating potential profits, finishing the groundwork for the business, developing the structure of the company, and setting up business operations. This list of 29 entrepreneurial activities was mailed to the nascent entrepreneurs in the follow-up survey. Nascent entrepreneurs were asked to indicate whether any of the 29 activities were undertaken, and, for those activities, to estimate the number of hours they had devoted to them. When an analysis of these responses were undertaken, Gatewood et. al. (1995) found that activities involved with setting up business operations (e.g.,

purchasing raw materials and supplies; hiring and training employees; producing, distributing, and marketing a product or service) were significantly correlated to the creation of a new firm (as measured by sales). The other categories of activities were not significantly correlated to the subsequent establishment of a firm. It should be noted that this study did not attempt to explore whether any particular sequence of these activities might result in a new firm since specific dates for each activity were not ascertained on the survey.

Carter et al. (1996) using data from a random sample of 683 adult residents in Wisconsin and 1,016 adults across the United States, identified 71 nascent entrepreneurs who had provided information on their startup activities. These nascent entrepreneurs were initially surveyed about their startup activities between 1992 and 1993 and were re-interviewed 6–18 months later. This study explored three broad questions: What activities do nascent entrepreneurs initiate when attempting to start a business? How many activities do they initiate? When are particular activities initiated? Approximately, one-half of the respondents had initiated a business by the time of the follow-up interview, over 30% were still engaged in activities to start a business, and 20% had given up on their efforts at business formation. In general, those nascent entrepreneurs who were able to establish a business were more likely to engage in more business formation activities, and engage in these business formation activities earlier, than the other two groups. For the first year of the startup process, the activity levels of those nascent entrepreneurs who “gave up” were very similar to the activity levels of those nascent entrepreneurs who established businesses. In subsequent periods the nascent entrepreneurs who gave up engaged in fewer activities than those that successfully established firms. Those nascent entrepreneurs who were in the “still trying” stage were likely to engage in fewer activities compared to the other two groups. Similar to the findings of Gatewood et al. (1995), it appeared that the nascent entrepreneurs who were able to successfully start a new business engaged in activities that made their businesses more tangible to others: they looked for facilities and equipment, they sought and got financial support, formed a legal entity, bought facilities and equipment, and were more likely to devote full time to the business. For those nascent entrepreneurs who indicated that they had started a business: 94% had sales, 71% had filed a federal income tax statement for their business, 50% had positive cash flow, and 47% were paying FICA taxes. Surprisingly, nascent entrepreneurs in the other two groups (still trying and gave up) had also achieved some of these new firm startup markers: 50% of those that gave up and 48% of those who indicated they were still trying had achieved sales, 19% of both those who gave up and those who were still trying reported positive cash flow, and 19% of those still trying and 6% of those who had given up had filed a federal income tax form for their business.

In undertaking the Carter et al. (1996) study, it became apparent that only a limited amount of knowledge could be gleaned from a sample of 71 nascent entrepreneurs. It was at this point, that Nancy M. Carter, William B. Gartner, and Paul D. Reynolds conceived of a plan to involve other scholars in an effort to raise funds for the development of much larger sample of nascent entrepreneurs. Except for the pilot studies that served as the samples for Carter et al. (1996), previous

efforts by Paul Reynolds to raise funds from government agencies for a national panel study of nascent entrepreneurs had been unsuccessful (Reynolds, 2000). It was believed that if a sufficient number of scholars could convince their institutions to provide \$20,000 each, these funds might be sufficient for a sample of hundreds of nascent entrepreneurs. And, not only could more insights be gained into the activities of nascent entrepreneurs, other questions about their startup efforts (e.g., their backgrounds, attitudes, network, net worth, and skills) could also be explored. The genesis of the PSED was born; therefore, out of the frustrations of having information on the behaviors of such a small sample of 71 nascent entrepreneurs.

The organization formation activities that were asked of the nascent entrepreneurs in the PSED I and II are listed in Table 5.2. For PSED I, the list of behaviors was generated, primarily, from combining lists of behaviors from Carter et al. (1996) and Gatewood et al. (1995). Additional activities were also added. The

Table 5.2 Startup activities by prevalence: PSED I, II

Startup activity	PSED I (%)	PSED II (%)	Average (%)
Serious thought given to the startup	100	99	100
Actually invested own money in the startup	87	75	81
Began saving money to invest in the startup	69	–	69
Began development of model, prototype of product, service	79	53	66
Began talking to customers	–	66	66
Began defining market for product, service	86	40	63
Organized startup team	58	–	58
First use of physical space	–	57	57
Purchased materials, supplied, inventory, components	70	43	57
Initiated business plan	61	48	55
Began to collect information on competitors	–	49	49
Purchased or leased a capital asset	52	41	47
Began to promote the good or service	56	36	46
Receive income from sales of goods or services	40	47	44
Took classes, seminars to prepare for startup	41	–	41
Determined regulatory requirements	–	39	39
Open a bank account for the startup	35	29	32
Established phone book or internet listing	17	44	31
Developed financial projections	37	25	31
Arranged for child care, household help	31	–	31
Began to devote full time to the startup	31	29	30
Established supplier credit	34	19	27
Legal form of business registered	–	26	26
Sought external funding for the startup	23	13	18
Hired an accountant	–	17	17
Liability insurance obtained for startup	–	14	14
Established dedicated phone line for the business	14	–	14
Initiated patent, copyright, trademark protection	20	4	12
Hired a lawyer	–	12	12
Hired an employee	14	7	11

Table 5.2 (continued)

Startup activity	PSED I (%)	PSED II (%)	Average (%)
Received first outside funding	–	9	9
Joined a trade association	–	7	7
Proprietary technology fully developed	–	5	5
Initial positive monthly cash flow	2	3	3
Acquired federal Employer Identification Number [EIN]	–	18	18
Filed initial federal tax return	17	12	15
Filed for fictitious name (DBA)	–	11	11
Paid initial federal social security payment	13	9	11
Paid initial state unemployment insurance payment	8	4	6
Know that Dun and Bradstreet established listing	3	3	3

Based on Table 5.8 in Reynolds and Curtin (2008).

behavior, “arranged child care . . .” was added because there was prior theory and evidence to suggest that this activity might predict the likelihood that female nascent entrepreneurs would have the time to successfully start new businesses (Carter, 1997; Gilbert, 1997). As we noted earlier, activities that might be considered as markers of the existence of an organization are also listed as startup behaviors. We added four other startup marker activities: bank account opened; business has own phone listing; business has own phone line; and paid managers who are owners a salary. These particular activities were added after reviewing the literature on identifying organizations (Aldrich et al., 1989; Birley, 1984, 1986; Busenitz & Murphy, 1996; Kalleberg et al., 1990; Murphy, 2002). It is our contention that these markers might also be important behaviors in the organization formation process, as well. Such activities as “business has own phone listing,” is not only a signifier for determining that an organization might exist, it is a way for a nascent entrepreneur to demonstrate to others (potential customers, investors, employees, suppliers) that the emerging organization should merit their involvement (Gartner et al., 1992). Indeed, in a recent study by Delmar and Shane (2003) which used data on nascent entrepreneurs from a research effort in Sweden that was run parallel to the PSED in the United States, arguments and empirical evidence are offered to support the idea that certain startup markers (such as acquiring a business license) can be seen as legitimizing activities (Aldrich & Fiol, 1994; Hannan & Freeman, 1984) and that such activities significantly improves the chances that an on-going organization will come into existence.

Based on analyses of the activities in PSED I, and interests of researchers involved with PSED II, additional items were added. So, while there were 26 activities in PSED I, there were 34 startup activities in PSED II. Between PSED I and II, there are 22 activities in common. In Table 5.2 we list a summary of the proportion of respondents who reported each activity during the first detailed interview. Nearly all nascent entrepreneurs reported giving serious thought to the startup effort. There are six activities related to the new firm in regards to listing in various business

registries. Less than one in five of the startups had completed any of these activities. Table 5.2 shows that of the other activities listed, less than 10 had been initiated by more than half of the nascent efforts. We suggest that this table indicated a wide diversity of activities across all business startups.

Selected Findings on Entrepreneurial Behaviors

This section of the chapter will report on findings about entrepreneurial behavior, that primarily, have come from the PSED I research program. We will begin with a discussion of the likelihood that startup activities will result in the creation of an on-going organization. We will then explore how startup activities, as a whole, influence the likelihood of business creation. And, the final part of this section will provide an overview of two specific entrepreneurial activities (opportunity recognition and planning) and their relationship to business creation.

Reynolds (2007) found that 7 years after entering the firm creation process: approximately one-third of the nascent entrepreneurs had quit, one-third reported an on-going business, and one-third were still active in the startup process. He also found that the median time for a new firm birth was 19–24 months while the median time for those who quit was 25–30 months. By 36 months, approximately 75% of new firms are created, while 75% of quits occur by 48 months.

Given the complexity of analyzing the 23 activities in PSED I, simultaneously, Reynolds (2007:68–69) undertook a factor analysis of these activities to find six domains

- (1) “Business presence: The emphasis is on formal registration of the firm, full-time attention by the nascent entrepreneur, and the beginning of hiring employees (five items).
- (2) Production implementation: Attention to acquiring inputs (supplies, inventory, components), use of major assets, actual sale of the product or service (six items).
- (3) Organizational, financial structure: Mobilizing individuals, preparing future plans, and acquisition of outside financial resources (four items).
- (4) Personal planning: The nascent entrepreneur’s efforts to prepare for the business and personal involvement (three items).
- (5) Personal preparation: The nascent entrepreneur’s organization of their personal life to become involved, by taking classes, saving money, or arranging for help with childcare or housework (three items).
- (6) Focus on the task or the product: Attention to developing the product or service to be sold and acquiring formal property rights to the same (two items)”.

Reynolds (2007) develops an index for each domain and each time period and compared these indices to three outcome measures 7 years after conception. Only one index that of personal preparation, had no relationship to outcomes in the seventh year. All of the other indices had, for some time periods, significant

relationships to the three outcome measures. He suggests that this analysis indicates that nascent entrepreneurs who emphasize a strong public presence, create an organizational and financial structure, and, develop a way to provide goods or services are more likely to create new businesses. Entrepreneurs who successfully start businesses are also more likely to engage in higher levels of activity, over time, than either the quits or the still active.

Another approach that has significant merit for understanding the processes of organization creation, in total, is championed by Lichtenstein (1999, 2000). He uses ideas from complexity theory (Dooley, 1997; Leifer, 1989; McKelvey, 1999; West, 1985) to suggest that organization creation activities: (1) will not occur at a constant rate over time, (2) will not obviously aggregate from specific activities, (3) will be mutually interdependent, and (4) that the outcomes of these activities will be non-proportional. While not wanting to simplify his logic and ideas, non-linear approaches for exploring entrepreneurial can show, “order” in what appear to be random patterns of activity. Lichtenstein (1999, 2000) has also been able to demonstrate how complexity theory has practical implications for how individuals might behave in emergent situations. In an empirical examination of the dynamic patterns of the startup activities in PSED 1, Lichtenstein, Carter, Dooley, and Gartner (2007) found that when: (1) the rate of startup activities is high, (2) startup activities are spread out over time, and (3) startup activities are concentrated later rather than earlier, the emergence of a new firm was more likely. Brush et al. (2008) also noticed that when nascent entrepreneurs “take more time to accumulate properties” (p. 563) they were more likely to continue in the process of organizing.

Opportunity Recognition

A number of scholars suggest that the idea of “opportunity” is a fundamental and critical aspect of the phenomenon of entrepreneurship (Alvarez & Barney, 2007; Buenstorf, 2007; Casson & Wadeson, 2007; Companys & McMullen, 2007; Gaglio & Katz, 2001; Kirzner, 1997; McMullen et al., 2007; Plummer et al., 2007; Shane, 2000; Shane & Venkataraman, 2000; Shepherd et al., 2007; Stevenson, 1983; Stevenson & Gumpert, 1985; Stevenson, & Jarillo, 1990). Indeed, one of the entrepreneurship field’s core definitions focuses on opportunity: “From our perspective, entrepreneurship is an approach to management that we define as follows: *the pursuit of opportunity without regard to resources currently controlled*” (Stevenson, 1983). Yet, recent discussions about characteristics of opportunity, as an aspect of the phenomenon of entrepreneurship (e.g., Alvarez & Barney, 2007; McMullen et al., 2007; Plummer et al., 2007; Shepherd et al., 2007) appears to be somewhat myopic in regards to the relevance of contributions from a variety of sources outside of economics to this discourse. Because Shane and Venkataraman’s (2000) article on the importance of opportunity to the study of entrepreneurship has become fundamental to views of the nature of entrepreneurship, there has been a great deal of thoughtful discussion about definitions of the attributes of opportunity and explorations of the processes by which opportunity

occurs, as well as the beginnings of specifying the value of the concept of opportunity to entrepreneurial studies (Alvarez & Barney, 2007; Buenstorf, 2007; Casson & Wadeson, 2007; Companys & McMullen, 2007; Gaglio & Katz, 2001; McMullen et al., 2007; Plummer et al., 2007; Shane, 2000; Shane & Venkataraman, 2000; Singh, 2001; Zahra & Dess, 2001). While there is some systematic evidence about the nature of opportunity by which these current ideas can be tested (Busenitz, 1996; Hills & Schrader, 1998; Kaish & Gilad, 1991; Shane, 2000; Singh et al., 1999), we believe the interpretations of these results are, at best, equivocal. The evidence from individuals involved in opportunity discovery and recognition is meager. We believe that data from the PSED can provide many insights into how the process of opportunity discovery and recognition actually occurs.

Discussions about the nature of opportunity are discussions about how circumstances external to the entrepreneur are construed. Most scholars currently pursue a line of reasoning about the nature of opportunity that suggests that opportunities are, sort-of-speak, concrete realities waiting to be noticed, discovered, or observed by entrepreneurs (Alvarez & Barney, 2007; Kirzner, 1997; Shane, 2000; Shane & Venkataraman, 2000). This view has come to be labeled as the “opportunity discovery” perspective (Alvarez & Barney, 2007; Gartner & Carter, 2003). Such a perspective uses the economics literature to emphasize the importance of alertness, observation, and the informational asymmetries among all individuals who are pursuing their best interests (Arrow, 1974; Hayek, 1945). We propose another alternative. We argue that in many circumstances, opportunities are enacted, that is, the salient features of an opportunity only become apparent through the ways that entrepreneurs make sense of their experiences (Gartner & Carter, 2003; Gartner et al., 1992; Sarasvathy, 2001; Weick, 1979). Indeed, we suggest that merely by talking about opportunities as a part of the circumstances of entrepreneurship, scholars invoke a way of making sense of the phenomenon of entrepreneurship that provokes entrepreneurs to see their experiences in a certain way. Entrepreneurs may talk about “discovering opportunities” because that is the way we (academic scholars) ask them to talk about opportunity.

In the opportunity enactment perspective, opportunities are seen to emerge out of the imagination of individuals by their actions and their interactions with others (Daft & Weick, 1984; Dutton, 1993a, 1993b; Dutton & Jackson, 1987; Gioia et al., 2000; Hill & Levenhagen, 1995; Jackson & Dutton, 1988; Scott & Lane, 2000; Thomas et al., 1993). Conceptualizing entrepreneurship and opportunity as an emergent cognitive and social process is not new to the field of entrepreneurship (Gartner, 1993; Gartner et al., 1992; Shaver & Scott, 1991; Stevenson, 1983; Stevenson & Gumpert, 1985; Stevenson, & Jarillo, 1990), yet, social psychological approaches to the study of this phenomenon seem to have been lost in the current fashion for an economic rationality to this process.

Since the theory and logic of these two perspectives are covered in more detail elsewhere (Gartner et al., 2003), we will offer evidence from Gartner and Shaver (2009) using data from PSED 1 to suggest there is no preponderance of evidence for either view. This study explores the label “opportunity” in the strategic issue literature as a point of departure for offering an attributional framework for categorizing opportunities entrepreneurs offer as they undertook efforts to start businesses.

The strategic issue literature broadly labels opportunities as: positive, controllable, and involve potential gain (Dutton & Jackson, 1988; Thomas et al., 1993). The article demonstrates that this is similar to an attribution theory approach. Open-ended questions from the Panel Study of Entrepreneurial Dynamics (PSED) were analyzed in which entrepreneurs offered comments about reasons for starting their businesses and problems they faced during the startup of their firms. Entrepreneurs were more likely to offer attributions about their opportunities that can be categorized as dependent on their abilities (internal and stable attributions) and efforts (internal and variable attributions). We suggest that this study provides evidence about the kinds of attributions entrepreneurs are likely to offer about opportunities supports perspectives that suggest that entrepreneurial action stems from the resources that are within these entrepreneurs' immediate control (Baker & Nelson, 2005; Sarasvathy, 2001, 2008) as well as from their own efforts and activities.

Given an appreciation that the phenomenon of entrepreneurial activity is very diverse, and that for many nascent entrepreneurs, a broad range of startup activities are occurring before they appear to "discover" their opportunity. Indeed, we wonder whether many of these nascent entrepreneur ever "discover" an opportunity, at all. Overall, we do not believe there is a preponderance of support for a belief that most entrepreneurs see opportunities in an objective way, that is, there is not very much evidence that opportunities are discovered in the manner assumed by some academic scholars (Alvarez & Barney, 2007; Gaglio & Katz, 2001; Kirzner, 1997; Shane & Venkataraman, 2000). Much more empirical evidence on the actual process of opportunity recognition needs to occur. Both PSED I + II provide evidence to be used to explore this topic in more detail.

*Planning*¹

Frederic Delmar and Scott Shane (2003) offer four broad reasons for why entrepreneurs should engage in planning during the process of venture creation. They suggest that planning helps individuals develop a framework and context for taking action so that individuals can: (1) quickly identify what they do not know, (2) understand what resources they need and when these resources might be utilized, and (3) identify specific actions that can help solve problems and attain goals, and (4) help communicate to others the purposes, objectives, and activities necessary to achieve venture success.

Entrepreneurs who develop a plan become conscious of their assumptions about how their proposed new business will succeed. Assumptions regarding: the ability of the new firm to be profitable, the amount of resources necessary to start and operate the firm, the knowledge necessary to provide products and services in a

¹This section on planning was excerpted from Gartner, William B. and Jianwen (Jon) Liao (2007). Pre-venture planning. In C. Moutray (Ed.) *The Small Business Economy for Data Year 2006: Report to the President*. Washington, DC: U. S. Small Business Administration Office of Advocacy, pp. 212–264 (Note: That this excerpt is with permission of the author, since this is a government publication, the author holds the copyright for any reprinting of the content.)

timely and cost-effective manner, and number of potential customers are just a few of the many issues that entrepreneurs would consider when planning. By surfacing these assumptions, entrepreneurs can test their beliefs, rather than invest time and resources in actions that may have little chance of succeeding. Planning, therefore, can save time and money in the venture creation process.

Planning can also reduce the likelihood that there will be delays in organizing the new venture, acquiring plant and equipment, as well as producing goods or providing services. Planning can help an entrepreneur identify when key resources (such as inventory, equipment, licenses and permits, trained personnel) will likely be needed during the business creation process, thereby saving time and money (Armstrong, 1982; Bracker et al., 1988).

Planning can help entrepreneurs identify specific actions they will need to take to achieve their goals (Locke & Latham, 1980). By identifying specific actions, entrepreneurs can focus their efforts, as well as realize when their efforts are not producing their desired goals. Planning, therefore, keeps individuals “on track” by channeling their energy and providing benchmarks (Robinson, 1984; Schrader et al., 1984).

Finally, planning helps entrepreneurs communicate their vision to others, thereby enabling the emerging venture to gain support and resources (Bird, 1992). By having a plan, entrepreneurs can thereby enlist potential investors, suppliers, customers, and employees into involvement in the new venture. A business plan also represents a form of “legitimacy,” in that entrepreneurs who have a plan are likely to be seen by others as individuals who have knowledge of the requirements for business success, rather than “dreamers” who are unaware of potential pitfalls in the startup process (Delmar & Shane, 2004; Honig & Karlsson, 2004).

One of the major problems in the search for research on the value of planning for creating new ventures is that most studies have not actually looked at new business creation. For example, Bhide (2000) uses as his primary source of data, businesses on the *INC Magazine* list of the 500 fastest growing private firms in the United States. His sample, then, looks at already established firms, and only firms that have high rates of sales growth. There are no failures in Bhide’s sample and there are no low growth firms either, to compare with the high growth sales firms. When a study looks only at successful firms there is a high likelihood that the study has “survivor bias.” The successful firms are “survivors” in that over a period of time many firms would have likely failed, and, the failures would not be listed in a register of the “survivors” to be studied.

The number of research studies that have compared entrepreneurs who have successfully created new firms with entrepreneurs who have failed at this process, is very small. Indeed, the studies that have looked at planning and its influence on new venture creation stem from data that either use the Panel Study of Entrepreneurial Dynamics (Liao & Gartner, 2006; Reynolds, 2007) or use data collection methods and questions based on the PSED (Delmar & Shane, 2003, 2004; Honig & Karlsson, 2004; Shane & Delmar, 2004). Table 5.3 lists the studies that have focused on planning during the process of business creation, the size of these samples, and highlights of their findings about the value of planning and success at getting into business.

Table 5.3 Previous research on business planning and success at starting a business

Study	Sample: size	Method of analysis	Findings on planning
Delmar and Shane (2003)	Sweden PSED*: 223	Event history: A hazard function of disbanding	Entrepreneurs who engaged in business planning were less likely to quit the venture creation process during a 3-year time frame. Entrepreneurs who engaged in business planning were more likely to: increase product development and the number of venture startup activities. Entrepreneurs with prior startup experience were less likely to quit the venture creation process. The type of opportunity pursued significantly affected survival
Delmar and Shane (2004)	Sweden PSED: 223	Event history: A hazard function of disbanding	Entrepreneurs who engaged in business planning and formed a legal entity were less likely to quit the venture creation process during a 3-year time frame, and more likely to complete product development, initiate marketing efforts, and obtain inputs
Honig and Karlsson (2004)	Sweden PSED: 396	Logistical regression on persistence in the startup process	A nearly significant result ($p > .10$) that entrepreneurs who engaged in business planning were likely to continue in the startup process (survive). Being a member of a business network, knowing the customer before startup, and being a manufacturing startup increased the likelihood of survival by a factor of 4.4, 2.7, and 4.0, respectively

Table 5.3 (continued)

Study	Sample: size	Method of analysis	Findings on planning
Liao and Gartner (2006)	PSED: 276	Event history: A hazard function of disbanding	Entrepreneurs who engaged in business planning were less likely to quit the venture creation process during a 2-year time frame. Entrepreneurs who initiated business plans: early in uncertain competitive and financial environments; and late in certain competitive and financial environments were less likely to quit
Reynolds (2007)	PSED: 648	Comparison of means (F-test) and cross tabulations (Chi-square)	Planning, as a part of a factor that describes the process of developing an organizational and financial structure, along with a variety of human capital (e.g., years of industry, work and managerial experience) and entrepreneurial activities (e.g., total hours and funds invested, contact with helping programs) is more likely to predict success at getting into business
Shane and Delmar (2004)	Sweden PSED: 223	Event history: A hazard function of disbanding	Entrepreneurs who engaged in business planning before talking to customers and initiating marketing and promotion efforts reduces the hazard of termination by 46 and 41%, respectively. Each prior startup by founding team reduced the hazard of termination by 24%. Each additional organizing activity reduced the hazard of termination by 25%

A detailed description of the Sweden PSED can be found in: Davidsson and Henrekson (2002).

These studies strongly suggest that planning matters [with Honig and Karlsson (2004) finding a nearly significant result, $p > .10$]. Entrepreneurs who complete a business plan are more likely to either: continue in the business startup process, or actually start a business than those individuals who do not plan.

There are a number of other factors that influence whether entrepreneurs will be successful in the venture creation process. For example, Delmar and Shane (2003) suggest that the nature of the opportunity pursued by entrepreneurs has a more significant impact on success than the act of planning, itself, though in terms of actions that an entrepreneur can take, planning is the most important activity to engage in. Liao and Gartner (2006) found that entrepreneurs who were more uncertain about their chances of financing their businesses and more uncertain about their understanding the competitive dynamics of their industries were more likely to be successful if they planned early in the startup process, rather than later. Shane and Delmar (2004) found that entrepreneurs who completed business plans before engaging in efforts to talk to customers and engage in marketing and promotional efforts were more likely to be successful in continuing in their startup efforts (i.e., not quit).

Overall, it would seem that completing a business plan is beneficial to enabling entrepreneurs to successfully create new businesses. Even though there are differences in: the various sample sizes used from each of the two major samples (US PSED and the Swedish PSED); how certain measures were constructed to indicate planning, as well as success at getting into business; and the analytical techniques used to evaluate the data, the results seem to be fairly robust. Business planning is an important activity that significantly correlates with creating new ventures.

Recommendations for Future Research

It is our belief that the Panel Studies of Entrepreneurial Dynamics I and II is a decisive moment in the study of entrepreneurship. The PSED studies are the first large-scale national database to offer systematic, reliable, and generalizable data on the process of business formation. While no data set can provide all of the answers about firm formation processes, it is our expectation that the PSED studies can offer a foundation of generalizable findings about entrepreneurial behavior. What should not be underestimated is the value of having the depth and breadth of information on this sample of nascent entrepreneurs. A major complaint about many entrepreneurship studies has been the idiosyncratic nature of the samples used (Gartner, 1989). It has been difficult to judge whether a sample of entrepreneurs is similar or different to other kinds of samples of entrepreneurs, to entrepreneurs overall, or to non-entrepreneurs. Since the PSED is a generalizable sample of all nascent entrepreneurs in the population (as well as a generalizable sample of non-nascent entrepreneurs), the PSED provides a way to compare any sample of entrepreneurs to the population of nascent entrepreneurs, and to the population of non-nascent entrepreneurs.

In addition, given the longitudinal nature of the PSED, the dataset also will be valuable for studying differences between the population of nascent entrepreneurs to those individuals who become the founders of established businesses. Studies of nascent entrepreneurs in the PSED should therefore provide important signposts for guiding all knowledge development in the entrepreneurship field. We hope that more scholars will devote the time and effort needed to explore this rich source of information on entrepreneurs.

Besides studies that utilize the PSED, there are a number of other ways that research on firm formation processes can and should be conducted. We suggest certain methodologies, rather than specific studies of entrepreneurial situations best apply those approaches.

There is a great need for scholars to undertake in-depth case studies (Stake, 2000) of the activities of individuals involved in the process of starting business. Firm formation involves a multitude of interdependent activities among a variety of individuals (e.g., founders; investors; prospective employees, buyers, and suppliers; and paid and unpaid mentors and advisors). Systematic evidence needs to be generated to better understand how all of these different actors interrelate during the founding process. In addition, there is very little evidence about the “micro-behaviors” of organization founders. For example, there is not much beyond anecdotal evidence about the specific behaviors and the sequences of these behaviors when nascent entrepreneurs actually negotiate with others for critical resources to start a new business (Baker & Nelson, 2005). What, specifically, occurs when nascent entrepreneurs attempt to convince other individuals to become investors? Do nascent entrepreneurs follow similar negotiating strategies and tactics (compared to managers or individuals in other negotiation situations), or are there unique characteristics of organization formation that require different behaviors? We would assume that the indeterminate and future-oriented characteristics of firm founding would influence how the process of negotiation occurred among nascent entrepreneurs and others, and that these characteristics of the situation (indeterminacy and future orientation) would be different than other kinds of negotiations.

We would also hope that some scholars would devote their efforts to documenting and discussing their own involvement in entrepreneurial activities through participant observation (Tedlock, 2000), action research (Kemmis & McTaggart, 2000), and the exposition of their own narratives and stories of organization formation through reflexivity, personal narrative, and autoethnography (Ellis & Bochner, 2000; Gartner, 2007). In addition, many highly successful entrepreneurs have written autobiographies of their experiences that could be explored for insights (Gartner, 2007; Silverman, 2000).

Finally, while there can, and should, be scholarly efforts to explore entrepreneurial behavior using more controlled methodologies (e.g., lab studies and simulations), it is our belief that major gains in scholarship on organization formation activities will primarily occur through field research. The phenomenon of organization formation, itself, is larger than a particular theoretical perspective or methodology. So, we celebrate using multiple theories and multiple methods to understand organization formation that can look at this phenomenon comprehensively. We take

seriously Weick's admonition to "Complicate Yourselves" (Weick, 1979), that is, scholars need to recognize that no one particular theory or method can adequately explain the phenomenon under observation, and that a variety of approaches are required.

If our experiences studying the process of organization formation have shown us anything, it is that there is: substantial variation in the kinds of organizations that are started by nascent entrepreneurs; substantial variation in the characteristics that would signal to researchers that these organizations, do, indeed exist; and substantial variation in when these characteristics that signal the existence of these new organizations, occur. There is no escaping this fact—entrepreneurial behavior is fundamentally an activity involved with generating "variation" as an organizational phenomenon (Aldrich, 1999; Katz & Gartner, 1988; Weick, 1979). There is no one particular way in how organizations emerge because there is no one particular kind of organization that results as an outcome of the startup process (Gartner et al., 1989; Reynolds, 2007). Research that can both recognize variation in the phenomenon of organization creation, while also offering insights into how these diverse activities might lead to patterns of successful formation of organizations is needed and required (Reynolds, 2007).

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Chapter 6

Corporate Entrepreneurship: An Introduction and Research Review

Donald F. Kuratko

Introduction

In today's hyper-competitive global economy corporate entrepreneurship (CE) has increasingly been recognized as a legitimate path to high levels of organizational performance (Garvin, 2004; Garvin & Levesque, 2006; Morris et al., 2008). Researchers have continually cited corporate entrepreneurship's important potential as a growth strategy (Antoncic & Hisrich, 2001; Kuratko, 1993; Kuratko et al., 1993; Merrifield, 1993; Pinchott, 1985; Stopford & Baden-Fuller, 1994; Zahra, 1991; Zahra & Covin, 1995; Zahra et al., 1999). The understanding of corporate entrepreneurship as a valid and effective area of research has real and tangible benefits for emerging scholars, as their work will have significant impact on an important strategy. As an example, Dess, Lumpkin, and McGee (1999) noted that, "Virtually all organizations—new start-ups, major corporations, and alliances among global partners—are striving to exploit product-market opportunities through innovative and proactive behavior"—the type of behavior that is called for by corporate entrepreneurship. Barringer and Bluedorn (1999) suggested that in light of the dynamism and complexity of today's environments, "... entrepreneurial attitudes and behaviors are necessary for firms of all sizes to prosper and flourish." Developing organizational environments that cultivate employees' interest in and commitment to innovation contribute to successful competition in today's global economy. Ireland, Kuratko, and Morris (2006a, 2006b) pointed out that to simultaneously develop and nurture today's and tomorrow's competitive advantages, advantages that are grounded in innovation, firms increasingly rely on "corporate entrepreneurship."

Corporate entrepreneurship (CE) and the behavior through which it is practiced has been initiated in established organizations for a host of purposes, including those of profitability (Vozikis et al., 1999; Zahra, 1993), strategic renewal (Guth & Ginsberg, 1990), innovativeness (Baden-Fuller, 1995), gaining knowledge

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to develop future revenue streams (McGrath et al., 1994), international success (Birkinshaw, 1997), and the effective configuration of resources as the pathway to developing competitive advantages (Borch et al., 1999; Covin & Miles, 1999; Covin et al., 2000; Ireland et al., 2003; Kuratko et al., 2009). Regardless of the reason the firm decides to engage in CE, it has become a major focus for researchers to examine (Morris et al., 2008; Narayanan et al., 2009).

However, despite the espoused and observed positive effects of CE, issues remain if we are to fully understand this construct’s promise (Dess et al., 2003; Hornsby et al., 2002; Hornsby et al., 2009; Zahra et al., 1999). The theoretical and empirical knowledge about the domain of CE and the entrepreneurial behavior on which it is based are key issues warranting greater attention. Moreover, outcome factors that influence an organization’s willingness to continue implementing a CE strategy as well as managers’ willingness to continue engaging in entrepreneurial behavior are now being integrated to enhance our understanding of CE practices (Kuratko et al., 2004). Even so, it has been argued that a fundamental ambiguity exists in the literature concerning what it means, in a theoretical sense, to have CE as a firm’s strategy (Meyer & Heppard, 2000). The existence of a corporate entrepreneurship strategy implies that a firm’s strategic intent is to continuously and deliberately leverage entrepreneurial opportunities (Shane & Venkataraman, 2000) for growth- and advantage-seeking purposes. Covin and Miles (1999) contended that innovation was the single common theme underlying all forms of corporate entrepreneurship. In that vein, Ireland, Covin, and Kuratko (2009) define a corporate entrepreneurial strategy as “a vision-directed, organization-wide reliance on entrepreneurial behavior that purposefully and continuously rejuvenates the organization and shapes the

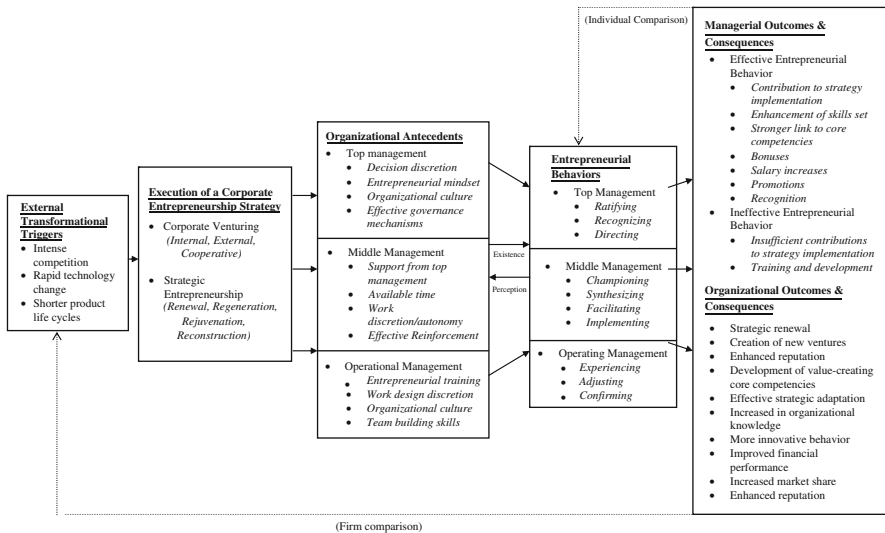


Fig. 6.1 A model of the corporate entrepreneurship process

scope of its operations through the recognition and exploitation of entrepreneurial opportunity” (p. 21).

While there is a broadly held belief in the need for and inherent value of entrepreneurial action on the part of established organizations (Hitt et al., 2001; Kuratko, 2009; Morris et al., 2008), much remains to be revealed about how CE strategy is enacted in organizational settings. Fortunately, knowledge accumulation on the topic of CE has been occurring at a rapid rate, and many of the elements essential to constructing a theoretically grounded understanding of CE can be readily identified from the extant literature. Figure 6.1 depicts the CE process and illustrates the various aspects that research has been examining over the last three decades. This chapter reviews the empirical and conceptual research that substantiates the many components of the model and describes a corporate entrepreneurship strategy that is depicted through the model.

The Domain of Corporate Entrepreneurship

The concept of corporate entrepreneurship (CE) has evolved over the last four decades and the definitions have varied considerably over time. The early research in the 1970s focused on venture teams and how entrepreneurship inside existing organizations could be developed (Hanan, 1976; Hill & Hlavacek, 1972; Peterson & Berger, 1972).

In the 1980s, researchers conceptualized CE as embodying entrepreneurial behavior requiring organizational sanctions and resource commitments for the purpose of developing different types of value-creating innovations (Alterowitz, 1988; Burgelman, 1983a, 1983b, 1984; Kanter, 1985; Pinchott, 1985; Schollhammer, 1982). CE was defined simply as a process of organizational renewal (Sathe, 1989).

In the 1990s researchers focused on CE as re-energizing and enhancing the firm’s ability to develop the skills through which innovations can be created (Borch et al., 1999; Jennings & Young, 1990; Merrifield, 1993; Zahra, 1991). Also, in the 1990s more comprehensive definitions of CE began to take shape. Guth and Ginsberg (1990) stressed that CE encompassed two major types of phenomena: new venture creation within existing organizations and the transformation of ongoing organizations through strategic renewal. Zahra (1991) observed that “corporate entrepreneurship may be formal or informal activities aimed at creating new businesses in established companies through product and process innovations and market developments. These activities may take place at the corporate, division (business), functional, or project levels, with the unifying objective of improving a company’s competitive position and financial performance.” Sharma and Chrisman’s (1999, 18) suggested that CE “is the process where by an individual or a group of individuals, in association with an existing organization, create a new organization or instigate renewal or innovation within that organization.”

With all of these various definitions taking shape, the 21st century linked CE to firms’ efforts to establish sustainable competitive advantages as the foundation for

profitable growth (Hornsby et al., 2009; Kuratko et al., 2001, 2005). In this regard, Morris, Kuratko and Covin (2008) described corporate entrepreneurship (CE) as being manifested in companies either through *corporate venturing* or *strategic entrepreneurship* (see Fig. 6.2).

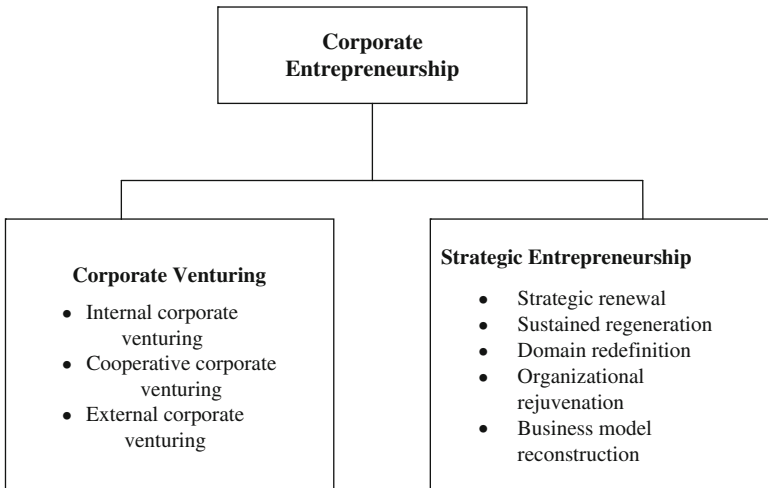


Fig. 6.2 Defining corporate entrepreneurship. *Source:* Morris, M. H., Kuratko, D. F., & Covin, J. G. 2008. *Corporate Entrepreneurship & Innovation*: 81. Mason, OH: Thomson/South-Western Publishers

Corporate venturing approaches have as their commonality the adding of new businesses (or portions of new businesses via equity investments) to the corporation. This can be accomplished through three implementation modes—internal corporate venturing, cooperative corporate venturing, and external corporate venturing. By contrast, *strategic entrepreneurship* approaches have as their commonality the exhibition of large-scale or otherwise highly consequential innovations that are adopted in the firm's pursuit of competitive advantage. These innovations may or may not result in new businesses for the corporation. With strategic entrepreneurship approaches, innovation can be in any of five areas—the firm's strategy, product offerings, served markets, internal organization (i.e., structure, processes, and capabilities), or business model (Morris et al., 2008).

Corporate venturing is the first major category of corporate entrepreneurship and it includes various methods for creating, adding to, or investing in new businesses (Covin et al., 2003; Kuratko et al., 2009; McGrath et al., 2006). With *internal corporate venturing*, new businesses are created and owned by the corporation. These businesses typically reside within the corporate structure but, occasionally, may be

located outside the firm and operate as semi-autonomous entities. Among internal corporate ventures that reside within the firm's organizational boundaries, some may be formed and exist as part of a pre-existing internal organization structure and others may be housed in newly formed organizational entities within the corporate structure. *Cooperative corporate venturing* (a.k.a. joint corporate venturing, collaborative corporate venturing) refers to entrepreneurial activity in which new businesses are created and owned by the corporation together with one or more external development partners. Cooperative ventures typically exist as external entities that operate beyond the organizational boundaries of the founding partners. *External corporate venturing* refers to entrepreneurial activity in which new businesses are created by parties outside the corporation and subsequently invested in (via the assumption of equity positions) or acquired by the corporation. These external businesses are typically very young ventures or early growth-stage firms. In practice, new businesses might be developed through a single venturing mode, any two venturing modes, or all three venturing modes. A firm's total venturing activity is equal to the sum of the ventures enacted through the internal, cooperative, and external modes. With corporate venturing, creating an entirely new business is the main objective (Covin & Miles, 2007).

It is impossible, however, to evaluate the success or failure of corporate venturing initiatives unless it is clear what management's goals were in the first place. Companies must create venture evaluation and control systems that assess venture performance on criteria that follow from the venture's founding motive. Tidd and Taurins (1999) concluded that there are two sets of motives that drive the practice of internal corporate venturing: leveraging—to exploit existing corporate competencies in new product or market arenas; and learning—to acquire new knowledge and skills that may be useful in existing product or market arenas. When the overall motive is leveraging, some of the specific reasons that firms engage in corporate venturing include:

- To exploit under-utilized resource—build a new business around internal capabilities that remain idle for prolonged periods; the new business becomes the vehicle for outsourcing those capabilities to others.
- To extract further value from existing resources—build a new business around corporate knowledge, capabilities, or other resources that have value in product-market arenas not currently being served by the firm.
- To introduce competitive pressure onto internal suppliers—build a new business that becomes an alternative supplier to existing internal supply sources.
- To spread the risk and cost of product development—build a new business whose target market promises to be larger than that for which the core product to be offered by the business was initially developed.
- To divest non-core activities—build a new business to pursue business opportunities that the firm is in a favorable position to exploit and that the firm has no strategic interest in.

The learning motives can also be broken down further as well. Three major types of organizational learning tend to receive the greatest emphasis:

- To learn about the process of venturing—build a new business as a laboratory in which the innovation process can be studied.
- To develop new competencies—build a new business as a basis for acquiring new knowledge and skills pertaining to technologies, products, or markets of potential strategic importance.
- To develop managers—build a new business as a training ground for the development of individuals with general management potential.

In another study of corporate venturing practice—this one including firms engaged in both internal and external corporate venturing—Miles and Covin (2002) reported that the firms pursued venturing for three primary reasons: (1) to build an innovative capability as the basis for making the overall firm more entrepreneurial and accepting of change; (2) to appropriate greater value from current organizational competencies or to expand the firm's scope of operations and knowledge into areas of possible strategic importance; and (3) to generate quick financial returns. Where the motivation is to generate quick financial returns, firms often concentrate on the external mode of venturing. Specifically, many corporations invest in new, externally founded businesses in hopes of realizing significant financial gains; returns beyond those easily obtainable within the firm's current scope of operations. This type of venturing is often pursued through the use of corporate venture capital funds.

Strategic entrepreneurship constitutes a second major category of approaches to corporate entrepreneurship. While corporate venturing involves company involvement in the creation of new businesses, strategic entrepreneurship corresponds to a broader array of entrepreneurial initiatives, which do not necessarily involve new businesses being added to the firm. Strategic entrepreneurship involves simultaneous opportunity- and advantage-seeking behaviors (Ireland et al., 2003). The innovations that are the focal points of strategic entrepreneurship initiatives represent the means through which opportunity is capitalized upon. These are innovations that can happen anywhere and everywhere in the company. By emphasizing an opportunity-driven mindset, management seeks to achieve and maintain a competitively advantageous position for the firm.

These innovations can represent fundamental changes from the firms' past strategies, products, markets, organization structures, processes, capabilities, or business models. Or, these innovations can represent fundamental bases on which the firm is fundamentally differentiated from its industry rivals. Hence, there are two possible reference points that can be considered when a firm exhibits strategic entrepreneurship: (1) how much the firm is transforming itself relative to where it was before (e.g., transforming its products, markets, internal processes, etc.) and (2) how much the firm is transforming itself relative to industry conventions or standards (again, in terms of product offerings, market definitions, internal processes, and so forth). Strategic entrepreneurship can take one of five forms—*strategic renewal*, *sustained*

regeneration, domain redefinition, organizational rejuvenation, and business model reconstruction (Covin & Miles, 1999; Ireland & Webb, 2007).

In this chapter corporate entrepreneurship (CE) is presented as a process whereby managers' entrepreneurial behavior is critical (Hornsby et al., 2009), regardless of the primary reason (either corporate venturing or strategic entrepreneurship) it is being pursued. Based on Smith and Di Gregorio's (2002) logic, this conceptualization of CE is that newness is CE's defining characteristic regardless of the context within which newness is sought.

The major thrust behind corporate entrepreneurship is a revitalization of innovation, creativity, and leadership in corporations. It appears that corporate entrepreneurship may possess the critical components needed for the future productivity of our organizations. If so, then examining the range of research that has focused on the various aspects of the corporate entrepreneurship process is most important for scholars to move the field forward.

The Corporate Entrepreneurship Process: A Research Model

The research model presented in this chapter is adapted from the work of Ireland, Covin and Kuratko (2009); Kuratko, Ireland, Covin, and Hornsby (2005); and Kuratko, Hornsby, and Goldsby (2004). It integrates and extends previous theoretical and empirical research in order to develop a framework of the current state of the knowledge regarding corporate entrepreneurship (CE) and managers' entrepreneurial behavior. The first part of the model is based on theoretical foundations from previous strategy and entrepreneurship research. The empirical research on organizational factors is also discussed thoroughly in this chapter. Contributions to the entrepreneurship and strategic management literatures suggest the viability of integrating theoretical and empirical findings as a means of better understanding conditions and relationships that are associated with CE (Hitt et al., 2001; Ireland et al., 2001). Hornsby, Naffziger, Kuratko, and Montagno (1993), for example, advanced an interactive model of CE suggesting that a combination of circumstances lead to entrepreneurial behavior by managers. In their multidimensional model, Baum, Locke, and Smith (2001) integrated research findings regarding personality traits, general motives, personal competencies, situational specific motivation, competitive strategies, and the business environment to study venture growth. The second part of the model then considers the comparisons made at the individual and organizational level on organizational outcomes, both perceived and real, that influence the continuation of the entrepreneurial activity. Of importance to the purpose of this work is the Baum et al. (2001) finding that the interaction among individual, organizational, and environmental domains was the strongest predictor of venture growth. The second part of the model's theoretical underpinnings are based on Porter and Lawler's (1968) Integrative Model of Motivation, which incorporates important elements of Adams's (1965) Equity Theory of Motivation and Vroom's (1964) Expectancy Theory of Motivation. In the

following sections, each stage of the model is discussed beginning with the transformational triggers that cause the choice of a corporate entrepreneurship strategy and the pursuit of entrepreneurial activities in the first place.

Transformational Triggers

Tushman, Newman, and Romanelli (1986) argued that most re-orientations are triggered by performance crises that push organizations to replace managers who cannot or will not adapt. However, they found that the most successful re-orientations occurred in organizations whose managers foresaw the need for radical change and initiated it before crises occurred. Decision-makers, therefore, are the architects of their environments and adapt to these interpretations. Managers must minimize misfits between their strategy-structure matches as they prepare their organizations to deal with organizational changes (Jennings & Seaman, 1994). The “transformational trigger” provides the impetus to behave entrepreneurially when other conditions are conducive to such behavior (Johnson, 1996). Zahra (1991) identified a number of influencing factors in corporate entrepreneurship that could be viewed as types of precipitating or transformational triggers. These include environmental factors such as hostility (threats to a firm’s mission through rivalry), dynamism (instability of a firm’s market because of changes), and heterogeneity (developments in the market that create new demands for a firm’s products). Some specific examples of transformational events in the corporate entrepreneurship process could include: a change in company management; a merger or acquisition; a competitor’s move to increase market share; the development of new technologies; change in consumer demand; and economic changes. Schindehutte, Morris, and Kuratko (2000) identified a comprehensive list of 40 triggering events that were classified into five distinct categories: internal/external source; opportunity-driven/threat-driven; technology-push/market-pull; top-down/bottom-up; and systematic or deliberate search/chance or opportunism (see Table 6.1).

Kuratko, Ireland, and Hornsby (2001) found that external circumstances caused one particular organization to institute a more entrepreneurial strategy that helped the company to regain its position as a market leader. Therefore, as seen in the model, a transformational trigger (or precipitating event) will cause executive management to pursue a corporate entrepreneurial strategy to cope with the change.

Although there are many ways in which these precipitating factors could be classified, each of the ones identified has potential strategic relevance. For instance, it may be that resource requirements differ markedly for entrepreneurial projects triggered by internal developments as opposed to those initiated principally by external developments and for technology-driven projects versus market-driven projects. Triggers from outside the company such as technological change may tend to produce entrepreneurial projects that are more innovative or that represent bigger departures from the status quo than do triggers from inside the company.

Table 6.1 “Triggering” events for corporate entrepreneurship

Specific customer request	Senior management initiative
Competitor threat or action	Initiative on the part of one or more employees
Changes in people’s lifestyles/expectations	Strategic program in the firm
New sales targets	Strategic growth target
Public relations/image	New marketing initiative
Substitute product or service	Diversification
Declining market share	Availability of new equipment
Declining profits	Availability of new resources
Declining sales	Availability of new distribution channel or method
Improved quality control	New management
Poor quality of an existing product or service	Perception of increasing risk
Rising costs	Vertical integration
Problem with existing logistical performance	Geographical expansion
Specific customer complaint	Internal opportunities
Supplier request	Inventory problems
Availability of new IT or on-line systems	Staff training
Regulatory requirement	Horizontal integration
Decreasing size of the market	New investment by a supplier
New investment by a buyer	Change in accounting practices
Supplier complaint	Insufficient standards

Source: Schindehutte, M., Morris, M. H., & Kuratko, D. F. 2000. Triggering events, corporate entrepreneurship and the marketing function. *Journal of Marketing Theory and Practice* 8(2): 18–30.

Triggers related to the actions of competitors might lead to more imitation, and those related to threat from a substitute product might produce more innovative solutions. Managerial support may be more easily obtainable for entrepreneurial projects triggered by threats (e.g., an impending government regulation) as opposed to opportunities (e.g., an untapped market niche). The same may be true for those where the source of the trigger is more top-down as opposed to bottom-up. Further, in terms of outcomes, if the trigger is some successful action by a competitor, then the entrepreneurial project may represent a reactive response that comes too late to have any marketplace impact. Similarly, it may be that entrepreneurial events that are in response to a particular supplier or customer request are associated with higher levels of success. There is a need to systematically review triggering events for both successful and unsuccessful products, service, and processes that have been pursued by the firm over the past 5 years. Further, managers should apply the groupings or categories above and then look for associations between types of triggers and types of entrepreneurial projects and between types of triggers and the outcomes of entrepreneurial endeavors (Morris & Kuratko, 2002). Thus, a corporate entrepreneurship strategy pursued by the firm is a response to a precipitating event.

Corporate Entrepreneurship Strategy

The choice of the firm's strategy or strategies is a critical organizational decision—a decision that has a major influence on organizational performance (Borch et al., 1999). Consistent with that, a strategy for corporate entrepreneurship is an option that a firm can choose to pursue once triggers from the external environment denote the need for organizational change and strategic adaptation (Kuratko et al., 2001). A strategy for corporate entrepreneurship is a set of commitments and actions that is framed around entrepreneurial behavior and innovation in order to develop current and future competitive advantages that are intended to lead to competitive success (Ireland et al., 2003). The choice of using a strategy for corporate entrepreneurship as a primary means of strategic adaptation reflects the firm's decision to seek competitive advantage principally through innovation and entrepreneurial behavior on a sustained basis (Russell, 1999).

Increasingly environmental triggers are interpreted by today's decision-makers as ones that call for the formation and use of corporate entrepreneurship as the core of the firm's efforts to adapt strategically. Lumpkin and Dess (1996) suggested that organizations facing a rapidly changing, faster-paced competitive environment might be best served by implementing corporate entrepreneurship behaviors as an adaptation mechanism. Labels have been attached to organizations relying on entrepreneurship actions as the core of their commitments, decisions, and strategies. Examples of these labels have included entrepreneurial firms (Mintzberg, 1973), prospectors (Miles & Snow, 1978), and adaptive, innovative, and impulsive firms (Miller & Friesen, 1980).

The operational essence of using a strategy for corporate entrepreneurship as the foundation of a firm's adaptation responses is the call for an organization's employees to rely on entrepreneurial behavior as the source of adjustments required to assure current and future marketplace success. In this context, a corporate entrepreneurship strategy encompasses the full set of commitments, decisions, and entrepreneurial behavior required for the firm to improve the likelihood of achieving current and future competitive success. When using corporate entrepreneurship as the source of strategic adaptation to the realities of a firm's external environment, the intention is to rely on innovation as the foundation for creating new businesses or reconfiguring existing ones. In general, corporate entrepreneurship calls for firms to innovate boldly and regularly and to be willing to accept considerable, though reasonable levels of risk in doing so (Miller & Friesen, 1982). To Sykes and Block (1989), reasonable risks are "affordable" to the organization in terms of its current and future viability as an operating entity. Resulting from successful use of corporate entrepreneurship firms may deliberately reposition themselves within their environment, including the main arena(s) in which they compete (Covin & Slevin, 1991).

For success to be recorded by using corporate entrepreneurship, those within the firm must be aware of it and encouraged and nurtured in their use of it. Without awareness, encouragement, and nurturing, the entrepreneurial behavior that is linked to use of corporate entrepreneurship will not surface or be used consistently

throughout the firm (Kuratko et al., 2001). Furthermore, an awareness of what corporate entrepreneurship calls for in terms of behavior on the part of individuals permits an analysis of choices. Typically, organizational members compare and evaluate the opportunity cost of engaging in entrepreneurial behavior with those of either not doing so or displaying still other behaviors. Lower opportunity costs, relative to the costs of other behavior, engender a commitment to engaging in entrepreneurial behavior (Amit et al., 1995; Reynolds, 1987; Shane & Venkataraman, 2000).

In comprehensive arguments, Burgelman (1983a, 1984) and Burgelman and Sayles (1986) argued that organizational innovation as well as other strategic activities surface through two models—induced strategic behavior and autonomous strategic behavior. Of the two models, induced strategic behavior occurs more frequently in organizations. Comparatively, induced strategic behavior captures formal entrepreneurial behavior while autonomous strategic behavior is concerned with entrepreneurial behavior that surfaces informally in the firm. The more resource rich is the firm the greater is the likelihood that autonomous strategic behavior will emerge.

Burgelman's (1983b) induced strategic behavior approach is a top-down process whereby the firm's strategy and structure provide the context within which entrepreneurial behavior is elicited and supported. The responsibility for establishing a strategy and forming a structure that can induce entrepreneurial behavior rests with top-level managers. Induced strategic or entrepreneurial behavior is shaped by the firm's structural context. Thus, in this instance, structure follows strategy.

This analysis focuses on induced strategic behavior. However, this focus does not suggest that a failure to recognize the importance of autonomous strategic behavior to the successful use of corporate entrepreneurship actions. Indeed, both induced and autonomous strategic behavior are important to a firm's corporate entrepreneurship efforts, whether they are oriented to creating new businesses or reconfiguring existing ones. The research model (shown in Fig. 6.1) is one in which managers are imbued with the firm's values and strategies so their entrepreneurial behavior and innovative efforts will be channeled toward effective use of current core competencies and simultaneous development of new ones in the pursuit of competitive success for the organization (Van de Ven, 1986). In the induced strategic behavior model, top-level managers oversee, nurture, and support the firm's attempts to use entrepreneurial behavior as the foundation for product, process, and administrative innovations (Heller, 1999). A corporate entrepreneurship strategy that is intended to elicit and support induced strategic behavior should also include degrees of flexibility through which autonomous strategic behavior is allowed and indeed encouraged to surface. Properly viewed as a formal tolerance of autonomous strategic behavior, an intentional commitment of this type is a conscious strategic decision on the part of the firm's upper-level decision-makers to foster the surfacing and use of innovative entrepreneurial behavior, regardless of whether its origin rests with formal or informal processes (Bird, 1988).

Ireland, Covin, and Kuratko (2009) define CE strategy as "a vision-directed, organization-wide reliance on entrepreneurial behavior that purposefully and continuously rejuvenates the organization and shapes the scope of its operations

through the recognition and exploitation of entrepreneurial opportunity” (p. 21). Morris, Kuratko, and Covin (2008) contend that when the actions taken in a large firm to form competitive advantages and to exploit them through a strategy are grounded in entrepreneurial actions, the firm is employing an *entrepreneurial strategy*. Further, when establishing direction and priorities for the product, service, and process innovation efforts of the firm, the company is formulating its *strategy for entrepreneurship*.

From the concept of a corporate entrepreneurial strategy the focus is now shifted to the organizational antecedents that must be present and recognized for any entrepreneurial behavior to be pursued.

Organizational Antecedents

Research has examined the organizational antecedents that affect (either by promoting or impeding) the breadth and depth of entrepreneurial actions that are taken within the firm at a point in time to pursue CE (Zahra, 1991; Zahra & Covin, 1995; Zahra et al., 1999). This research has studied different internal organizational factors including the firm’s incentive and control systems (Sathe, 1985), culture (Brazeal, 1993; Hisrich & Peters, 1986; Kanter, 1985), organizational structure (Covin & Slevin, 1991; Dess et al., 1999; Naman & Slevin, 1993), and managerial support (Kuratko et al., 1993; Stevenson & Jarillo, 1990). Because they affect the nature of the firm’s internal environment, these factors, both individually and in combination, are recognized as antecedents of the entrepreneurial behavior on which CE is built. An internal environment supportive of innovation tends to have strong antecedents of entrepreneurial behavior while an environment that dismisses innovation and its importance yields weak antecedents of entrepreneurial behavior (Hornsby et al., 2002).

Other research has contributed to our understanding of the organizational antecedents of entrepreneurial behavior. Miller (1983), for example, correlated several macro-level variables (e.g., company type, environment, structure, and decision-making) with the intensity of entrepreneurial activity. Quinn (1985) identified several actions large corporations can take to develop the right “atmosphere” for entrepreneurial behavior to flourish. Some of these actions are oriented to changing the firm’s structure in ways that will facilitate innovation. Souder (1981) found a positive relationship between six management practices and performance for 100 new ventures in 17 organizations. Fry (1987) and Kanter (1985) also identified a set of factors that were associated with successful CE while Schuler (1986) outlined essential structural practices that firms need to use to facilitate entrepreneurial actions.

As mentioned earlier, Burgelman (1983a, 1983b) argued that CE can take two primary forms—autonomous strategic behavior and induced strategic behavior. As an organizational antecedent, induced strategic behavior is a top-down process in which the firm’s current strategy and structure shape the entrepreneurial actions

taken to develop product, process, and administrative innovations. Autonomous strategic behavior is a bottom-up process in which product champions pursue new ideas, often through a political process, by means of which they develop and coordination activities associated with an innovation until it achieves success. A top-level managerial decision to encourage risk-taking and not to punish failure is a strong antecedent of autonomous strategic behavior on the part of managers' behavior as well as others in the firm. An important contribution of Burgelman's (1983a, 1983b; 1984) work is the recognition of the effect of the firm's culture, strategy, and structure as antecedents of autonomous strategic behavior—behavior that is grounded in entrepreneurial actions. Other research (e.g., Floyd & Wooldridge, 1990, 1992, 1994) has recognized the importance of managers in enhancing and cultivating autonomous strategic behavior. Thus, top-level managers should verify that organizational antecedents are in place that will elicit and support value-creating entrepreneurial behavior (in the form of autonomous strategic behavior) on the part of managers.

Much of our understanding of the impact of organizational architecture on individual-level entrepreneurial behavior is based on the empirical research of Kuratko and his colleagues (Hornsby et al., 1999, 2002, 2009; Kuratko et al., 1990, 2005). In the Kuratko et al. (1990) study, results from factor analysis showed that what had been theoretically argued and hypothesized to be five conceptually distinct factors that would elicit and support entrepreneurial behavior on the part of first- and middle-level managers (top management support for CE, reward and resource availability, organizational structure and boundaries, risk-taking, and time availability) were actually only three in number. More specifically, based on how items loaded, Kuratko et al. (1990) concluded that three factors—management support, organizational structure, and reward and resource availability—were important influences on the development of an organizational climate in which entrepreneurial behavior on the part of first- and middle-level managers could be expected. Although this study's results did not support the hypothesized five-factor model, the findings established the multidimensionality of antecedents of managers' entrepreneurial behavior.

To extend this earlier work (Kuratko et al., 1990), Hornsby et al. (1999) conducted an empirical study designed to explore the effect of organizational culture on entrepreneurial behavior in a sample of Canadian and US firms. In particular, Hornsby et al. (1999) wanted to determine if organizational culture creates variance in entrepreneurial behavior on the part of Canadian and US managers. The results based on data collected from all levels of management showed no significant differences between Canadian and US managers' perceptions of the importance of five factors—management support, work discretion, rewards/reinforcement, time availability, and organizational boundaries—as antecedents to their entrepreneurial behavior. These findings partially validate those reported by Kuratko et al. (1990) and extend the importance of organizational antecedents of managers' entrepreneurial behavior into companies based in a second (albeit similar) national culture.

Hornsby et al. (2002) developed the Corporate Entrepreneurship Assessment Instrument (CEAI) to partially replicate and disentangle previously reported

findings. The instrument featured 84 Likert-style questions that were used to assess antecedents of entrepreneurial behavior. In this study, only middle-level managers, from both Canada and the United States, were surveyed. Results from factor analyses suggested that there are five stable antecedents of middle-level managers' entrepreneurial behavior. The five antecedents are: (1) *management support* (the willingness of top-level managers to facilitate and promote entrepreneurial behavior, including championing of innovative ideas and providing necessary resources), (2) *work discretion/autonomy* (top-level managers' commitment to tolerate failure, provide decision-making latitude and freedom from excessive oversight, and delegate authority and responsibility), (3) *rewards/reinforcement* (development and use of systems that reward based on performance, highlight significant achievements, and encourage pursuit of challenging work), (4) *time availability* (evaluating work loads to assure time to pursue innovations and structuring jobs to support efforts to achieve short- and long-term organizational goals, and (5) *organizational boundaries* (precise explanations of outcomes expected from organizational work and development of mechanisms for evaluating, selecting, and using innovations).

In summary, the literature on the organizational antecedents to CE is vast and expanding. The literature reviewed in this section only scratches the surface in identifying the attributes of a pro-entrepreneurship organizational architecture. However, the purpose here is not to provide an exhaustive listing of the organizational factors that invite CE. Others have devoted significant attention to this question. (The reader is referred to Brown and Eisenhardt (1998), Burgelman and Sayles (1986), Cornwall and Perlman (1990), and Miller and Friesen (1984) as examples of more comprehensive treatments of the topic.) The attention is now focused on the role of managers in the corporate entrepreneurship process.

The Role of Managers in Corporate Entrepreneurship

Managers at all organizational levels have critical strategic roles to fulfill for the organization to be successful (Floyd & Lane, 2000; Ireland et al., 2002). According to Floyd and Lane (2000), senior-, middle-, and first-level managers have distinct responsibilities with respect to each subprocess. Senior-level managers have *rati-fying*, *recognizing*, and *directing* roles corresponding to the competence definition, modification, and deployment subprocesses, respectively. These roles, in turn, are associated with particular managerial actions.

In examining the role of senior-level managers, Burgelman (1984) contends that in successful corporate entrepreneurship senior-level management's principal involvement takes place within the strategic and structural context determination processes. In particular, senior-level managers are responsible for *retroactively rationalizing* certain new businesses into the firm's portfolio and concept of strategy based on their evaluations of those businesses' prospects as desirable, value-creating components of the firm. Senior-level managers are also responsible for *structuring* the organization in ways that accommodate and reinforce the business ventures

embraced as part of the firm's strategic context. Overall, Burgelman (1984) sees senior-level managers as having a *selecting* role in the corporate venturing form of CE.

Ling, Simsek, Lubatkin, and Veiga (2008) examined 152 firms in regard to "transformational" CEO's impact on corporate entrepreneurship. Their research demonstrated that the transformational CEO's had a significant role in directly shaping four salient characteristics of top management teams: behavioral integration, risk-taking propensity, decentralization of responsibilities, and long-term compensation. This study provided impetus to the importance of the "directing" role that top management must embrace.

In summary, senior-level managers have multiple and critical roles in CE activity. These managers are responsible for the articulation of an entrepreneurial strategic vision and instigating the emergence of a pro-entrepreneurship organizational architecture. Moreover, through specific manifestations of entrepreneurial actions, senior-level managers are also centrally involved in the defining processes of both the corporate venturing and strategic renewal forms of CE, and they proactively respond to various entrepreneurial imperatives.

In examining the role of middle-level managers, research highlights the importance of middle-level managers' entrepreneurial behaviors to the firm's attempt to create new businesses or reconfigure existing ones (Floyd & Wooldridge, 1992; Ginsberg & Hay, 1994; Kanter, 1985; Pearce et al., 1997). This importance manifests itself both in terms of the need for middle-level managers to behave entrepreneurially themselves and the requirement for them to support and nurture others' attempts to do the same. Middle-level managers' work as change agents and promoters of innovation is facilitated by their organizational centrality.

Kuratko, Ireland, Covin, and Hornsby (2005) proposed a model of middle-level managers' entrepreneurial behavior. They contend that middle-level managers *endorse, refine, and shepherd* entrepreneurial opportunities and *identify, acquire, and deploy* resources needed to pursue those opportunities. Regarding the *endorsement* of entrepreneurial opportunities, middle-level managers often find themselves in evaluative positions vis-à-vis entrepreneurial initiatives emerging from lower organizational levels. In an induced sense, middle-level managers endorse CE perspectives coming from top-level executives and "sell" their value-creating potential to the primary implementers—first-level managers and their direct reports.

Their *refinement* behaviors characteristically involve molding the entrepreneurial opportunity into one that makes sense for the organization, given the organization's strategy, resources, and political structure. It is characteristically the job of middle-level managers to convert malleable entrepreneurial opportunities into initiatives that fit the organization. Through the *shepherding* function, middle-level managers champion, protect, nurture, and guide the entrepreneurial initiative. These behaviors assure that entrepreneurial initiatives originating at lower organizational levels are not "orphaned" once their continued development requires support beyond what can be given by individuals at those lower levels. The pursuit of entrepreneurial opportunities necessitates the *identification* of resources needed to convert the entrepreneurial concept into a business reality. Knowing which resources will be

needed to pursue any given entrepreneurial opportunity will be difficult inasmuch as entrepreneurial initiatives tend to evolve in their scope, content, and focus as they develop (McGrath & MacMillan, 1995). While the resource identification function relates to middle-level managers knowing what resources are needed to pursue the entrepreneurial opportunity, the resource *acquisition* function relates to them knowing where and how to get those resources. Middle-level managers are often most responsible for redirecting resources away from existing operations and toward entrepreneurial initiatives appearing to have greater strategic value for the firm (Burgelman, 1984). In short, it might be argued that the middle management level is where entrepreneurial opportunities are given the best chance to flourish based on the resources likely to be deployed in their pursuit.

In summary, evidence shows that middle-level managers are a hub through which most organizational knowledge flows (Floyd & Wooldridge, 1992; King et al., 2001). To interact effectively with first-level managers (and their reports) and to gain access to their knowledge, middle-level managers must possess the technical competence required to understand the initial development, subsequent shaping, and continuous applications of the firm's core competencies. Simultaneously, to interact effectively with senior-level executives and to gain access to their knowledge, middle-level managers must understand the firm's strategic intent and goals as well as the political context within which these are chosen and pursued. Resulting from these interactions is the ability of middle-level managers to champion strategic alternatives from those below (i.e., first-level managers and their reports) and to make them accessible to those above. Through interactions with senior- and first-level managers, those operating in the middle of an organization's leadership structure influence and shape their firms' CE strategies.

In Floyd and Lane's (2000) model, first-level managers have *experimenting* roles corresponding to the competence definition subprocess, *adjusting* roles corresponding to the competence modification subprocess, and *conforming* roles corresponding to the competence deployment subprocess. For example, first-level managers' experimenting role is expressed through the initiating of entrepreneurial projects. The adjusting role is expressed through, for example, first-level managers' responding to recognized and unplanned entrepreneurial challenges. Finally, the conforming role is expressed through first-level managers' adaptation of operating policies and procedures to the strategic initiatives endorsed at higher organizational levels.

Thus, organizations pursuing CE strategies exhibit a cascading, yet, integrated set of entrepreneurial action at the senior, middle, and first levels of management. At the senior level, managers act in concert with others throughout the firm as well as with key stakeholder groups to identify effective means through which new businesses can be created or existing ones reconfigured. CE is pursued in light of environmental opportunities and threats, with the purpose of creating a more effective alignment between the company and conditions in its external environment. The entrepreneurial behaviors expected of middle-level managers are framed around the need for this group to propose and interpret entrepreneurial opportunities that might create new business for the firm or increase the firm's competitiveness in current business domains. As recipients of these interpretations, first-level managers then

work with their people to fashion the entrepreneurial behaviors through which the firm's core competencies can be used daily to exploit entrepreneurial opportunities that others have not observed or have failed to effectively exploit.

In one empirical examination of managers' relation to employees in the corporate entrepreneurship process, Brundin, Patzelt, and Shepherd (2008) studied the entrepreneurial behavior of employees in entrepreneurially oriented firms and found a direct relation to manager's emotions and displays. The employees' willingness to act entrepreneurially increased when managers displayed confidence and satisfaction about an entrepreneurial project. It was also shown that the employees' willingness to act entrepreneurially decreased when managers displayed frustration, worry, or bewilderment about an entrepreneurial project.

In an effort to study entrepreneurial actions within the context of CE at different levels of management, Hornsby, Kuratko, Shepherd, and Bott (2009) conducted an empirical study of 458 managers at different levels in their firms. They found that the relationship between perceived internal antecedents (as measured by the Corporate Entrepreneurship Assessment Instrument [Hornsby et al., 2002]) and corporate entrepreneurial actions (measured by the number of new ideas implemented), differed depending on managerial level. Specifically, the positive relationship between managerial support and entrepreneurial action was more positive for senior- and middle-level managers than it was for first-level (lower level) managers, and the positive relationship between work discretion and entrepreneurial action was more positive for senior- and middle-level managers than it was for first-level managers. The few studies that have explored managerial level (primarily conceptual studies) have emphasized the role of first-level managers in a "bottom-up" process of corporate entrepreneurship (Burgelman, 1983a, 1983b, 1984). This study offered a counter-weight to this "bottom-up" process with arguments and empirical support for the notion that given a specific organizational environment more senior managers have greater structural ability to "make more of" the conditions and thus implement more entrepreneurial ideas than do first-level managers.

Even with the differences found with levels of management in the Hornsby et al. (2009) study, it reinforced the belief that working jointly, senior-, middle-, and first-level managers are responsible for developing the entrepreneurial behaviors that could be used to form the core competencies through which future competitive success can be pursued.

Entrepreneurial Behavior

The relationship between entrepreneurial behavior and performance in large organizations has been assessed differently across time. During the 1980s, some (e.g., Duncan et al., 1988; Morse, 1986) argued that it was difficult for people to act entrepreneurially in bureaucratic organizational structures. During this same time period others suggested that for companies of any size, entrepreneurial behavior was possible, should be encouraged, and could be expected to enhance firm performance (Burgelman, 1984; Kanter, 1985; Kuratko & Montagno, 1989).

A significant change in the general perception of the value of entrepreneurial behavior as a predictor of firm performance took place throughout the 1990s. This was a time during which companies were redefining their businesses, thinking about how to most effectively use human resources and learning how to compete in the global economy through entrepreneurial actions (Zahra et al., 1999).

Entrepreneurial behavior does not occur in a vacuum; rather, it takes place within the context of the organization's full array of actions (Dess et al., 1997). Establishing an internal environment in large, established organizations that elicits and nurtures entrepreneurial behavior is challenging and requires appropriate decisions and actions (Sathe, 1985). As shown in Fig. 6.1, entrepreneurial behavior is a product of organizational and individual antecedents.

Entrepreneurial behavior is a set of entrepreneurial actions by which individuals make judgmental decisions under uncertainty (McMullen & Shepherd, 2006) and through which companies seek to exploit entrepreneurial opportunities that rivals have not noticed or exploited. *Entrepreneurial opportunities* are external environmental conditions suggesting the viability of introducing and selling new products, services, raw materials, and organizing methods at prices exceeded their production costs (Casson, 1982; Shane & Venkataraman, 2000). In complex environments, entrepreneurial opportunities often surface unexpectedly. Because these opportunities are short-lived and subject to capture or appropriation by rivals, a firm must move quickly to pursue a desired opportunity once it has been identified (Eisenhardt & Sull, 2001). Entrepreneurial behavior constitutes a "...fundamental behavior of firms by which they move into new markets, seize new customers, and/or combine (existing) resources in new ways" (Smith & Di Gregorio, 2002). Three key dimensions—innovativeness (the seeking of creative solutions to problems or needs), risk-taking (the willingness to commit significant levels of resources to pursue entrepreneurial opportunities with a reasonable chance of failure), and proactiveness (doing what is necessary to bring pursuit of an entrepreneurial opportunity to completion)—underlie entrepreneurial behavior (Covin & Slevin, 1991; Lumpkin & Dess, 1996; Morris et al., 2008).

An entrepreneurial event varies in terms of the degree of entrepreneurship, or how much innovativeness, risk-taking, and proactiveness is involved. Just as important is the question of how many entrepreneurial events take place within a company over a given period of time. Morris, Kuratko, and Covin (2008) referred to this as the "frequency of entrepreneurship." Some companies produce a steady stream of new products, services, and processes over time, while others very rarely introduce something new or different.

Morris and Sexton (1996) introduced the concept of "entrepreneurial intensity". Other researchers have used such terms as entrepreneurial posture, organic emphasis, entrepreneurship level, and entrepreneurial aggressiveness to talk about what, in essence, is the same thing (Cheah, 1990; Covin & Slevin, 1991; Jennings & Seaman, 1994; Keats & Bracker, 1988; Schaefer, 1990; Stuart & Abetti, 1989). To assess the overall level of entrepreneurship in a company, the concepts of degree and frequency must be considered together. Thus, a firm may be engaging in lots of entrepreneurial

initiatives (high on frequency), but none of them are all that innovative, risky, or proactive (low on degree). Another company may pursue a path that emphasizes breakthrough developments (high degree) that are done every 4 or 5 years (low frequency).

To better understand the *entrepreneurial intensity (EI)* concept, consider Fig. 6.3. Here, a 2-D matrix has been created with the number, or frequency, of entrepreneurial events on the vertical axis, and the extent or degree to which these events are innovative, risky, and proactive on the horizontal axis. We refer to this matrix as the “entrepreneurial grid.” For purposes of illustration, five sample scenarios have been identified in Fig. 6.3, and these have been labeled Periodic/Incremental, Continuous/Incremental, Periodic/Discontinuous, Dynamic, and Revolutionary.

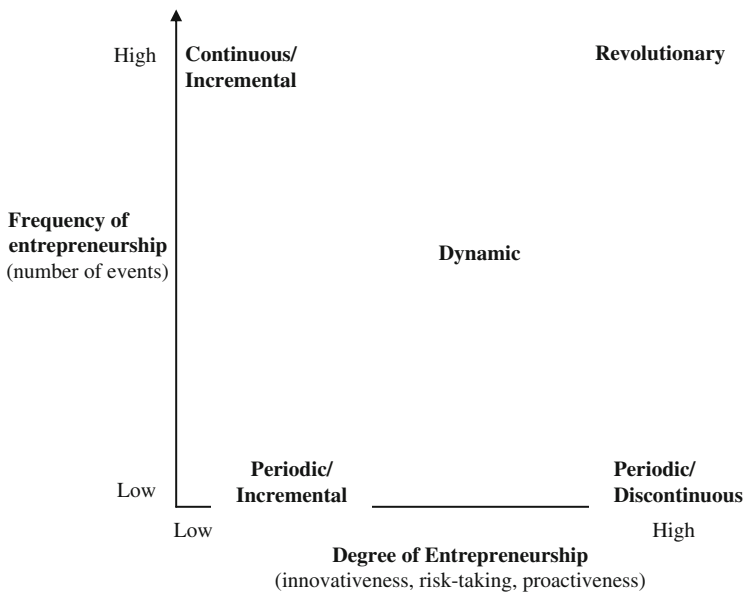


Fig. 6.3 The entrepreneurial grid. *Source:* Morris, M. H., Kuratko, D. F., & Covin, J. G. 2008. *Corporate Entrepreneurship & Innovation*: 70. Mason, OH: Thomson/SouthWestern Publishing

Each of these reflects the variable nature of entrepreneurial intensity. For example, where few entrepreneurial events are produced, and these events are only nominally innovative, risky, and proactive, the organization can be described as Periodic/Incremental in terms of its (modest) level of EI. Similarly, an organization that is responsible for numerous entrepreneurial events that are highly innovative, risky, or proactive will fit into the Revolutionary segment of the entrepreneurial matrix and will exhibit the highest levels of EI.

While Fig. 6.3 depicts five discrete segments, it is important to note that these segments have been arbitrarily defined to illustrate how EI can vary. Amounts and degrees of entrepreneurship are relative; absolute standards do not exist. Further, any given organization could be highly entrepreneurial at some times and not very entrepreneurial at others. Consequently, they could occupy different points in the grid or matrix at different periods in time.

Novelty, in terms of new resources, new customers, new markets, or a new combination of resources, customers, and markets is the defining characteristic of entrepreneurial behavior as the foundation for pursuing entrepreneurial opportunities (Ireland et al., 2001; Smith & Di Gregorio, 2002). Entrepreneurial behavior is the conduit through which entrepreneurship is practiced in companies of all types. Increasingly, organizations are committing to the position that entrepreneurial behavior is essential if they are to first survive and then achieve competitive success in a world that is being driven by accelerating change (Barringer & Bluedorn, 1999; Ireland et al., 2001; Lyon et al., 2000).

Entrepreneurial behavior is one of two foundational components (willingness is the other) comprising the entrepreneurship construct. In essence, through two components, entrepreneurship is concerned with discovering and exploiting value-creating entrepreneurial opportunities (Shane & Venkataraman, 2000). The *behavioral* component "... includes the set of activities required to move a concept or idea through the key stages in the entrepreneurial process to implementation" (Morris & Kuratko, 2002). Managers' entrepreneurial behavior is vital to this set of implementation-related activities. Furthermore, managers' entrepreneurial behavior can be a source of competitive advantage for a firm over its rivals (Floyd & Wooldridge, 1994). Entrepreneurship's *willingness* component "... refers to the willingness of an individual or organization to embrace new opportunities and take responsibility for effecting creative change" (Morris & Kuratko, 2002). Lumpkin and Dess (1996) call this attitude or willingness *entrepreneurial orientation*. Here too, managers' entrepreneurial behavior is important, especially in terms of autonomous strategic behavior.

Entrepreneurial behavior, displayed within the context of an existing organization, is linked to corporate entrepreneurship and is differentiated from its relationship with independent entrepreneurship (Sharma & Chrisman, 1999). Evidence indicates that corporate entrepreneurship is especially important for use in firms facing rapid changes in industry and market structures, customers' needs, technology, and societal values (Morris et al., 2008). In the instance of corporate entrepreneurship, the process of entrepreneurial behaviors encompasses a set of organization-wide activities rather than any single one (Vozikis et al., 1999).

Next, entrepreneurial outcomes and the consequences resulting from them are considered. These outcomes and their consequences are a product of the series of events that is initialized by top-level managers' awareness of external transformational triggers, the execution of a corporate entrepreneurial strategy, the existence of organizational antecedents, and the pursuit of entrepreneurial behaviors by managers.

Entrepreneurial Outcomes and Consequences

Entrepreneurial outcomes result from using entrepreneurial behavior as the foundation for implementing a strategy for corporate entrepreneurship. The model illustrates that there are unique yet interrelated outcomes that accrue to the organization and to managers (see Fig. 6.1). Once recorded, each party evaluates the outcomes that have been achieved and the subsequent consequences relative to incurred costs and opportunity costs. Resulting from these evaluations are decisions regarding the status (continuance, rejection, or modification) of corporate entrepreneurship behaviors (an organizational-level issue) and the status (continuation, rejection, or modification) of entrepreneurial behavior (an individual-level issue). For an organization, the consequences to be evaluated concern primarily the degree to which using corporate entrepreneurship behaviors enhanced current and future performance. For managers, consequences concern the degree to which the displayed entrepreneurial behavior enhanced and expanded their skills set as well as the degree to which the organization recognized and rewarded the behavior.

Individual-Level Outcomes and Consequences

Effective entrepreneurial behavior is the major outcome that managers experience following their attempts to behave in ways required to implement corporate entrepreneurship. In this context, effectiveness has two dimensions—the extent to which managers' behavior contributed positively to implementation of the firm's corporate entrepreneurship behaviors and the degree to which the behavior enhanced each manager's skills set and value to the organization, as indicated by recognition and rewards (Sykes, 1986, 1992).

Objective measures are critical to assessing performance relative to the two dimensions; however, subjective measures are also important. The primary reason for this is that the long-term commercial value of entrepreneurial behavior, especially when that behavior results more from autonomous than induced strategic behavior is difficult to assess by using only objective measures. Moreover, the ultimate value of more intricately developed networks and relationships—ones that are based on tacit knowledge—that evolve from managers' intense entrepreneurial behavior innovations is hard to judge without at least some degree relying on subjective measures. However, introspection may play a prominent role in each individual manager's analysis of skills set improvements and the value of formal (i.e., organizational) and informal (i.e., personal) recognition and rewards.

For managers, entrepreneurial behavior's consequences are of two types—intrinsic (i.e., psychological) and extrinsic (i.e., tangible). While very little entrepreneurship research has addressed specific incentive/renewal programs, Block and MacMillan (1993) cite four possible types of incentives for internal entrepreneurial behavior. These incentives include: (1) equity and equity equivalents; (2) bonuses; (3) salary increases and promotions; and (4) recognition systems and rewards. Block and Ornati (1987) studied the use of incentives for internal

entrepreneurs and found that more than 30% of the firms compensated venture managers differently than other managers; over half of all respondents believed that variable bonuses based on ROI should be used; and internal equity was the major obstacle cited by organizations with no incentive program. Firms with an incentive program cited the difficulty of determining venture goals as the most significant obstacle. All outcomes will have some level of perceived value to the manager. Each manager will have his or her own system to value outcomes.

One inference in the model is the manager's perception that the outcomes of entrepreneurial behavior will meet or exceed expectations. According to Porter and Lawler (1968), the relationship between individual effort and performance is moderated by individual skills, abilities and role perceptions and the relationship between performance and outcomes affects whether or not the individual is likely to repeat the behavior. Also, the individual's satisfaction with the outcome is dependent on a perception of equity between his or her performance-outcome relationship and a reference person's (e.g., coworker or employee in another organization performing similar work) performance-outcome relationship. It is proposed that the manager enters the process with expectations of extrinsic and intrinsic outcomes that will result from the inception of the entrepreneurial behavior. The specific expectations may vary for each individual. These expectations may evolve over time as new opportunities present themselves or as the reality of operation emerges. For corporate entrepreneurship, the corresponding outcome expectations are (1) independence, autonomy, and control; (2) financial considerations; and (3) significant sales and profit growth, respectively. Naffziger et al. (1994) argued that individuals demonstrate sustained entrepreneurial behavior if the achievements of the entrepreneurial venture meet or exceed the expectations or goals that were initially believed. Kuratko et al. (1997) found the importance of initial goals was vital to the sustained entrepreneurial activity of business owners.

Huseman, Hatfield, and Miles (1987) identified three response patterns to perceived equity or inequity. The first response type is a benevolent response where the individual is only satisfied when they are under-rewarded and feels guilty when equitably rewarded or over-rewarded. The second response type is the equity sensitive response where the individual perceives that everyone should be rewarded fairly based on the inputs (e.g., effort, skills, abilities, etc.) invested. The third response type is the entitlement response where the individual believes everything they receive is due them. They are only satisfied when they perceive that they are over-rewarded or receive the highest possible reward. According to Huseman et al. (1987) it is the equity sensitive response type that can be explained by Equity Theory. This theory is most closely related to the work of Adams (1965), which deals with the exchange relationships among individuals and groups. The theory holds that, in deciding whether or not they are being treated equitably or fairly, people compare what they are giving to an organization to what they are getting from the organization. When the person concludes that, in comparison to others, what they are receiving is equal to or greater than what they are giving, equity exists. If any one side of the equation is larger, then imbalance exists and motivation is affected (Cosier & Dalton, 1983). Greenberg (1988, 1990) and Miles, Hatfield, and Huseman

(1994) empirically supported the existence of these three response types and their impact on work outcomes. It is hypothesized that individuals who decide to behave entrepreneurially are equity sensitive and will compare the outcomes received for their entrepreneurial actions to counterparts in their organization or in other organizations. Also, individuals must perceive that they have some control over their environment. In other words, they must believe that their efforts will impact performance and that performance will result in desired outcomes. This hypothesis regarding entrepreneurial behavior resembles similar assumptions in a model on job crafting by Wrzesniewski and Dutton (2001). Their model examines the degree to which individuals are willing to change the nature of their work beyond static job designs. Similarly, they state that certain organizational features, such as flexible organizational boundaries, must first be in place for the effect to happen to a significant degree. Results perceived as favorable to themselves also will serve as feedback for further job crafting in the future, ultimately leading to the individual redefining their work in a new way. Likewise, in our research model, as an individual undertakes more entrepreneurial activities with positive results, he or she will develop a more positive entrepreneurial perspective toward their work and organization. It is hypothesized that managers that decide to behave entrepreneurially are equity sensitive and will compare the outcomes received for their entrepreneurial behaviors to counterparts in their organization or in other organizations. Also, managers must perceive that they have some control over their environment. In other words, they must believe that their efforts will impact performance and that performance will result in desired outcomes (Gatewood et al., 2002).

Therefore, applying the findings of Porter and Lawler (1968), Baum, Locke, and Smith (2001), and Wrzesniewski and Dutton (2001), the critical factors for ongoing entrepreneurial behavior include: the impact of both intrinsic and extrinsic rewards on sustained entrepreneurial behavior (i.e., satisfaction and reinforcement of the behavior) and the value of rewards and their impact upon sustained entrepreneurial behavior.

Organizational-Level Outcomes and Consequences

Changes in the firm's external and internal environment may increase both pressures for, and resistance to, change. Changes in the external environment and changes in the internal environment may lead to pressure for change by providing feedback that a firm is misaligned with its *economic* environment (Lundberg, 1984). This misalignment in turn decreases the *effectiveness* of continuing with the strategy and increases the efficiency of engaging in multifaceted and radical change (Friesen & Miller, 1986).

Performance outcomes may influence changes by providing feedback that indicates whether or not the current strategy is effective or efficient. Alternatively, they may provide feedback regarding the firm's willingness or capacity to change to a new strategy (Ginsberg, 1988). Success of entrepreneurial behaviors can be based on either financial outcomes such as increased sales, productivity, market share, reduced waste, and labor efficiencies or on behavioral criteria such as number of

ideas suggested; number of ideas implemented; amount of time spent working on new ideas; and amount of time spent outside of normal channels to pursue an idea (Hornsby et al., 1999). The more traditional financial criteria can be heavily influenced by factors unrelated to the corporate entrepreneurial process. External factors such as the economy, technology, suppliers, competitors, and governmental regulation may confound the relationship between the entrepreneurial strategy and outcomes. The behavioral criteria, however, can provide a less confounded assessment of the success of the entrepreneurial strategy since they are more directly tied to organizational control.

Both organizational and individual (managers) outcomes play a key role in sustaining corporate entrepreneurship. In an equity theory framework, these outcomes will reinforce or sustain future entrepreneurial behavior only if the rewards are valued by those who receive them and perceived to be linked directly to the manager's decision to behave entrepreneurially. Also, the outcomes received by the organization and the manager must be perceived to exceed the possible outcomes received from a different choice of strategy or behavior.

It is hypothesized that perceptual interpretations of the overall outcomes made by the organization's executive management play a key role in the entrepreneurial strategy process, as illustrated in the implementation-to-outcome relationship in the Porter and Lawler (1968) model. One important perceived relationship is the strength of the relationship between the entrepreneurial strategy and firm outcomes. Executive management must believe that strategic and managerial actions will lead to specific outcomes achieved by the firm, such as increased entrepreneurial behaviors, increased sales, profit, and/or market share. The research model hypothesizes that the more positive this relationship is perceived to be, the stronger will be the resulting motivation to continue this strategy to encourage entrepreneurial behaviors and actions, either in the form of continued pursuit of the current projects or initiation of further projects. It is also hypothesized that these perceptions will have a feedback effect on succeeding strategies, strategy implementation, and management of the firm. This hypothesis is consistent with Ginsberg's (1988) framework for modeling changes in strategy. According to Ginsberg, performance outcomes influence changes by providing feedback indicating whether the chosen strategy is effective and assess the organization's willingness to retain the strategy or change to a new strategy.

Effective entrepreneurial behavior on the part of managers should benefit the organization as well as the managers. Appropriate individual-level rewards for those who display requested entrepreneurial behavior reinforce those individuals' decision to sustain their entrepreneurial behavior while achievement of desired organizational outcomes reinforces the firm's decision to continue pursuing and reinforcing entrepreneurial behavior as a vital aspect of effective CE strategy. Kuratko, Hornsby, and Bishop (2005) investigated the relationship between the previously identified antecedents and self-reported outcomes from managers including the number of new ideas suggested, the number of new ideas implemented, the number of times recognized for new ideas, method of recognition, time spend thinking about new ideas and job satisfaction. Based on data obtained from 530

managers, significant support (based on stepwise regression analysis) for a relationship between the environmental antecedents and outcomes was established. Specifically, the following relationships were identified:

- An overall composite score on the CEAI (Corporate Entrepreneurship Assessment Instrument) was related to total satisfaction, use of bonuses, and times recognized for new ideas.
- Management support was related to total satisfaction, times recognized for new ideas, use of bonuses, and rating of effectiveness of bonuses.
- Work discretion was related to total satisfaction and unofficial improvements implemented.
- Rewards/reinforcement was related to total satisfaction, use of pay raise, and times recognized for new ideas.
- Time availability was related to total satisfaction and use of “other” method of pay raise.
- Organizational boundaries were related to total satisfaction, times recognized for job improvement, and use of bonuses.

Perhaps the most important finding of these results is that total satisfaction was highly related to the existence of a corporate entrepreneurial environment. Total satisfaction accounted for the most variance in all of the stepwise analyses.

Sustaining Corporate Entrepreneurship

The true value of entrepreneurship as a corporate concept lies in the extent to which it helps organizations create *sustainable competitive advantage*. In order to maintain this “entrepreneurial mindset,” managers must assume certain ongoing responsibilities (McGrath & MacMillan, 2000). Managers must exhibit “entrepreneurial leadership” for their organization (Kuratko, 2007; Ling et al., 2008). The first responsibility involves “framing the challenge.” In other words, there needs to be a clear definition of the specified challenges that everyone involved with innovative projects should accomplish. It is important to think in terms of, and regularly reiterate, the challenge. Second, leaders have the responsibility to “absorb the uncertainty” that is perceived by team members. Entrepreneurial leaders make uncertainty less daunting. The idea is to create the self-confidence that lets others act on opportunities without seeking managerial permission. Employees must not be overwhelmed by the complexity inherent in many innovative situations. A third responsibility is to “define gravity”—that is, what must be accepted and what cannot be accepted. The term *gravity* is used to capture limiting conditions. For example, there is gravity on the earth, but that does not mean it must limit our lives. If freed from the psychological cage of believing that gravity makes flying impossible, creativity can permit us to invent an airplane or spaceship. This is what the entrepreneurial mindset is all

about—seeing opportunities where others see barriers and limits. A fourth responsibility of entrepreneurial leadership involves “clearing obstacles” that arise as a result of internal competition for resources. This can be a problem especially when the entrepreneurial innovation is beginning to undergo significant growth. A growing venture will often find itself pitted squarely against other (often established) aspects of the firm in a fierce internal competition for funds and staff. Creative tactics, political skills, and an ability to regroup, reorganize, and attack from another angle become invaluable. A final responsibility for entrepreneurial leaders is to keep their finger on the pulse of the project. This involves constructive monitoring and control of the developing opportunity (Morris et al., 2008).

In the contemporary organization, all managers must be entrepreneurial leaders. As such, responsibilities such as those described here must become a core part of how every manager’s job is defined. Doing so will help limit the extent to which individual champions begin that inexorable transition from corporate entrepreneur to corporate bureaucrat.

Times have certainly changed in terms of how entrepreneurship is perceived in a corporate setting. In the 1970s, the word entrepreneurship was simply not associated with large corporate environments. During the 1980s, many argued that it was difficult if not almost impossible for people to act entrepreneurially in bureaucratic organizational structures (Morse, 1986). At the same time, a few researchers began to suggest that entrepreneurial actions were possible for companies of any size, should be encouraged, and might be expected to enhance firm performance (Burgelman, 1984; Kanter, 1985). During the latter part of the 1980s and throughout the 1990s, there was a veritable revolution with respect to the perceived value of entrepreneurial actions. This significant change paralleled the profound adjustments companies were making in terms of how they defined their business, utilized their human resources, and competed in the global economy. Zahra, Kuratko, and Jennings (1999) noted that: “Some of the world’s best-known companies had to endure a painful transformation to become more entrepreneurial. They had to endure years of reorganization, downsizing, and restructuring. These changes altered the identity or culture of these firms, infusing a new entrepreneurial spirit throughout their operations. . .change, innovation, and entrepreneurship became highly regarded words.”

Extending this position to the current day, the 21st century is a time when entrepreneurial actions are recognized widely as the path to competitive advantage and success in organizations of all types and sizes (Covin et al., 2000). Moreover, a lack of entrepreneurial actions in today’s global economy is a recipe for failure.

A sustainable corporate entrepreneurship strategy will drive organizations through the challenging global economy (Kuratko, 2009). As Baumol (2004) states, “The outlook is, indeed, that there will be no break in the acceleration of innovation, and that the innovations in prospect will be as difficult for us to comprehend as those now thoroughly familiar to us would have been to our ancestors.” Corporate entrepreneurship is a risk and it has to start somewhere—sometimes small and corporate controlled. But if it starts, there is the likelihood of greater success. Managers become more comfortable with the idea; confidence builds, results occur, and soon

the first corporate assigned projects evolve into more autonomous ventures that reach farther out before being required to report into administrative structure.

The major thrust behind corporate entrepreneurship is a revitalization of innovation, creativity, and leadership in today's organizations. It appears that corporate entrepreneurship may possess the critical components needed for the future productivity of all organizations. If so, then recognizing the objectives, requisites, and range of potential research areas are most important in establishing entrepreneurial strategies in contemporary organizations.

Our focus has been on the research associated with the antecedents, behaviors, and outcomes related to the various levels of managers involved with corporate entrepreneurship. The research model used proposes that entrepreneurial actions are the result of the perception of the existence of several organizational antecedents such as top management support, autonomy, rewards, etc. The outcomes realized from this entrepreneurial behavior are then compared at both the individual and organizational level to previous expectations. Thus, it is contended that corporate entrepreneurial behavior is a result of both an equity perception by the individual and the organization. Both must be satisfied with the outcomes for the entrepreneurial behavior to continue from the organizational strategy perspective as well as the individual perspective. The impact of performance outcomes on sustaining a strategy is consistent with Ginsberg's (1988) strategic change model. Satisfaction with performance outcomes serves as a feedback mechanism for either sustaining the current strategy or selecting an alternative one. The model further suggests that managers, as agents of the strategic change, must also be satisfied with the intrinsic and extrinsic outcomes they receive for their entrepreneurial behavior. While it may be a "chicken-and-egg" question as to whether individual behavior or organizational strategy should change first, the model suggests that in a major strategic change, both are instrumental in making the change successful.

The research model presented in this chapter is integrative in nature since it builds on previous work in the entrepreneurship/corporate entrepreneurship literature (Hornsby, et. al. 1993; Ireland et al., 2009; Kuratko et al., 2004, 2005; Naffziger, et al. 1994; among others), as well as the theoretical propositions from other disciplines such as Porter and Lawler (1968), Adams (1965), Vroom (1964), and Ginsberg (1988). It is believed that this model focuses on the body of literature related to corporate entrepreneurship since it illustrates the importance of the managers' role in a corporate entrepreneurship strategy.

Future Research

Based on the compilation of ideas presented in this work, there are a number of areas for future research that can be suggested. First, issues related to entrepreneurship and corporate innovation as a strategic choice need to be studied. One issue is that of governance. How is the organization owned and governed? In corporate restructuring, governance has been shown to be a major concern (Certo et al., 2008;

Hoskisson et al., 1994; Hoskisson & Turk, 1990). Ownership issues may arise where investors do not seek the same entrepreneurial goals for the firms (Kochhar & David, 1996). Therefore, the governance issue needs to be examined in conjunction with this research model. Another issue is the pacing of strategic change (Gersick, 1994) and the timing of entrepreneurial progress (Bird, 1988). Short-term versus long-term actions may reveal interesting results for the corporate entrepreneurial strategy. Finally, research is needed concerning the impact of environment, and prior history of changes, related to corporate entrepreneurship strategy.

A second area for future research involves a firm's performance outcomes related to successful strategic implementation. Which outcomes (either behavioral or financial) account for more of the variance when the organization evaluates whether or not corporate entrepreneurship as a strategy should continue? Furthermore, do organizations utilize the concept of equity when determining their satisfaction with outcomes? Research into these questions as well as how the feedback loop develops in firms may provide guidance for the future use of this strategy.

The third area of research focuses on the manager's role in the success of a corporate entrepreneurial strategy. How do organizational antecedents influence or moderate the manager's decision to behave entrepreneurially? Research is necessary to determine how critical these antecedents are compared to other influencing factors such as the manager's past work experience and demographic factors (i.e., age, gender, culture, etc.). The antecedents suggested in the model should account for a significant portion of the variance for entrepreneurial decision-making by the manager. Research is necessary to determine the degree to which these antecedents must exist, and how they coexist, in order for successful entrepreneurial behaviors to occur. Furthermore, once the manager initiates entrepreneurial behavior, which outcomes are valued as a result of their behavior? Also, does the manager desire more intrinsic outcomes or extrinsic outcomes when determining whether they have received equitable outcomes?

A fourth area of inquiry that has taken some shape in recent years is the examination of failure in the context of specific corporate entrepreneurial projects (Shepherd et al., 2009). Although failure can be an important source of information for learning, this learning is not automatic or instantaneous. The emotions generated by failure (i.e., grief) can interfere with the learning process. Future research can examine the grief process and how it can be managed by individuals and organizations to enhance learning (Shepherd & Kuratko, 2009). Specifically, how failed innovators can learn more from their project failures and remain committed to future innovative endeavors.

A fifth area of future research would begin to move beyond the single cause and effect relationship and examine the interrelationship of the individual and the organization together. Shepherd, Patzelt, and Haynie (2009) explored this domain by introducing the notion of entrepreneurial spirals (enduring, deviation-amplifying loops) that link the manager's mindset to the organizational culture. Future studies will need to extend this type of research using longitudinal studies.

In summary, organizations are choosing to pursue entrepreneurial and innovative strategies. However, as the research on corporate entrepreneurship continues to

expand there needs to be more aspects focused upon. The concepts proposed in this chapter may provide insights for researching corporate entrepreneurship strategy from a process perspective. This research will impact ultimately on organizational success.

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Chapter 7

High-Impact Entrepreneurship

Zoltan J. Acs

Introduction

In recent years, economists have come to recognize the crucial role of entrepreneurs in innovation and growth and the significant contribution of innovation and growth to prosperity and economic welfare (Acs & Armington, 2006; Audretsch, 2006; Schramm, 2006). Innovation and growth—much more than state-guided efforts to ameliorate static “market failures” such as monopoly power—allow economies to lift individuals out of poverty and to provide for growing and aging populations. According to Leibenstein (1978, 50)

[only] those individuals who have the necessary skills to perceive entrepreneurial opportunities, to carry out the required input gap filling activities, and to be input-completers can be entrepreneurs.

Indeed, for developed countries high impact entrepreneurship (HIE) has become the main form of entrepreneurship driving their economies. With this recognition has come a growing interest by the economics profession in the phenomenon of entrepreneurship: the role it plays in the economy, the process of new and innovative business creation, the personal attributes of entrepreneurs, and the public policies that encourage entrepreneurial success.

Entrepreneurs recognize the latent power and utility of inventions and play a crucial role in bringing those inventions to market. These entrepreneurs—those that Schumpeter described as “the promoters of new combinations”—are individuals who can both see new possibilities and assess market needs (Acs & Audretsch, 2003). HIE is fundamentally the study of the actions of individuals responding to market opportunities by bringing inventions to market that create wealth and growth. These entrepreneurs are distinct from mere creators of new firms, those that replicate thousands of other establishments. According to Leibenstein (1968, 72–73, emphasis added)

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We may distinguish two broad types of entrepreneurial activity: at one pole there is routine entrepreneurship, *which is really a type of management*, and for the rest of the spectrum we have Schumpeterian or “new type” entrepreneurship . . . By routine entrepreneurship we mean the activities involved in coordinating and carrying on a well established, going concern in which the parts of the production function in use (and likely alternatives to current use) are well known and which operates in well-established and clearly defined markets.

By high-impact entrepreneurship “. . . we mean the activities necessary to create or carry on an enterprise where not all the markets are well established or clearly defined and/or in which the relevant parts of the production function are not completely known.” It is certainly the case that replicative entrepreneurs can be of great social significance. However, innovative entrepreneurs ensure the utilization of invention, contribute to increased productivity, and both facilitate and contribute to economic growth.

While this chapter will highlight the theoretical literature on HIE, it is important to note upfront that economics lacks a body of formal theory that corresponds to the other three factors of production—land, labor, and capital (Baumol, 1968, 2005).¹ The absence of the entrepreneur from value theory does not mean that the study of entrepreneurship is void of theory. While no formal value theory exists a large body of literature on labor markets, technological change, and strategy—the three pillars of HIE—makes our understanding of the economic landscape far from incomplete.²

This chapter proceeds as follows. After defining the concept, the second section frames our discussion of entrepreneurship through the exposition of a collection of stylized facts concerning the rate of entrepreneurship, focusing our attention on HIE. We then examine the question of “why do people choose to become high-impact entrepreneurs?” from the perspective of occupational choice, labor market theories, knowledge spillover entrepreneurship, and strategic entrepreneurship.

Definition of High-Impact Entrepreneurship

The domain of HIE is parallel to the development of other entrepreneurship literatures—social entrepreneurship, ethnic entrepreneurship, family-owned business, international entrepreneurship, gender and entrepreneurship, self-employment. HIE is a “class” of entrepreneurship. As you might expect there are similarities between types, and important differences. The important differences can be best distinguished by examining the literatures that have floated around HIE, but have yet to be integrated as a distinct domain: innovation, occupational choice, human capital, venture capital, endogenous growth, knowledge spillovers, capital markets, entrepreneurial rents, and even the personality bits of traditional entrepreneurship.

¹For discussion of this issue see Bianchi and Henrekson (2005).

²For a review of the broader theoretical and historical literature on entrepreneurship see Parker (2004, 2005), Hebert and Link (2007), and Casson, Young, Basu, and Wadeson (2006). For a review of the empirical literature on high-impact entrepreneurship, see van Praag and Versloot (2007).

The goal of HIE is more than growth and change—it is different from other domains primarily because it operates with leverage as its outcome.³

We have been poking around like “blind men examining an elephant,” touching upon risk-bearing preferences of entrepreneurs, uncertainty, the magic of technical innovation, and the intermediaries that have emerged to finance these special firms. HIE is innovation driven, operates in a highly uncertain environment and is Schumpeterian in outcome. Integrating these various literatures gives us a clear picture of what HIE is, where it is aligned with other types of entrepreneurship, and where it is not. HIE is a distinct domain of entrepreneurship research. When seen from this perspective one can surmise that many of the confounds in existing entrepreneurship research are the result of conflating different types of entrepreneurs.

From the new venture process springs the new business forms with which we are familiar: a local clothing boutique; a bakery; a local fast-food franchise; Google. The focus of this chapter is the latter form at the earliest stage of its development: a sub-specie of entrepreneurial new venture known as a leveraged startup. A leveraged startup is distinct from other types of businesses that get lumped into discussions about other nascent ventures: potential lifestyle businesses, a service business, a franchise, or anything else related to job replacement or job substitution. A company has to be more than small and newly founded to be a leveraged startup. In this context, a leveraged startup is a firm engaged in the act of innovation: the development and commercialization of disruptive breakthroughs that shift the wealth creation curve at the industry and the individual level. Often, those participating in a new venture fail to understand the distinction, and there are many entrepreneurs who think that they are engaged in a “leveraged startup” when they are not: these companies are lifestyle businesses, franchises, consulting firms, and (eventually) venture capital funded zombie companies (Shane, 2008). The latter, however, is in part facilitated by the fact that, “. . . some percentage of those individuals that form firms to generate and appropriate economic rents do so because they believed they possessed rare knowledge about a market opportunity. Given this belief, these individuals may have behaved in way perfectly consistent with the theory developed here, only to discover that their knowledge was not valuable or not rare or both” (Alvarez & Barney, 2004, 633).

Leverage is a key component of any high-impact startup, and entails *being a product business and not a service business*. To be a leveraged startup you have to be interested in selling one thing to a lot of people rather than a lot of different or semi-custom products to individual clients. This is not a strict dichotomy: products and services business range along a continuum. It is a state of mind, an intention implicit in the notion of being a product business is that startups are growth businesses, not job replacement businesses.

Recent research has done a decent job of unpacking the previously confounded distinction between different types of entrepreneurial ventures. Entrepreneurs do

³I thank Robert Wuebker for this definition of HIE.

not form leveraged startups as a substitute for a day job! That's because leveraged startups have nothing to do with job replacement. The essence of a leveraged startup is the opportunity to shift the wealth curve, compress time, and get paid a multiple in the future for doing so. As Alvarez and Barney (2004, 633) point out, "... this entire analysis is based on the assumption that economic actors are seeking to generate and appropriate economic rents in their organizing decision, and that they are interested in minimizing the costs of doing so."

Understanding the essential nature of the leveraged startup exchange—*building a growth business and shifting the wealth creation curve*—helps to explain why those engaged in the process of building new ventures and those studying them encourage individuals to start early (Reynolds, 2009). There are some times that are more advantageous than others to be an entrepreneur. How an entrepreneur frames risk is not the issue here. How much attention an entrepreneur can devote to the business, and how aligned their life is for the single-minded pursuit of business success is the crucial success factor.

The leveraged startup by definition is a new organization founded by an entrepreneur who has identified an opportunity and has decided to act on it. In other words, the opportunity is objective and the recognition of the opportunity is subjective consistent with the theories of Schumpeter, Knight, and Hayek. This *de novo* startup rests on the three foundations of HIE. First, occupational choice explains how people choose to become entrepreneurs, why human capital matters, what kind of jobs do they leave and what kind of education do they have. Second, technological change explains how leveraged startups impact the economy through innovation by focusing on the knowledge spillover theory of entrepreneurship. In this theory agents in the possession of new knowledge is exogenous to the model and the agent endogenously engages in a leveraged startup. The firm does not exist exogenously as it does in strategy and most theories of the firm—resourced-based theory, agency theory, or transaction cost economics. Finally, how leveraged startups are financed is the final pillar that is examined. Again, venture capital is most applicable for the startup firm. If the firm is exogenous to the model and endogenously engages in HIE there is no need for the study of leveraged startups. We now turn to the stylized facts.

Stylized Facts

What data are available for the study of HIE? The succinct answer is: not enough, and the data that is available is fraught with statistical difficulties. A recent, comprehensive study on US government data collection conducted by the National Research Council of the National Academies confirms this shortage of data for the study of entrepreneurship, concluding that current US business data are inadequate for the study of productivity, innovation, and firm creation. A central recommendation of the authors of the study was that there is a "need to increase the statistical system's capacity to measure activities of nascent and young businesses—especially those positioned in fast-growing and innovative sectors of the economy—that are

central to understanding business dynamics” (National Research Council, 2007). With this challenge in mind, I present our perspective on the best data available for the study of HIE.

If one is interested in high-impact firms that grow and shift the wealth curve, ex-post initial public offerings gives us a good rear view mirror (Plummer, Mosakowski, & Acs, 2008). Table 7.1 contains data on initial public offerings (IPOs). The data on IPOs is interesting because it comes closer to what we want to measure in terms of leveraged startups, and the data is not that different from startups in the ICT or the biotechnology sector. However, IPOs exhibit much more variation over the same time periods from a low of 81 in 2000 to a high of 672 in 1995. Going public is influenced by, among other things, the state of the stock market and the state of the economy.⁴ Of course this does not include the many high-impact startups that do not go public or are bought by other firms.

The US Census Bureau, the US Small Business Administration (SBA), and the US Bureau of Labor Statistics (BLS) each offer longitudinal datasets related to new firm formation (startups) in the United States.⁵ While the advantages and disadvantages of these datasets continue to be debated, each clearly show that entrepreneurship rates do not vary significantly over time (Reynolds, 2009). Table 7.1 presents detailed information on firm formation from the SBAs Business Information Tracking System (BITS), including the number of firm births and the firm birth rate for the period between 1989 and 2003. The birth rate for employer firms is fairly consistent, and the overall rate fluctuates in the narrow range between 10.8 and 12.2% over the sample period with no clear statistical trend. Table 7.1 also examines the firm birth rate by sector for manufacturing, information and communication technologies (ICT), and biotechnology. There is a clear decline in the firm birth rate in manufacturing, and a slight upward trend in biotechnology.

Are we able to statistically separate HIE from replicative entrepreneurship co-mingled in most census databases?⁶ Several studies in the past have attempted to do this. Original attempts defined HIE based on rates of revenue growth (Birch, 1981). The concept was developed to appeal to marketing executives at large enterprises seeking to sell their products and services to companies with substantial revenue. A crucial limitation of this conceptualization of HIE is that it does not look at

⁴International data suggest that there is wide variation in entrepreneurial activity by country. These comparisons, however, are further complicated by different approaches to data collection, variations in definitions of entrepreneurial firms, and the wide range of reporting systems. Self-employment has historically been one of the most accessible data sources for international comparisons and has been used in a number of studies (Acs et al., 1994; Iversen et al., 2007; Klapper et al., 2006).

⁵Other data sources also exist. For an overview of the major federal business data sources see National Research Council (2007) Appendix A. For limitations of the current data system for measuring business dynamics (see National Research Council (2007) Chapter 4, 65–91).

⁶Above we were interested in two kinds of productive entrepreneurs—replicative and innovative. Both contribute to the economy and society in a positive albeit different way. However, entrepreneurs can also engage in unproductive activity that is neither replicative nor innovative. It merely engages in rent seeking activity (Acemoglu & Johnson 2005; Desai & Acs, 2007; Murphy et al., 1991).

Table 7.1 Firm births and firm birth rates; by industry, 1990–2003

	1989–1990	1990–1991	1991–1992	1992–1993	1993–1994	1994–1995	1995–1996	1996–1997	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003
IPOs^b														
Total IPOs	103	278	392	487	405	457	672	472	283	476	380	81	66	63
IPO rate	0.002%	0.006%	0.008%	0.009%	0.008%	0.009%	0.012%	0.009%	0.005%	0.009%	0.007%	0.001%	0.001%	0.001%
Manufacturing^c														
Firm births	32,600	29,821	29,590	31,320	30,141	29,847	29,703	28,810	26,032	22,263	21,586	20,918	19,687	20,008
Birth rate	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%
Information and communications technology^d														
Firm births	1,243	1,125	977	1,142	1,002	907	930	1,108	882	778	840	562	513	486
Birth rate	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.01%	0.01%	0.01%
Biotechnology^d														
Firm births	46	70	80	86	67	76	129	146	122	106	117	93	93	106
Birth rate	0.001%	0.001%	0.002%	0.002%	0.001%	0.002%	0.003%	0.003%	0.002%	0.002%	0.002%	0.002%	0.002%	0.002%
Total^a														
Firm births	584,892	541,141	544,596	564,504	570,587	594,369	597,792	590,644	589,982	579,609	574,300	585,140	569,750	612,296
Birth rate	11.6%	10.8%	10.7%	10.9%	10.9%	11.2%	11.0%	10.7%	10.6%	10.4%	10.2%	10.4%	10.0%	10.7%
Existing firm	5,031,094	5,012,911	5,067,190	5,159,826	5,240,658	5,330,130	5,435,232	5,510,418	5,547,310	5,575,064	5,617,507	5,621,295	5,669,415	5,732,755

Notes:

Existing firms and births are based on establishment data covering the continental US excluding Montana, Idaho, South Dakota, North Dakota, Kansas, and Nebraska.

Firm births are original (i.e., single) establishment births based on payroll activity between mid-March of the beginning year and mid-March of the ending year of the period.

Existing firms are employer firms based on mid-March payroll at the first quarter of the beginning year of the period.

Birth rate is the number of firm births divided by the number of existing firms.

Because of the methodology used in determining firm births, the US Census Bureau considers these figures to be estimates.

Manufacturing is defined as SIC 20 (i.e., SIC 2000–3999) for ending years 1990–1998 and as NAICS 31–33 for ending years 1999–2003.

ICT is defined as SIC 357, 366, and 367 for ending years 1990 to 1998 and as NAICS 3341, 3342, and 3344 for ending years 1999–2003.

Biotech is defined as SIC 2833, 2834, 2835, and 2836 for ending years 1990 to 1998 and as NAICS 3254 for ending years 1999–2003.

Data sources:

^aSmall Business Administration, “US births, deaths and job creation, 1989–2003”, http://www.sba.gov/advo/research/dyn_b_d8903.pdf

^bProfessor Jay R. Ritter, 2007, “Some Factsoids About the 2006 IPO Market”, <http://bear.cba.ufl.edu/ritter/New%20Folder/IPOs2006Factsoids.pdf>

^cSmall Business Administration, “Employer Firms, Establishments, Employment, and Annual Payroll by Firm Size, and State, 2004”, http://www.sba.gov/advo/research/st_04.pdf

^dUS Census Bureau, “County Business Patterns”, custom unpublished tabulations, Larry Plummer’s dissertation

employment growth—an important policy consideration for government. Since a non-trivial number of traditional high-impact firms, often referred to as gazelles, do not contribute to employment growth, this initial conceptualization is insufficient.

Acs, Parsons, and Tracy (2007) developed an alternative conceptualization of high-impact firms that takes both sales and employment considerations into account. They define a high-impact firm as an enterprise in which sales have doubled over the most recent 4-year-period and which has an employment growth quantifier of 2 or greater over the same period. The employment growth quantifier (EGQ) is the product of the absolute and percent change in employment over a 4-year-period of time, expressed as a decimal, and is used to mitigate the unfavorable impact of measuring employment change solely in either percent or absolute terms, since the former favors small companies and the latter large businesses.⁷ Of course while this conceptualization includes firm growth it does not include wealth creation. Acs et al. (2007) also break the high-impact firms out into three size classifications to compare with the US Census Bureau/Small Business Administration classifications. They are 1–19 employees, 20–499 employees, and over 500 employees.

Table 7.2 presents summary statistics on the ratio of high-impact firms to all other firms for the period 1994–2006. Between 2002 and 2006 there were 352,114 high-impact firms giving us a US HIF rate of 6.3%. Of these 376,605 were between

Table 7.2 Ratio of high-impact firms to non-high-impact firms

1994–1998 high-impact companies = 352,114
1998 all other companies = 5,579,117
US high-impact company rate = 6.3%
1998–2002 high-impact companies = 299,973
2002 all other companies = 5,697,579
US high-impact company rate = 5.2%
2002–2006 high-impact companies = 376,605
2006 all other companies = 5,787,631
US high-impact company rate = 6.5%

Source: Corporate Research Board, American Corporate Statistical Library (2007).

⁷The number of new jobs necessary for firms of different sizes to achieve an EGQ of two or more are as follows:

<i>Initial firm size</i>	<i>Minimum job increase necessary to achieve EGQ of two or more</i>
1–4 jobs:	2
5–7 jobs:	3
8–12 jobs:	4
13–17 jobs:	5
18–24 jobs:	6
25–31 jobs:	7
32–40 jobs:	8
41–49 jobs:	9
20,000 jobs:	200

1 and 19, 16,523 were between 20 and 499 while 793 had over 500 employees at the beginning of the period. The high-impact rate was 5.2% between 1998 and 2002 and 6.5% between 1994 and 1998. The HIF rate varies as much because the absolute number of high-impact firms changes over time as it does because the total number of firms changes in the economy. The denominator used in Table 7.1 represents all employer firms in the US SBA BITS data file. Of course using a different denominator would result in a different rate. For example, using the D&B data in Table 7.1, that includes the self-employed, would more or less half the high-impact rate.

How much have HIFs grown over 4 years on average? Table 7.3 presents data on high-impact firms for the 2002–2006 time periods for both the distribution of employment by firm size class and the average firm size. As shown in Table 7.3, for the 1–19 firm size class between 2002 and 2006 the average employment size in 1998 was 2.7 growing to 14 in 2006. For the 2002–2006 time period the average employment size increased from 61 to 182 with similar results for the other two time periods. For the over 500 firm size class average employment increased from 3,233 to 6,975.

Table 7.3 Number of high-impact firms, by employment size for period 2002–2006

Average number of employees	1–19		20–499		500+	
	Start of period	End of period	Start of period	End of period	Start of period	End of period
0–4	87.21	25.55	–	–	–	–
5–9	8.22	34.38	–	–	–	–
10–24	4.56	27.66	22.24	–	–	–
25–49	–	8.62	41.60	20.76	–	–
50–99	–	2.99	20.52	36.76	–	–
100–249	–	0.62	11.80	27.54	–	–
250–499	–	0.11	3.85	9.01	–	–
500–999	–	0.04	–	3.82	38.59	12.74
1,000–2,499	–	0.02	–	1.62	32.41	32.03
2,500–4,999	–	0.01	–	0.24	14.88	23.96
5,000–9,999	–	–	–	0.15	7.57	15.64
10,000–24,999	–	–	–	0.09	5.42	10.21
25,000–49,999	–	–	–	0.01	0.76	3.40
50,000+	–	–	–	–	0.38	2.02
<i>Average size</i>	<i>2.70</i>	<i>14.00</i>	<i>61.70</i>	<i>182.90</i>	<i>3,233.80</i>	<i>6,975.10</i>

Source: Corporate Research Board, American Corporate Statistical Library (2007).

The distribution of employment size between high-impact and non-high-impact firms is also interesting. While for the non-high-impact firms almost 70% remain in the 1–4 firm size class while for the high-impact firms only 30% remain in the 0–4 firm size category. This result is robust throughout the whole time period. The results are even more startling for the 20–499 firm size class: for the non-high-impact firms, employment size decreased slightly from 58 to 56.

Table 7.4 Number of non-high-impact firms, by employment size for period 2002–2006

Average number of employees	1–19		20–499		500+	
	Start of period	End of period	Start of period	End of period	Start of period	End of period
0–4	79.06	79.18	–	3.63	–	2.97
5–9	13.55	13.42	–	1.64	–	1.12
10–24	7.39	7.13	22.91	23.44	–	1.76
25–49	–	0.21	42.57	38.89	–	1.90
50–99	–	0.04	20.47	19.03	–	2.16
100–249	–	0.01	10.83	10.12	–	3.33
250–499	–	–	3.22	2.97	–	4.70
500–999	–	–	–	0.23	46.98	37.68
1,000–2,499	–	–	–	0.03	28.17	26.00
2,500–4,999	–	–	–	0.01	10.41	8.96
5,000–9,999	–	–	–	–	6.18	4.68
10,000–24,999	–	–	–	–	4.52	2.70
25,000–49,999	–	–	–	–	2.03	1.22
50,000+	–	–	–	–	1.71	0.81
<i>Average size</i>	<i>3.30</i>	<i>3.50</i>	<i>58.02</i>	<i>56.80</i>	<i>5,199.90</i>	<i>3,153.10</i>

Source: Corporate Research Board, American Corporate Statistical Library (2007).

As shown in Table 7.4 the average firm size for the non-high-impact firms did not change materially. In effect, the employment change was virtually unchanged over the 4-year-period. While in 2002–2006 the non-high-impact firms in the 0–19 and the 20–499 firm size class exhibit either no change in average employment size or a slight increase, the average employment size for the over 500 firm size class exhibits a persistent and steady decrease in average firm size class by 62%.

These results also point to a crucial distinction between high-impact entrepreneurship and high-technology firms. High-technology firms only represent about 10% of high-impact firms. Using a standard definition of high technology based on SIC codes we can identify 38,780 firms as high tech out of the 376,605 high-impact firms in the above study. High tech firms are also slightly younger with about half under 11 years old. It is clear that high-technology firms are too narrow a definition to use when studying HIE.

HIE and Occupational Choice

Why do people choose to be entrepreneurs? This question, examined in great detail in the entrepreneurship literature, gives way to a more specific question: why do people choose to be high-impact entrepreneurs? Thus, we are interested in a subset of the group of entrepreneurs, those that choose to found high-impact firms. Given that most people who become productive entrepreneurs are employed at the time of the decision to become entrepreneurs (studies suggest close to 80% of people

that start businesses are employed) theories of occupational choice are a useful perspective from which to address our question of interest. In this view, the decision to become an entrepreneur hinges on the opportunities the individual has for salaried work. These opportunities are shaped by the skill of the individual and the economy in which they work, including its incentive structure.

Evans and Leighton (1989) approach the entrepreneurship as occupational-choice question using data on self-employment from the National Longitudinal Survey (NLS). In their analysis, they use a simple time-homogeneous Markov model for first approximations, where e denotes the probability of entering self-employment, and x is the probability of exiting self-employment. The model assumes that e and x are independent of time or age and that the probability of being self-employed at time T years after entering the labor force is

$$e/x + e \{1 - (1 - x - e)^T\}. \quad (7.1)$$

In this straightforward model the probability of entering self-employment increases as the utility of entrepreneurship exceeds wage work. The difference between these two depends on the earnings in the two occupations and the preferences of the agents. Expected wage earnings depend on current wage earnings, education, job tenure, and wage experience. Expected entrepreneurial earnings, however, depend only on education and experience. Evans and Leighton explain that (525), "... the probability of switching into self-employment will decline with current wage earnings but may increase or decrease with education and experience depending upon whether these characteristics are more important in self-employment or wage work."

The findings of Evans and Leighton (1989) offer some insight into the general characteristics of entrepreneurs. Using data on self-employment from the National Longitudinal Survey (NLS), the authors consider the probability of entering or exiting self-employment based on various characteristics. They find, for example, that the probability of switching into self-employment is independent of age and total labor market experience and that the fraction of the labor force that is self-employed increases with age up to the 40s and is constant up to retirement. They also find that men with greater assets are more likely to switch to self-employment and that poorer wage workers are more likely to enter self-employment at some point in time. Finally, men with a greater internal locus of control are more likely to start a business.

Early theoretical literature provides three historical perspectives on the financing of new firms. Knight (1921) and Schumpeter (1934) draw different conclusions about firm financing due to their differing perspectives on who bears risk. Knight suggests that entrepreneurs bear the risk of their inventions, while Schumpeter maintains that the capitalist bears the financial risk for new ventures. The Austrians offer a more nuanced view, making a distinction between the financing of innovative firms and replicative firms. From this perspective, *innovative entrepreneurs*—those who

stand to reap economic rents—will be financed by the capitalist, while *replicative entrepreneurs*—those who dissipate economic rents—will finance their own innovations (Kirzner, 1973).

Financial economists have given substantial thought to the relationship between finance and economic growth, seeking to determine if the financial system promotes economic growth or if financial development simply follows economic growth. King and Levine (1993) support the view that financial systems promote growth, providing evidence that higher levels of financial development are positively associated with faster rates of economic growth, the accumulation of physical capital, and improvements in economic efficiency, both before and after controlling for numerous country and policy characteristics.

Entrepreneurship, in fact, is key to King and Levine's explanation of the role that financial systems play in affecting economic growth. King and Levine (1993) construct an endogenous growth model in which financial systems evaluate prospective entrepreneurs, mobilize savings to finance the most promising productivity-enhancing activities, diversify the risks associated with these innovative activities, and reveal the expected profits from engaging in innovation rather than the production of existing goods using existing methods. From this perspective, better financial systems improve the probability of successful innovation and thereby accelerate economic growth.

Human-Capital Theories and HIE

While the occupational choice model offered us a way to think about how ordinary people enter entrepreneurship the model did not focus on HIE. Building on the occupational choice models, a more recent body of research has focused on high-potential entrepreneurs. High-potential entrepreneurs are defined as individuals with intellectual human capital that have the potential to start high-impact firms. The focus is frequently on agents with high levels of human capital, leaving an existing firm with the intention of engaging in a startup. A revolutionary and controversial concept when first introduced as a major topic of inquiry, human-capital theory has evolved into one of the most universally accepted concepts in economics and other social sciences, especially as a driving force in the new information economy and startups. In effect, the human-capital revolution has shifted the center of attention away from focusing solely on investment in physical capital and physical capital accumulation human-capital investments and how those resources are allocated.

The work that a researcher conducts for a firm increases both the firm's stock of innovations and the human capital of the researcher. This increase in human capital has significant implications for the researcher's decision to leave the firm and start a spin-off. Not only does the immediate increase in human capital affect the wage that the researcher expects from the incumbent firm, but also the potential for future increases in human capital as the researcher continues to conduct research and development work.

Zucker, Darby, and Brewer (1994) have called the knowledge that resides in economic agents “intellectual human capital.” Intellectual human capital is human capital that can earn a monopoly rent because the knowledge is not publicly available or perfectly protected. These features distinguish it from ordinary human capital, which is the widely diffused knowledge that can be acquired at a cost and earns a normal rate of return on the implied investment. It is, in fact, these monopoly rents that motivate investments in research and development in the first place.

Human-capital theory suggests that the valuable knowledge to which research and development employees has access will affect their wage expectations in the present and the future. From this perspective, employees may be willing to accept lower wages because they are also acquiring valuable knowledge as part of their employment. They will, however, expect higher wages in the future, as they will then possess valuable intellectual human capital that cannot be found elsewhere. Rosen (1972) and Pakes and Nitzan (1983) develop models of labor mobility that seek to explain how human capital affects an agent’s decision about starting a new firm.

Møen (2005) tests both the Rosen (1972) and the Pakes and Nitzan (1983) models using data from Norwegian firms and finds that technical workers in R&D intensive firms pay for the knowledge they accumulate on the job through lower wages early in their careers. They later earn a return on these implicit investments through higher wages. This finding suggests that potential externalities associated with labor mobility are, at least partially, internalized in the labor market. It also suggests that if the innovation would make the firm a monopolist, the firm will be willing to increase the worker’s wages such that the worker will not leave. It will never be profitable for the firm and the scientist to split, in this case, as the rents in a duopoly will always be less than the monopoly rent. The Pakes and Nitzan model predicts that firms are able to avoid worker mobility by sharing the monopoly rents with workers.

Are entrepreneurs largely generalists, or are they specialists requiring specific human capital? In addition to specialized knowledge in the field of the new business, entrepreneurs must be able to obtain funds, hire workers, choose location and decor, obtain food supplies at a reasonable cost, keep the books, and market the restaurant. Even when these tasks are outsourced, the entrepreneur must possess enough basic knowledge to choose good vendors. Following from this line of reasoning, entrepreneurs do not need to be experts in any single skill, but they must be sufficiently good at a wide range of things (Lazear, 2005). A theory of entrepreneurs as generalists, while those that are employees should be specialists, implies that human-capital investment patterns should differ between those who choose entrepreneurship and those who work for others. This does not seem to be the case. While Lazear’s analysis seems to apply for a “salary substitution” or “lifestyle” small business owner, this “generalist” view of human-capital investment is less likely to hold for the launching of high-growth new ventures or “gazelles.” Perhaps in these high-impact firms the specialized—yet pooled—skills of a founding team of entrepreneurs may be the dominant pattern.

The size of the incumbent firm may also have an impact on the decision to leave the firm and start a new business. Hvide (2009) conducts an analysis of firm size

(large vs. small), finding that small firms are able to implement wage policies that are “fine-tuned to workers” external options, while large firms have more rigid wage policies. As a consequence, workers’ decisions to leave small firms are not influenced by economics. Instead, these workers start new firms to achieve private benefits, such as more flexible work hours or a sense of freedom. The more rigid wage policies at large firms, however, result in a loss of the best workers and ideas who will make more money as entrepreneurs. Entrepreneurs emerging from large firms, therefore, are of higher quality than entrepreneurs emerging from small firms.

As the opportunity cost of entrepreneurship increases, individuals have less incentive to accumulate entrepreneurial human capital. Iyigun and Owen (1998) develop a model that highlights the shift in the balance of entrepreneurial human capital and professional human capital in the evolution of an economy. According to this model, economic development may lead to more entrepreneurs in total, but it also results in a decrease in the proportion of the population engaged in entrepreneurship compared to the share engaged in “professional” activities. In other words, economic development brings a greater number of professional activities that involve relatively less risk relative to the number of more uncertain entrepreneurial activities. A comparison of descriptive statistics from the Penn World Tables and the Yearbook of Labor Statistics supports this conclusion, showing that professional human capital is more abundant in richer countries.

This model has three implications for development as follows: (1) Entrepreneurial human capital is more important in intermediate income countries that need entrepreneurship for further economic growth. (2) Sufficient initial levels of both types of human capital are key determinants of development. Economies with too little of either form of human capital may become “trapped” by little investment by individuals in either form of human capital. (3) Since the social returns to work and education likely differ from the private returns, the allocation of resources to schooling and working will be inefficient. In particular, if entrepreneurial skills are relatively more (less) important in determining technology, the steady state will have too much (not enough) education. The inefficiency does not result from too much human capital, but a misallocation of professional versus entrepreneurial human capital.

Knowledge Spillover Entrepreneurship

Neoclassical macroeconomic growth models link economic expansion to increases in capital and labor (Solow, 1957). While these traditional models yield important insights into the drivers of economic growth, the growth predicted by these models tends to underestimate the growth actually observed. To reduce the size of the unexplained residual, new growth theory models incorporate knowledge as a third factor explaining economic growth as an endogenous response to knowledge investments (Lucas, 1978; Romer, 1990). Such knowledge—embodied in technological innovation and human capital—not only increases a firm’s productivity, but also

“spills over” to other firms to improve the productive capabilities of entire sectors (Griliches, 1979; Romer, 1990). That a single source of knowledge may improve the performance of more than one firm helps explain why observed economic growth greatly exceeds the sum increases of capital and labor.

Although new growth theory more accurately explains economic growth, a sizable difference persists between the growth predicted and the level of growth actually observed. The residual unexplained by new growth theory is a manifestation of a simple omission from the models. In particular, for sake of conceptual simplicity, the spillover of knowledge from the innovating firm to other firms is exogenous to new growth theory. Lacking a mechanism for how or why knowledge spillovers occur, new growth theorists implicitly assume that spillovers are automatic and costless and that recipients readily apply the knowledge to new products or improved processes. This assumption, however, ignores Arrow’s (1962) contention that “generic” knowledge must be transformed by firms or individuals into “economic” or useful knowledge in order to contribute to an industry’s productivity and economic growth.

In response, Acs et al. (2010) propose that entrepreneurs and incumbent firms are key conduits of knowledge spillovers. Importantly, they reject the assumption that spillovers are automatic and costless and, instead, explicitly incorporate Arrow’s (1962) premise of knowledge conversion by postulating that new knowledge is converted into economic knowledge by the commercialization capabilities of incumbent firms and the process of creating new ventures. In addition, given the spatial proximity necessary for the spillover of knowledge—especially its tacit component—it follows that the links between knowledge, entrepreneurial activity, and economic growth are bounded geographically. Thus, this framework explains regional economic growth in response to the creation of new knowledge and its conversion into economically useful knowledge by new and existing firms.

The keystone of this knowledge spillover growth framework is the proposition that the knowledge unexploited by incumbent firms can find commercial application through the actions of alert individuals who exploit the available knowledge as an entrepreneurial opportunity (Shane & Venkataraman, 2000). This conjecture is more fully developed in the knowledge spillover theory of entrepreneurship (Acs et al., 2009; Audretsch et al., 2006), which emphasizes how—in addition to the knowledge created by public research institutions (i.e., universities)—the knowledge created by incumbent firms seeds new ventures. The knowledge spillover theory of entrepreneurship explains the region’s level of knowledge spillover entrepreneurship as determined by the restricted flow of knowledge from incumbent firms and the flow of knowledge from university research.

The strengths of the knowledge spillover theory of entrepreneurship are its intuitive appeal, its integration of strategic entrepreneurship with theories of regional and economic growth, and its explicit modeling of entrepreneurial opportunities. Thus, in one framework, the knowledge spillover theory of entrepreneurship links the literature on industry spin-offs (Klepper & Sleeper, 2005), occupational choice (Parker, 2004), entrepreneurial opportunity and judgment (Casson, 2003; Shane & Venkataraman, 2000), and the previously untapped new growth theory (Acs &

Armington, 2006). As such, it offers a formal theoretical framework consistent with the observation that new firms appear as likely to emerge from universities and public research facilities as industry firms (Neck et al., 2004).

Strategic Entrepreneurial Behavior

Strategic entrepreneurship research addresses the intersection between strategic management and entrepreneurship in an effort to advance the understanding of how the creation of competitive advantage can be combined with the pursuit of opportunity (Ireland, Hitt, & Camp, 2003). Where strategic management research has been primarily concerned with the creation and exploitation of competitive advantage, entrepreneurship research has focused on the individual-opportunity nexus to understand how, by whom, and with what consequences opportunities for entrepreneurial action are recognized and exploited (Shane & Venkataraman, 2000). In this research we focus on strategic entrepreneurial actions of individuals and consider the decision to allocate one's human and financial capital to the pursuit of growth through an entrepreneurial venture in lieu of alternative occupational pursuits. In the great majority of new ventures, the founder's human and social capital constitute the most valuable, rare, and difficult-to-imitate aspect of the venture's initial resource endowment, and therefore, the defining aspect of its initial competitive advantage (Davidsson et al., 2003).

One of the pertinent questions in the emerging agenda of strategic entrepreneurship research concerns the susceptibility of strategic entrepreneurial behaviors to institutional and cultural influences (Schendel & Hitt, 2007, 3). When the intellectual property that results from an incumbent firm's investment in research and development is protected by patents or other legal means, the incumbent firm appropriates the returns on its investments in R&D, and the researcher does not have the option of appropriating the intellectual property and starting a new firm. If the intellectual property cannot be protected, however, the research and development capital that is embodied in the employees influences the decision to start a new firm. This perspective, modeled by Hellmann (2007) also generates new insights about intellectual property rights and the importance of the external environment. If the employee owns the intellectual property, the external environment becomes more attractive. If the firm owns the intellectual property then the external environment only constitutes an opportunity for the firm.

The protection of intellectual property rights constitutes a particularly important influence, because it directly influences the leakage of opportunities through imitation, and thus, the efficiency with which the creation of competitive advantage can be combined with the pursuit of opportunity (Hitt et al., 2001; Schendel & Hitt, 2007). As Schendel and Hitt (2007, 4) observed, nations differ in terms of their regimes of intellectual property protection, and therefore, the sharing of profits among innovators, developers, users, and consumers. The protection of intellectual property, therefore, is likely to have a direct influence on the allocation of effort into

strategic entrepreneurship. In this chapter, our objective is to advance the understanding of how the protection of intellectual property influences the allocation of effort into strategic entrepreneurship by individuals.

For the individual, the decision to invest her human, financial, and social capital into a new venture typically precludes the pursuit of alternative occupations, and the opportunity cost of this decision for the individual grows higher as a function of the value of her human, financial, and social capital (Cassar, 2006). Particularly for high human-capital individuals, therefore, the decision to pursue growth opportunities through an entrepreneurial venture is a highly strategic decision in its own right, and also one that merges opportunity pursuit with the creation of initial competitive advantage in the venture.

Conclusion

This chapter has examined the literature on HIE. The subject of HIE fills a space between new firm formations in general and corporate venturing since it has aspects of both strategic value creation and opportunity recognition. We now turn to the financing of HIE via the vehicle of venture capital.

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Chapter 8

Equity Financing

Paul Gompers and Josh Lerner

Introduction

Equity financing for entrepreneurial firms has attracted increasing attention in both the popular press and academic literature. The dramatic growth in the venture capital industry in past two decades has been accompanied by new academic research that explores its form and function. Angel financing, while less well-understood, is also attracting attention. At the same time, many of the questions that are most critical to policy-makers remain unanswered. Thus, this chapter has a twofold role: to summarize and synthesize what we do know about equity finance from recent research, and to indicate the important questions that we cannot yet answer.

A natural first question is what constitutes venture capital and angel financing. Many start-up firms require substantial capital. A firm's founder may not have sufficient funds to finance these projects alone, and therefore must seek outside financing. Entrepreneurial firms that are characterized by significant intangible assets, expect years of negative earnings, and have uncertain prospects are unlikely to receive bank loans or other debt financing. Venture capital organizations finance these high-risk, potentially high-reward projects, purchasing equity stakes while the firms are still privately held. At the same time, not everyone who finances these firms is a venture capitalist. We define venture capital as independently managed, dedicated pools of capital that focus on equity or equity-linked investments in privately held, high-growth companies. Individual investors (or "angels") also finance these firms, putting their own capital to work in these concerns.

Three limitations should be acknowledged at the outset. The primary focus of this chapter is on drawing together the empirical academic research on venture capital and angel investing. The many theoretical papers that examine various aspects of the equity financing of entrepreneurial firms are beyond the scope of this paper.

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Harvard Business School and National Bureau of Economic Research. This chapter is based in part on the works of Gompers and Lerner (1999b, 2001). All errors are our own.

Much of the theoretical literature examines the role that these investors play in mitigating agency conflicts surrounding entrepreneurial firms. The improvement in efficiency might be due to the active monitoring and advice that is provided (Cornelli & Yosha, 1997; Hellmann, 1998; Marx, 1994), the screening mechanisms employed (Chan, 1983), the incentives to exit (Berglöf, 1994), the proper syndication of the investment (Admati & Pfleiderer, 1994), or the staging of the investment (Bergemann & Hege, 1998). This work has improved our understanding of the factors that affect the relationship between equity investors and entrepreneurs.

Nor do we seek to duplicate the guides that explain the intricacies of the equity financing process to practitioners. Numerous excellent volumes exist (especially Bartlett, 1995; Halloran et al., 1995; Levin, 1995), which document the legal and institutional considerations associated with raising such financing at much greater depth than could be done in this chapter.

Third, we will not consider the upstream relationships between equity financiers of entrepreneurial firms and the institutions that provide them with capital at much length. Over the past several years, a series of research papers have given us a better understanding of how venture capital funds are structured, and how incentive issues that arise are (or are not addressed). This topic, however, would take us too far from our central mission. The interested reader is referred to Gompers and Lerner (1999b).

The rest of the paper is organized as follows: Section 2 presents a brief history of financing of entrepreneurial firms. The selecting of investments, structuring of deals, monitoring of firms, and exiting of investments by venture capitalists and angels are taken up in Section 3. Section 4 discusses two public policy issues. The final section highlights an area that urgently needs future research: the internationalization of the US venture capital industry and its implications.

The Development of the Equity Financing

Angel financing is probably as old as civilization. Certainly, examples can be found of entrepreneurs raising capital from financiers (e.g., for trading expeditions) from Babylonian times and early medieval European and Arabic nations. The venture capital industry—using the definition above—was, on the other hand, a much more recent and a predominantly American phenomenon. Only gradually had it spread to elsewhere around the globe.

It is important to note that in many ways, venture capital is an outgrowth of angel investing. The industry had its origins in the family offices that managed the wealth of high net worth individuals in the first decades of this century. Wealthy families invested in and advised a variety of business enterprises, including the Rockefeller family (Douglas Aircraft and Eastern Airlines) and the Phipps (Ingersoll Rand and International Paper). Gradually, these families began involving outsiders to select and oversee these investments. In many cases, these entities formed the nuclei for

what would ultimately become independent groups. These included J.H. Whitney & Co. (Whitney family) and Venrock Associates (Rockefeller family).¹

The first venture capital firm satisfying the criteria delineated above, however, was not established until after World War II. American Research and Development (ARD) was formed in 1946 by MIT President Karl Compton, Harvard Business School Professor Georges F. Doriot, and local business leaders. A small group of venture capitalists made high-risk investments into emerging companies that were based on technology developed for World War II. The success of the investments ranged widely: almost half of ARD's profits during its 26-year existence as an independent entity came from its \$70,000 investment in Digital Equipment Company (DEC) in 1957, which grew in value to \$355 million. Because institutional investors were reluctant to invest, ARD was structured as a publicly traded closed-end fund and marketed mostly to individuals (Liles, 1977). Many of the other venture organizations begun in the decade after ARD's formation were also structured as closed-end funds.

The first venture capital limited partnership, Draper, Gaither, and Anderson, was formed in 1958. Imitators soon followed, but limited partnerships accounted for a minority of the venture pool during the 1960s and 1970s. Most venture organizations raised money either through closed-end funds or small business investment companies (SBICs), federally guaranteed risk-capital pools that proliferated during the 1960s. While the market for SBICs in the late 1960s and early 1970s was strong, incentive problems ultimately led to the collapse of the sector. The annual flow of money into venture capital during its first three decades never exceeded a few hundred million dollars and usually was substantially less.

The activity in the venture industry increased dramatically in late 1970s and early 1980s. Table 8.1 and Fig. 8.1 provide an overview of fundraising by venture partnerships, highlighting the changing volume of investments over the years, as well as the shifting mixture of investors. Industry observers attributed much of the shift to the US Department of Labor's clarification of ERISA's "prudent man" rule in 1979. Prior to this year, the Employee Retirement Income Security Act (ERISA) limited pension funds from investing substantial amounts of money into venture capital or other high-risk asset classes. The Department of Labor's clarification of the rule explicitly allowed pension managers to invest in high-risk assets, including venture capital. In 1978, when \$424 million was invested in new venture capital funds, individuals accounted for the largest share (32%). Pension funds supplied just 15%. Eight years later, when more than \$4 billion was invested, pension funds accounted for more than half of all contributions.²

¹These family offices are not the only antecedents to modern venture capital firms. For instance, patent agents in the United Kingdom and United States also played an intermediary role during the late nineteenth and early twentieth centuries, introducing individual inventors to wealthy potential investors. They typically did not, however, raise funds or invest their own capital into these firms. For a discussion, see Lamoreaux and Sokoloff (2000) and MacLeod (1992).

²The annual commitments represent pledges of capital to venture funds raised in a given year. This money is typically invested over 3–5 years starting in the year the fund is formed.

Table 8.1 Summary statistics for venture capital fund-raising by independent venture partnerships. All dollar figures are in millions of 1992 dollars

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	
<i>First closing of funds</i>																								
Number of funds	23	27	57	81	98	147	150	99	86	112	78	88	50	34	31	46	80	84	80	103	161	209	228	
Size (millions of 1992\$)	414	469	1,208	1,661	2,026	5,289	4,694	4,065	4,295	5,217	3,606	3,354	2,431	1,483	1,950	2,480	3,582	4,045	6,805	8,060	16,933	33,633	60,339	
<i>Sources of funds</i>																								
Private pension funds	15%	31%	30%	23%	33%	26%	25%	23%	39%	27%	27%	22%	31%	25%	22%	59%	47%	38%	43%	40%	37%	43%	40%	
Public pension funds	a	a	a	a	a	5%	9%	10%	12%	12%	20%	14%	22%	17%	20%	a	a	a	a	a	10%	a	a	
Corporations	10%	17%	19%	17%	12%	12%	14%	12%	11%	10%	12%	20%	7%	4%	3%	8%	9%	2%	13%	30%	18%	14%	4%	
Individuals	32%	23%	16%	23%	21%	21%	15%	13%	12%	12%	8%	6%	11%	12%	11%	7%	12%	17%	9%	13%	11%	10%	12%	
Endowments	9%	10%	14%	12%	7%	8%	6%	8%	6%	10%	11%	12%	13%	24%	18%	11%	21%	22%	21%	9%	8%	17%	21%	
Insurance/banks	16%	4%	13%	15%	14%	12%	13%	11%	10%	15%	9%	13%	9%	6%	14%	11%	9%	18%	5%	1%	3%	16%	23%	
companies/banks																								
Foreign investors/other	18%	15%	8%	10%	13%	16%	18%	23%	11%	14%	13%	13%	7%	12%	11%	4%	2%	3%	8%	7%	13%	b	b	
<i>Independent venture partnerships as a share of the total venture pool^f</i>																								
	40%	44%	58%	68%	72%	73%	75%	78%	80%	80%	81%	80%	80%	81%	78%	78%	78%							

^aPublic pension funds are included with private pension funds in these years.
^bForeign investors are included with other investors in 1999 and 2000.
^cThis series is defined differently in different years. In some years, the *Venture Capital Journal* states that non-bank SBICs and publicly traded venture funds are included with independent venture partnerships. In other years, these funds are counted in other categories. It is not available after 1994.
^dSource: Compiled from the unpublished Venture Economics funds database and various issues of the *Venture Capital Journal*. The numbers differ slightly from Gompers and Lerner (1996) due to continuing emendations to the funds database.

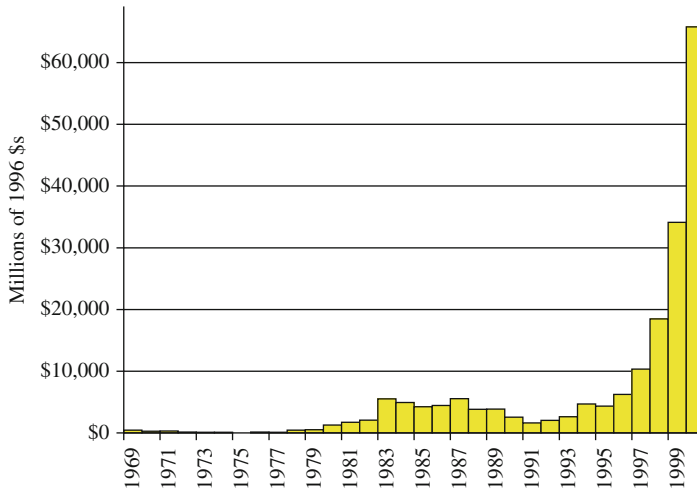


Fig. 8.1 Commitments to the venture capital industry. Commitments are defined as the amount of money that is pledged to venture capital funds in that year. Amounts are in millions of 1996 dollars
Source: Venture Economics and Asset Alternatives

One important change in the venture capital industry around this time was the rise of the limited partnership as the dominant organizational form. Limited partnerships have an important advantage that makes them attractive to tax-exempt institutional investors: capital gains taxes are not paid by the limited partnership. Instead, the (taxable) investors only pay taxes. Venture partnerships have pre-determined, finite lifetimes (usually 10 years though extensions are often allowed). Investors in the fund are limited partners. In order to maintain limited liability, investors must not become involved in the day-to-day management of the fund.

The subsequent years saw both very good and trying times for venture capitalists. On the one hand, venture capitalists backed during the 1980s and 1990s many of the most successful high-technology companies, including Apple Computer, Cisco Systems, Genentech, Netscape, and Sun Microsystems. A substantial number of service firms (including Staples, Starbucks, and TCBY) also received venture financing. At the same time, commitments to the venture capital industry were very uneven. As Fig. 8.1 and Table 8.1 depict, the annual flow of money into venture funds increased by a factor of 10 during the early 1980s, peaking at just under six billion 1996 dollars. From 1987 through 1991, however, fundraising steadily declined. Over the past decade years, the pattern has been reversed. Year 2000 represented a record fundraising year, in which over \$68 billion was raised by venture capitalists. This process of rapid growth and decline has created a great deal of instability in the industry.

As Fig. 8.2 depicts, returns on venture capital funds had declined in the mid-1980s, apparently because of overinvestment in various industries and the entry of inexperienced venture capitalists. As investors became disappointed with returns, they committed less capital to the industry. The recent activity in the IPO market

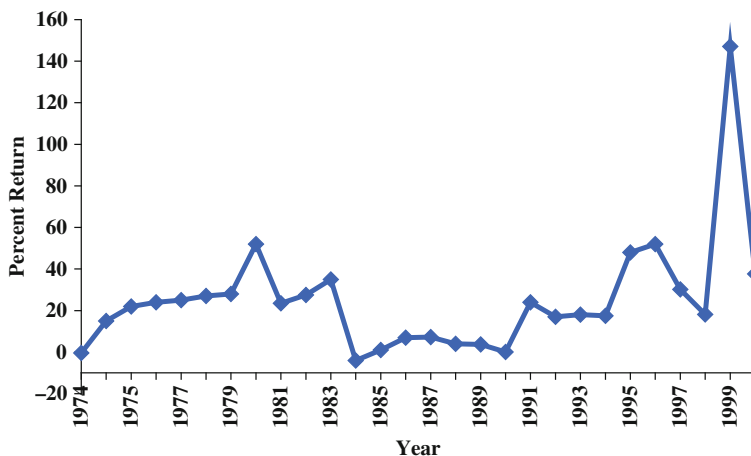


Fig. 8.2 Return on venture capital. The average annual internal rate of return on venture capital funds, net of fees and profit sharing, is plotted by year

Source: Compiled from Venture Economics (2000b) and their unpublished data

and the exit of many inexperienced venture capitalists led to an increase in returns. New capital commitments rose again in response, increasing by more than 20 times between 1991 and 2000. While systematic data are not available, most indications are that angel investing underwent a dramatic increase during this period as well.

The question of how equity financing for entrepreneurial firms will evolve over the next decade is a particularly critical one because the recent growth and subsequent decline has been so spectacular. As will be highlighted below, short-run shifts in the supply of or demand for such equity investments can have dramatic effects. For instance, periods with a rapid increase in capital commitments have historically led to less restrictions on venture capital funds, larger investments in portfolio firms, higher valuations for those investments, and lower returns for investors. These patterns have led many practitioners to conclude that this activity is inherently cyclical. In short, this view implies that periods of rapid growth generate sufficient problems that periods of retrenchment are sure to follow. These cycles may lead us to be pessimistic about the prospects in the years to come.

It is important, however, to consider the *long-run* determinants of the level of equity investors, not just the short-run effects. In the short run, intense competition between investors may lead to a willingness to pay a premium for certain types of firms (e.g., firms specializing in tools and content for the Internet). This is unlikely to be a sustainable strategy in the long run: investors that persist in such a strategy will earn low returns and eventually either run out of funds or be unable to raise follow-on funds.

The types of factors that determine the long-run steady-state supply of equity for entrepreneurial firms in the economy are more fundamental. These are likely to include the pace of technological innovation in the economy, the degree of

dynamism in the economy, the presence of liquid and competitive markets for investors to sell their investments (whether markets for stock offerings or acquisitions), and the willingness of highly skilled managers and engineers to work in entrepreneurial environments. However, painful the short-run adjustments, these more fundamental factors are likely to be critical in establishing the long-run level.

When one examines these more fundamental factors, there appears to have been quite substantial changes for the better over the past several decades.³ Consider two of the determinants of the long-run supply of equity investments for entrepreneurial firms in the United States: the acceleration of the rate of technological innovation and the decreasing “transaction costs” associated with such investments.

While the increase in innovation can be seen through several measures, probably the clearest indication is in the extent of patenting. Patent applications by US inventors, after hovering between 40,000 and 80,000 annually over the first 85 years of this century, have surged over the past decade to over 120 thousand per year. This does not appear to reflect the impact of changes in domestic patent policy, shifts in the success rate of applications, or a variety of alternative explanations. Rather, it appears to reflect a fundamental shift in the rate of innovation.⁴ The breadth of technology appears wider today than it has been ever before. The greater rate of intellectual innovation provides fertile ground for future investments, especially by venture capitalists.

A second change has been decreasing cost of making new equity investments in entrepreneurial firms. The efficiency of the equity investment process has been greatly augmented by the emergence of other intermediaries familiar with its workings. The presence of such expertise on the part of lawyers, accountants, managers, and others—even real estate brokers—has substantially lowered the transaction costs associated with forming and financing new firms or restructuring existing ones. The increasing number of professionals and managers familiar with and accustomed to the employment arrangements offered by these firms (such as heavy reliance on stock options) has also been a major shift. In short, the increasing familiarity with the equity financing process has made the long-term prospects for investment more attractive than they have ever been before.

Many of these changes appear to have actually been driven by the activities of investors: for instance, venture capitalists have funded many innovative firms, which have in turn, created opportunities for new venture investments. It appears as if there is a somewhat of a “virtuous circle” at work. The growth in the activity of equity investors in entrepreneurial firms has enhanced the conditions for new investments, which has in turn led to more capital formation.

³It is also worth emphasizing that despite its growth, the pool of equity for entrepreneurial firms today remains very small relative to the overall pool of public equities, which has also grown rapidly during these years.

⁴These changes are discussed in Kortum and Lerner (1998).

Equity Investing

Basic Patterns

Because so little systematic data is available on angel investments, we will here discuss only investments by venture capital funds. Venture capital disbursements are highly concentrated. Divided by industry, about 60% in 1999 went to information technology industries, especially communications and networking, software, and information services. About 10% went into life sciences and medical companies, and the rest is spread over all other types of companies. When venture capital disbursements are viewed geographically, a little more than one-third of venture capital went to California. A little less than one-third went to Massachusetts, Texas, New York, New Jersey, Colorado, Pennsylvania, and Illinois, combined. The remaining third was spread between the other 42 states.

Tables 8.2 through 8.4 present historical information on the mixture of investments. Table 8.2 provides a detailed summary of investments in 2000; Table 8.3 presents a more aggregated summary of investments (in manufacturing firms only) over the past three decades; and Table 8.4 provides a summary of investments in the 10 states with the most venture capital activity over the past three decades.

Table 8.2 Dollar amount of venture capital disbursements in the United States in 2000, by VentureOne industry classification. All dollar figures are in millions of current dollars

Industry	Total \$ invested	Share of total (%)
Internet Specific	47.9	46.5
Communications	17.6	17.1
Computer Software and Services	14.4	14.0
Semiconductors/Other Elect	6.1	5.9
Medical/Health	3.6	3.5
Biotechnology	2.8	2.7
Computer Hardware	2.3	2.2
Consumer Related	1.7	1.7
Industrial/Energy	1.4	1.4
Other Products	5.3	5.1
Total	103.0	

Source: National (2001).

The industry results in Tables 8.2 and 8.3 highlight the continuing focus by venture capitalists on high-technology firms (e.g., communication, computers, electronics, biotechnology, and medical/health). The percentage of venture capital invested in high-technology firms never falls below 70% of annual investments. Industry investment composition suggests that venture capitalists specialize in industries in which monitoring and information evaluation are important.

Table 8.3 Number and dollar amount of venture capital disbursements for US manufacturing industries, by industry and 5-year period. The count of venture capital investments in each 5-year period is the sum of the number of firms receiving investments in each year. All dollar figures are in millions of 1992 dollars

Panel A: Venture capital investments (#s)							
#	Industry	1965–1969	1970–1974	1975–1979	1980–1984	1985–1989	1990–1996
1	Food and kindred	1	9	6	23	80	93
2	Textile and apparel	4	12	9	19	27	70
3	Lumber and furniture	2	8	6	24	62	37
4	Paper	2	2	2	2	12	14
5	Industrial chemicals	1	1	1	6	18	23
6	Drugs	1	12	34	245	554	746
7	Other chemicals	1	7	8	10	52	46
8	Petroleum refining and extraction	3	3	26	92	27	14
9	Rubber products	1	5	6	19	11	7
10	Stone, clay, and glass products	0	1	3	14	48	31
11	Primary metals	0	3	5	20	44	33
12	Fabricated metal products	0	0	0	2	1	2
13	Office and computing machines	39	84	108	744	641	442
14	Other non-electrical machinery	12	12	32	254	280	162
15	Communication and electronic	23	65	60	497	736	709
16	Other electrical equipment	0	6	16	36	52	50
17	Transportation equipment	1	7	5	6	24	25
18	Aircraft and missiles	0	0	0	12	20	4
19	Professional and scientific instruments	13	37	70	383	549	544
20	Other machinery	7	14	16	62	89	98
	Total	111	288	413	2,470	3,327	3,150

Table 8.3 (continued)

Panel B: Venture capital disbursements (millions of 1992 \$s)							
#	Industry	1965–1969	1970–1974	1975–1979	1980–1984	1985–1989	1990–1996
1	Food and kindred	4	19	7	25	212	258
2	Textile and apparel	6	15	14	27	45	186
3	Lumber and furniture	4	17	9	26	200	354
4	Paper	1	8	3	3	22	46
5	Industrial chemicals	0	1	1	41	34	33
6	Drugs	0	15	136	623	1,869	3,017
7	Other chemicals	1	40	4	9	155	87
8	Petroleum refining and extraction	12	6	92	359	110	29
9	Rubber products	1	3	15	28	8	18
10	Stone, clay, and glass products	0	1	5	34	99	45
11	Primary metals	0	8	11	25	67	166
12	Fabricated metal products	0	0	0	1	0	1
13	Office and computing machines	67	404	288	3,253	2,491	1,426
14	Other non-electrical machinery	64	17	37	677	669	323
15	Communication and electronic	44	189	82	1,746	2,646	2,627
16	Other electrical equipment	0	8	53	78	107	104
17	Transportation equipment	0	10	4	9	47	96
18	Aircraft and missiles	0	0	0	19	19	8
19	Professional and scientific instruments	13	86	114	811	1,449	1,509
20	Other machinery	7	28	22	113	176	350
	Total	\$225	\$874	\$895	\$7,907	\$10,423	\$10,685

Source: Based on Kortum and Lerner (2000) and supplemented with tabulations of unpublished Venture Economics databases.

Table 8.4 Number and dollar amount of venture capital disbursements for all industries in the 10 states with the most venture capital activity, by state and 5-year period. The count of venture capital investments in each 5-year period is the sum of the number of firms receiving investments in each year. All dollar figures are in millions of 1992 dollars

Panel A: Venture capital investments (#s)						
State	1965–1969	1970–1974	1975–1979	1980–1984	1985–1989	1990–1996
California	65	179	310	1,863	2,645	3,380
Massachusetts	45	93	155	708	1,014	1,028
Texas	18	71	84	373	584	489
New York	28	90	73	311	324	276
New Jersey	15	35	47	171	291	336
Colorado	5	22	31	194	258	298
Pennsylvania	8	21	32	120	290	311
Illinois	16	29	31	133	214	312
Minnesota	12	34	42	170	186	194
Connecticut	3	20	37	136	217	210
Total, all states	302	847	1,253	5,365	8,154	9,406

Panel B: Venture capital disbursements (millions of 1992 \$s)						
State	1965–1969	1970–1974	1975–1979	1980–1984	1985–1989	1990–1996
California	218	546	691	6,711	9,670	13,603
Massachusetts	61	155	197	1,943	2,829	3,386
Texas	37	140	148	1,161	2,171	2,010
New York	32	154	162	688	1,404	1,394
New Jersey	33	82	77	370	1,214	1,711
Colorado	12	50	46	493	805	951
Pennsylvania	18	41	116	370	1,530	1,109
Illinois	59	134	117	287	1,208	1,413
Minnesota	6	90	44	270	406	522
Connecticut	1	32	85	319	1,463	724
Total, all states	\$687	\$1,935	\$2,259	\$15,261	\$30,742	\$37,162

Source: Based on tabulations of unpublished Venture Economics databases.

Why This Concentration?

Uncertainty and informational asymmetries often characterize young firms, particularly in high-technology industries. These information problems make it difficult to assess these firms, and permit opportunistic behavior by entrepreneurs after financing is received. This literature has highlighted the role of informed investors such as angels and venture capitalists in alleviating these information problems.

To briefly review the types of conflicts that can emerge in these settings, Jensen and Meckling (1976) demonstrate that conflicts between managers and investors (“agency problems”) can affect the willingness of both debt and equity holders to provide capital. If the firm raises equity from outside investors, the manager has an incentive to engage in wasteful expenditures (e.g., lavish offices) because he may benefit disproportionately from these but does not bear their entire cost. Similarly, if the firm raises debt, the manager may increase risk to undesirable

levels. Because providers of capital recognize these problems, outside investors demand a higher rate of return than would be the case if the funds were internally generated.

Even if the manager is motivated to maximize shareholder value, informational asymmetries may make raising external capital more expensive or even preclude it entirely. Myers and Majluf (1984) and Greenwald, Stiglitz, and Weiss (1984) demonstrate that equity offerings of firms may be associated with a “lemons” problem (first identified by Akerlof (1970)). If the manager is better informed about the investment opportunities of the firm and acts in the interest of current shareholders, then managers only issue new shares when the company’s stock is overvalued. Indeed, numerous studies have documented that stock prices decline upon the announcement of equity issues, largely because of the negative signal sent to the market. These information problems have also been shown to exist in debt markets by Stiglitz and Weiss (1981) and others.

More generally, the inability to verify outcomes makes it difficult to write contracts that are contingent upon particular events. This inability makes external financing costly. Many of the models of ownership (e.g., Grossman & Hart, 1986; Hart & Moore, 1990) and financing choice (e.g., Hart & Moore, 1998) depend on the inability of investors to verify that certain actions have been taken or certain outcomes have occurred. While actions or outcomes might be observable, meaning that investors know what the entrepreneur did, they are assumed not to be verifiable, i.e., investors could not convince a court of the action or outcome. Start-up firms are likely to face exactly these types of problems, making external financing costly or difficult to obtain.

If the information asymmetries could be eliminated, financing constraints would disappear. Financial economists argue that specialized financial intermediaries, such as venture capital organizations, can address these problems. By intensively scrutinizing firms before providing capital and then monitoring them afterwards, they can alleviate some of the information gaps and reduce capital constraints. Thus, it is important to understand the tools employed by venture investors discussed below as responses to this difficult environment, which enable firms to ultimately receive the financing that they cannot raise from other sources. It is the nonmonetary aspects of venture capital that are critical to its success.

The Specific Tools

One of the most common features of equity investors in entrepreneurial firms is the meting out of financing in discrete stages over time. Sahlman (1990) notes that staged capital infusion is the most potent control mechanism such an investor can employ. Prospects for the firm are periodically reevaluated. The shorter the duration of an individual round of financing, the more frequently the investors monitors the entrepreneur’s progress and the greater the need to gather information. Staged

capital infusion keeps the owner/manager on a “tight leash” and reduces potential losses from bad decisions.⁵

The research on conflicts between investors and managers discussed above suggests several factors that should affect the duration and size of these investments. Investors should weigh potential agency and monitoring costs when determining how frequently they should reevaluate projects and supply capital. The duration of funding should decline and the frequency of reevaluation should increase when the venture capitalist expects conflicts with the entrepreneur are more likely.

If monitoring and information gathering are important—as models by Admati and Pfleiderer (1994), Amit, Glosten, and Muller (1990a, 1990b), and Chan (1983) suggest—the most specialized investors in entrepreneurial firms, venture capitalists, should invest in firms in which asymmetric information is likely to be a problem. The value of oversight will be greater for these firms. The capital constraints faced by these companies will be very large and the information gathered will help alleviate the constraint. Early-stage companies have short or no histories to examine and are difficult to evaluate. Similarly, high-technology companies are likely to require close monitoring. A significant fraction of venture capital investment should therefore be directed towards early-stage and high-technology companies.

In practice, equity investors in entrepreneurial firms incur costs when they monitor and infuse capital. Monitoring costs include the opportunity cost of generating reports for both the venture capitalist and entrepreneur. If investors need to “kick the tires” of the plant, read reports, and take time away from other activities, these costs can be substantial. Contracting costs (e.g., legal fees) and the lost time and resources of the entrepreneur must be imputed as well. These costs lead to funding being provided in discrete stages.

Even though equity investors periodically “check-up” on entrepreneurs between capital infusions, entrepreneurs still have private information about the projects that they manage. Gorman and Sahlman (1989) show that between financing rounds, the lead venture capitalist visits the entrepreneur once a month on average and spends 4–5 h at the facility during each visit. Venture capitalists also receive monthly financial reports. Gorman and Sahlman show, however, that venture capitalists do not usually become involved in the day-to-day management of the firm. Major reviews of progress and extensive due diligence are confined to the time of refinancing.

⁵Two related types of agency costs exist in entrepreneurial firms. Both agency costs result from the large information asymmetries that affect young, growth companies in need of financing. First, entrepreneurs might invest in strategies, research, or projects that have high personal returns, but low expected monetary payoffs to shareholders. For example, a biotechnology company founder may choose to invest in a certain type of research that brings him/her great recognition in the scientific community but provides little return for the venture capitalist. Similarly, entrepreneurs may receive initial results from market trials indicating little demand for a new product, but may want to keep the company going because they receive significant private benefits from managing their own firm. Second, because entrepreneurs’ equity stakes are essentially call options, they have incentives to pursue highly volatile strategies, such as rushing a product to market when further testing may be warranted.

The checks between financings are designed to limit opportunistic behavior by entrepreneurs between evaluations.

The nature of the firm's assets also has important implications for expected agency costs and the structure of staged equity investments. Intangible assets should be associated with greater agency problems. As assets become more tangible, equity investors can recover more of their investment in liquidation. This reduces the need to monitor tightly and should increase the time between refinancings. Industries with high levels of R&D should also have more frequent agency problems, and investors should shorten funding duration. Finally, a substantial finance literature (e.g., Myers, 1977) argues that firms with high market-to-book ratios are more susceptible to these agency costs, thus investors should increase the intensity of monitoring of these firms.

Gompers (1995) tests these predictions using a random sample of 794 venture capital-financed companies. The results confirm the predictions of agency theory. Venture capitalists concentrate investments in early-stage companies and high-technology industries where informational asymmetries are significant and monitoring is valuable. Venture capitalists monitor the firm's progress. If they learn negative information about future returns, the project is cut off from new financing. Firms that go public (these firms yield the highest return for venture capitalists on average) receive more total financing and a greater number of rounds than other firms (which may go bankrupt, be acquired, or remain private). Gompers also finds that early-stage firms receive significantly less money per round. Increases in asset tangibility increase financing duration and reduce monitoring intensity. As the role of future investment opportunities in firm value increases (higher market-to-book ratios or R&D intensities), firms are refinanced more frequently. These results suggest the important monitoring and information generating roles played by equity investors in entrepreneurial firms. Consistent evidence regarding the actual contractual terms in these agreements is found in Kaplan and Stromberg's (2003) analysis of 130 venture partnership agreements.

Why cannot other financial intermediaries that focus on debt financing (e.g., banks) undertake the same sort of monitoring? First, because regulations limit banks' ability to hold shares, they cannot freely use equity to fund projects. Though several papers focus on monitoring by banks (Hoshi et al., 1990; James, 1987; Petersen & Rajan, 1994, 1995), banks may not have the necessary skills to evaluate projects with few collateralizable assets and significant uncertainty. In addition, Petersen and Rajan (1995) argue that banks in competitive markets will be unable to finance high-risk projects because they are unable to charge borrowers rates high enough to compensate for the firm's riskiness. Taking an equity position in the firm allows the venture capitalist or angel to proportionately share in the upside, guaranteeing that the venture capitalist benefits if the firm does well. Finally, angels' personal investments and venture capital funds' high-powered compensation schemes give these investors incentives to monitor firms more closely, because their individual compensation is closely linked to the funds' returns. Corporations, investment banks, and other institutions that have sponsored venture funds without such high-powered incentives have found it difficult to retain personnel, once the

fund managers have developed a performance record that enables them to raise a fund of their own.

In addition to the staged capital infusions, venture capitalists and angels will usually make investments with other investors. One investor will originate the deal and look to bring in others. This syndication serves multiple purposes. First, it allows the investors to diversify. If the investor had to invest alone into all the companies in his portfolio, then he could make many fewer investments. By syndicating investments, the venture capitalist or angel can invest in more projects and largely diversify away firm-specific risk.

For example, a typical venture capital firm may raise a fund of between 200 million dollars. In any one particular round in recent years, a portfolio company receives between 5 and 20 million dollars. If the typical venture-backed company receives four rounds of venture financing, any one firm might require about 40 or 50 million dollars of financing. If the venture capital firm originating the deal were to make the entire investment, the fund could only make four or five investments. Hence, the value of bringing in syndication partners for diversification is large.

A second potential explanation for syndication patterns is that involving other investors provides as a second opinion on the investment opportunity. There is usually no clear-cut answer as to whether any of the investments that an equity investor undertakes will yield attractive returns. Having other investors approve the deal limits the danger that bad deals will get funded. This is particularly true when the company is early-stage or technology-based.

Lerner (1994a) tests this “second opinion” hypothesis in a sample of biotechnology venture capital investments. In a sample of 271 firms, Lerner finds that in the early rounds of investing, experienced venture capitalists tend to syndicate only with venture capital firms that have similar experience. Lerner argues that if a venture capitalist were looking for a second opinion, then he would want to get a second opinion from someone of similar or better ability, certainly not from someone of lesser ability.

The advice and support provided by equity investors is often embodied by their role on the firm’s board of directors. Lerner (1995) examines the decision of venture capitalists to provide this oversight. He examines whether venture capitalists’ representation on the boards of the private firms in their portfolios is greater when the need for oversight is larger. This approach is suggested by Fama and Jensen (1983) and Williamson (1983), who hypothesize that the composition of the board should be shaped by the need for oversight. These authors argue that the board will bear greater responsibility for oversight—and consequently that outsiders should have greater representation—when the danger of managerial deviations from value maximization is high. If venture capitalists are especially important providers of managerial oversight, their representation on boards should be more extensive at times when the need for oversight is greater.

Lerner examines changes in board membership around the time that a firm’s chief executive officer (CEO) is replaced, an approach suggested by Hermalin and Weisbach’s (1988) study of outside directors of public firms. The replacement of the top manager at an entrepreneurial firm is likely to coincide with an organizational

crisis and to heighten the need for monitoring. He finds that an average of 1.75 venture capitalists are added to the board between financing rounds when the firm's CEO is replaced in the interval; between other rounds, 0.24 venture directors are added. No differences are found in the addition of other outside directors. This oversight of new firms involves substantial costs. The transaction costs associated with frequent visits and intensive involvement are likely to be reduced if the venture capitalist is proximate to the firms in his portfolio. Consistent with these suggestions, he finds that geographic proximity is an important determinant of venture board membership: organizations with offices within 5 miles of the firm's headquarters are twice as likely to be board members as those more than 500 miles distant. Over half the firms in the sample have a venture director with an office within 60 miles of their headquarters.

Another mechanism utilized by equity investors in entrepreneurial firms to avoid conflicts is the widespread use of stock grants and stock options. Managers and critical employees within a firm receive a substantial fraction of their compensation in the form of equity or options. This tends to align the incentives of managers and investors, unlike large public companies, where the CEO's personal wealth typically increases by only a dollar or two for each \$1000 increase in firm value.

Equity investors also employ additional controls on compensation to reduce potential gaming by the entrepreneur. First, venture capitalists usually require vesting of the stock or options over a multi-year period. In this way, the entrepreneur cannot leave the firm and take his shares. Similarly, the venture capitalist can significantly dilute the entrepreneur's stake in subsequent financings if the firm fails to realize its targets. This provides additional incentives for the entrepreneur. In order to maintain his stake, the entrepreneur will need to meet his stated targets.

Distortions to the Equity Investment Process

Until this point, this section has highlighted the ways in which equity investors can successfully address agency problems in portfolio firms. Practitioners, however, often make the argument that equity financing has gone through periods of disequilibrium. During periods when the amount of money flowing into the industry has dramatically grown, they argue, the valuations at which investments are made or the likelihood that certain transactions get funded can shift dramatically. If there are only a certain number of worthy projects to finance, then a substantial increase in the amount of venture fundraising may increase the prices that are paid to invest in these companies. These higher prices may ultimately affect the returns on investment in the industry.

Sahlman and Stevenson (1987) chronicle the exploits of angel investors and venture capitalists in the Winchester disk drive industry during the early 1980s. Sahlman and Stevenson believe that a type of "market myopia" affected equity investing in the industry. During the late 1970s and early 1980s, 19 disk drive companies received venture capital financing. Two-thirds of these investments came between

1982 and 1984, the period of rapid expansion of the venture industry. Many disk drive companies also went public during this period. While industry growth was rapid during this period of time (sales increased from \$27 million in 1978 to \$1.3 billion in 1983), Sahlman and Stevenson question whether the scale of investment was rational given any reasonable expectations of industry growth and future economic trends.⁶ Similar stories are often told concerning investments in software, biotechnology, and the Internet. The phrase “too much money chasing too few deals” is a common refrain in the equity financing market during periods of rapid growth.

Gompers and Lerner (2000) examine these claims through a dataset of over 4000 venture investments between 1987 and 1995 developed by the consulting firm VentureOne. They construct a hedonic price index that controls for various firm attributes that might affect firm valuation, including firm age, stage of development, and industry, as well as macroeconomic variables such as inflow of funds into the venture capital industry. In addition, they control for public market valuations through indexes of public market values for firms in the same industries and average book-to-market and earnings-to-price ratios.

The results support contentions that a strong relation exists between the valuation of venture capital investments and capital inflows. While other variables also have significant explanatory power—for instance, the marginal impact of a doubling in public market values was between a 15% and a 35% increase in the valuation of private equity transactions—the inflows variable is significantly positive. A doubling of inflows into venture funds leads to between a 7% and a 21% increase in valuation levels.

The overall price index is depicted in Fig. 8.3. The index is constructed such that the price level in the first quarter of 1987 is set equal to 100. The index controls for differences in the underlying deals in the venture industry. While prices rose somewhat in 1987, they declined and remained quite flat through the 1990s. Starting in 1994, however, prices steadily increased. This increase coincided with the recent rise in venture fundraising. The regression results show that this rise in fundraising is an important source of the increase in prices.

The results are particularly strong for specific types of funds and funds in particular regions. Because funds have become larger in real dollar terms, with more capital per partner, many venture capital organizations have invested larger amounts of money in each portfolio company. Firms have attempted to do this in two ways. First, there has been a movement to finance later-stage companies that can accept larger blocks of financing. Second, venture firms are syndicating less. This leads to greater competition for making later-stage investments. Similarly, because the majority of money is raised in California and Massachusetts, competition for deals in these regions should be particularly intense and venture capital inflows may have

⁶Lerner (1997) suggests, however, that these firms may have displayed behavior consistent with strategic models of “technology races” in the economics literature. Because firms had the option to exit the competition to develop a new disk drive, it may have indeed been rational for venture capitalists to fund a substantial number of disk drive manufacturers.

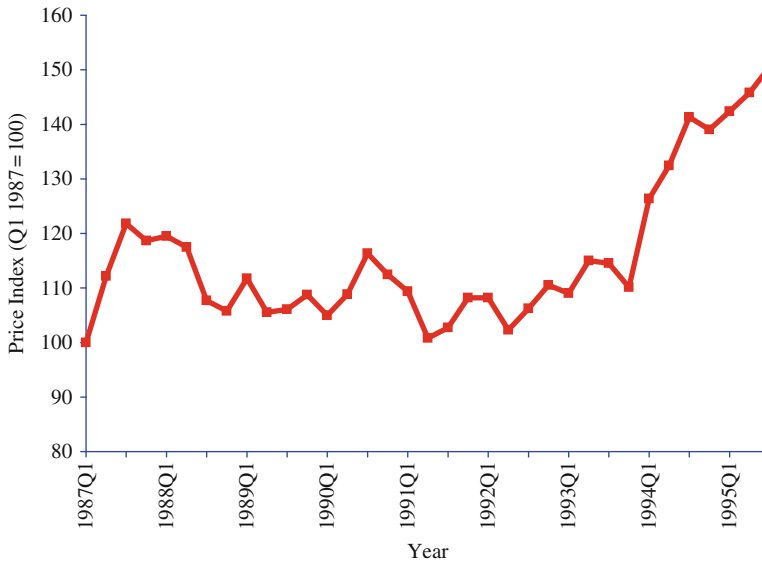


Fig. 8.3 Price index of venture capital investments. The chart depicts the relative price of venture capital investments, controlling for changes in the companies funded
Source: Gompers and Lerner (2000).

a more dramatic effect on prices in those regions. The results support these contentions. The effect of venture capital inflows is significantly more dramatic on later-stage investments and investments in California and Massachusetts.

Gompers and Lerner also examine whether increases in venture capital inflows and valuations simultaneously reflect improvements in the environment for young firms. If shifts in the supply of venture capital are contemporaneous with changes in the demand for capital, their inferences may be biased. They show that success rates—whether measured through the completion of an initial public offering or an acquisition at an attractive price—did not differ significantly between investments made during the early 1990s, a period of relatively low inflows and valuations, and those of the boom years of the late 1980s. The results seem to indicate that the price increases reflect increasing competition for investment.

Exiting Equity Investments in Entrepreneurial Firms

The final stage in the investment process is exiting. In order to make money on their investments, equity investors need to turn illiquid stakes in private companies into realized return. Typically, as was discussed above, the most profitable exit opportunity is an initial public offering (IPO). In an IPO, the investor assists the company in issuing shares to the public for the first time. Table 8.5 summarizes the exiting of investments in entrepreneurial firms through initial public offerings.

Table 8.5 The distribution of venture-backed and non-venture IPOs for the period 1978–1999. This table compares the distribution of IPOs in this sample versus all IPOs recorded over this period of time. All dollar figures are in millions of 1992 dollars

Year	Number of venture-backed IPOs	Amount raised in venture-backed IPOs	Total number of IPOs	Total amount raised in all IPOs	Venture-backed IPOs as percent of all IPOs (number) (%)	Venture-backed IPOs as percent of all IPOs (amount) (%)
1978	6	\$134	42	\$485	12.50	21.59
1979	4	\$62	103	\$777	3.74	7.34
1980	24	\$670	259	\$2,327	8.48	22.35
1981	50	\$783	438	\$4,848	10.25	13.91
1982	21	\$738	198	\$1,901	9.59	27.97
1983	101	\$3,451	848	\$17,999	10.64	16.09
1984	44	\$731	516	\$5,179	7.86	12.37
1985	35	\$819	507	\$13,307	6.46	5.80
1986	79	\$2,003	953	\$23,902	7.66	7.73
1987	69	\$1,602	630	\$19,721	9.87	7.52
1988	36	\$915	435	\$6,679	8.28	13.70
1989	39	\$1,110	371	\$6,763	10.51	16.41
1990	43	\$1,269	276	\$4,828	15.58	16.29
1991	119	\$3,835	367	\$16,872	32.43	22.73
1992	157	\$4,317	509	\$23,990	30.84	17.99
1993	193	\$4,905	707	\$40,456	27.30	12.12
1994	159	\$3,408	564	\$27,786	28.19	12.26
1995	205	\$6,251	566	\$36,219	36.22	17.26
1996	284	\$10,976	845	\$38,245	33.61	28.70
1997	138	\$4,419	628	\$40,278	21.34	10.60
1998	78	\$3,388	319	\$31,075	24.45	10.90
1999	271	\$20,757	485	\$56,952	55.87	36.45

Sources: Barry et al. (1990), Ritter (1998), and various issues of the *Going Public: The IPO Reporter* and the *Venture Capital Journal*.

Initial empirical research into the role of equity investors in exiting investments focused on the structure of IPOs. Barry, Muscarella, Peavy, and Vetsuypens (1990) focus on establishing a broad array of facts about the role of venture capitalists in IPOs, using a sample of 433 venture-backed and 1123 non-venture IPOs between 1978 and 1987.

Barry et al., document that venture capitalists hold significant equity stakes in the firms they take public (on average, the lead venture capitalist holds a 19% stake immediately prior to the IPO, and all venture investors hold 34%), and hold about one-third of the board seats. They continue to hold their equity positions in the year after the IPO. Finally, venture-backed IPOs have less of a positive return on their first trading day. The authors suggest that this implies that investors need less of a discount in order to purchase these shares (i.e., the offerings are less “underpriced”), because the venture capitalist has monitored the quality of the offering.

Meggison and Weiss (1991) argue that because venture capitalists repeatedly bring firms to the public market, they can credibly stake their reputation. Put another way, they can certify to investors that the firms they bring to market are not overvalued. Certification requires that venture capitalists possess reputational capital, that the acquisition of such a reputation is costly, and that the present value of lost reputational capital by cheating is greater than the one-time gain from behaving in a duplicitous manner.

The certification model yields several empirical implications. First, because venture capitalists repeatedly take firms public, they build relationships with underwriters and auditors. These relationships may lead to the average venture-backed IPO having higher-quality underwriters and auditors than non-venture IPOs. Meggison and Weiss also argue that these relationships and the existence of reputation should lead to greater institutional holdings of the venture-backed firm after IPO. Meggison and Weiss also argue that the retention of large stakes of equity both before and after the IPO is a “bonding mechanism” that increases the effectiveness of the venture capitalist’s certification. Any benefit to issuing overpriced shares would be minimized because the venture capitalist sells few or no shares at IPO. Meggison and Weiss test these ideas using a matched set of 640 venture-backed and non-venture IPOs between 1983 and 1987, and find results generally consistent with their hypotheses.

More recent research has examined the timing of the decision to take firms public and to liquidate the equity investors’ holdings (which frequently occurs well after the IPO). Several potential factors affect when firms go public. One of these is the relative valuation level of publicly traded securities. Lerner (1994b) examines when venture capitalists choose to finance a sample of biotechnology companies in another private round versus taking the firm public in. Using a sample of 350 privately held venture-backed firms, he shows that venture capitalists take firms public at market peaks, relying on private financings when valuations are lower. Seasoned venture capitalists appear more proficient at timing IPOs. The results are robust to the use of alternative criteria to separate firms and controls for firms’ quality. The results are not caused by differences in the speed of executing the IPOs, or in the willingness to withdraw the proposed IPOs.

Another consideration may be the reputation of the investor, at least in the case of venture capitalists that need to raise money from outside investors. Gompers (1996) argues that young venture capital firms have incentives to “grandstand,” i.e., they take actions that signal their ability to potential investors. Specifically, young venture capital firms bring companies public earlier than older venture capital firms in an effort to establish a reputation and successfully raise capital for new funds. He examines a sample of 433 venture-backed initial public offerings (IPOs) between 1978 and 1987, as well as a second sample consisting of the first IPOs brought to market by 62 venture capital funds. The results support predictions of the grandstanding hypothesis.

The typical equity investor, however, does not sell their equity at the time of the IPO. The negative signal that would be sent to the market by an insider “cashing out” would prevent a successful offering. In addition, most investment banks require that all insiders, including the venture capitalists, do not sell any of their equity

after the offering for a pre-specified period (usually 6 months). Once that lock-up period is over, however, venture capitalists can return money to investors in one of two ways. They can liquidate their position in a portfolio company by selling shares on the open market after it has gone public and then paying those proceeds to investors in cash. More frequently, however, venture capitalists make distributions of shares to investors in the venture capital fund. Many institutional investors have received a flood of these distributions during the past several years and have grown increasingly concerned about the incentives of the venture capitalists when they declare these transfers.

Gompers and Lerner (1998) examine how investors might be affected by distributions. These distributions have several features that make them an interesting testing ground for an examination of the impact of transactions by informed insiders on securities prices. Because they are not considered to be “sales,” the distributions are exempt from the anti-fraud and anti-manipulation provisions of the securities laws. The legality of distributions provides an important advantage. The institutional investors compile comprehensive records of these transactions and the intermediaries who invest in venture funds, addressing concerns about sample selection bias. Like trades by corporate insiders, transactions are not revealed at the time of the transaction. Venture capitalists can immediately declare a distribution, send investors their shares, and need not register with the SEC or file a report under Rule 16(a). Rather, the occurrence of such distributions can only be discovered from corporate filings with a lag, and even then the distribution date cannot be precisely identified. To identify the time of these transactions, one needs to rely on the records of the partners in the fund. They characterize the features of the venture funds making the distributions, the firms whose

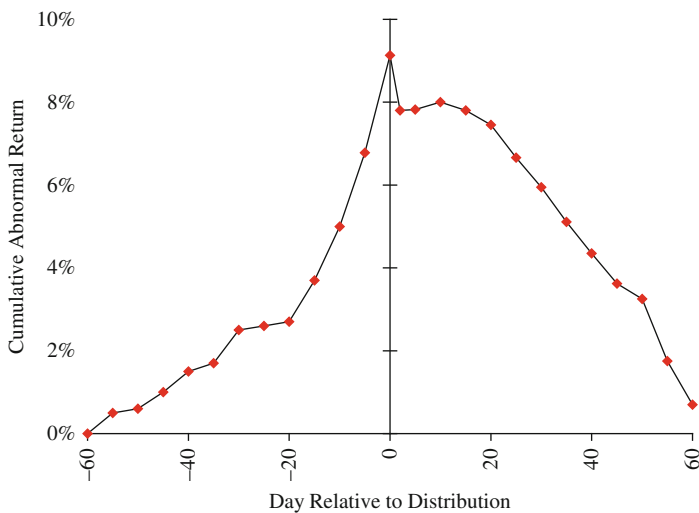


Fig. 8.4 Stock price around distribution of equity by venture capitalists. The graph plots the cumulative abnormal return from 60 days prior to distribution to 60 days after distribution
Source: Gompers and Lerner (1998).

shares are being distributed, and the changes associated with the transactions in a way that can discriminate between the various alternative explanations for these patterns.

From the records of four institutions, Gompers and Lerner construct a representative set of over 700 transactions by 135 funds over a decade-long period. The results are consistent with venture capitalists possessing inside information and of the (partial) adjustment of the market to that information. As depicted in Fig. 8.4, after significant increases in stock prices prior to distribution, abnormal returns around the distribution are a negative and significant -2.0% , comparable to the market reaction to publicly announced secondary stock sales. The sign and significance of the cumulative excess returns for the 12 months following the distribution appear to be negative in most specifications, but are sensitive to the benchmark used.

Current Public Policy Issues

In this section, we consider two of the debates swirling about public policies to encourage equity investments in entrepreneurial firms. First, we consider the evidence about the relationship between venture capital and innovation. We then explore the advisability of steps to encourage angel investing.

Venture Capital and Technological Innovation

A critical policy question is whether venture capital is particularly effective in stimulating innovation. A key motivation for policy-makers seeking to emulate the US model is the perception that venture capital organizations have had much to do with the rising leadership of US firms in high-technology industries, whether measured through patent counts or more qualitative measures. But demonstrating a causal relationship between innovation and job growth, on the one hand, and the presence of venture capital investment, on the other hand, is a challenging empirical problem.

It might be thought that it would be not difficult to address this question. For instance, one could look in regressions across industries and time whether, controlling for R&D spending, venture capital funding has an impact on the number of patents or other measures of innovation. But even a simple model of the relationship between venture capital, R&D, and innovation suggests that this approach is likely to give misleading estimates. Both venture funding and patenting could be positively related to a third unobserved factor, the arrival of technological opportunities. To date, only two working papers have attempted to address these challenging estimation issues.

The first of these papers, Hellmann and Puri (2000), examines a sample of 170 recently formed firms in Silicon Valley, including both venture-backed and non-venture firms. Using questionnaire responses, they find empirical evidence that

venture capital financing is related to product market strategies and outcomes of start-ups. They find that firms that are pursuing what they term an innovator strategy (a classification based on the content analysis of survey responses) are significantly more likely and faster to obtain venture capital. The presence of a venture capitalist is also associated with a significant reduction in the time taken to bring a product to market, especially for innovators. Furthermore, firms are more likely to list obtaining venture capital as a significant milestone in the lifecycle of the company as compared to other financing events.

The results suggest significant interrelations between investor type and product market dimensions, and a role of venture capital in encouraging innovative companies. Given the small size of the sample and the limited data, they can only modestly address concerns about causality. Unfortunately, the possibility remains that more innovative firms select venture capital for financing, rather than venture capital causing firms to be more innovative.

Kortum and Lerner (2000), by way of contrast, examine these patterns can be discerned on an aggregate industry level, rather than on the firm level. They address concerns about causality in two ways. First, they exploit the major discontinuity in the recent history of the venture capital industry: as discussed above, in the late 1970s, the US Department of Labor clarified the Employee Retirement Income Security Act, a policy shift that freed pensions to invest in venture capital. This shift led to a sharp increase in the funds committed to venture capital. This type of exogenous change should identify the role of venture capital, because it is unlikely to be related to the arrival of entrepreneurial opportunities. They exploit this shift in instrumental variable regressions. Second, they use R&D expenditures to control for the arrival of technological opportunities that are anticipated by economic actors at the time, but that are unobserved to econometricians. In the framework of a simple model, they show that the causality problem disappears if they estimate the impact of venture capital on the patent-R&D ratio, rather than on patenting itself.

Even after addressing these causality concerns, the results suggest that venture funding does have a strong positive impact on innovation. The estimated coefficients vary according to the techniques employed, but on average a dollar of venture capital appears to be three to four times more potent in stimulating patenting than a dollar of traditional corporate R&D. The estimates therefore suggest that venture capital, even though it averaged less than 3% of corporate R&D from 1983 to 1992, is responsible for a much greater share—perhaps 10%—of US industrial innovations in this decade.

In their concluding remarks, Kortum and Lerner suggest that the growth of the venture capital industry is one of these key changes in the management of innovative activities that has led to the recent surge in patenting in the United States. To be sure, other innovations in organizing research occurred contemporaneously. For example, central R&D facilities of large corporations have been redirected toward more applied problems. They identify the parallel rise of venture capital and other R&D management innovations as an important issue, which while challenging to explore empirically is worthy of further investigation.

The Need for Stimulating Angel Investment

Within the past few years, public officials in the United States on both a national and local level have increasingly sought to encourage individual investors. The most visible of these efforts has been the Angel Capital Network (ACE-Net), introduced by the US Small Business Administration's Office of Advocacy. This Internet forum allows small businesses to post business plans and communicate with accredited investors. (For an overview, see US Small Business Administration, Office of Advocacy, (1996b)).

Advocates of these programs claim that despite the growth of venture financing, there still might be attractive companies that cannot raise capital. In this section, we assess these claims. We highlight two sets of arguments: those based on the finance literature about capital constraints, as well as on observations about the changing dynamics of the venture capital industry.⁷

A growing body of empirical research suggests that new firms, especially technology-intensive ones, may receive insufficient capital. The literature on capital constraints (reviewed in Hubbard (1998)) documents that an inability to obtain external financing limits many forms of business investment. Particularly relevant are works by Hall (1992), Hao and Jaffe (1993), and Himmelberg and Petersen (1994). These show that capital constraints appear to limit research-and-development expenditures, especially in smaller firms.

However, compelling the evidence for capital constraints limiting investments by small, technology-intensive firms,⁸ these studies' relevance for policy-makers today is unclear. Many of these works examine firms during the 1970s and early 1980s, when the venture capital pool was relatively modest in size. As noted above, the pool of venture capital funds has grown dramatically in recent years. Thus, even if small high-technology firms had numerous value-creating projects that they could not finance in the past, it is not clear that this problem remains today.

A second set of arguments is based on the perceived limitations of the venture capital industry. Venture capitalists fund a modest number of firms each year, and these investments are highly concentrated. Furthermore, venture investors tend to only consider investing in firms that have a substantial need for capital. We next review and assess these arguments.

Venture capitalists back only a tiny fraction of the technology-oriented businesses begun each year. In 2000, a record year for venture disbursements, just under 3,000 companies received venture financing for the first time (National, 2001). (By way of comparison, the Small Business Administration estimates that in recent years close to one million businesses have been started annually). Furthermore, these funds—as in previous years—have been very concentrated. Ninety-two percent went to

⁷For a detailed presentation of the arguments for these initiatives, see US Small Business Administration, Office of Advocacy (1996a, 1996b).

⁸A related body of literature documents that investments in R&D yield high private and social rates of return (e.g., Griliches, 1986; Mansfield et al., 1977). These findings similarly suggest that a higher level of R&D spending would be desirable.

firms specializing in information technology and the life sciences, and 46% went to Internet-related companies (National, 2001).

It is not clear, however, what lessons to draw from these funding patterns. Concentrating investments in such a manner may well be an appropriate response to the nature of opportunities. Consider, for instance, the geographic concentration of awards. Recent models of economic growth—building on earlier works by economic geographers—have emphasized powerful reasons why successful high-technology firms may be very concentrated. The literature highlights several factors that lead similar firms to cluster in particular regions, including knowledge spillovers, specialized labor markets, and the presence of critical intermediate good producers. (The theoretical rationales for such effects are summarized in Krugman (1991)). Case studies of the development of high-technology regions (e.g., Saxenian, 1994) have emphasized the importance of intermediaries such as venture capitalists, lawyers, and accountants in facilitating such clustering.

A related argument for encouraging angel investors is that structure of venture investments may be inappropriate for many young firms. Venture funds tend to make quite substantial investments, even in young firms. The mean venture investment in a start-up or early-stage business even before the current growth was quite substantial: between 1961 and 1992 (expressed in 2000 dollars), the mean investment was \$2.2 million (Gompers, 1995).

The substantial size of these investments may be partially a consequence of the demands of institutional investors. The typical venture organization raises a fund (structured as a limited partnership) every few years. Because investments in partnerships are often time-consuming to negotiate and monitor, institutions prefer making relatively large investments in venture funds (typically \$10 million or more). Furthermore, governance and regulatory considerations lead institutions to limit the share of the fund that any one limited partner holds. (The structure of venture partnerships is discussed at length in Gompers and Lerner (1996)). These pressures lead venture organizations to raise substantial funds. Because each firm in his portfolio must be closely scrutinized, the typical venture capitalist is typically responsible for no more than a dozen investments. Venture organizations are consequently unwilling to invest in very young firms that only require small capital infusions.⁹ This problem may be increasing in severity with the growth of the venture industry. As the number of dollars per venture fund and dollars per venture partner have grown, so too has the size of venture investments: for instance, the mean financing round for a start-up firm has climbed (in 2000 dollars) from \$1.8 million in 1991 to \$11.5 million in 2000 (National, 2001).

⁹There are two primary reasons why venture funds do not simply hire more partners if they raise additional capital. First, the supply of venture capitalists is quite inelastic. The effective oversight of young companies requires highly specialized skills that can only be developed with years of experience. A second important factor is the economics of venture partnerships. The typical venture fund receives a substantial share of its compensation from the annual fee, which is typically between 2 and 3% of the capital under management. This motivates venture organizations to increase the capital that each partner manages.

Again, it is not clear what lessons to draw from these financing patterns. Venture capitalists may have eschewed small investments because they were simply not profitable, because of either the high costs associated with these transactions or the poor prospects of the thinly capitalized firms. (For a theoretical discussion of why poorly capitalized firms are less likely to be successful, see Bolton and Scharfstein (1990)). Encouraging individuals to make such small investments may be counter-productive and socially wasteful if the financial returns are unsatisfactory and the companies financed are not viable.

Support for these claims is found in recent work on the long-run performance of initial public offerings (IPOs). Brav and Gompers (1997) show that IPOs that had previously received equity financing from venture capitalists outperform other offerings, such as those firms who were backed by individual investors. Field (1996) shows that the long-run returns of IPOs are positively correlated with the willingness of institutional (as opposed to individual) investors to purchase shares in the offering. Taken together, these findings underscore concerns about policies that seek to encourage individuals to invest in companies that are rejected by professional investors.

Beyond this question, there are many challenges associated with the design of programs to encourage individual investors. Because of the relatively little research done on the topic of “angel” investors, this discussion is necessarily speculative in nature. Thus, we only seek to raise questions about how these efforts should be designed and implemented:

- *How to insure the involvement of value-added individual investors?* Field studies—see, for instance, Wetzel and Seymour (1981) and Freear, Sohl, and Wetzel (1994)—have highlighted the heterogeneity of angel investors. Some are very sophisticated former entrepreneurs who may be of a great deal of assistance to the new businesses that they finance; but other individual investors may be quite naïve about the risks and delays associated with building an entrepreneurial firm. In fact, in some cases the involvement of unsophisticated individual investors can make it more difficult for an entrepreneurial firm to raise outside capital (e.g., Das & Lerner, 1995). One challenge facing public efforts is how to insure the involvement of angels who can add the most value.
- *How to address concerns about disclosure and securities laws?* In order to participate in ACE-Net, entrepreneurs need to file offering documents under such securities provisions as Regulation A, Regulation D, or Rule 504, as well as appropriate state filings. When private companies raise money informally through angel investors, they very rarely are required to undertake such filings. Small privately held companies frequently resist disclosing financial or business data, lest they provide their larger rivals with competitively useful information about their strategy and/or technology. It may be important to consider whether public initiatives can be developed which do not require such disclosures.
- *How should public initiatives interact with similar private-sector efforts?* An Internet search reveals that a variety of for-profit entities have introduced services which seek to match entrepreneurs with angel investors. Examples

include American Venture Capital Exchange, Capital Matchmaker, FinanceHub, MoneyHunter, and Venture Capital Report. Determining how public and private efforts should interact will be an important policy priority.

Thus, important unanswered questions remain, both about the overall need for and the desirable structure of public efforts to encourage angel investments in entrepreneurial firms. One conclusion is certain: angel finance is a ripe area for more intensive research, on both an empirical and theoretical level, by financial economists. While data limitations have been a substantial barrier to researchers in the past, through careful and creative exploration of new data sets, we may gain a better understanding of these issues.

Future Research

While financial economists know much more about equity financing of entrepreneurial firms than they did a decade ago, there are many unresolved issues that would reward future research. While we have indicated a number of these in the course of the discussion, this section highlights the area where research is most needed: the internationalization of venture capital.

The rapid growth in the US venture capital market have led institutional investors to look increasingly at private equity alternatives abroad. Until very recently, outside of the United Kingdom (where performance of funds has been quite poor) and Israel there has been little venture capital activity abroad.¹⁰ (Table 8.6 provides an international comparison of venture capital activity). Black and Gilson (1998) argue that the key source of the US competitive advantage in venture capital is the existence of a robust IPO market. Venture capitalists can commit to transfer control back to the entrepreneur when a public equity market for new issues exists. This commitment device is unavailable in economies dominated by banks, such as Germany and Japan.

These arguments, however, have less credibility in light of the events of the past 2 years. There has been a surge in venture capital investment, particularly relating to the Internet, in a wide variety of nations across Asia, Europe, and Latin America. While some of these investments have been made by local groups (many recently established), much of the activities have been driven by US-based organizations.

The changes in Europe are illustrative. On the venture capital side, the same changes have happened on a much more accelerated time frame. As the European private equity industry emerged in the early 1980s, there was a significant representation of venture capital investments. Over time, however, the venture capital portion

¹⁰One potential source of confusion is that the term venture capital is used differently in Europe and Asia. Abroad, venture capital often refers to all private equity, including buyout, late stage, and mezzanine financing (which represent the vast majority of the private equity pool in most overseas markets). In the United States, these are separate classes. We confine our discussion of international trends—as the rest of the chapter—to venture capital using the restrictive, US definition.

Table 8.6 The size of the venture capital pool in 21 nations in 1995. We use Jeng and Wells' figures for early-stage funds in each country outside the United States because we believe it to be most comparable to venture capital funds as defined in the United States. Figures for Australia and New Zealand are 1994 estimated levels; figures for Israel are a 1995 estimate; and figures for Portugal are the actual level in 1994. All dollar figures are in millions of current US dollars

Country	Total venture capital under management
Australia	54
Austria	0.4
Belgium	8
Canada	182
Denmark	4
Finland	1
France	35
Germany	116
Ireland	1
Israel	550
Italy	60
Japan	11
Netherlands	100
New Zealand	1
Norway	7
Portugal	9
Spain	24
Sweden	9
Switzerland	1
United Kingdom	36
United States	3,651

Source: Compiled from Jeng and Wells (1999), as slightly amended by the author.

dwindled dramatically. The shrinking representation of venture capital investments reflected their poor performance. Between 1980 and 1994, for instance, while the average mature large buyout fund in Great Britain boasted a net return of 23.1% and the average mid-sized buyout fund had a return of 14.7%. Meanwhile, the typical venture fund had a net return of 4.0% over the same period ("European Performance," 1996). As a result, most venture capital specialists were unable to raise new funds, and generalist investors (such as Apax and 3i) shifted to an emphasis on buyouts.

This situation began reversing itself around 1997. The shifting attitudes were in part triggered by American venture groups, particularly East Coast-based organizations such as General Atlantic and Warburg Pincus. Attracted by the modest valuations of European technology and biotechnology start-ups relative to their European counterparts, general partners began increasingly traveling to Europe to invest in portfolio companies. This trend accelerated at the end of the decade, as American groups such as Benchmark and Draper Fisher Jervetson began targeting large amounts of capital (sometimes in dedicated funds) for European venture investments. The trend was also helped by the superior performance of venture investments in the last years of the decade. In fact, by the end of 1999, the 10-year performance of venture capital funds (17.2%) was almost indistinguishable

from that of buyout ones (17.5%) (Venture Economics, 2000a). (Generalist funds performed significantly more poorly, with 9.5% rate of return over this period).

Meanwhile, European-based funds also became more active. The increase in activity was manifested in three ways. First, groups that had been active for a number of years, such as Atlas Ventures, were able to raise significantly larger amounts of funds. Second, new entrants—in many cases modeled after American groups—became increasingly active. (Examples include Amadeus in the United Kingdom and Early Bird in Germany). Finally, generalist funds increased their allocation to venture capital again: for instance, over the late 1990s, 3i moved from a 15% allocation to technology funds to a 40% share.

In a pioneering study, Jeng and Wells (1999) examine the factors that influence venture capital fundraising in 21 countries. They find that the strength of the IPO market is an important factor in the determinant of venture capital commitments, echoing the conclusions of Black and Gilson. Jeng and Wells find, however, that the IPO market does not seem to influence commitments to early-stage funds as much as later-stage ones. While this work represents an important initial step, much more remains to be explored regarding the internationalization of venture capital.

One provocative finding from the Jeng and Wells analysis is that government policy can have a dramatic impact on the current and long-term viability of the venture capital sector. In many countries, especially those in Continental Europe, policy-makers face a dilemma. The relatively few entrepreneurs active in these markets face numerous daunting regulatory restrictions, a paucity of venture funds focusing on investing in high-growth firms, and illiquid markets where investors do not welcome IPOs by young firms without long histories of positive earnings. It is often unclear where to be in the process of duplicating the success of the United States. Only very recently have researchers begun to examine the ways in which policy-makers can catalyze the growth of venture capital and the companies in which they invest. (Three recent exceptions are Irwin and Klenow (1996), Lerner (1999), and Wallsten (2000)). Given the size of recent initiatives undertaken both in the United States and abroad (summarized in Lerner (1999) and Gompers and Lerner (1999a)), much more needs to be done in this arena.

Finally, the interaction between angel and venture capital investors needs to be explored. To what extent did the venture groups “crowd out” the angel investors that have hitherto been the dominant providers of equity capital in these markets? Or instead, were the two types of investments complements: did the entry of venture investors lead to more wealthy entrepreneurs, who in turn became angel investors? These topics will reward research in the years to come.

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Part III
The Market Context

Chapter 9

Market Processes and Entrepreneurial Studies

Roger Koppl and Maria Minniti

The language of alertness enables us to see with clarity that there is a single explanation for all market movements.

(Kirzner, 2009, 150)

Introduction

In 2006, Israel Kirzner received the International Award for Entrepreneurship and Small Business Research prize.¹ The award cemented Kirzner's status as a leading figure in the study of entrepreneurship. It also brought at the forefront of the literature, the important contributions that the Austrian view of markets has provided and continues to provide to the field. Indeed, the last 5 years have seen a significant amount of work in entrepreneurship as well as the emergence of a new generation of scholars whose works are rooted in the Austrian tradition. While some have continued developing Kirzner's encompassing view of the entrepreneur and entrepreneurship (for example, see works by Koppl and Minniti), others have branched out in areas such as the theory of the firm (among others see works by Klein and Foss), institutions (see Boettke and Coyne), and economic growth (see Sautet and Leeson). The purpose of this chapter is to review the most important contributions to entrepreneurship emerging from the Austrian approach and position them properly within the context of Austrian social science.

The last 15 years have witnessed a proliferation of research on entrepreneurship and the development of an entire field of inquiry. Yet, the central concept and

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¹The International Award for Entrepreneurship and Small Business Research Prize, renamed in 2009 "the Global Award for Entrepreneurship Research" has become firmly established as the foremost global award for research on entrepreneurship. For more details see Henrekson and Lundstrom (2009).

boundaries of entrepreneurial studies are not well-defined. In particular, the concept of “entrepreneurship” has been given different meanings. Shane and Venkataraman (2000) argue, “Perhaps the largest obstacle in creating a conceptual framework for the entrepreneurship field has been its definition” (p. 218). In entrepreneurial studies, entrepreneurship sometimes refers to the founding of a new venture, and sometimes to one or more special characteristics of the founder.

Already in 1990, Gartner’s survey of business and academic professionals revealed a diversity of concepts falling under the label “entrepreneurship.” Gartner’s cluster analysis showed that the professionals in his survey fell into two groups, each with a different basic concept of entrepreneurship. The first group thought of the “characteristics of entrepreneurship;” the second group thought of the “outcomes of entrepreneurship” such as creating value or owning an ongoing business (p. 27, emphasis in original). We can express this difference in a simple formula: Sometimes entrepreneurship means what the actor is like; sometimes it means what the actor does.

In principle, this diversity is not necessarily a problem, as Gartner noted. In practice, however, the result has been that much research on entrepreneurship has weak theoretical foundations. We are getting more pieces of the puzzle, but no picture is emerging. Today, scholars of entrepreneurship still find themselves in the awkward position of using the same word to identify very different things. We would benefit from a definition that captured both aspects of entrepreneurship in a coherent and consistent way. We seek a definition in which what the entrepreneur is like determines necessarily what the entrepreneur does. The Austrian school of economics has produced just such a definition in the work of Israel Kirzner. In his work, entrepreneurship has two aspects. First, entrepreneurship is the “alertness” to new opportunities. Entrepreneurs are alert; this is what they are like. Second, entrepreneurship is seizing an opportunity by taking innovative actions. Entrepreneurs innovate; this is what they do. In Kirzner’s theory, what the entrepreneur is like determines necessarily what the entrepreneur does. Alertness leads to the discovery of new opportunities. If the opportunity discovered is a real one, the entrepreneur will act on it. Thus, as we will explain more carefully below, alertness necessarily leads to innovative actions such as founding a new venture.

It is difficult to appreciate the value, indeed the nature, of Kirzner’s contribution, however, if it is not set in the larger context of the Austrian theory of markets. Kirzner himself has recently pointed out that his approach has often been misunderstood (Kirzner 2009, 149, n. 4). The misunderstandings Kirzner notes about the Austrian approach to entrepreneurship and its relationship to Schumpeter’s theory seem particularly common in management literature. Kirzner may seem to neglect the entrepreneurial process, to view profit opportunities as external to the entrepreneur, and to restrict entrepreneurship to simultaneous arbitrage. These limits to Kirzner’s analysis, however, are more apparent than real. As Kirzner (2009) notes: “The ‘merely alert’ entrepreneur identified in my work was never intended as an alternative to the creative, innovative Schumpeterian entrepreneur. It was only the equilibrative impact of the alert entrepreneur that was contrasted with the distinctive impact that Joseph Schumpeter attributed to the activity of the creative entrepreneur.

(p. 149) . . . Once the pure arbitrage element is recognized to exist in the speculative activities of entrepreneurs, the road is open to yet another recognition. This is the recognition that the bold, creative, innovative entrepreneur, too, is at a yet higher level of abstraction also engaged in arbitrage” (p. 150).

Placing Kirzner’s work in the context of the Austrian school reveals his theory to be much less static and narrow than it often appears to critical observers. In addition, more recent writers in the Austrian tradition have produced much work on entrepreneurship, both at the micro-economic and macro-economic levels, which completes and expands his vision. This chapter explains Kirzner’s theory and the contributions of more recent Austrians in their proper context. Koppl (2006) and Koppl and Minniti (2008), for example, argue that progress is possible only if entrepreneurship is acknowledged as a human universal and entrepreneurs as agents of change.

A solid comprehension of the Austrian definition of entrepreneurship requires scholars to familiarize themselves with the elements of Austrian economics. One could almost define the Austrian theory as entrepreneurial economics. In fact, the Austrian school addresses the concern of Shane and Venkataraman (2000) that, “the absence of entrepreneurship from our theories of markets, firms, organizations, and change makes our understanding of the business landscape incomplete” (p. 219).

The rest of this chapter is organized as follows. The section entitled “the Austrian theory of markets” provides the context and background for Kirzner’s theory. The section entitled “Kirzner’s Theory of Entrepreneurship” discusses Kirzner’s theory in detail. The section entitled “Recent Developments in the Austrian Theory of Entrepreneurship” surveys several authors working under Kirzner’s influence. The section entitled “The Macro-economic Implications of Entrepreneurship” surveys recent works by scholars who take the Austrian perspective to tackle the relationship between entrepreneurship, institutions, regional development, and economic growth. Finally, the conclusion explains how the Austrian approach helps to integrate and organize much of the entrepreneurship literature and how it may be used to create a common theoretical framework for entrepreneurial studies.

The Austrian Theory of Markets

The Disequilibrium Economics of Menger

The Austrian school of economic thought began with Carl Menger’s 1871 classic, *Principles of Economics*. Menger was an Austrian who taught at the University of Vienna. With Jevons and Walras, he was one of the three creators of marginal utility theory and neoclassical economics. Unlike the other two founders of neoclassical economics, however, Menger did not use equations or mathematical notation.

While Jevons and Walras simply posited the utility curves of economic actors, Menger developed an economics of the planning mind. He imagined an “economizer” who is conscious of his various “needs.” Menger’s economizer uses his

limited knowledge to determine what things are “goods.” For a thing to be a “good,” four conditions must hold. There must be a “human need,” a “causal connection” between the thing and the need, “knowledge of this causal connection,” and “command of the thing sufficient to direct it to the satisfaction of the need” (Menger 1871, 52). Once the economizer has determined which things are “goods,” he decides how much of each good he needs. Then Menger’s economizer determines the available quantities for each good. He discovers that for some goods the available quantities are not larger than his requirements. These are “economic goods.” The economizer then imputes value to the economic goods. For Menger, marginal utility is “the importance that individual goods or quantities of goods attain for because we are conscious of being dependent on command of them for the satisfaction of our needs” (p. 115). Thus, Menger emphasizes the “subjective” nature of marginal utility. Value emerges from an act of evaluation. Exchange takes place when evaluations differ. When two parties trade, each individual values the goods of the other more highly than the goods he has control of. Thus, for Menger, exchange is always exchange of *unequal* values and always, therefore, a disequilibrium phenomenon. Because exchange can occur only in disequilibrium, it is the process that matters, not any imaginary equilibrium that a process might lead to. Austrian scholars continue Menger’s tradition of process analysis. Although equilibrium plays an honored role in the Austrian theory of markets that role is subsidiary to their analysis of economic processes.

Menger does not address the role of entrepreneurs explicitly, his economizer, however, is “entrepreneurial” because he possesses an active mind and seeks out new knowledge with which to improve his situation. He learns and grows and changes. Thus, Menger’s work lays the foundation for the methodological subjectivism of the Austrian school and, especially, for the Kirznerian approach to the entrepreneur as an agent of change.

Mises and the Austrian Logic of Choice

In the twentieth century, Ludvig von Mises (1949) and F.A. Hayek (1973–1979) became the leading advocates of the Mengerian tradition.² Mises developed the pure logic of choice originally outlined by Menger. Hayek emphasized the role of knowledge and its dispersion among economic actors.

In Menger’s description of “economizing,” Mises saw the elements of a universal logic of all human action. He developed this “logic of choice” and made it the foundation for economic theory. Modern “neoclassical” micro-economics does the same thing. Neoclassical micro-economics uses, however, a mathematical and somewhat stylized picture of choice. Mises, instead, continued Menger’s tradition and used

²Friedrich Weiser and Eugen von Böhm-Bawerk were early followers of Menger. Frederick A. Hayek and Ludwig von Mises were their students. Mises was an important influence on Hayek and the leader of the Austrian school from about 1920 to his death in 1973.

words rather than equations. To describe his version of the logic of choice, Mises invented the unfortunate word “praxeology.” Specifically, “praxeology” is the economic theory of human action. The Austrian micro-economics of Mises and others follows Menger by viewing the chooser (or economizer) as an active mind trying to improve its situation.

Mises’ micro-economics integrated Menger’s market process theory with the general equilibrium theory of Walras and the partial equilibrium theory of Jevons and Marshall. Like Menger, Mises emphasized the thought behind the action. This view led him to preserve Menger’s emphasis on process. In Mises, as in Menger, the process is more important than the imaginary endpoint. Indeed, Mises emphasized that all action occurs in disequilibrium. The equilibria of economic theory are entirely imaginary; they are aids to reasoning, not realistic descriptions of the world. By definition, as we shall see, entrepreneurship occurs in disequilibrium.³

Hayek and the Austrian Knowledge Problem

Early in his career Hayek came under the influence of Mises. Hayek analyzed a problem raised by Mises, namely, the economic role of knowledge in society. Menger, too, had placed great emphasis on the role of knowledge. But Menger was considering mostly theoretical knowledge generally available to all “economizers.” Hayek recognized that the division of labor produces a division of knowledge. Different people know different things. Thus, the knowledge that guides economic decision-making is dispersed among many independently acting economic agents, such as individuals, families, and firms. Hayek was the leading theorist of the Austrian “knowledge problem.”

The knowledge of what to produce, how to produce it, and so on is scattered in bits and pieces across many different economic actors. The Austrian knowledge problem is that of coordinating this dispersed knowledge. Hayek and the Austrians arrived at their argument about knowledge during a debate on socialism. Hayek and Mises maintained that socialism was not a feasible system because socialist planners

³In addition to his contribution to the Austrian theory, Mises is also the defining figure of the migration of the Austrian school from Europe to the United States. Inter-war Vienna saw the flourishing of intellectual circles, which were groups of scholars meeting regularly to discuss common interests. The Mises circle was an important one attracting economists, philosophers, and social scientists. Among them were Oskar Morgerstern, Alfred Schutz, Felix Kaufmann, Frederick von Hayek, Erich Voegelin, and Gottfried von Haberler. Another member of this illustrious group, Fritz Machlup, once mused, “I wonder whether there as ever existed anywhere a group from which so large a percentage of members became internationally recognized scholars” (Machlup as quoted in Mises, 1984, 203). The group was eventually dispersed by the dramatic events surrounding the rise of Nazism. One after the other, Hayek, Voegelin, Morgerstern, Haberler, Schutz, and many others fled to the United States. Finally, in 1940, Mises too arrived in New York. In the following years, a group of American students fell under his influence.

would not have access to all relevant knowledge in society, which is always dispersed throughout the system. Significantly, Joseph Schumpeter was among those who rejected this argument and saw no economic objections to socialism.

Hayek showed how the market process solves the knowledge problem through decentralized decision-making. The gist of his position is conveyed by his famous tin example.⁴ Tin may grow scarcer because of a new opportunity for its use or because of the loss of a source of supply. “It does not matter for our purpose – and it is significant that it does not matter – which of these two causes has made tin more scarce” (Hayek, 1945, 85). All that is needed is that those on the spot recognize the need to economize on its use. Individuals in markets that use tin will be induced to economize on tin by the increase in its price. Increases of demand will induce suppliers of substitute goods to expand their outputs. Such changes “will rapidly spread throughout the whole economic system and influence not only all the uses of tin but also those of its substitutes and the substitutes of these substitutes, and so on; and all this without the great majority of those instrumental in bringing about these substitutions knowing anything at all about the original cause of these changes” (1945, 86).

Each actor knows only a few things; no one has a synoptic view of the whole. In spite of this widespread ignorance, the market acts as an integrated whole. The individual spheres of knowledge and action overlap, producing a system-wide chain of adjustments to a change of knowledge occurring in any part of the system.

The market process is the leading example of Hayek’s concept of “spontaneous order.” A spontaneous order is one that emerges as a “result of human action, but not of human design” (Hayek, 1967). Examples include the development of social institutions such as money and language, the growth of great cities, and, as we have seen, the emergence of order out of the potential chaos of market exchange.

If the market is a spontaneous order in Hayek’s sense, then market participants can have only partial understandings of it. No one knows in detail how the whole system works. A spontaneous order hangs together and follows its own laws of operation even if no one has a theoretical understanding of it. Participants can always hope to profit from the discovery of new opportunities within the system. This is why Hayek was led to describe the market competition as a “discovery procedure” (Hayek, 1978).

Hayek’s idea of competition as a discovery procedure (1978) is quite different from the neoclassical notion of allocation. In a model of general equilibrium, tastes and technology are known; prices allocate known resources to their highest valued uses. Known methods are applied to known resources to best satisfy known preferences. In Hayek’s vision of the market process, by contrast, knowledge of resources, tastes, and technology is dispersed. No one person, firm, or government agency possesses all the knowledge required to allocate resources optimally.

⁴The next paragraph is lifted from Minniti and Koppl (1999).

Resources can always be allocated more satisfactorily. Thus, anyone in the system may chance upon new knowledge or information that allows him to reallocate resources profitably. Such acts of discovery are characteristic of the market process.

For understanding Kirzner's theory, it is important to include creativity among such acts of "discovery." The creator brings something to the scene that was not already implied in the problem situation he faced. But if his innovation is to make a profit, it must fit the existing realities of the market. If it does, the innovating entrepreneur may reasonably be said to have "discovered" an opportunity. Kirzner (2009) stresses this point, insisting that misinterpretations of this argument have led several scholars to believe, erroneously, that Kirzenerian entrepreneurs are completely distinct from Schumpeterian entrepreneurs.⁵

Discovery is not only possible in the market; it is necessary. Consider Hayek's earlier example of an increase in tin prices. Firms that use tin have an incentive to cast about for new ways to reduce their tin inputs. Those who discover such new techniques will enjoy profits. Those sticking to the old ways of doing things will suffer losses. Hayek's theory of the market as a discovery procedure forms an essential part of Kirzner's notion of entrepreneurial discovery.

Schumpeter versus the Austrian Tradition

The tradition of Austrian economics as described here does not include the great theorist of entrepreneurship, Joseph Schumpeter. Schumpeter was an Austrian national and a student of Menger's great disciple, Böhm-Bawerk. He was thus an "Austrian economist" by both national origin and intellectual heritage. He was not, however, an "Austrian economist" in the most current sense of the term. First, Schumpeter put Walras's system of general equilibrium at the center of modern economics and denied to Menger the central role that modern Austrians attribute to him. Second, Schumpeter predicted the collapse of capitalism from within and its replacement by socialism. This argument contradicted Austrian arguments for the impossibility of a workable socialism. Finally, Schumpeter's theory of market process was quite different from that of modern Austrians. He had a theory of disruptive innovations (Schumpeter, 1934). For modern Austrians, however, the core of market process theory explains how individual adjustments to changing circumstances tend to produce market equilibrium and to restore it when equilibrium is disrupted. (Objecting to the term "equilibrium," some Austrians would substitute the word "coordination.") In this sense of the term, Schumpeter did not have a theory of the market process. Schumpeter's importance to entrepreneurial studies is hardly subject to doubt. His theory of innovation is a permanent contribution to the field. But it is a contribution that is not "Austrian" in the modern sense. Furthermore, Schumpeterian

⁵See the introduction for Kirzner comments on this point.

entrepreneurs are accounted for in Kirzner's theory of entrepreneurship and are, in fact, a subset of the more comprehensive group of Kirznerian entrepreneurs (Kirzner, 2009).

Kirzner's Theory of Entrepreneurship

Israel Kirzner was a student of Mises; he was also influenced by Hayek, especially Hayek's theory of competition as a discovery procedure. Kirzner's theory of entrepreneurship is a part of the Austrian theory of markets and, like all contemporary Austrian theory, bears the imprint of its founder, Carl Menger. Kirzner developed his theory in a long series of writing beginning with his 1973 classic, *Competition and Entrepreneurship*. (See also Kirzner, 1979, 1992, 1997, 2009).

What is Entrepreneurship

Kirzner gives the word "entrepreneurship" a precise meaning. First, entrepreneurship is the "alertness" to new opportunities. This is what entrepreneurs are like. Second, entrepreneurship is the sequence of innovative actions following from the "discovery" of such an opportunity. This is what entrepreneurs do. In Kirzner's theory, what the entrepreneur is like determines necessarily what the entrepreneur does. A simple example illustrates.

A professor walks the same route to class every day. His path is optimal given his knowledge; it gets him there in the least time. One day he discovers that a slightly roundabout route allows him to avoid his dean, who usually pesters him along his accustomed path. He takes the new route and avoids the dean. Our professor has found a new ends–means framework. He had been minimizing travel time; he now minimizes the bother of getting to class, considering both travel time and obnoxious deans. Thus, his ends have changed. The means have changed too; he takes a different route. Our professor could have made this change only by being "alert" to the opportunity to improve his situation by changing his route. The new, roundabout route was a profit opportunity; he could profit by switching to the new route. When he discovered it, his actions changed. His actions had to change if the new route was truly a profit opportunity. For him this is an innovation. If he had considered the new route but found it to be too long, then it would not have been a true profit opportunity and he would not have taken it. Of course, the dean may also find the professor along the new route and the new plan may fail. It is not *profit* that drives the professor to the new route, but the *expectation* of profit.

Traditional neoclassical micro-economics can explain our professor's old route assuming his goal of minimizing time. It can explain his new route assuming his new goal of minimizing bother. But it cannot explain the movement from the old route to the new route. Being alert to the opportunity for such a movement is what the entrepreneur is like. Making the move is what the entrepreneur does.

It is important to recognize the necessary link between these two aspects of entrepreneurship. If there is innovative action, it is because there was discovery, which cannot occur without alertness. Therefore, innovative action necessarily emerges from alertness. Also, if the actor is truly alert, he discovers profit opportunities and acts on them. (If he does not in a particular instance, it is because it was not worth doing in the first place and what he discovered were not true profit opportunities). Thus, alertness necessarily leads to innovative action.

To summarize, Kirzner's definition of entrepreneurship has two aspects. First, entrepreneurship is the "alertness" to new opportunities. Entrepreneurs are alert; this is what they are like. Second, entrepreneurship is seizing an opportunity by taking innovative actions. Entrepreneurs innovate; this is what they do. Within this context, what the entrepreneur is like determines necessarily what the entrepreneur does. Alertness leads to the discovery of new opportunities. If the opportunity discovered is a real one, the entrepreneur will act on it.

Entrepreneurship is Alertness

In its first meaning, entrepreneurship is an aspect of action. It is the element in the Austrian logic of choice that is missing from the traditional neoclassical logic of choice. Thus, entrepreneurship is present in Austrian micro-economics, but not in neoclassical micro-economics. In both versions of the logic of choice, every human action entails the allocation of scarce resources across competing uses. The chooser must allocate his time and attention across different possible activities, even when no other resources are involved. The agent allocates resources to maximize some end, perhaps utility, perhaps net revenue. In the neoclassical version, however, the agent's framework of ends and means is simply given. This model of action has proved useful in many scientific contexts. But, it cannot account for change in the agent's framework of ends and means.

According to Kirzner, entrepreneurship is a change in the ends-means framework of the chooser. Such change can happen because the entrepreneur is "alert" to new possibilities for action. If the entrepreneur were not alert, he would never adopt a new ends-means framework, and change in economic life would be impossible. But change is a necessary feature of human action because the passage of time subjects us all to change and uncertainty. Time and chance happen to us all. Thus, alertness is a necessary feature of all human action. Because we cannot step into the same river twice, all our actions contain an element of improvisation. Such improvisation would be impossible without alertness to new opportunities.

Entrepreneurs are alert to new opportunities. When one is found, Kirzner says the entrepreneur has "discovered" it. The word "discovery" may suggest to some readers that the opportunity the entrepreneur acts upon was "already out there," whereas an entrepreneur may create such opportunities. Any opportunity he "creates," however, must fit external reality. It must conform to external constraints. Thus, as we argued when discussing Hayek, it is reasonable to use the word "discovery" even when the entrepreneur exercises his creativity.

Entrepreneurship is Action

In its second meaning, entrepreneurship is the series of actions that follow from the alert discovery of an opportunity. These actions follow necessarily from the discovery. If the entrepreneur does not act on an opportunity, he has not “discovered” it at all. Imagine someone noticing a price discrepancy, but not acting on it. Why was there no action? Perhaps he could not imagine how to coordinate the required resources; perhaps he is uninterested in money profits. In any case, the failure to act shows that the price discrepancy did not correspond to any imagined change in plans that the individual really preferred to his pre-existing course of action. If he did not do it, he did not want to, whether for lack of know-how, lack of will, or other causes. If he did not want to, it was no opportunity. It was no opportunity *for him*.

Just as the entrepreneurial role in individual action produces change in the agent’s ends–means framework, the entrepreneurial role in the market produces change there. This is what Kirzner means when he says entrepreneurship “occupies precisely the same logical relationship to the more narrow ‘economizing’ elements in the market that, in individual action, is occupied by the entrepreneurial elements in relation to the efficiency aspects of decision-making” (Kirzner, 1973, 32).

The market process cannot emerge, Kirzner argues, unless entrepreneurship operates. This statement has an important implication: To some degree all market participants are entrepreneurs. We are all alert, though in different degrees. We all innovate, though in different degrees. Entrepreneurship is sometimes taken to be a property of a few special individuals. Sometimes the property is even viewed as a mystery, to be admired and revered. Kirzner encourages us to the more scientific view of entrepreneurship as a universal characteristic of human action, though a characteristic more pronounced in some cases than in other.

Koppl and Minniti (2008) develop this point at some length under the heading “the groundhog principle.” Every moment is different from the past, if only because of the accumulation of memory. Thus, it is very much a new and strange world for the protagonist in the film *Groundhog Day* (1993) when he rises to find that yesterday is being repeated exactly today. Because every moment involves some degree of novelty, every action involves some degree of improvisation or innovation.

In Kirzner’s market theory, arbitrage is the fundamental form of entrepreneurship. This stipulation seems to reduce entrepreneurship to something very narrow. But Kirzner gives arbitrage an enlarged meaning that includes even the most elaborate entrepreneurial ventures. Thus, we should not imagine that Kirzner’s theory is limited or inapplicable because he represents entrepreneurs as arbitrageurs. His arbitrageur is a highly creative and innovative individual or organization with significant managerial abilities. A business plan may be very complex. No matter how complex it is, however, the plan requires the purchase of inputs and the sale of output. If we consider the plan from a sufficiently distant and abstract perspective, we may always see in it buying in one set of markets and selling in another. The plan calls for arbitrage between the two sets of markets. Even when I sell today where I bought yesterday, there are two distinct markets, namely, yesterday’s market and today’s market. If the plan is a success, the value of sales will exceed the value of purchases. In that case, we may say that the inputs came cheap and the output

sold dear. Consider, for example, Henry Ford's assembly line. Ford's innovation consisted in a new method of production. The assembly line was a business success, however, only because it increased the difference between input prices and output prices. In this sense, the assembly line represented an arbitrage opportunity for Henry Ford. Thus, his achievement was at the same time a creative act and the discovery of an arbitrage opportunity.

Entrepreneurship Produces Market Order

In Kirzner's theory, market order is produced by entrepreneurship. Without acts of entrepreneurial alertness, our never-changing actions would gradually fall further and further away from consistency with the underlying scarcities. In Kirzner's vision, the "constant market agitation" caused by "jostling competitors and innovative entrepreneurial upstarts" is "not chaotic at all." Rather, it is here, "in this apparently chaotic sequence of market events that the market's orderliness resides" (1992, 49). The market process is a dynamic process of change driven by alert entrepreneurs who discover new profit opportunities. Throughout the market process, economic incentives exist for people to reallocate resources. People respond to such incentives, but the ability of individuals to recognize incentives and reallocate resources varies. Individuals with superior alertness to changes and to the state of disequilibrium move to exploit opportunities and earn economic profits. Thus, the role of the entrepreneur is to discover and seize market opportunities through the re-allocation of productive resources.

Market order is where the difference and complementarity between Kirzner and Schumpeter are revealed. Kirzner provides a theory of equilibration. The entrepreneur coordinates the plans of other economic actors. Schumpeter's entrepreneur disrupts the plans of other economic actors. This difference is a substantive one. Without the equilibrating entrepreneur Schumpeter cannot explain the existence of the order disrupted by his disequilibrating entrepreneur. Thus, as we said earlier, there is a sense in which Schumpeter has no theory of the market process (See Kirzner, 1999).

Entrepreneurship is a Process

In Kirzner's sense, an opportunity is "seen" if and only if it is acted on. It entails no opportunity cost. Essential to the process is the non-deliberative discovery of an unexpected opportunity. This statement must not be taken to imply, however, that the discovery of an entrepreneurial opportunity entails no calculations of money costs and revenues. Kirzner recognizes that to "see" an opportunity requires planning and calculation (Kirzner, 1973, 74–75).⁶

⁶This paragraph and the next come from Minniti and Koppl (1999).

Consider the simplest case of Kirznerian entrepreneurship, namely, instantaneous arbitrage. There is no true opportunity cost associated with the discovery of a price differential. But before the arbitrageur elects to buy here and sell there he does calculate costs and revenues. He adds to his prospective purchase price any transaction costs that he now expects – now that his costless discovery has put the arbitrage opportunity on his list of possible actions. Once the possibility of arbitrage is on his menu of choice, the potential entrepreneur employs the usual economic calculus of maximization. If the costs of the arbitrage are sufficiently low, then the discovery was indeed a real, entrepreneurial discovery and the arbitrage will occur. (None of this goes to deny, of course, that the entrepreneur’s calculations may have been mistaken. He may suffer losses). Thus, while the entrepreneurial discovery is, as such, costless, the entrepreneur does calculate his costs when deciding whether to act on what he has noticed.

Entrepreneurship is a process involving many stages of action. If we look at the process from a sufficiently distant and abstract perspective, however, the particulars fall out of view. This perspective is the one Kirzner has adopted. In his theory, the stages of the discovery process fall out of view. But if we look closely, we can notice separate stages occurring at different times. Kirzner’s lack of interest in the stages of the entrepreneurial discovery process should not be taken to imply that they do not exist or that his theory denies that they exist. Harper’s theory discussed below provides an Austrian approach to the stages of action involved in the entrepreneurial process (Harper, 1994, 1996, 1998).

Some Austrian Criticisms of Kirzner’s Theory

Klein and Briggeman (2009) criticize Kirzner for “work[ing] to maintain that, *in market activity, successful voluntary entrepreneurial action necessarily enhances coordination*” (p. 2, emphasis in original). They prefer to say that successful voluntary entrepreneurial action “usually” or “by and large” enhances coordination. As a matter of strictest logic, Kirzner does not overstate the case for the coordinative power of entrepreneurship or even for “successful” entrepreneurship. His unqualified insistence on the coordinative role of successful entrepreneurship reflects, however, an unfortunate standard of judgment. Unlike Hayek (1937), Kirzner judges the state of “coordination” at the moment *between* entrepreneurial discovery and the moment when all adjustments to that discovery have been made (Kirzner, forthcoming). This way of speaking lets him acknowledge the innovative and creative power of entrepreneurship, while insisting on its coordinative nature. While we share the seeming preference of Klein and Briggeman for a less baroque treatment of coordination, we cannot accept their view that “[n]ecessarily embedded within” the idea of “coordination” in the Hayekian tradition there are “aesthetic or moral sensibilities” (p. 8).

In an important and penetrating article, McMullen and Shepard (2006) say, “For the most part, Kirzner’s theory of entrepreneurial alertness is an elegant explanation

of the attention stage,” while failing to recognize the “evaluation stage” (p. 145). We believe this criticism is overstated. Kirzner fully recognizes that alert entrepreneurs must make ordinary “maximizing” calculations of profit and loss *once they have discovered a new ends–means framework*. We recognize, however, that Kirzner has contributed to the confusion by his tendency to neglect what McMullen and Shephard call the “evaluation stage.”

In elaborating their “action framework” for entrepreneurship theory, McMullen and Shephard provide an insightful analysis of the unity of alertness and action. They distinguish an “attention stage” and an “evaluation stage” of entrepreneurial action (pp. 139–142). In the attention stage a person’s prior knowledge and motivation help to determine whether a “third-person opportunity” exists, which they define as “a potential opportunity for someone in the marketplace” (p. 137). The recognition of a third-person opportunity triggers a search-like process in the evaluation stage, during which the person decides, among other things, “whether the [he or she] is motivated enough to act, given the uncertainty he or she expects to encounter in pursuit of a third-person opportunity” (p. 141). We agree that their “proposed synthesis” (p. 139) helps to integrate multiple perspectives, but we prefer to see it as more fully Kirznerian than they seem to allow.

Shane (2000, 2003) contrasts psychological approaches to entrepreneurship with the supposed approach of the Austrian school. While Kirzner himself did largely eschew psychological inquiries, especially in *Competition and Entrepreneurship*, he explicitly recognized that psychological factors influence the different degrees of alertness characterizing different people as we have seen above. “To be a successful entrepreneur,” Kirzner explains, “requires vision, boldness, determination, and creativity.” Kirzner continues, “There can be no doubt that in the concrete fulfillment of the entrepreneurial function these psychological and personal qualities are of paramount importance. It is in this sense that so many writers are undoubtedly correct in linking entrepreneurship with the courage and vision necessary to create the future in an uncertain world” (Kirzner, 1982, 155).

We have argued that entrepreneurship is an aspect of action. In the context of the pure theory of economics, this means that entrepreneurship is a functional type, separated from capital and labor, even though individual entrepreneurs will be in part capitalists and laborers too. Salerno (2008) recognizes that this separation is desirable in the context of the economic theory of “functional distribution,” which asks how much in the purchase price of a good should in principle be attributed to rent, how much to interest, how much to wages, and how much to the residual, which is profit. Salerno objects to separating out a “pure entrepreneur,” in any other context. The dynamic theory of the market process requires the “integral entrepreneur,” defined as the figure “who integrates the . . . indivisible roles of uncertainty bearer, capital investor and property owner” (p. 11 of ms.). The integral entrepreneur thus defined “is restricted to the actions of those who are markedly superior” at foreseeing and responding to market conditions by “swiftly and efficiently” adjusting their actions accordingly. “Thus the concept refers to the quality of leadership possessed by those who introduce new products or radically new methods of producing old products, the pioneers who discover untapped markets or sources of supply”

(pp. 11–12). Salerno’s definition – couched in terms such as “radically new,” “pioneers,” and “markedly superior” – is exceedingly vague. More importantly, it uses the unscientific language of hero worship. Hero worship hardly seems to path to the “more realistic analysis,” Salerno declares to be the “aim” of his paper (p. 32 of ms).

Recent Developments in the Austrian Theory of Entrepreneurship

Koppl (2003) is a broad, but now less current, survey of Austrian interpretations of entrepreneurship. Several of the contributions take an “Austrian” perspective without following Kirzner. Peter Earl (2003), for example, develops his connectionist model of entrepreneurship. Baumol’s (2004) contribution contains an appreciation of Kirzner’s theory and argues that his work on productive and unproductive entrepreneurship shows “how someone not raised in the Austrian tradition can nevertheless build on the Austrian approaches and accomplishments” (2003, 68). (We strongly endorse his view that “Austrian” ideas are not the exclusive property of “Austrian economists.”) The contribution of Minniti (2003) provides a useful, if no longer fully current, stocktaking in the context of Kirzner’s theory of entrepreneurship. Koppl’s (2003) introduction identifies “gains from trade between Austrian economics and entrepreneurial studies.”

Building upon Kirzner’s classic works, Koppl (2006) introduces the term post-Kirznerian theory to identify works rooted in the Austrian tradition and in which time and uncertainty are central elements. This section organizes and summarizes recent works in this tradition.

Theories of Entrepreneurial Learning

In 1985, O’Driscoll and Rizzo published *The Economics of Time and Ignorance* (O’Driscoll & Rizzo, 1985). After this classic work, it was “impossible to think of Austrian economics as anything but the economics of time and ignorance” (Vaughn, 1994, 134). O’Driscoll and Rizzo made Austrian theory “the economics of *coping* with the problems posed by real time and radical ignorance” (Rizzo, 1995, xiv). The term “real time” refers to the subjective experience of time and change. It contrasts with clock time, which leaves out of consideration the inner experiences of memory, expectation, and surprise (O’Driscoll & Rizzo, 1985, 52–70).

The Economics of Time and Ignorance includes an important section on “The Nature and Process of Learning.” For O’Driscoll and Rizzo “learning” is moving from one interpretive framework to another (p. 37). When the book was published in 1985, they could say, “At present we do not have a theory that enables us to say something significant about the move from one problem context to another” (p. 37). But they did say something “about how such a theory might look” (p. 37). In

particular, the emphasis on real time and learning encouraged Austrian economists to develop theories of entrepreneurial learning.

For O'Driscoll and Rizzo, "The *process* of entrepreneurial learning is neither determinate nor random" (p. 38). Thus, it has two important features. "First, although what individuals will learn is not determinate, that they will learn something may well be." Second, each interpretive framework will have a "loose dependency" on its predecessor. Given the entrepreneur's initial framework, we can rule out many frameworks as possible successors. The succeeding framework must not be one of the ones ruled out (p. 38).

Complementary considerations also favor the construction of a theory of entrepreneurial learning. Entrepreneurship is a part of the Austrian logic of choice. Thus, it is a universally applicable theory. Anything that happens fits the theory. Like any pure theory, the pure theory of entrepreneurship cannot give us testable knowledge of the world. It cannot tell us how entrepreneurship unfolds in real markets. To produce such testable results, the theory must be combined with a theory of entrepreneurial learning. A theory of learning adds empirical content. Several figures within the Austrian tradition have attempted to provide such a theory.

Choi (1993a, 1993b, 1999) proposes a theory of decision-making as a learning process that has direct relevance to entrepreneurship and the market process. Choi argues that the process of coming to an understanding of one's environment is an inferential process. In this process the entrepreneur marshals his information to make sense of things. He tries to see how things hang together. The understanding he arrives at is a guess, though it is his best guess. The entrepreneur can find out whether his understanding is sound only by observing the consequence of his actions. In this sense, human decision-making is experimental and can be likened to the process of science – proposing conjectures and testing them. Choi calls the understanding by which a person resolves uncertainty a "paradigm." He uses this word to indicate that the decision-making process rests heavily on the entrepreneur's prior experiences and his understanding of other things.

When faced with uncertainty, people do not know how to act. Since this state is intolerable, they try to identify usable paradigms. The process ends when the decision-maker identifies a usable paradigm to act on. This process of identifying usable paradigms is the process of learning. Because paradigms are best guesses, they may or may not bring the expected results. If they do not, the decision-maker has an incentive to look for new paradigms. If they bring satisfactory results, then they are reused. The paradigms proven to be usable repeatedly are retained and become parts of the entrepreneur's "tool box." They become behavioral regularities and, over time, each individual comes to have a set of serviceable habits and routines that make his life easier.

In society, people have the possibility of learning from others' practices. Trial and error processes in society generate conventions. That is, people identify mutually compatible paradigms. These conventions make social life possible. Their stability, however, makes innovation difficult. Social and economic practices, therefore, tend to continue through time, even as experiences of different individuals might suggest (to some) that by adopting alternative paradigms, profit is possible. With the

stability of conventions, therefore, the size of neglected opportunities (and the possibility of profitable exploitation), grows over time. In this way, Choi accounts for the existence of neglected opportunities, and their eventual exploitation; he accounts for entrepreneurship.

The entrepreneur discovers the neglected opportunities and tries to capture them. He is going against the “conventional” crowd. If he fails, others will ignore him. If he succeeds, then, others will try to imitate him. In the process, the prevailing practices are transformed. Choi calls the process of entrepreneurial discoveries and their eventual adoption by the rest of the society a “social learning process”.

Butos and Koppl (1999) view Kirznerian entrepreneurs as Hayekian learners. They rely on Hayek’s classic work of 1952, *The Sensory Order*. In this work, Hayek developed an evolutionary theory of mind. Hayek’s theory bears many striking similarities to the work of complexity theorists such as Holland et al. (1986). (See Koppl, 2000a, 2000b, 2009). Several of Hayek’s conclusions are relevant to a theory of entrepreneurial learning.

Butos and Koppl rely on Hayek’s theory, to argue that entrepreneurial knowledge is always an interpretation. The entrepreneur does not so much “see” as “interpret.” Thus, each entrepreneur’s mental model is unique in some degree. Two entrepreneurs will interpret any situation differently. The entrepreneur’s interpretations are expressed in his habits of action and reaction to market events. They are expressed in the rules entrepreneurs follow. Following Hayek, Butos and Koppl point out that the entrepreneur’s habits are subject to a market test. Some habits produce profits; others produce losses. Thus, the market system of profit and loss shapes the interpretations of entrepreneurs. They tend to fit the market because they will be weeded out if they do not.

Butos and Koppl point out that Hayek’s discussion of “attention” in *The Sensory Order* fits nicely with Kirzner’s notion of “alertness.” Attention, Hayek notes, is always directed to things “we are on the look-out” for and can perceive, therefore, more clearly when they happen (Hayek, 1952, 139). Thus, entrepreneurs tend to learn only what they are prepared to learn. Entrepreneurial discovery is not a pure bolt from the blue.

By relying on Hayek’s theory of mind, Butos and Koppl view learning from a relatively objective and external perspective. Koppl (2002a, 2002b) adds a more subjective and internal perspective by bringing in the “phenomenological psychology” of Alfred Schutz. In Schutz’s system, our knowledge is a system of typifications, a system of stereotypes and recipes guiding us through our daily activities. The entrepreneur’s knowledge, too, is such a structure. The entrepreneur organizes his collection of typifications through a “system of relevancies” (Schutz, 1951, 76). This system of relevancies guides the entrepreneur and influences the sorts of discoveries he can make. (Koppl (2002b) attempts to refine and clarify the idea of alertness with the aid of concepts from phenomenological psychology).

Any act of entrepreneurship has its meaning for the entrepreneur within his system of relevancy even as it transforms that system. Kirzner’s pure arbitrageur discovers apples selling for one price on one side of the street and another price on the other side. This discovery has meaning only within the entrepreneur’s existing

system of relevancy. The entrepreneur knows already what apples are and recognizes the apples on each side of the street to be “the same.” He knows what buying and selling are. He knows how to make a purchase, carry inventory, and make a sale. Without this pre-existing body of knowledge, he cannot make his discovery. We see again from this relatively subjective angle that entrepreneurs tend to learn only what they are prepared to learn.

The entrepreneur’s discovery depends on his pre-existing knowledge. At the same time, the entrepreneur’s discovery transforms that knowledge. He looks at apples or, say, automobile assembly differently after the discovery. The actions following from the initial discovery induce further change in his knowledge. The entrepreneur learns by exploiting his discovery.

The writings of Butos and Koppl help us unite relatively subjective and objective perspectives on entrepreneurial learning. Therefore, they help us to move from close descriptions of how entrepreneurs think of things to larger perspectives on the role of entrepreneurial learning in producing economic growth and change.

The Entrepreneurial Process

As we have seen, “entrepreneurship” is both “alertness” to new opportunities and the actions following the “discovery” of an opportunity. Learning is involved in both aspects. When the entrepreneur’s alertness produces a discovery, he learns about an opportunity. As he attempts to act on his new knowledge he acquires still more knowledge; he learns. Kirzner’s theory is silent on learning. It isolates the “category” of alertness, but does not provide a theory thereof. It further identifies entrepreneurship with acting on the discovered opportunities, but, as mentioned earlier, does not elaborate upon the process of doing so. Kirzner does not provide a theory of alertness or a theory of the entrepreneurial process. David Harper’s theory of entrepreneurial learning provides both.

Among self-consciously “Austrian” economists since Kirzner, Harper (1994, 1996, 1998) has offered the most extensive discussions of the theory of entrepreneurship. His basic theoretical framework can be divided into two parts. His discussion of “locus of control” provides a theory of alertness. His discussion of “growth of knowledge” provides a theory of entrepreneurial learning.

Harper draws on Gilad (1982) to argue that a person’s “locus of control” (LOC) influences his degree of alertness. A person with an “internal” locus of control tends to believe that events are “contingent upon his own behavior or his own relatively permanent characteristics” (Rotter 1966, 1 as cited in Harper 1998, 248). People with “external” locus of control tend to see their actions as less effective in producing outcomes. They see events “as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding” them (Rotter 1966, 1 as cited in Harper 1998, 249). Harper cites evidence that entrepreneurs tend to have internal locus of control.

In Harper’s theory, an internal locus of control increases entrepreneurial alertness. This increased alertness leads to more incidental learning and, therefore,

to more entrepreneurship. On this view of things, it is important to know what, if any, social conditions promote alertness. Following Gilad, Harper argues that the nature of our political and economic institutions influences alertness. Those institutions and policies that increase the objective link between action and outcome tend to increase the subjective perception of such a link. They increase, therefore, the number of persons who have an internal locus of control. Harper's "central hypothesis" is that "an environment of freedom is more likely than other environments to generate internal LOC beliefs and acute entrepreneurial alertness" (1998, 253). He discusses this and other institutional factors at some length.

Harper's theory of the entrepreneurial process draws on the "growth of knowledge" literature. It thus borrows heavily from twentieth-century philosophy of science. Karl Popper (1959) and Imre Lakatos (1970) are the leading figures in this group. Citing Boland (1982, 1986), Loasby (1976), and others, Harper compares entrepreneurs to scientists. His theory enjoins us to "Explicitly ascribe Popperian theories of learning to the economic agents in economic theories" (1994, 53).

In the philosophy of Karl Popper, scientists are problem solvers. The scientific process of discovery begins with a scientific problem. The scientist applies his mind to the problem and generates competing hypotheses as potential solutions to that problem. Each solution is always a guess, a conjecture. Scientists engage in testing and experimentation in order to find the best solution to the problem. As a result of these tests, they might even redefine the problem or obtain a deeper understanding of it. To solve the new problem, the scientist makes a new guess and tests it, thus arriving at yet another problem to be solved. It is also important to note that there is no "logic of induction" that carries scientists from particular observations of hard facts to general hypothesis. All conjectures are theory-laden and tentative. New evidence may always turn up that refutes or "falsifies" conjectures that have until then been reliable. Thus, science is an ongoing process of trial and error-elimination or, in Popper's words, an endless process of conjecture and refutation.

Harper suggests that the entrepreneurial process is similar to the scientific process of conjecture and refutation. Entrepreneurship begins with the alert discovery of an opportunity. The discovery is like the scientist's conjecture. It is a prediction (of success in the marketplace) that must be tested. The entrepreneur tests the conjecture by, say, conducting market research or talking to a trusted advisor. He will learn from these tests. (Nothing guarantees, however, that he will learn something true or useful. Entrepreneurs make mistakes). The entrepreneur will apply what he learns to modify the original business conception. He will amend his entrepreneurial conjecture. The process may repeat any number of times. Eventually, the repeatedly amended conjecture that got the process started will meet with a market test. The entrepreneur will learn from this test, too. Thus, he will amend his entrepreneurial conjecture yet again and adjust his business plan accordingly.

The two central aspects of Harper's theory are the testing of conjectures and endogenous change. If entrepreneurs are like Popperian scientists, then the entrepreneurial process is, indeed, a process with identifiable stages. The movement from alert discovery to market action is not automatic or instantaneous. It is a fallible error-elimination process. If entrepreneurs are like Popperian scientists,

then the market process is driven by endogenous change. The ceaseless learning of entrepreneurs implies ceaseless change in their plans. In Harper's entrepreneurial vision, the market process does not wind down to some grand equilibrium. It is an open-ended process of change and discovery. This point is consistent with Hayek's vision of the market as a "discovery procedure."

Sarasvathy and her co-authors (Sarasvathy & Dew 2007; Sarasvathy, 2001, 2008) describe the entrepreneurial process in a way similar to that of Harper. Under their "logic of effectuation," entrepreneurial plans start out vague. They are refined and altered as the entrepreneur puts the pieces together. He is making a deal or a linked set of them and must therefore adjust his plans to the wishes of others, which implies he will learn from them too. The plan the entrepreneur finally executes is a result of this process. In this sense we may call the entrepreneur's plan "endogenous" to the process of negotiation with other "stakeholders" in the enterprise that eventually emerges from this same process.

While Harper emphasized the Popperian logic of the entrepreneurial process, Sarasvathy and Dew view the logic of effectuation as challenging ideas about rationality and rational planning that emphasize prior planning and the supposed knowledge that goes into "rational" planning. It also suggests that it we should not think of the entrepreneur as a forecaster. The entrepreneur is making the future, not predicting it. G.L.S. Shackle (1972) is often associated with the view that man creates the future. Kirzner (1982) affirms the point, whose logic is examined extensively in Schutz (1959).

Entrepreneurship, Capital Heterogeneity, and the Theory of the Firm

Transaction cost, property rights, and resource-based approaches to the firm assume that assets, both tangible and intangible, are heterogeneous. Arranging these assets to minimize contractual hazards, to provide efficient investment incentives, or to exploit competitive advantage is conceived as the prime task of economic organization. None of the mainstream approaches, however, is based on a systematic theory of capital heterogeneity. Foss, Foss, Klein, and Klein (2007) propose the Austrian notion of capital heterogeneity as a possible link between entrepreneurship and economic organization. In their paper, they emphasize three points. First, capital heterogeneity matters for entrepreneurship theory, especially in the context of the firm. Second, the theory of capital should be an integral part of theories of entrepreneurship and organizations. Third, some processes of experimenting with heterogeneous capital are best organized within firms, which helps to explain why firms emerge and how their boundaries are determined. If capital were homogeneous, Foss et al. note, the entrepreneurial act would be trivial. Taking into account heterogeneous capital, as developed by the Austrian school, facilitates the discussion of a class of transaction costs that are relevant to economic organization but neglected in mainstream theories of the firm. Foss et al. build on Foss and Klein

(2005), by linking the theory of entrepreneurship and the theory of the firm. The link involves first, defining entrepreneurship as the exercise of judgment over resource uses under uncertainty, and second, viewing the theory of economic organization as a subset of the theory of asset ownership.

Klein (2008) further develops this argument showing how entrepreneurship theory and its applications to the theory of the firm can be more thoroughly grounded, and more closely linked to more general problems of economic organization viewing entrepreneurship as judgment, a view he attributes to Cantillon (1755), Knight (1921), and Mises (1949). Klein notes that the increasingly formalized treatment of markets, notably in the form of general equilibrium theory, made firms increasingly passive. He then distinguishes among occupational, structural, and functional approaches to entrepreneurship and between two influential interpretations of the entrepreneurial function – discovery and judgment. Klein argues that the contemporary literature on opportunity identification misinterprets Kirzner's instrumental use of the discovery metaphor and mistakenly makes opportunities the unit of analysis. Klein then suggests an alternative approach in which investment is the unit of analysis and is linked to capital heterogeneity. The judgment approach to entrepreneurship, which employs the Austrian School's subjectivist account of capital heterogeneity, "emphasizes that profit opportunities do not exist, objectively, when decisions are made, because the result of action cannot be known with certainty" (Klein, 2008, 176). Citing Foss et al. (2007) and Alvarez and Barney (2007), Klein says opportunities are "essentially subjective phenomena" and "neither discovered nor created," but "imagined" (p. 176).

The emphasis on judgment is developed in Foss, Foss, and Klein (2007) in which a distinction between original and derived judgment is introduced. When judgment is complementary to other assets, it makes sense for entrepreneurs to hire labor. Entrepreneurs' role, then, is to organize human and capital assets under their control. Foss et al. (2007) extend this Knightian concept by developing a theory of delegation under Knightian uncertainty. What they call "original judgment" refers exclusively to owners who, however, may delegate decision powers to employers, who then exercise "derived judgment" and act as proxy for the owners. Building on key ideas from the entrepreneurship literature, Austrian economics, and the economic theory of the firm, Foss et al. develop a framework for analyzing the trade-off between productive and destructive proxy-entrepreneurship and their dependence on incentive systems and transaction costs.

Peter Lewin (2008) and Lewin and Phelan (2000) also take a capital-based perspective on the firm, one that emphasizes the importance of disequilibrium, heterogeneity of resources, dispersed knowledge, and, vitally, a characteristically Austrian understanding of rent that recognizes no essential difference between the "rent" of land and the "rent" of a worker's time. Armed with this Austrian understanding of rent, Lewin (2008) concludes that "heterogeneity of resources would have no strategic significance" in equilibrium and in the ubiquitous disequilibrium of markets, "rent is not an indication of inefficiency or monopoly power." Lewin's analysis reveals the shallowness of pretending to find objectionable monopoly rents in the value-creating strategic choices of creative entrepreneurs. All valuable assets

yield a “rent,” properly understood. Those strategic choices could enhance such rents only if the system were in disequilibrium in the first place, so that those rent-enhancing decisions serve the desirable end of increased coordination.

Sarasvathy and Dew (2007) criticize the judgment approach to entrepreneurship on the grounds that “Austrian conceptualizations of entrepreneurial judgment are rather unrealistic.” Their criticism seems to be based on a somewhat crude misunderstanding, however. They seem to suggest that judgment implies infallibility, a point explicitly counted in Klein (2008), who notes that entrepreneurial imagination “can be wrong as often as it is right” (p. 182). Citing Mises (1951), he says market competition creates “a kind of natural selection” that favors “those entrepreneurs whose judgments tend to be better than the judgments of their fellow entrepreneurs. Of course one needn’t go as far as Friedman (1953) in assuming that the result is optimal behavior” (p. 182, n. 10). In other words, the market grades on a curve.

A different link between entrepreneurship and the firm is identified by Witt (2003, 2007) and Ioannides (2003) for whom the vision of the entrepreneur creates a kind of cognitive leadership for the firm the entrepreneur founds. Langlois (2007) links a similar set of ideas to the Weberian concept of charismatic authority. Langlois, however, is more Knightian in his emphasis on the concept of “judgment” discussed above in the context of Klein and Foss. This body of literature emphasizes the context of change and uncertainty for the entrepreneur’s actions.

The Macro-economic Implications of Entrepreneurship

There seems to be general agreement that a relationship exists between entrepreneurship and economic growth. The nature and mechanism of such relationship, however, are not yet clearly understood. Scholars in the Austrian tradition have recently developed a significant body of work addressing this important question.

Entrepreneurship and Institutions

Institutions refer to the formal and informal rules governing human behavior and can vary across time and space. Boettke and Coyne (2003, 2006, 2009) leverage the Austrian tradition and, in addition to discussing the importance of institutions, provide an analysis of the connection between institutions, the market process, and entrepreneurship. Their work explores how various institutional structures influence entrepreneurial behavior, and the linkage between the latter and sustainable economic growth. The underlying logic of the connection between institutions and entrepreneurial behavior is the realization that institutions provide a framework that guides activity, removes uncertainty and makes the actions of others predictable. In short, institutions serve to reduce transaction costs and facilitate the coordination of knowledge dispersed throughout society. Formal and informal institutions influence the behavior of individuals of all cultures and traditions. Indeed, Boettke

and Coyne argue that while cultural factors may explain some aspects of human behavior, they cannot explain all behaviors. The same individuals, with the same motivations, will tend to act very differently under different sets of institutions. Thus, institutional arrangements have major implications for the way we understand economic change and progress or the lack thereof. In addition, Boettke and Coyne suggest that institutions determine the type of entrepreneurial behavior individuals pursue.

When engaging in productive activities, such as arbitrage, innovation, and other socially beneficial behaviors, entrepreneurs foster economic growth by acting upon previously unexploited profit opportunities and by innovating. In countries with low growth, they argue, it is not that entrepreneurs are absent or are not acting, but rather that profit opportunities are tied to socially destructive behaviors. Thus, the adoption of certain institutions precedes (and is a necessary condition for) the existence of productive entrepreneurial behaviors since it is the institutional framework that enables the right type of entrepreneurship. In order to adopt institutions that promote productive entrepreneurial behavior, Boettke and Coyne argue, it is necessary to understand the conditions and institutions necessary for political entrepreneurs to adopt such policies. In other words, since entrepreneurship is a universal aspect of human action, the entrepreneurial mindset applies not only to the private realm, but also to the public arena and to the meta-rules followed by policy makers; thus, appropriate political systems need to be in place. As Harper (2003) states “Societies which bind themselves to the principles of the rule of law, security of property rights, market coordination of resources, free trade and sound money grow faster than societies in which economic freedom is curtailed. Because many of the components of economic freedom are the result of public policy and explicit political decisions, it follows that the choice of institutional framework has immense consequences for economic prosperity and the wealth of nations” (p. 125).

Entrepreneurship and Economic Growth

From Boettke and Coyne we learn that the right institutions are a necessary condition for economic growth and that productive entrepreneurship is the mechanism through which growth happens. A few scholars in the Austrian tradition have studied the relationship between entrepreneurship and growth at the country and local level.

Emily Chamlee-Wright takes an Austrian approach and explains how cultural meanings and government policies influence entrepreneurs (Chamlee-Wright, 1997). She shows the need to study culture if we hope to have a satisfactory theory of economic development. Chamlee-Wright provides useful case studies illustrating the importance of trust, reputation, and personal relationships in regulating the supposedly anonymous forces of the market. Close studies such as hers reveal the cultural underpinnings of market relations. Each culture and each market has its own mechanisms for producing trust. Thus, Chamlee-Wright shows that entrepreneurs

are cultural figures. On the one hand, their actions reflect the cultural environment in which they act. On the other hand, their actions are an important influence on the culture in which they operate. Development theory should take account of the role of entrepreneurs as cultural figures.

Holcombe (1998, 2003) provides a complementary contribution. He argues that every time an entrepreneur seizes a new opportunity, the possibility for new markets is created. When an entrepreneur fills a niche in his market, resources are mobilized, the possibility of complementary products or services is created and, as a result, new entrepreneurial opportunities exist. Thus, the entrepreneur is an equilibrator within his market and, simultaneously, a catalyst of activity for the economy as a whole.⁷

The works of Holcombe and Chamlee-Wright both complement Minniti (1999, 2004, 2005). Minniti links complexity theory to the study of entrepreneurship. Her work provides a model of the possible relationship between entrepreneurial behavior and aggregate entrepreneurial activity in which non-pecuniary externalities and embeddedness take center stage. These dimensions are consistent with Hayek's notion of spontaneous order in the sense that, as in many complex phenomena, the aggregate outcome "cannot be reduced to the regularities of the parts" (Hayek, 1967b, 74). In particular, Minniti (2004) shows that, when information is evenly distributed, the number of entrepreneurs remains low even when agents are highly alert because arbitrage opportunities are low. On the other hand, when information is asymmetrically distributed, plenty of opportunities exist and entrepreneurship increases. Her results are consistent with observed clustering of entrepreneurial activity in otherwise similar regions. Also, Minniti (2005) shows that if the entrepreneur is a catalyst of further economic activity then entrepreneurship breeds entrepreneurship, the aggregate level of entrepreneurial activity within an economy is uncertain, and that the level of entrepreneurship is determined through a path dependent process.

The Austrian perspective further contributes to the debate about entrepreneurship policy. Desrochers and Sautet (2008) discuss regional specialization versus spontaneous industrial diversity. They argue that policies enabling entrepreneurs to exploit opportunities in a context of spontaneously evolved industrial diversity are better facilitators of regional development. Following the idea that regional specialization produces external economies of scale, regional policies often emphasize the positive features of industrial environments focusing on concentrated and clustered firms. Desrochers and Sautet contend that a push towards specialization might leave regional economies more vulnerable to cyclical downturns, and less likely to generate innovations such as those made possible by industrial symbiosis and Jacobsian externalities. Noticeably, however, that Desrocher and Sautet do not argue against regional specialization. Instead, they suggest that regional specialization and spontaneous industrial diversity should co-exist. Within this context, they provide evidence

⁷In a recent volume, Holcombe (2007) further develops this point and provides a comprehensive discussion of the relationship between entrepreneurship and economic growth.

suggesting that spontaneously developed industrial variety generates an environment very conducive to innovation, as proximity and diversity enable entrepreneurs to build on both explicit and tacit knowledge. What matters, Desrochers and Sautet argue, is not the type of industries that develop but, rather, the environment in which entrepreneurship takes place. Finally, they speculate that a good regional context for innovation would resemble a diversified city made up of many specialized clusters, as the birth, life, and death of diversified urban centers are essentially part of a spontaneous order that rests on entrepreneurship.

The analysis of economic growth and its relationship to entrepreneurship and institutions lends itself, of course, to the study of what policy approach may be more effective in promoting productive entrepreneurship.

Government and Entrepreneurship Policy

Koppl (2008) supports the basic institutional perspective of Boettke and Coyne discussed above. He notes that when proposing or supporting entrepreneurship policies, policy makers have expectations regarding the outcome of those policies. Policies that go beyond measures such as institutional transparency to promote relatively concrete ends imply relatively concrete expectations. Such expectations require policy makers to predict outcomes that are, in fact, impossible to predict. His argument draws on the mathematics of complex systems, especially the “computable economics” of Velupillai (2005, 2007). Velupillai (2007) shows that in complex economies policy is undecidable in a precise mathematical sense. (For an economy capable of computational universality, an effective theory of economic policy is impossible where “effective” is defined in Rosser (1939)). This impossibility, Koppl explains, is particularly problematic for many entrepreneurship policies since, by definition, entrepreneurs are individuals who deviate from the norm and act under highly uncertain (as opposed to risky) situations. Governments are not able to make any prediction about what type of entrepreneurial activity is more desirable, nor about how to make it emerge, since to do so would require them to perform an impossible calculation. According to Koppl, however, governments can create a reliable set of rules that entrepreneurs can play by. This is because policies ensuring institutional transparency, predictable taxation, and secure property rights do not require policymakers to compute specific outcomes in order to achieve their intended goal of promoting entrepreneurial ventures. Koppl’s work contributes directly to the debate about the limitations of pro-active policies and the claim that only the market can identify value-creating ventures.

In a policy-oriented paper, Kirzner and Sautet (2006) identify explicitly some of the policy characteristics necessary to encourage productive entrepreneurship. Among other things, and in line with Koppl (2008), they discuss the difficulty faced by governments wishing to implement policies fostering the entrepreneurial process, noting that entrepreneurial activity cannot be directly measured. Policies that enable entrepreneurship to flourish are one step removed from where entrepreneurial

activity occurs, as they deal with the institutional and regulatory context. They also stress that particular attention should be paid to well-defined and enforceable property rights, freedom of contract and its enforcement, and to the amount of interference from governments with market outcomes, all institutional characteristics whose importance for productive entrepreneurship has also been tested and confirmed empirically by Sobel (2008). Taking a similar perspective and adopting a similar method, Boettke et al. (2007) discuss the characteristics of an entrepreneurial commercial society in the wake of natural disasters. Using the example of Hurricane Katrina, they explore how politically and privately created disaster preconditions and responses contributed to or undermine institutional robustness.⁸

Conclusion

An entire field of inquiry centering on the entrepreneurial process has developed in recent years. The domain and boundaries of the field, however, are not well-defined. As a result, much of the literature in the area has produced results based on narrow empirical studies and often lacking a robust theoretical foundation. And, yet, the questions and issues surrounding entrepreneurship concern important components of human action and integral aspects of psychological, social, and economic phenomena. The Austrian approach provides a methodological and theoretical context that may help ground the field of entrepreneurial study in a sound disciplinary tradition.

If we define entrepreneurial studies to be the study of “(1) why, when, and how opportunities for the creation of goods and services come into existence; (2) why, when, and how some people and not others discover and exploit these opportunities; and (3) why, when, and how different modes of action are used to exploit entrepreneurial opportunities (Shane and Venkataraman 2000, 218),” an Austrian approach to entrepreneurship seems appropriate. In addition to a clearly defined body of entrepreneurial theory grounded in a rich theory of markets, Austrian methodological subjectivism and focus on process rather than equilibrium are particularly well-suited for the study of entrepreneurial behavior. Several points illustrate our claim.

First, we noted that, at the highest level of abstraction, the Austrian concept of entrepreneurship is an intrinsic aspect of human action, a dynamic process centered on the existence, discovery, and exploitation of opportunities. The Austrian approach studies the interdependence between individuals and opportunities and is thus well-suited to the organizational approach of Shane and Venkataraman

⁸For a very interesting collection of essays in the area of development and poverty see also Powell (2008).

(2000).⁹ The Austrian approach is nevertheless suited to issues neglected by Shane and Venkataraman such as the environmental antecedents of entrepreneurship and its consequences in the form of growth and cultural change. Indeed, the flexibility of the Austrian approach allows studies of the characteristics of the individual entrepreneur, studies of organizations, and studies of the macro-economic implications of entrepreneurship all under the same theoretical umbrella.

Second, scholars of entrepreneurship and organizations are often frustrated with economic approaches that focus on equilibrium outcomes rather than the dynamics tending toward such equilibria. As Baumol (1983, 1993) has lamented, mainstream economists working with analytical models have neglected entrepreneurship and simply treated it as a residual that cannot be attributed to any measurable productive input. Some scholars have introduced entrepreneurship in an equilibrium context (Bates 1990; Iyigun & Owen, 1998; Otani 1996) and their work has made valuable contributions. Their focus on long-term equilibria, however, makes these models inappropriate for the study of the less predictable aspects of the entrepreneurial process. In contrast, the Austrian approach to entrepreneurship makes it a disequilibrium phenomenon, in which the final equilibrium is frequently not the main concern.

Third, learning and knowledge play an important role in the entrepreneurship literature. Austrian economics provides a theory of entrepreneurial learning. Menger had an evolutionary theory of change where economic growth depends on the growth of knowledge. More recently, Harper has analyzed the issue and transformed the discussion about the growth of knowledge into a theory of entrepreneurial learning. For Harper, entrepreneurship begins with the alert discovery of an opportunity about which the entrepreneur makes an inference. Then the entrepreneur tests his conjecture, learns, and revises his business plan. Harper's argument is complementary to Minniti and Bygrave (2001) who explore entrepreneurial decision-making when agents choose repeatedly among actions with potentially risky consequences.

Minniti and Bygrave build on the idea that most learning takes place by filtering signals obtained by experimenting with different competing hypotheses, where some actions are reinforced and others weakened as new evidence is obtained. Over time, individuals repeat only those actions that have generated better outcomes. As a result, independently of objective desirability or actual outcomes, actions whose random outcomes happened to be positive become systematic components of the knowledge stock upon which entrepreneurs form their decisions. Thus, their result is analogous to Choi's idea that paradigms proven to be usable will be retained and become parts of the entrepreneur's "tool box." Botos and Koppl develop this point too by presenting the entrepreneur as a Hayekian learner.

⁹For an Austrian entrepreneurial treatment of organizational issues see Lewin and Phelan (2000), Yu (1999), and Sautet (2000). For related discussions see also the important work of Langlois and Robertson (1995).

Indeed, for the Austrians, learning is embedded. That is, it is rooted in the specific environment of the potential entrepreneur as determined by history and institutions. As Sue Birley puts it: “There is no dichotomy between entrepreneurs and non-entrepreneurs; with the right stimulus, the most unexpected people can become entrepreneurs” (Wright, 2001, 37–38). Thus, an Austrian approach to entrepreneurship complements studies of embeddedness and social networks such as those, among others, by Aldrich (1999) and Aldrich and Fiol (1994). These works lead organically to considering the importance of institutions and their relationship to entrepreneurship.

Works by Boettke, Coyne, and others, adopt an Austrian prospective to analyze the role institutions play in fostering productive entrepreneurship. Works by Holcombe, Sautet, and others, expand on this theme and apply the Austrian perspective to studying important and complex questions on the relationship between entrepreneurship, economic growth, and policy. These works complement important applied work by Acs et al. (2004), and Van Stel et al. (2005), and theoretical work by Minniti and Levesque (2010), who in recent years have provided empirical evidence and arguments explaining how entrepreneurial activity contributes to growth and how the latter, in turn, influences the level and type of entrepreneurship.

Finally, works by Langlois, Klein, and Foss, among others, have applied an Austrian perspective to the study of the emergence and boundaries of the firm that are so important in applied fields such as strategy and organization theory.

Our introduction noted three limits to Kirzner’s theory that we consider more apparent than real. First, we noted that Kirzner may seem to neglect the entrepreneurial process. As we saw above, however, this neglect is not denial. Although Kirzner does not himself examine the entrepreneurial process, his framework is consistent with an indefinite number of theories of it. David Harper provides one example coming from within the Austrian tradition. Second, we noted that Kirzner may seem to view profit opportunities as external to the entrepreneur. As we saw above, however, we should interpret Kirzner’s term “discovery” broadly so that creative acts of entrepreneurial invention are at the same time “discoveries” of profit opportunities. If the creative innovation proves profitable, it is because the entrepreneur has discovered an opportunity. Third, we noted that Kirzner may seem to restrict entrepreneurship to simultaneous arbitrage. As we noted above, however, Kirzner gives arbitrage an enlarged meaning that includes even the most elaborate entrepreneurial ventures. No matter how complex a business plan may be, it will be a success only if the end result is that inputs are bought cheap and outputs are sold dear. In that case, the entrepreneur has engaged in successful arbitrage between input markets and output markets.

The three limits to Kirzner’s analysis, then, are apparent, not real. They are like optical illusions created by the relatively high level of abstraction Kirzner maintains. While this level of abstraction is a source of potential misunderstanding, it is also a great strength in his analysis and a necessary feature of any approach that might be used to unify and organize the sprawling literature in entrepreneurship.

As a field of inquiry, entrepreneurial studies has great strengths and weaknesses. Its great strength is the richness and diversity of particular studies and models.

The great weakness of entrepreneurial studies is the lack of a common theoretical framework. This weakness might almost seem the flip side of its great strength, although we believe it is a weakness we can overcome. Scholars of entrepreneurial studies may lack a disciplinary core, but they share a vision of entrepreneurship. Entrepreneurship is a dynamic process of change, in which individuals having in unusual degree certain personal or psychological characteristics undertake innovative actions. The Austrian approach to entrepreneurship outlined in this chapter expresses this common vision. The Austrian framework is a broad one, uniquely suited to seize the common elements of thought uniting scholars of entrepreneurship without imposing relatively specific models or empirical hypotheses about which legitimate disagreement exists within the field.

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Chapter 10

Entrepreneurship, Business Culture and the Theory of the Firm

Mark Casson

Introduction

This chapter is concerned with the relationship between the entrepreneur and the firm. It is written from the perspective of the modern economic theory of the entrepreneur, which is explained in the first part of the chapter. This perspective is rather different from that which dominates the small business literature, as reflected in some of the other chapters in this handbook.

In the small business literature the entrepreneur is often identified with the founder of a firm, or with the owner-manager of it. The entrepreneur is self-employed, and may employ others, but is never an employee. This creates the paradox that the Chief Executive Officers of large firms are not entrepreneurs because they are salaried employees. However, “entrepreneurial” their firm may be, they are not entrepreneurs because they are employees. This paradox is caused entirely by reliance on an unsuitable definition of the entrepreneur.

The definition of entrepreneurship in term of running a small business has wide appeal because it invokes a popular cultural stereotype of the individualistic and competitive founder of a successful firm. Despite all the evidence that many small firms fail, the stereotype perpetuates the mistaken idea that people who found firms are successful people who deserve admiration. This appeal to misleading stereotypes is a weakness rather than a strength of popular theories of the entrepreneur.

The economic theory of entrepreneurship presented in this chapter helps to place the analysis of entrepreneurship on a more rigorous basis. Critics have alleged that the resulting theory is too abstract, or too philosophical, to be of much practical use. In fact, however, the theory has proved extremely useful in the field of business history, and is widely used by business historians to explain differences in performance between firms. The theory is also increasingly used by economic historians to address long-term “big issues” such as the causes and consequences of the rise and

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decline of nations, and the influence of politics and religion on national economic life (see, for example Godley, 1996). It is, indeed, somewhat ironic that the field of small business research, which professes to specialise in the study of entrepreneurship, has been particularly notable for neglecting the practical application of the economic theory of the entrepreneur.

A possible reason why small business researchers have neglected economic theories of entrepreneurship is that they may believe that the theory is still rooted in the “neoclassical” thinking which dominated the economic theory of the firm in the 1960s. As other chapters in this handbook show, however, this view of modern economic theory is misleading. Economics is a dynamic and evolving discipline, and many of the restrictive assumptions of neoclassical economics, which limited its usefulness in small business research, have now been relaxed.

The main assumptions that have been relaxed concern the objectivity of information, autonomy of preferences and costless optimisation. Relaxing these assumptions makes it possible to accommodate theoretical insights derived from other social sciences. To retain predictive power, however, it is necessary to replace the assumptions that have been relaxed with specific postulates about how people handle information within a social environment. These postulates generate hypotheses about entrepreneurial behaviour, which can be tested at the individual, corporate, industry and national level.

Once these assumptions are relaxed, it becomes evident that theories of entrepreneurship are closely related to modern theories of the firm, such as transactions cost theories (Williamson, 1985) and resource-based theories (Penrose, 1959). The theory of entrepreneurship emerges as a powerful mechanism for synthesising the insights of these modern theories of the firm.

It also turns out that, once these assumptions are relaxed, the theory of entrepreneurship can address issues concerning the role of the entrepreneur in cultural change. The “change management” literature (Peters & Waterman, 1982) has placed considerable emphasis on the role of the entrepreneur in providing employees with a vision of the future, and in inculcating values in the workplace, which will serve to realise this vision. Conventional economic theories encounter difficulties in analysing this role because of the assumption of autonomous preferences on which they are based. Relaxing this assumption allows the theory of entrepreneurship to examine the costs and benefits of cultural change, and the role of the entrepreneur in effecting such change.

Finally, it should be pointed out that before the hey-day of the neoclassical theory of the firm, economic theorists did not normally make the very strong assumptions on which the neoclassical theory of the firm was based. Relaxing these assumptions gives intellectual access to the classic writings on entrepreneurship of previous generations. The insights of the great writers of the past can therefore be synthesised with modern thinking in a systematic way. One result of this process is that the reader will notice that many of the references and citations in this chapter are to relatively early literature. The profusion of references to recent papers, which is a hallmark of modern professional literature in business studies, is missing from this chapter. Because of the wide span of publication dates, and the breadth of the

issues addressed, only a representative set of references to recent literature on each individual topic is given.

The Division of Labour and the Role of the Entrepreneur

Entrepreneurial Judgement

The modern economic theory of the entrepreneur has evolved from a series of fundamental contributions going back to Cantillon (1755). Leading 20th-century writers include Knight (1921), Schumpeter (1934), Hayek (1937), Kirzner (1973) and Baumol (1993). A modern synthesis defines the entrepreneur as *someone who specialises in taking judgemental decisions about the coordination of scarce resources* (Casson, 1982).

In this definition, the term *someone* emphasises that the entrepreneur is an individual. It is the individual and not the firm that is the basic unit of analysis. A full analysis of entrepreneurship must explain the internal structure of the firm as well as its external competitive strategies; in other words, it must explain the place of the entrepreneur within the firm. It cannot be assumed that membership of the firm is so cohesive that the firm has a “will of its own”, and that this “will” of the firm, as exemplified by its strategies, is simply the will of the entrepreneur. This starting point of the theory reflects the methodological individualism, which the economic theory of entrepreneurship shares with other branches of economics.

Judgemental decisions are decisions for which no obviously correct procedure exists – a judgemental decision cannot be made simply by plugging available numbers into a scientific formula and acting on the basis of the number that comes out. The need for judgement reflects both the costliness of factual information, and the partial and limited nature of the conceptual frameworks used to interpret this information when arriving at a decision. The entrepreneur does not normally possess a correct model of the environment, and even if they did possess one, much of the information they would need to apply the model would only be available at prohibitive cost.

Judgement is defined here in terms of what it is *not* – namely the routine application of a standard rule. What it is can best be explained by describing when it is most likely to be required. Judgement is most important in taking decisions where relevant information is very scarce. Key facts may be missing, or the facts may be known but, in the absence of a suitable model, their meaning may be unclear. It is where information is scarce that good judgement is of the greatest value. Judgement draws upon intuition, and the capacity to reflect on relevant experience, to supplement meagre resources of objective information. Judgement is particularly important in improving the quality of decisions that must be taken *urgently* in *novel* and *complex* situations where objectives are *ambiguous*. The urgency of decisions is often stimulated by *competitive forces*; in particular, by the need to recognise and exploit profit opportunities before others do so. The novelty of decisions, as reflected in the

absence of suitable precedents, tends to be greatest when the business environment is rapidly *changing*, and is *evolving* in such a way that the same situation never occurs twice. Complexity is often associated with *long-term* decisions taken in situations where the potentially *adversarial reactions* of other people must be taken into account (Casson, 1990a, Chap. 3). Ambiguity is exemplified by a situation where a number of stakeholders have clubbed together to undertake a project (for example the entrepreneur may have borrowed funds from business partners). Although the stakeholders share a commitment to the success of the project, their interests may differ in other respects, and these conflicting interests can lead to tensions. Under these conditions the entrepreneur may have to negotiate key decisions with the individual stakeholders rather than simply impose the decision that he would favour himself. This not only complicates the decision-making process, but also slows it down.

Information is always scarce (Simon, 1983), and so judgement is required for many different types of decision, as diverse as selecting a marriage partner or choosing a career. The emphasis in the definition on *scarce resources* confines attention to decisions of an economic kind – such as business decisions. Reference to the *coordination* rather than the allocation of resources emphasises the dynamic aspect – coordination *changes* the allocation in order to improve the situation. It should be emphasised, though, that entrepreneurial activity does not necessarily improve the situation from everyone's point of view. An entrepreneur's decisions may have adverse effects on third parties who have no right of redress because they possess no property rights through which they can articulate their opposition.

In principle, judgemental decision-making could be a once-for-all rather than a continuing process. In an economic system, where everything depends on everything else, each individual faces a single integrated life-time problem – namely how best to allocate their time, their wealth and their effort over the rest of their life. To cope with uncertainty, each individual could develop a contingent inter-temporal plan which would specify how every moment of the remainder of his (or her) life would be spent. Reactions to new events would be pre-planned, by calculating in advance the best response to every situation that could possibly occur. Provided all possibilities were considered at the outset, all decision-making could be telescoped into the present.

In practice, of course, such planning is prohibitively costly, and so many decisions are deferred on the basis that the situations to which they relate may never materialise. While entrepreneurs may well find it useful to pre-plan their responses to the most commonly occurring types of situation, because the costs of identifying the situations and calculating the appropriate responses are fixed costs, which can be spread over repeated occurrences, pre-planning is uneconomic for situations which are unlikely to occur, and whose recurrence is even more improbable. Plans are therefore left open-ended, covering only the major contingencies, and consequently they need to be refined as and when improbable or unexpected situations occur. In the volatile environment in which entrepreneurs operate, change is endemic and so improbable and unexpected situations of this kind arise on a regular basis. Thus, entrepreneurial decision-making becomes a continuing process.

The Mental Division of Labour and Intellectual Comparative Advantage

An integrated decision problem may be decomposed into constituent parts. For example, an entrepreneur may decide to separate the question of whether to invest in some asset from the decision of how best to utilise that asset on a daily basis later on. In certain cases the logic of a problem may permit exact decomposition, but this is fairly unusual. Decomposition normally involves ignoring some of the interdependencies in a situation. This introduces errors, which would be unacceptable to an individual who faced costless information. But when information is very costly the overall quality of decision-making may actually improve. This is because the cost of the information required to take a sequence of simple decisions is often much less than the cost of the information required to take a single complex one. This is mainly because information on current situations is usually far easier to collect than information which will predict future situations. Because of this, short-term decision-making is often artificially separated from the long-term decision-making by replacing a long-term strategic objective with a sequence of short-term tactical ones. Tactics can then be altered without changing the entire strategy.

A strategy that has been immunised against tactical change need not be continuously reconsidered. A sensible response is only to reconsider strategies when it seems likely that a significant change may be required. This involves establishing some norm for an acceptable risk of error, and passively following a no change policy in strategy until the norm has been breached. Individuals working with norms tend to re-examine their strategies only when they have been surprised (Shackle, 1979). Problem-solving thus becomes an intermittent process driven by what appears to the problem-solver to be stochastic events.

The sub-problems generated by decomposition can usually be specified more precisely than the integrated problem from which they have been derived. Moreover, they tend to be of a standard type. Thus, while an overall strategic problem may be idiosyncratic, it may simply be an unusual permutation of tactical problems, each of a common type.

When a problem has been decomposed in this way, different sub-problems can be allocated to different people. Because different types of integrated problem can generate the same kind of sub-problem, several different people may call upon the same person to solve a given sub-problem. By concentrating his effort on a particular sub-problem, the person concerned may acquire considerable expertise. Efficiency therefore dictates that problem-solving should be concentrated on specialists.

This is a particular manifestation of the *division of labour* – albeit applied to the intellectual task of problem-solving rather than the physical tasks of production. The related principle of *comparative advantage* implies that people with particular aptitudes should concentrate on particular types of problem. Specifically, some problems call for greater judgement than others – and it is people who specialise in judgemental decision-making that become entrepreneurs. Thus, while everyone takes judgemental decisions from time to time, it is only entrepreneurs that *specialise* in doing so.

Delegation

The division of labour in problem-solving can be effected either by *referring* problems or *transferring* them. *Referral* involves *delegation* – someone is instructed to solve the problem on someone else’s behalf. Shareholders, for example, delegate corporate managers to solve the problem of how the wealth they have invested in the firm is to be used. The senior managers may in turn delegate some responsibility to junior managers. For example, the problem of factory management may be decomposed functionally into a production planning problem, a personnel problem and a financial problem, each of which is delegated to a different manager. Since the solutions to these sub-problems must complement each other, those involved must work as a team.

In a managerial division of labour the chief executive is responsible for synthesising the overall solution. The chief executive’s role normally requires the greatest judgement and so carries the main entrepreneurial responsibility. Whether other managers share this responsibility depends on whether they are given discretion to exercise their judgement. If so, the team is a coalition of entrepreneurs; if not, it is a hierarchy in which the members obey instructions on information-processing dictated by a solitary entrepreneur.

A problem is *transferred* when the resources to which the problem pertains are allocated to someone else. Problems can be transferred either *between principals* or *between delegates*. The first involves an *arm’s length transaction* between two ownership units. Consumers, for example, pay producers for solutions to problems. These solutions are embodied in consumer goods and services. Problems relating to the production of those services are entirely the responsibility of firms. Producers may also pay other producers for solutions – a firm may sell off a component factory, for example, and buy back components at arm’s length from the subcontractor. In this case the assembly firm has transferred problems of component manufacture to another firm.

The transfer of a problem between delegates is affected by an *internal transaction*. Assuming both delegates work for the same principal, the transfer occurs within the ownership unit. In a vertically integrated production sequence, for example, responsibility for the quality of intermediate products may be transferred from an upstream division to a downstream division as the products flow down the chain. Under long-term corporate restructuring, an entire facility may be transferred from one division to another – as when a central research laboratory is “captured” by one of the application-centred divisions.

Inter-Personal Subjectivity

Subjectivity

In an evolving economy, the division of labour will adapt as new problems arise and existing ones are solved. Environmental change is endemic because of population ageing, resource depletion, wars, etc. But it is the *perception* as well as the reality

of problems that is important. Information lags mean that real problems may not be immediately perceived, while cultural changes mean that new problems may be perceived even if the underlying reality is unchanged.

At the root of this is the *subjectivity* of problems. This pertains both to their identification and solution.

Identification is subjective because people have different objectives and different norms. Conventional economics stresses that objectives differ because of differences in tastes. But the problem goes deeper than this. People also need to morally legitimate their wants, so objectives are affected by personal morality too (Casson, 1991). Differences in taste and morality mean that in the same situation one person may perceive one problem and another person another.

Differences in norms are important too. In economic problems efficiency considerations are paramount and so the emphasis is on performance norms. A person with high norms may perceive a problem where a person with low norms does not.

Solutions are subjective because of both the information available and the model (or “mental map”) used. Because information sources are localised, different people have access to different information, but even where access is similar, opinions may differ as to reliability. No item of information can authenticate itself, and so one person may dismiss as false and misleading information which someone else regards as true. People capable of synthesising information from diverse sources are the best judges of veracity because they can use different items to corroborate each other.

The interpretation of information requires a model. Models are typically very simple in relation to the environment they claim to represent, and so in many situations – particularly complex ones – there may be several models representing different aspects of the situation. At the other extreme, in an unprecedented situation there may be no adequate model at all. The decision-maker may have to rely on very crude analogies instead. People who have been educated in a different way may be biased towards particular types of model or analogy and so interpret information very differently.

Thus, a consumer products industry, which involves the continuous innovation of novel designs, may require entrepreneurs who are good at taking decisions without a carefully specified model and with only limited information. A mature process industry, by contrast, may require entrepreneurs who are good at reconciling different models, which deal with complementary aspects of a very complex production system. The principle of comparative advantage applied to subjective decision-making therefore implies that people with different personal qualities will gravitate to different industries. Individuals who are good at coping with ignorance due to shortage of data will incline to innovative industries, while those who are good at synthesising different models will opt for mature industries with complex technologies.

Innovation and Arbitrage

In a free enterprise economy anyone can devote their time to identifying and solving any kind of problem they wish – provided they are willing to pay the opportunity

cost involved. Profit opportunities provide the material incentive to use their time in this way.

Profit opportunities are exemplified by *innovation* (Schumpeter, 1934) and *arbitrage* (Kirzner, 1973, 1979). The most dramatic forms of innovation are those concerned with *infrastructure* – notably transport, communication and the distribution systems associated with utilities (electricity grids, gas mains, etc.). These innovations solve crucial problems relating to the movement of people and freight, the exploitation of scale economies in energy-generation, etc. Also significant, but less dramatic, are ordinary *product and process* innovations. A consumer product innovation, for example, may be based on the solution of a common household problem. The solution is embodied in the design of an ingenious durable good. The production and marketing of this good may form the basis of profitable corporate activity.

Innovation usually involves the entrepreneur in the active *management* of resources under his control (though see Section “Internalisation”). Arbitrage, on the other hand, does not. Arbitrage deals with problems which lie purely in the domain of *ownership*. For example, one party may require resources urgently to resolve a pressing problem, but the relevant resources may initially belong to someone else. Alternatively, someone may be mismanaging resources, which would be better placed under someone else’s control. A single transaction can solve problems of this kind, and recognition of this solution provides an opportunity for arbitrage. When the problem lies in the future rather than the present, the opportunity becomes a speculative one instead.

The successful appropriation of profit depends upon maintaining a monopoly of the solution until the appropriate contractual arrangements have been made. Competition from other entrepreneurs exploiting a similar solution will drive up the prices of resources it is planned to acquire, and depress the prices of resources, which are to be sold.

Even with a monopoly, however, the appropriation of profit may be impeded if a key resource required to implement the solution is monopolised by someone else. To avoid being held to ransom, the entrepreneur must understate his valuation of the resource – withholding relevant information as a secret – so that the other monopolist underestimates his own market power. *Negotiation skills* of this kind are very important to the entrepreneur.

Because the economy is in a continual state of flux there is always uncertainty about whether any particular solution is really the best. The prudent entrepreneur will ask himself whether the problem is really as easy to tackle as he believes, and whether his solution is really the best available. Has he really discovered something that other people do not know, or has he merely overlooked some aspect of the problem that they have recognised? This issue can never really be resolved until the outcome is known. Indeed, even then it can never be fully resolved – for what seems in immediate retrospect to have been a failure may turn out even later to look like a success. Nevertheless, the entrepreneur must be prepared for the fact that the consensus of opinion, acting on hindsight, may condemn the judgement that underpinned his solution.

The entrepreneur therefore needs to be not only *optimistic* that the problem can indeed be solved, but also *confident* that his optimism, even though it is not shared by others, is still justified. He must also be able to *tolerate the stress* of waiting for the outcome to materialise, and wondering if he can find a suitable excuse if it is a disaster. Indeed, it is because of his optimism and confidence that the entrepreneur is likely to have a monopoly of the opportunity – there is a subjective “barrier to entry” into the exploitation of the solution created by the relative scepticism of the other people involved.

Capital Requirements as an Entry Barrier

When the resources required to exploit a solution are large, however, the entrepreneur may himself become the victim of an entry barrier – namely lack of funds. To capitalise an enterprise properly, the funds must be sufficient to meet contractual obligations in the event of failure as well as in the event of success (Casson, 1990b). These funds may be quite large in relation to the entrepreneur’s personal wealth. Because of subjective differences in the perception of risk, potential financiers will be less optimistic than the entrepreneur. There is, moreover, a “catch-22” problem, because if the entrepreneur presents potential backers with convincing evidence for his optimism then they may decide to invest directly themselves. Since they have the funds and he does not, they can cut him out altogether. The evidence must therefore be presented with some crucial information withheld.

The success of the solution may also depend on the effort supplied by the entrepreneur after the funds have been made available. To provide a suitable material incentive, the backers may insist that the entrepreneur place some of his own personal wealth “on the line”. It is in this way that the entrepreneur becomes an uncertainty bearer (Knight, 1921).

If the entrepreneur does not have funds of his own then the backers may insist on powers of supervision. In effect, the entrepreneur becomes an employee. He receives a basic salary, and will normally be “incentivised” by bonuses, share-options, or other forms of performance-related pay. His job security may be limited too – if he performs badly then he can be fired from his job.

The fact that an entrepreneur becomes an employee does not imply that his role becomes a purely passive one. In many large companies the directors on the board may each represent a particular “constituency” – such as a particular group of shareholders – and the chairman may be quite independent, leaving the chief executive, who makes the key decisions, as the entrepreneur, even though he is an employee. The board is there to exercise oversight, appoint auditors and to fix the chief executive’s remuneration. Thus, the employee, rather than the owner-employers, takes the key strategic decisions that govern the performance of the firm. The main responsibility of the owners is to decide which chief executive to hire.

Some writers dub the employed entrepreneur an “intrepreneur”. This is quite helpful if it is understood that the intrapreneur is a special type of entrepreneur –

namely an employee – but it can be confusing if it is taken to mean that the intrapreneur is not a proper fully fledged entrepreneur.

The entrepreneur may, however, be reluctant to submit to supervision, or to share authority with outside shareholders. An entrepreneur who values autonomy may confine his backing to family sources. Relatives may interfere less because they trust the entrepreneur more than do other people. In cases where the older generation of the family are lending to a descendent, the entrepreneur is effectively taking a loan against his own inheritance. In the absence of family sources, the entrepreneur may be able to realise other assets – taking a second mortgage on his house (particularly useful if he has obtained capital gains), selling his second car and so on. Apart from this he will have to rely on savings out of income from work.

The Nature of the Entrepreneurial Firm

Intermediation

The flexibility of a private enterprise economy owes much to the individual initiative of the entrepreneur. The decentralisation of initiative is, in turn, promoted by specific institutional arrangements – in particular, *money* and *markets*. *Money* is important because it allows complex multilateral networks of trade to be resolved into separate bilateral arrangements. These are sufficiently loosely coupled that anyone of them can normally be renegotiated without simultaneously changing all the others. *Markets* are important because they facilitate switching between trading partners – switching which can be informed by price comparisons obtained at convenient central places.

In a market economy a good deal of entrepreneurial effort is normally devoted to the problem of improving trading arrangements – i.e., to *reducing transaction costs*. Transaction costs are incurred in seeking out a partner (including advertising), specifying requirements, negotiating terms, transferring title (and exchanging physical custody of goods where appropriate), checking compliance and sanctioning defaulters.

Two transaction cost-reducing strategies are particularly important for the entrepreneurial firm – namely *intermediation* and *internalisation*. Both involve a significant measure of *building trust*.

Intermediation is exemplified by entrepreneurial activity in retailing and commodity broking, which is finely tuned to reducing customer's transaction costs. Reputation is very important to an intermediary. An intermediary with a reputation for integrity can establish a chain of trust between a buyer and seller who do not directly trust each other. The gains from reputation are such that even if the intermediary is not particularly moral, it is in his own interests to maintain any reputation that he has incidentally acquired because of the profit it will yield in the long run. Thus, the customers' collective trust in the intermediary has a self-validating property.

An intermediary with a widespread customer base will also wish to establish a reputation for taking a hard line in negotiations – i.e., quoting a firm price and sticking to it – particularly where low-value items are involved. Otherwise the time costs of negotiation will become prohibitive. Intermediation is particularly entrepreneurial when it involves buying and re-selling goods on own account, rather than simply charging customers a fee, because it affords opportunities for speculation as well.

Some of the inputs into intermediation are of a very specialised nature. Since transactions normally involve the transfer of legal title, lawyers have an important role. Monitoring the timeliness of payment and managing the associated cash-flow problems is the prerogative of accountants. The demand for transaction cost savings therefore creates a derived demand for specialist employees.

The hiring of specialists in turn creates its own transaction cost problems – in particular assessing individual competence, which is very difficult for the layman to do. Professional accreditation, backed by examination and peer group review, has emerged as an important mechanism for guaranteeing quality. It is financed by professional membership fees paid by licensed practitioners out of the economic rents that flow from their accredited status. The employment of qualified professionals is an important feature of large-scale entrepreneurial activity, and the integration of different professions into a harmonious management team is a potential source of problems, which require considerable judgement to resolve.

Internalisation

Internalisation is another important strategy for reducing transaction costs. Internalisation is effected by bringing both the buying and the selling activity under common ownership and control (Coase, 1937). It is most appropriate when there are regular flows of intermediate products between two or more activities in the business sector. Internalisation is particularly useful in a low-trust environment as it eliminates the incentives to haggle and default.

Internalisation of the market in innovative solutions (see Section “Innovation and Arbitrage”) is particularly important for the entrepreneur. An entrepreneur can assure the technical quality of the solution most easily if it is generated by employed inventors working under his supervision. He therefore integrates backwards into R&D. Given the limitations of the patent system, it is often difficult to appropriate rents effectively by delegating exploitation to a licensee. He therefore integrates forward into production too. Economies of scale in transport and in wholesale and retail facilities normally discourage full forward integration into distribution, but nevertheless most entrepreneurs employ their own sales forces to monitor the distribution channel and ensure adequate point-of-sale promotion (Casson, 1990c). Thus, transaction costs are minimised by establishing a firm which embraces several functional areas, rather than by simply arbitraging in an intellectual property market for innovations.

Some ideas have very wide applicability. For example, a knowledge of how low-income households can improve their status by conspicuous consumption of certain types of product may have implications for the marketing of an entire range of mass-produced goods. Such general concepts, exploited through internalisation, can lead the firm to develop a diversified product range. Similarly, concepts which are general in a geographical sense – for example pharmaceutical treatments – can lead to exporting and multinational production.

The Growth of the Firm

Entrepreneurs are often identified as the founders of new firms or as the owner-managers of small and medium-size enterprises (SMEs). Economic principles indicate, however, that entrepreneurship is much broader than this, and encompasses senior management role in long-established large firms. Indeed, a marketing manager in a large firm may take judgemental decisions much more regularly than the founder of an SME, whose exercise of judgement may be confined largely to a one-off decision to work for themselves instead of for someone else.

The frequency with which judgement has to be exercised within a firm is partly a consequence of its size, but is also dependent on the volatility of the environment in which the firm operates. Volatility creates a stream of new problems, and of new opportunities, for the firm. Volatility creates opportunities for the firm when it creates problems for other people that the firm can help them to solve – in other words, when it creates new customers for its products. Problems and opportunities may well occur together. For example, an increase in local raw material prices may create problems for the firm on account of higher costs. On the other hand, higher raw material prices faced by its customers may encourage the customers to invest in new technology to cut down waste, and this may generate new orders for equipment. An entrepreneurial firm is constantly on the look out for opportunities of this kind.

In terms of “resource-based” theories of the firm (Teece & Pisano, 1994), this argument suggests that entrepreneurship is the key resource possessed by the firm. Indeed, much of the literature on resource-based theory can be interpreted as a restatement of propositions in the theory of entrepreneurship with the word “resource” substituted for “entrepreneur”. The greater is the firm’s endowment of entrepreneurship, the higher is the rate of profit it will earn for a given degree of risk, and the faster the firm will grow relative to the average for its industry. Indeed, the theory goes beyond resource-based theories, by highlighting the role of factors such as volatility in driving a wedge between the performance of average firms and the performance of highly entrepreneurial ones. In an industry with high volatility, differences in performance between firms will tend to be wider because differences in entrepreneurial endowments will have a greater impact on profitability and growth.

Inter-Cultural Subjectivity

Culture

Subjectivity has hitherto been discussed as an individualistic phenomenon – as in the Austrian literature (Hayek, 1937; Mises, 1949). But subjectivity can also be collective. Culture may, indeed, be usefully defined (from an economic standpoint) as a collective subjectivity – a shared set of values, norms and beliefs.

Because culture deals with values and beliefs to which everyone in a group conforms, individual members are often not aware of its influence. This in turn means that they are not naturally critical of these beliefs. Some of these beliefs may be quite naive because they are imparted in childhood when people are uncritical anyway. Culture is important both for geographical units, such as the nation or the region, and for organisational units, such as the firm. The discussion below focuses on geographical units first.

Values are reflected in the legitimisation of objectives – for example one culture may see scientific progress as an important collective endeavour, but another may see it as a purely utilitarian exercise. Since different values legitimate different objectives, and different objectives generate different kinds of problem, societies with different cultures will tend to focus on distinctive types of problem-solving. “Learning by doing” is an important aspect of problem-solving, and so learning effects will give each culture a distinctive kind of problem-solving expertise. This may show up in the industrial pattern of comparative advantage between different cultural groups.

Absolute advantage as well as comparative advantage is important to a group. Absolute advantage confers high productivity on the comparatively advantaged sectors, thereby raising the standard of living. A culture that establishes *high norms* will keep group members “on their toes”, and so develop the high-level expertise that underpins absolute advantage of this kind.

Values and norms are also reflected in the relative status accorded to different roles. A culture that promotes *industrial progress effected through structural change* will confer high social status on entrepreneurs. Conversely, a culture that promotes *stability maintained by formal authority* will accord high status to politicians and bureaucrats instead.

It is beliefs about the *social environment*, rather than the *natural environment*, that are of greatest moment for the entrepreneur. Such beliefs can affect the political choice of the economic system within which the entrepreneur has to work. A belief that *only a few people of a certain type are well-informed* tends to support centralised decision-making by the state, as in socialist planned economies, whereas a belief that potentially anyone may be well-informed tends to support decentralisation through private enterprise based on individual property rights. In the centralised state entrepreneurial activity is concentrated on the planners, whereas under private enterprise it is much more widely diffused. In the intermediate case of a “mixed economy”, culture can affect the amount of bureaucratic intervention and market regulation to which private enterprise is subject.

Beliefs about *genetics* can be important too. Non-scientific beliefs may lend support to traditional systems of authority – kingship at the state level, paternalism in the family, etc. Tradition often favours hereditary systems such as primogeniture – which is important to entrepreneurship because it maintains the personal concentration of wealth within family dynasties (see Section “Capital Requirements as an Entry Barrier”). Tradition can also reduce social mobility by discouraging trade or inter-marriage between different classes or castes.

Perhaps the single most important set of beliefs, however, relate to the question of *who can be trusted* (see Section “Intermediation”). When few people can be trusted transaction costs become very high. This affects relations both between firms and within them. Inter-firm relations are undermined because licensors cannot rely on licensees, assemblers cannot rely on subcontractors and *vice versa*. In response to this, internalisation becomes a widespread strategy. Industrial activities get divided up between a small number of large integrated firms.

Unfortunately, however, internalisation encounters its own problems of distrust within the firm. To discourage slacking, complex and intrusive monitoring systems have to be established using a formal hierarchy supported by accountants, work-study specialists and the like.

In a high-trust culture, by contrast, complex interdependencies between firms can be sustained by arm’s length contracts, and within each firm the owner can rely on the loyalty and integrity of employees. One important implication of this is that it is a high-trust culture rather than a low-trust culture that sustains an industrial structure based on a large number of small highly productive firms.

The high-trust culture and the low-trust culture are, of course, the two extremes of a continuous spectrum. In the middle of this spectrum culture influences perception of where exactly trust should be placed. Some authoritarian cultures suggest that subordinates must trust their superiors irrespective of their personal qualities, thereby allowing superiors to exercise moral suasion purely by virtue of their role. Other cultures require superiors to win the respect of their subordinates by “getting along side them” – reducing “power distance” in Hofstede’s (1980) terms. Management is clearly much easier in the first situation than in the second, though arguably good management, when available, can achieve much more in the second situation than in the first.

The Entrepreneur as Leader: Corporate Culture as an Instrument of Strategy

The basic cultural unit is the social group. Each group typically has a leader whose role is to engineer the values and beliefs to which members conform. The firm is the basic social unit in which people work. Although a firm does not necessarily consist of a single entrepreneur, one of the entrepreneurs in any given firm may well be the dominant personality, and this dominant entrepreneur is likely to act as

the leader, and to fashion the corporate culture of the firm. In other words, even if entrepreneurship is not unitary, leadership is.

Where the members of a firm are recruited from similar backgrounds, corporate culture may well “free ride” on national culture, or on values and beliefs inspired by religion or social class. Religions that stress freedom of conscience and the subduing of nature are most likely to sustain entrepreneurship. It is on this basis that Protestantism and Quakerism have been said to promote entrepreneurial behaviour (Kirby, 1984). Furthermore, “middle class” attitudes that endorse social competitiveness, wealth accumulation and upward mobility are more likely to encourage entrepreneurship than “working class” values of conformity and solidarity with fellow employees.

The 1980s has witnessed a surge of interest in corporate culture (Schein, 1985), which has been sustained ever since. The engineering of corporate culture is claimed to hold the key to long-run corporate performance. Much of the analysis has centred on the large enterprise. Since managerial effort, being mental rather than physical, is difficult to monitor, managerial motivation cannot easily be achieved by supervision alone. Moral manipulation may be more effective. By creating a corporate ethic of integrity and dedication, the owner of the firm may encourage employees to punish themselves emotionally for lack of effort. External supervision is replaced by internal monitoring by the individual himself, and from an information-handling point of view this is much more effective (Casson, 1990a).

Moral manipulation thus provides a useful complement to supervision. While supervision is helpful in discouraging gross misconduct, because such misconduct is easily observed, manipulation is valuable in eliciting that extra degree of effort of which only the employee himself is immediately aware. It may be suggested that it is a capacity for moral manipulation that distinguishes the true “business leader” from a mere “entrepreneur”.

The Market for Entrepreneurship

Demand and Supply of Entrepreneurs

The market for entrepreneurship equates demand and supply. The demand for entrepreneurship determines the number and nature of the entrepreneurial roles that need to be filled. Supply factors govern the availability of suitable candidates to fill these roles.

It has been stressed throughout this chapter that the demand for entrepreneurship is highly subjective. This means, first, that the roles created reflect a perceived need for solutions to problems rather than any underlying reality. Second, and more important, it means that some roles may be specifically created by individuals who believe that it is their mission to occupy them. This is typically the situation of the self-employed entrepreneur, who has created his own demand for the role he plays.

The overall intensity of entrepreneurial demand will reflect the level of norms in the population for, as noted in Section “Subjectivity”, high norms generate problems that low norms do not. Coordination problems are particularly intense when there is a perceived need for structural change. Structural change requires a pervasive reallocation of resources from declining industries into growth industries, and generates substantial profit opportunities for the entrepreneur. It is, therefore, amongst a population with high norms that perceives a far-reaching need for structural change that there is likely to be the most intense demand for entrepreneurs.

The supply of entrepreneurs is governed by occupational choice. The options include manual work as well as intellectual work and, within intellectual work, the rule-governed as well as judgemental. Other options include unpaid work – housework, charitable work – and no work at all – unemployment, leisure. It follows that, for a given distribution of entrepreneurial aptitudes, recruitment to entrepreneurship depends upon the entire spectrum of rewards to alternative uses of time.

These rewards may contain a significant non-pecuniary element. These may be a moral element (as in the case of charitable work). Negative moral attitudes to profit-seeking – especially low-level activities such as arbitrage – may inhibit entry into entrepreneurship. The social dimension can be important too. Some roles carry a much higher status than others. Status may be particularly important in choosing between a professional career as a lawyer or accountant or a more broadly based entrepreneurial career.

It has been emphasised that entrepreneurs must continually put their personal judgement to the test, and that in doing so they must also place some of their own resources, and their personal reputation at risk. They must also be able to work in partnership with other risk-bearers too. The supply of entrepreneurs is therefore influenced by the level of confidence, tolerance of stress, moderation of risk-aversion and willingness to share responsibility – all factors which have been mentioned earlier.

Occupational choice will also reflect educational background. Basic education increases the supply of entrepreneurs by inculcating basic literacy and numeracy. Further education has a more ambiguous effect. On the one hand, it can help to refine entrepreneurial judgement – for example, by providing historical awareness of the endemic nature of change – and so increase the rewards to entrepreneurship. On the other hand, it can open up artistic and scientific careers that can entice people away from business.

Early specialisation in education can also reduce entrepreneurship by encouraging people to enter narrowly defined professions instead. Although these professions support entrepreneurial activity indirectly, the support they give is often limited by the inability of complementary specialisms to coordinate with each other under the direction of the entrepreneur (see Section “Intermediation”).

The market for entrepreneurship will tend to adjust to equilibrium through changes in the pecuniary rewards offered to entrepreneurs. These rewards may be in the form of profits for owner-entrepreneurs or salaries for employee-entrepreneurs.

It is, of course, anticipated rather than actual rewards that are important – expected profits may not materialise and even expected salaries may not get paid if the employer goes bankrupt. Because anticipations are liable to change even when there is no change in the underlying situation, the market for entrepreneurs is potentially volatile. The tendency to equilibrium is, therefore, only a fairly weak one in the short run. In the long run the underlying situation too is liable to change, and so the equilibrium to which the market tends is itself a moving target.

Subject to these reservations, though, certain predictions about market behaviour can be deduced using the method of comparative statics. A real resource shock, for example such as a substantial oil price increase, will create a perceived need for structural change, which stimulates the demand for entrepreneurs. Although the initial impact of this may be modified through macroeconomic effects caused by wage and price rigidities, the profit opportunities created by potential substitution possibilities will stimulate entrepreneurial demand in new and growing industries. The anticipated reward to entrepreneurship will rise, and new recruits will be attracted to these industries. While there may be some transfer of entrepreneurs from obsolescing industries, this will be limited by the industry-specificity of many people's skills. Many of the new recruits will therefore be people drawn away from non-entrepreneurial occupations.

The increased pressure on a limited supply of competent entrepreneurs will reduce the average quality of judgement amongst practising entrepreneurs. Thus, while there will be more entrepreneurs earning a higher reward for a given quality of judgement, many new recruits, though earning more than they would in some other occupation, may not earn anywhere near as much as the more able and experienced entrepreneurs.

Entry into entrepreneurship will be effected most smoothly when new recruits have an accurate perception of their own quality of judgement. If they overestimate this quality, however, then too many people of poor quality will enter. Mistakes will be made because of poor judgement – and as expectations fail to be realised, confidence will be undermined and entrepreneurs will withdraw from the industry in an atmosphere of crisis. In certain cases the effect may be severe enough to precipitate a macroeconomic recession (Schumpeter, 1939).

A similar analysis can be provided for shifts in supply. This shows, for example, that a shift to greater breadth in further education, by stimulating entrepreneurial supply, will lead to a greater number of people entering business because their potential productivity in more specialised work has been reduced. This will lead to greater entrepreneurial activity, but lower anticipated rewards for each entrepreneur because of greater competition between them.

Because state education is subject to government policy shifts, a public perception of rising demand for entrepreneurs may indirectly induce an increase in supply. Because the supply response refers to a flow of newly trained entrants, however, it will take a long time to impact significantly on the total stock of entrepreneurs. By the time the supply effect works through, demand may have changed, and so this lagged response may generate a "cobweb" cycle in the market for entrepreneurs.

The Role of Financial Institutions

The preceding analysis was silent on the crucial question of how exactly the market for entrepreneurs adjusts towards an equilibrium. It followed a long tradition amongst economists of fudging this issue. According to Adam Smith (1776), the market works through an “invisible hand” – a concept which later economists attempted to formalise in terms of the hypothetical Walrasian auctioneer. Austrian economists have rightly criticised the Walrasian notion and stressed that the market is a process. They emphasise the decentralised nature of the process, and tend to suggest that the market generally “gets it right”.

The view that the market gets it right is dubious, however. Few markets get it right in the short run, and there are special reasons for believing that the market for entrepreneurs is one of the least efficient in the economy. While entrepreneurial activity may well improve the functioning of other markets, it has only a limited impact on the market for entrepreneurs itself.

One reason is that – like other labour markets – the market for entrepreneurs is a market in people and, in the absence of slavery – or transferable long-term employment contracts generally – opportunities for intermediators to arbitrage are limited. The main potential for arbitrage lies in identifying able entrepreneurs who are in the wrong job and offering them the right job for only a little additional pay. If the entrepreneur is loyal to his new employer he may refrain from demanding increased pay and so allow the employer to retain the arbitrage profit generated by his “headhunting” activity. There is only limited scope for exploiting this approach, however, because of the problem of adverse selection – those who are most easily enticed to quit their present job are likely to turn out to be disloyal in the future.

Another problem with the market is that it is difficult to screen accurately for entrepreneurial qualities. Indeed, until recently, the backward state of entrepreneurial theory has meant that it was not even clear what the desirable qualities were.

Because of these difficulties, intermediation in the market is confined mainly to the activities of financial institutions. There are grounds for believing that these institutions may systematically select inappropriate people for entrepreneurial roles. Key decisions are concentrated in the hands of a few institutions operating behind substantial barriers to entry, and the decisions of these institutions may well reflect shared – and possibly inaccurate – culturally specific values.

Pension funds are major shareholders in large corporations and can influence the selection of chief executives, while clearing banks and venture capitalists can regulate start-ups by potential self-employed entrepreneurs through their procedures for approving loan applications. The agglomeration of financial decision-makers in major financial centres (see Section “The Spatial Dimension”) facilitates the formation of a distinctive culture based on frequent social interaction between them. This culture may involve stereotypes of other social groups, which influences financiers’ decisions whether to place financial resources under the control of members of

particular groups. An inappropriate financial culture can therefore undermine performance at the micro-level even though at the macro-level the underlying demand and supply conditions are favourable.

If true, this proposition has important implications for economic performance. It suggests that good economic performance is not just the consequence of an intense demand for entrepreneurship driven by high norms, and sourced by an abundant supply of able entrepreneurs, but also depends on the micro-level efficiency with which individual entrepreneurs are matched to particular roles. Are potentially good entrepreneurs overlooked and incompetents appointed in their place? Are entrepreneurs who would be good at managing innovation in high-growth consumer product industries mismatched to jobs managing complexity in mature process industries, and *vice versa*? Are young entrepreneurs who lack experience promoted too soon to positions of responsibility, and are old entrepreneurs allowed to stay on when they should be retired?

An economy that has a good supply of entrepreneurs, but serious inefficiencies in the domestic market for entrepreneurs, may find that entrepreneurs emigrate to exploit opportunities overseas. In addition, foreign capital may enter the country to employ the able entrepreneurs that domestic institutions are unwilling to support. Thus, international migration and capital flows may emerge to compensate (partially) for the inefficiencies of the domestic market.

The Spatial Dimension

The division of labour has an important spatial dimension. This applies both to the physical division of labour in production and to the mental division of labour in problem-solving. It is the spatial division of labour in problem-solving that holds the greatest significance for the location of entrepreneurial activity.

Economies of internalisation mean that in a global economy many production plants are branch plants owned by multinational firms. The headquarters of these firms are drawn to large financial centres because of the importance to managers of face-to-face contact with financiers and professional specialists such as international lawyers, tax advisers, and so on. Access to government for lobbying, and to major corporate clients for marketing intermediate goods, may also be important. The agglomeration of headquarters activities around major financial centres means that most high-level judgemental decisions will be taken by people living within commuting distance of such centres. Only lower-level decisions will be taken elsewhere.

The most important centres may become international service centres, and play an important role in cross-cultural communication. Merchants, bankers and businessmen from different cultures meet there to make contracts. For a city to achieve the status of an international service centre the local culture must support religious

and ethnic toleration. Respect for business confidentiality, and impartiality in the legal enforcement of contracts, are important too.

Such centres are attractive to frustrated foreign entrepreneurs who cannot get backing from their own domestic financiers. They are also attractive to exiles. At any one time, civil wars and persecutions create refugees who need to re-establish their culture overseas. Exiled people, though dispersed, often maintain contact amongst themselves, creating channels of international communication along which commercial as well as personal and domestic information can flow. These channels are particularly well-adapted to developing the international trade of an entrepôt, and to speculation and arbitrage in international financial markets.

Certain exile groups – “wandering Jews”, “sojourning Chinese” and so on – have very strong business-oriented cultures which can survive persecution and take root in new locations. The creative intellectual tension generated by the arrival of these groups can transmit – through parental influence and schooling – a strongly entrepreneurial culture to the next generation of both indigenous and immigrant people. In this way the international service centre may be able to maintain its economic base even though the original rationale – such as port activity – goes into decline as a result of the geographical restructuring of trade.

The Life Cycle of the Entrepreneur

The co-existence, within the division of labour, of high and low-level problems is important for the career structure of the entrepreneur. High-level problem-solving typically requires a broader range of relevant experience and hence calls for older people to take it on. These people should have “spiralled upwards” in their careers through a variety of more functionally specialised roles. Senior professionals who have remained within the same functional area all their life are not well-suited to these roles. They may be important as advisors to the high-level entrepreneurs (as noted above), but are not capable of filling the roles themselves.

Those who occupy high-level roles also require personal skills to elicit relevant information from delegates. They need team-building skills to handle their subordinates, and an extensive network of contacts to allow them to access a wide variety of consultants. This suggests that the successful high-level entrepreneur will typically have followed a career path, which begins with a fairly routine functionally specialised role (“learning the business” in his twenties) and switches to a more responsible innovative role (in his 30s). This role, as it expands, gives him team-building experience and brings him into contact with a wider group of people. He can then move, in his forties, to a leadership role – acting as an exemplar to an increasing number of subordinates and representing his organisation to other institutions. He can retain this role until it becomes increasingly symbolic rather than executive (in his 60s). Finally, he retires and functions purely as an “elder statesman” of business in a consultative and counselling capacity.

In exceptional circumstances the entrepreneur's responsibilities may grow along with the firm he has founded, so that his career development is also the biography of the firm. More usually, though, where high-level entrepreneurs are concerned, he will have acquired his initial experience of the industry as an employee of a large firm. In some cases he may remain with this firm throughout his career. In other cases he may quit to found his own business at the innovative stage of his career. When the innovation becomes successful, and the scale of operations grows, the entrepreneur may then sell out to a larger firm in return for a seat on the board, and pursue his rise to the top by internal promotion at board level. On this analysis, those most likely to reach the top are people who are willing, when necessary, not merely to share responsibility with, but even to subordinate themselves to others, and are willing to move geographically around production locations to learn the business and then transfer to the metropolis to take up a high-level post. The most successful entrepreneur, therefore, is unlikely to be the ruggedly independent self-employed individual of popular myth.

Summary

The preceding analysis has used a fairly conventional economic methodology to generate an unconventional synthesis of insights derived from various social sciences. The entrepreneur has been defined as someone who specialises in judgemental decision-making. Judgement is required in finding urgent solutions to novel, complex and ambiguous problems. Within a private enterprise economy, specialisation is normally effected in two distinct stages. First, problems are decomposed and allocated to separate ownership units. The coordination of problem-solving between ownership units is then coordinated by the market mechanism. Further decomposition of problems can then be effected within the ownership unit if desired.

The firm itself is an institutional product of the first stage of the specialisation process. It takes over from consumers the problem of finding solutions to common household problems. It takes over from wealth-holders the problem of how to manage the resources they own. It takes over from workers the problem of how to organise themselves as a team. The second stage of specialisation is exemplified by the delegation of decisions to functional roles within the firm. Because delegates can enjoy considerable discretion, entrepreneurship is not necessarily confined to the owner or chief executive of the firm. The entrepreneurial firm is an opportunity-seeking information system, geared to identifying profit opportunities, based on solving other people's problems, and to setting up administrative systems to exploit these opportunities in an efficient way. It is also a problem-solving system, employing professional specialists to tackle its own internal coordination problems as and when they occur. New problems and opportunities continually arise with a frequency that reflects the underlying volatility of the firm's environment.

Innovation is a very judgement-intensive activity – particularly where infrastructure investments are concerned. Arbitrage and speculation require a rather

different kind of judgement, since they are concerned, not with the management of resources, but merely with the transfer of resources between one ownership unit and another. Internalisation economies explain why innovation leads to managerial involvement – problems of insecure intellectual property rights and difficulties in quality control encourage backward integration into technical research and forward integration into production.

The demand for entrepreneurship is partly created by entrepreneurs themselves who perceive opportunities that they believe they are personally well-equipped to exploit. A culture that emphasises high norms will stimulate this perceptual process. Another source of demand arises from people who perceive a need for economic restructuring, but who wish to hire entrepreneurs to take decisions on their behalf. While the first source of demand leads to self-employment, the second source leads to the recruitment of entrepreneurial employees.

The supply of entrepreneurs depends upon natural abilities, the nature of the educational system (in particular the degree of specialisation) and the relative status of entrepreneurial careers. Demographic factors are important because few entrepreneurs acquire the breadth of experience needed for high-level entrepreneurship until early middle age.

Entrepreneurial rewards, in the form of profits for the self-employed or salaries for employees, tend to adjust to balance overall supply and demand. Adjustment is subject to substantial disequilibrium fluctuation, however, because it is anticipated rewards rather than real rewards to which supply and demand respond. Inefficiencies are even more serious where the matching of people to specific roles is concerned. Thus, consumer product industries may require individuals who can take urgent and novel decisions of a fairly simple kind, while mature process industries may require people who can cope with complexity instead. Because it is difficult to screen for the necessary qualities, suitable placements can often be found only by trial and error.

The matching process is typically intermediated by financial institutions. Cultural stereotyping may result in group affiliation being used as a surrogate for personal qualities in deciding whether entrepreneurs are to receive financial backing. If the financial community has its own culture, then the stereotyping may merely reflect one culture's views of other cultures, and the outcome of the process may be quite poor.

Financial institutions tend to agglomerate around international financial centres, which then compete to attract business from entrepreneurs. Any centre needs a culture of tolerance and impartiality. It also needs a culture that employs stereotypes, which are realistic – or ideally with personal information that is so good that stereotyping is not required.

The international competitiveness of an economy will depend crucially on entrepreneurial factors. The norms and values of the domestic culture will determine the types of problems that are researched, and hence the industrial structure of the expertise that is developed. This expertise can be exploited internationally through either exporting, licensing or foreign direct investment. Education policy and the social ranking of occupations will govern the supply of indigenous entrepreneurs, while toleration and impartiality will govern the supply of immigrant entrepreneurs.

A combination of buoyant demand, abundant supply and efficient matching will sustain international competitive advantage through entrepreneurship.

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Chapter 11

Knowledge Spillover Entrepreneurship

Zoltan J. Acs and David B. Audretsch

Introduction

Just as the economy has been besieged by a wave of technological change that has left virtually no sector of the economy untouched, scientific understanding of the innovative process—that is, the manner by which firms innovate, and the impact such technological change has on enterprises and markets—has also undergone a revolution, which, although somewhat quieter, has been no less fundamental. Well into the 1970s, a conventional wisdom about the nature of technological change generally pervaded. This conventional wisdom had been shaped largely by scholars such as Alfred Chandler (1977), Joseph Schumpeter (1942), and John Kenneth Galbraith (1956) who convinced a generation of scholars and policymakers that innovation and technological change lay in the domain of large corporations and that small business would fade away as the victim of its own inefficiencies.

At the heart of this conventional wisdom was the belief that monolithic enterprises exploiting market power drove the engine of innovative activity. Schumpeter closed the debate with his 1942 (p. 106) proclamation that, “What we have got to accept is that (the large-scale establishment) has come to be the most powerful engine of progress.” Galbraith (1956, 86) echoed Schumpeter’s sentiment: “There is no more pleasant fiction than that technological change is the product of the matchless ingenuity of the small man forced by competition to employ his wits to better his neighbor. Unhappily, it is a fiction.”

At the same time, the conventional wisdom about small and new firms was that they were burdened with a size inherent handicap in terms of innovative activity. Because they had a deficit of resources required generating and commercializing ideas, this conventional wisdom viewed small enterprises as being largely outside of the domain of innovative activity and technological change. Thus, even after

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David Birch (1981) revealed the startling findings from his study that small firms provided the engine of job creation for in the United States, most scholars still assumed that, while small businesses may create the bulk of new jobs, innovation and technological change remained beyond their sphere.

While this conventional wisdom about the singular role played by large enterprises with market power prevailed during the first three decades subsequent to the close of the World War II, more recently a wave of new studies has challenged this conventional wisdom. Most importantly, these studies have identified a much wider spectrum of enterprises contributing to innovative activity, that, in particular, small entrepreneurial firms were as important as the large established incumbents for innovation and process of technological change. Taken together, these studies comprise a new understanding about the links between entrepreneurship, firm size, and innovative activity. An important question raised by the “new learning” was, “Where do small innovative firms get the knowledge to innovate?” This subject has now become broadly known as knowledge spillover entrepreneurship.

The purpose of this chapter is to identify this new understanding about the role that entrepreneurship and small firms play as a conduit for the spillover of knowledge from the incumbent organization creating that knowledge to a new organization where that knowledge is commercialized through innovative activity (Agarwal et al 2007; Plummer et al., 2010). This chapter begins with the most prevalent theory about innovation and technological change—the model of the knowledge production function. Just as the conventional wisdom was shaped largely by the available empirical data and analyses, so it is with the newer view. Thus, in the following section of this chapter, issues arising when trying to measure innovative activity are discussed.

The debate and the evidence regarding the relationship between innovative activity and firm size are examined in the third section. In the fourth section, the impact that the external industry environment exerts on technological change is identified. The role that knowledge spillovers and geographic location plays in innovative activity is explained in the fifth section. The sixth section presents the Knowledge Spillover Theory of Entrepreneurship, which explains why entrepreneurship, in the form of starting a new firm, is a key organizational structure for innovation and growth.

Finally, a summary and conclusions are provided in the last section. A key finding is that the conventional wisdom regarding the process of innovation technological change is generally inconsistent with the new understanding about the role of entrepreneurship in innovative activity. The empirical evidence strongly suggests that small entrepreneurial firms play a key role in generating innovations, at least in certain industries. While the conventional wisdom is derived from the Schumpeterian Hypothesis and assumption that scale economies exist in R&D effort, for which there is considerable empirical evidence, more recent evidence suggests that scale economies bestowed through the geographic proximity facilitated by spatial clusters seems to be more important than those for large enterprises in producing innovative output.

The Knowledge Production Function

The starting for most theories of innovation is the firm (Baldwin & Scott, 1987; Cohen & Levin, 1989; Dosi, 1988; Scherer, 1984, 1991). In such theories the firms are exogenous and their performance in generating technological change is endogenous (Arrow 1962; Cohen & Klepper, 1991, 1992; Scherer, 1984, 1991).

For example, in the most prevalent model found in the literature of technological change, the model of the *knowledge production function*, formalized by Zvi Griliches (1979), firms exist exogenously and then engage in the pursuit of new economic knowledge as an input into the process of generating innovative activity.

The most decisive input in the knowledge production function is new economic knowledge. As Cohen and Klepper conclude, the greatest source generating new economic knowledge is generally considered to be R&D (Cohen & Klepper, 1991, 1992).

When it came to empirical estimation of the knowledge production function, it is clear that measurement issues play a major role. The state of knowledge regarding innovation and technological change has generally been shaped by the nature of the data available to scholars for analyses. Such data have always been incomplete and, at best, represents only a proxy measure reflecting an aspect of the process of technological change. Simon Kuznets observed in 1962 that the greatest obstacle to understanding the economic role of technological change was a clear inability of scholars to measure it. More recently, Cohen and Levin (1989) warned, “A fundamental problem in the study of innovation and technical change in industry is the absence of satisfactory measures of new knowledge and its contribution to technological progress. There exists no measure of innovation that permits readily interpretable cross-industry comparisons (p. 1062).”

Measures of technological change have typically involved one of the three major aspects of the innovative process: (1) a measure of the inputs into the innovative process, such as R&D expenditures, or else the share of the labor force accounted for by employees involved in R&D activities; (2) an intermediate output, such as the number of inventions which have been patented; or (3) a direct measure of innovative output.

These three levels of measuring technological change have not been developed and analyzed simultaneously, but have evolved over time, roughly in the order of their presentation. That is, the first attempts to quantify technological change at all generally involved measuring some aspects of inputs into the innovative process (Grabowski, 1968; Mueller, 1967; Mansfield, 1968; Scherer, 1965a, 1965b, 1967). Measures of R&D inputs—first in terms of employment and later in terms of expenditures—were only introduced on a meaningful basis enabling inter-industry and inter-firm comparisons in the late 1950s and early 1960s.

A clear limitation in using R&D activity, as a proxy measure for technological change, is that R&D reflects only the resources devoted to producing innovative output, but not the amount of innovative activity actually realized. That is, R&D is an input and not an output in the innovation process. In addition, Kleinknecht (1987, 1989), Kleinknecht and Verspagen (1989), and Kleinknecht (1991) systematically

show that R&D measures incorporate only efforts made to generate innovative activity that are undertaken within formal R&D budgets and within formal R&D laboratories. They find that the extent of informal R&D is considerable, particularly in smaller enterprises.¹ And, as Mansfield (1984) points out, not all efforts within a formal R&D laboratory are directed toward generating innovative output in any case. Rather, other types of output, such as imitation and technology transfer, are also common goals in R&D laboratories.

As systematic data measuring the number of inventions patented were made publicly available in the mid-1960s, many scholars interpreted this new measure not only as being superior to R&D but also as reflecting innovative output. In fact, the use of patented inventions is not a measure of innovative output, but is rather a type of intermediate output measure. A patent reflects new technical knowledge, but it does not indicate whether this knowledge has a positive economic value. Only those inventions, which have been successfully introduced in the market, can claim that they are innovations as well. While innovations and inventions are related, they are not identical. The distinction is that an innovation is “. . . a process that begins with an invention, proceeds with the development of the invention, and results in the introduction of a new product, process or service to the marketplace” (Edwards & Gordon, 1984, 1).

Besides the fact that many, if not most, patented inventions do not result in an innovation, a second important limitation of patent measures as an indicator of innovative activity is that they do not capture all of the innovations actually made. In fact, many inventions, which result in innovations, are not patented. The tendency of patented inventions to result in innovations and of innovations to be the result of inventions which were patented combine into what F.M. Scherer (1983a) has termed as the propensity to patent. It is the uncertainty about the stability of the propensity to patent across enterprises and across industries that casts doubt upon the reliability of patent measures.² According to Scherer (1983b, 107–108), “The quantity and quality of industry patenting may depend upon chance, how readily a technology lends itself to patent protection, and business decision-makers’ varying perceptions of how much advantage they will derive from patent rights. Not much of a systematic nature is known about these phenomena, which can be characterized as differences in the propensity to patent.”

Mansfield (1984, 462) has explained why the propensity to patent may vary so much across markets: “The value and cost of individual patents vary enormously within and across industries. . . . Many inventions are not patented. And in some industries, like electronics, there is considerable speculation that the patent system is being bypassed to a greater extent than in the past. Some types of technologies

¹Similar results emphasizing the importance of informal R&D are found by Santarelli and Sterlachinni (1990).

²For example, Shepherd (1979, 40) concludes that, “Patents are a notoriously weak measure. Most of the eighty thousand patents issued each year are worthless and are never used. Still others have negative social value. They are used as ‘blocking’ patents to stop innovation, or they simply are developed to keep competition out.”

are more likely to be patented than others.” The implications are that comparisons between enterprises and across industries may be misleading. According to Cohen and Levin (1989), “There are significant problems with patent counts as a measure of innovation, some of which affect both within-industry and between-industry comparisons (p. 1063).”

Thus, even as new and superior sources of patent data have been introduced, such as the new measure of patented inventions from the computerization by the US Patent Office (Hall et al., 1986; Jaffe, 1986; Pakes & Griliches, 1980, 1984) as well as in Europe (Greif, 1989; Greif & Potkowik, 1990; Schwalbach & Zimmermann, 1991), the reliability of these data as measures of innovative activity has been severely challenged. For example, Pakes and Griliches (1980, 378) warn that “patents are a flawed measure (of innovative output); particularly since not all new innovations are patented and since patents differ greatly in their economic impact.” And in addressing the question, “Patents as indicators of what?,” Griliches (1990, 1669) concludes that, “Ideally, we might hope that patent statistics would provide a measure of the (innovative) output . . . The reality, however, is very far from it. The dream of getting hold of an output indicator of inventive activity is one of the strong motivating forces for economic research in this area.”³

It was well into the 1970s before systematic attempts were made to provide a direct measure of the innovative output. Thus, it should be emphasized that the conventional wisdom regarding innovation and technological change was based primarily upon the evidence derived from analyzing R&D data, which essentially measure inputs into the process of technological change, and patented inventions, which are a measure of intermediate output at best.

The first serious attempt to directly measure innovative output was by the Gellman Research Associates (1976) for the National Science Foundation. Gellman identified 500 major innovations introduced into the market between 1953 and 1973 in the United States, the United Kingdom, Japan, West Germany, France, and Canada. The database was compiled by an international panel of experts, who identified those innovations representing the “most significant new industrial products and processes, in terms of their technological importance and economic and social impact” (National Science Board, 1975, 100).

A second and comparable database once again involved the Gellman Research Associates (1982), this time for the US Small Business Administration. In the second study, Gellman compiled a total of 635 US innovations, including 45 from the earlier study for the National Science Foundation. The additional 590 innovations

³Chakrabarti and Halperin (1990) use a fairly standard source of data for US patents issued by the US Office of Patents and Trademarks, the BRS/PATSEARCH online database, to identify the number of inventions patented by over 470 enterprises between 1975 and 1986. Of particular interest is their comparison between the propensity of firms to patent and company R&D expenditures, and a measure not often found in the economics literature the number of published papers and publications contributed by employees of each firm. Not only do they bring together data from a number of rich sources, but they also compare how the relationships between the various measures of innovative activity vary across firm size.

were selected from 14 industry trade journals for the period 1970–1979. About 43% of the sample was selected from the award winning innovations described in the *Industrial Research & Development* magazine.

The third data source attempting to directly measure innovation activity was compiled at the Science Policy Research Unit (SPRU) at the University of Sussex in the United Kingdom.⁴ The SPRU data consist of a survey of 4,378 innovations identified over a period of 15 years. The survey was compiled by writing to experts in each industry and requesting them to identify “significant technical innovations that had been successfully commercialized in the United Kingdom since 1945, and to name the firm responsible” (Pavitt et al., 1987, 299).

Perhaps the most ambitious major database providing a direct measure of innovative activity is the US Small Business Administration’s Innovation Database (SBIDB). The database consists of 8,074 innovations commercially introduced in the United States in 1982. A private firm, The Futures Group, compiled the data and performed quality-control analyses for the US Small Business Administration by examining over 100 technology, engineering, and trade journals, spanning every industry in manufacturing. From the sections in each trade journal listing innovations and new products, a database consisting of the innovations by four-digit standard industrial classification (SIC) industries was formed.⁵ These data were implemented by Acs and Audretsch (1987, 1988, 1990) to analyze the relationships between firm size and technological change, and market structure and technological change, where a direct rather than indirect measure of innovative activity is used.

In their 1990 study (Chap. 2), Acs and Audretsch directly compare these four databases directly measuring innovative activity and find that they generally provide similar qualitative results. For example, while the Gellman database identified small firms as contributing 2.45 times more innovations per employee than do large firms, the US Small Business Administration’s Innovation Database finds that small firms introduce 2.38 more innovations per employee than do their larger counterparts. In general, these four databases reveal similar patterns with respect to the distribution of innovations across manufacturing industries and between large and small enterprises. These similarities emerge, despite the obviously different methods used to compile the data, especially in terms of sampling and standard of significance.

Just as for the more traditional measures of technological change, there are also certain limitations associated with the direct measure of innovative activity. In fact, one of the main qualifications is common among all three measures—the implicit assumption of homogeneity of units. That is, just as it is implicitly assumed that each dollar of R&D makes the same contribution to technological change, and that each invention, which is patented, is equally valuable, the output

⁴The SPRU innovation data are explained in considerable detail in Pavitt et al. (1987) and Rothwell (1989).

⁵A detailed description of the US Small Business Administration’s Innovation Database can be found in Chap. 2 of Acs and Audretsch (1990).

measure implicitly assumes that innovations are of equal importance.⁶ As Cohen and Levin (1989) observe, “In most studies, process innovation is not distinguished from product innovation; basic and applied research are not distinguished from development (p. 1066).” Thus, the increase in the firm’s market value resulting from each innovation, dollar expended on R&D, and patent, is implicitly assumed to be homogeneous—an assumption which clearly violates real-world observation.

In order to at least approximate the market value associated with innovative activity, FitzRoy and Kraft (1990, 1991) follow the example of Pakes (1985), Connolly et al. (1986), and Connolly and Hirschey (1984). Based on data for 57 West German firms in the metalworking sector, FitzRoy and Kraft (1990, 1991) measure innovation as the “proportion of sales consisting of products introduced within the last five years.” Presumably, the greater the market value of a given product innovation, the higher would be the proportion of sales accounted for by new products.

Similarly, Graf von der Schulenburg and Wagner (1991, 1992) are able to provide one of the first applications of a direct measure of innovative activity in West Germany. Their measure is from the IFO Institute and is defined as the “percentage of shipments of those products which were introduced recently into the market and are still in the entry phase.”⁷ Like the measure of innovative activity used by FitzRoy and Kraft (1990, 1991), the Graf von der Schulenburg and Wagner measure reflects the market value of the innovation and therefore attempts to overcome one of the major weaknesses in most of the other direct and indirect measures of innovative activity.

The knowledge production function has been found to hold most strongly at broader levels of aggregation. The most innovative countries are those with the greatest investments to R&D. Little innovative output is associated with less-developed countries, which are characterized by a paucity of production of new economic knowledge. Similarly, the most innovative industries also tend to be characterized by considerable investments in R&D and new economic knowledge. Not only are industries such as computers, pharmaceuticals, and instruments high in R&D inputs that generate new economic knowledge, but also in terms of innovative outputs (Audretsch, 1995). By contrast, industries with little R&D, such as wood products, textiles, and paper, also tend to produce only a negligible amount of innovative output. Thus, the knowledge production model linking knowledge generating inputs to outputs certainly holds at the more aggregated levels of economic activity.

Where the relationship becomes less compelling is at the disaggregated microeconomic level of the enterprise, establishment, or even line of business. For example, While Acs and Audretsch (1990) found that the simple correlation between R&D

⁶It should be emphasized, however, that Acs and Audretsch (1990, Chap. 2) perform a careful analysis of the significance of the innovations based on four broad categories ranking the importance of each innovation.

⁷The database used by Graf von der Schulenburg and Wagner (1991) is the IFO Innovations-Test and is explained in greater detail in Oppenlander (1990) and Konig and Zimmermann (1986).

inputs and innovative output was 0.84 for four-digit standard industrial classification (SIC) manufacturing industries in the United States, it was only about half, 0.40 among the largest US corporations.

The model of the knowledge production function becomes even less compelling in view of the recent wave of studies revealing that small enterprises serve as the engine of innovative activity in certain industries. These results are startling, because as Scherer (1991) observes, the bulk of industrial R&D is undertaken in the largest corporations; small enterprises account only for a minor share of R&D inputs.

The Role of Firm Size

At the heart of the conventional wisdom has been the belief that large enterprises able to exploit at least some market power are the engine of technological change. This view dates back at least to Schumpeter, who in *Capitalism, Socialism and Democracy* (1942, 101) argues that, "The monopolist firm will generate a larger supply of innovations because there are advantages which, though not strictly unattainable on the competitive level of enterprise, are as a matter of fact secured only on the monopoly level." The Schumpeterian thesis, then, is that large enterprises are uniquely endowed to exploit innovative opportunities. That is, market dominance is a prerequisite to undertaking the risks and uncertainties associated with innovation. It is the possibility of acquiring quasi-rents that serves as the catalyst for large-firm innovation.

Five factors favoring the innovative advantage of large enterprises are identified in the literature. First is the argument that innovative activity requires a high fixed cost. As Comanor (1967) observes, R&D typically involves a "lumpy" process that yields scale economies. Similarly, Galbraith (1956, 87) argues, "Because development is costly, it follows that it can be carried on only by a firm that has the resources which are associated with considerable size."

Second, only firms that are large enough to attain at least temporary market power will choose innovation as a means for maximization (Kamien & Schwartz, 1975). This is because the ability of firms to appropriate the economic returns accruing from R&D and other knowledge-generating investments is directly related to the extent of that enterprise's market power (Cohen & Klepper, 1990, 1991; Cohen et al., 1987; Levin et al., 1985, 1987). Third, R&D is a risky investment; small firms engaging in R&D make themselves vulnerable by investing a large proportion of their resources in a single project. However, their larger counterparts can reduce the risk accompanying innovation through diversification into simultaneous research projects. The larger firm is also more likely to find an economic application of the uncertain outcomes resulting from innovative activity (Nelson, 1959).

Fourth, scale economies in production may also provide scope economies for R&D. Scherer (1991) notes that economies of scale in promotion and in distribution facilitate the penetration of new products, thus enabling larger firms to enjoy a

greater profit potential from innovation. Finally, an innovation yielding cost reductions of a given percentage results in higher profit margins for larger firms than for smaller firms.

There is also substantial evidence that technological change—or rather, one aspect of technological change reflected by one of the three measures discussed in the previous section, R&D—is, in fact, positively related to firm size.⁸ The plethora of empirical studies relating R&D to firm size is most thoroughly reviewed in Acs and Audretsch (1990, Chap. 3), Baldwin and Scott (1987), and Cohen and Levin (1989). The empirical evidence generally seems to confirm Scherer's (1982, 234–235) conclusion that the results “tilt on the side of supporting the Schumpeterian Hypothesis that size is conducive to vigorous conduct of R&D.”

In one of the most important studies, Scherer (1984) used the US Federal Trade Commission's Line of Business Data to estimate the elasticity of R&D spending with respect to firm sales for 196 industries. He found evidence of increasing returns to scale (an elasticity exceeding unity) for about 20% of the industries, constant returns to scale for a little less than three-quarters of the industries, and diminishing returns (an elasticity less than unity) in less than 10% of the industries. These results were consistent with the findings of Soete (1979) that R&D intensity increases along with firm size, at least for a sample of the largest US corporations.

While the Scherer (1984) and Soete (1979) studies were restricted to relatively large enterprises, Bound et al. (1984) included a much wider spectrum of firm sizes in their sample of 1,492 firms from the 1976 COMPUSTAT data. They found that R&D increases more than proportionately along with firm size for the smaller firms, but that a fairly linear relationship exists for larger firms. Despite the somewhat more ambiguous findings in still other studies (Comanor, 1967; Mansfield, 1981, 1983; Mansfield et al., 1982), the empirical evidence seems to generally support the Schumpeterian hypothesis that research effort is positively associated with firm size.

The studies relating patents to firm size are considerably less ambiguous. Here the findings unequivocally suggest that “the evidence leans weakly against the Schumpeterian conjecture that the largest sellers are especially fecund sources of patented inventions” (Scherer, 1982, 235). In one of the most important studies, Scherer (1965b) used the Fortune annual survey of the 500 largest US industrial corporations. He related the 1955 firm sales to the number of patents in 1959 for 448 firms. Scherer found that the number of patented inventions increases less than proportionately along with firm size. Scherer's results are confirmed by Bound et al. (1984) in the study mentioned above. Basing their study on 2,852 companies and

⁸Fisher and Temin (1973) demonstrated that the Schumpeterian Hypothesis could not be substantiated unless it was established that the elasticity of innovative output with respect to firm size exceeds one. They pointed out that if scale economies in R&D do exist, a firm's size may grow faster than its R&D activities. Kohn and Scott (1982) later showed that if the elasticity of R&D input with respect to firm size is greater than unity, then the elasticity of R&D output with respect to firm size must also be greater than one.

4,553 patenting entities, they determined that the small firms (with less than \$10 million in sales) accounted for 4.3% of the sales from the entire sample, but 5.7% of the patents.

Such results are not limited to the United States. Schwalbach and Zimmermann (1991) find that the propensity to patent is less for the largest firms in West Germany than for the medium-sized enterprises included in their sample.

A number of explanations have emerged why smaller enterprises may, in fact, tend to have an innovative advantage, at least in certain industries. Rothwell (1989) suggests that the factors yielding small firms with the innovative advantage generally emanate from the difference in management structures between large and small firms. For example, Scherer (1991) argues that the bureaucratic organization of large firms is not conducive to undertaking risky R&D. The decision to innovate must survive layers of bureaucratic resistance, where an inertia regarding risk results in a bias against undertaking new projects. However, in the small firm the decision to innovate is made by relatively few people.

Second, innovative activity may flourish the most in environments free of bureaucratic constraints (Link & Bozeman, 1991). That is, a number of small-firm ventures have benefited from the exodus of researchers who felt thwarted by the managerial restraints in a larger firm. Finally, it has been argued that while the larger firms reward the best researchers by promoting them out of research to management positions, the smaller firms place innovative activity at the center of their competitive strategy (Scherer, 1991).

Scherer (1988, 4–5) has summarized the advantages small firms may have in innovative activity:

“Smaller enterprises make their impressive contributions to innovation because of several advantages they possess compared to large-size corporations. One important strength is that they are less bureaucratic, without layers of ‘abominable no-men’ who block daring ventures in a more highly structured organization. Second, and something that is often overlooked, many advances in technology accumulate upon a myriad of detailed inventions involving individual components, materials, and fabrication techniques. The sales possibilities for making such narrow, detailed advances are often too modest to interest giant corporations. An individual entrepreneur’s juices will flow over a new product or process with sales prospects in the millions of dollars per year, whereas few large corporations can work up much excitement over such small fish, nor can they accommodate small ventures easily into their organizational structures. Third, it is easier to sustain a fever pitch of excitement in small organization, where the links between challenges, staff, and potential rewards are tight. ‘All-nighters’ through which tough technical problems are solved expeditiously are common.”

Two other ways that small enterprises can compensate for their lack of R&D is through spillovers and spin-offs. Typically, an employee from an established large corporation, often a scientist or engineer working in a research laboratory, will have an idea for an invention and ultimately for an innovation. Accompanying this potential innovation is an expected net return from the new product. The inventor would expect to be compensated for his/her potential innovation accordingly. If the

company has a different, presumably lower, valuation of the potential innovation, it may decide either not to pursue its development or that it merits a lower level of compensation than that expected by the employee.

In either case, the employee will weigh the alternative of starting his/her own firm. If the gap in the expected return accruing from the potential innovation between the inventor and the corporate decision-maker is sufficiently large, and if the cost of starting a new firm is sufficiently low, the employee may decide to leave the large corporation and establish a new enterprise. Since the knowledge was generated in the established corporation, the new startup is considered to be a spin-off from the existing firm. Such startups typically do not have direct access to a large R&D laboratory. Rather, these small firms succeed in exploiting the knowledge and experience accrued from the R&D laboratories with their previous employers.

The research laboratories of universities provide a source of innovation-generating knowledge that is available to private enterprises for commercial exploitation. Jaffe (1989) and Acs, Audretsch, and Feldman (1992), for example, found that the knowledge created in university laboratories “spills over” to contribute to the generation of commercial innovations by private enterprises. Acs, Audretsch, and Feldman (1994) found persuasive evidence that spillovers from university research contribute more to the innovative activity of small firms than to the innovative activity of large corporations. Similarly, Link and Rees (1990) surveyed 209 innovating firms to examine the relationship between firm size and university research. They found that, in fact, large firms are more active in university-based research. However, small- and medium-sized enterprises apparently are better able to exploit their university-based associations and generate innovations. Link and Rees (1990) conclude that, contrary to the conventional wisdom, diseconomies of scale in producing innovations exist in large firms. They attribute these diseconomies of scale to the “inherent bureaucratization process which inhibits both innovative activity and the speed with which new inventions move through the corporate system towards the market” (Link & Rees, 1990, 25).

Thus, just as there are persuasive theories defending the original Schumpeterian Hypothesis that large corporations are a prerequisite for technological change, there are also substantial theories predicting that small enterprises should have the innovative advantage, at least in certain industries. As described above, the empirical evidence based on the input measure of technological change, R&D, tilts decidedly in favor of the Schumpeterian Hypothesis. However, as also described above, the empirical results are somewhat more ambiguous for the measure of intermediate output—the number of patented inventions. It was not until direct measures of innovative output became available that the full picture of the process of technological change could be obtained.

Using this new measure of innovative output from the US Small Business Administration’s Innovation Data Base, Acs and Audretsch (1990) show that, in fact, the most innovative US firms are large corporations. Further, the most innovative American corporations also tended to have large R&D laboratories and be

R&D intensive. At first glance, these findings based on direct measures of innovative activity seem to confirm the conventional wisdom. However, in the most innovative four-digit standard industrial classification (SIC) industries, large firms, defined as enterprises with at least 500 employees, contributed more innovations in some instances, while in other industries small firms produced more innovations. For example, in computers and process control instruments small firms contributed the bulk of the innovations. By contrast in the pharmaceutical preparation and aircraft industries the large firms were much more innovative.

Probably their best measure of innovative activity is the total innovation rate, which is defined as the total number of innovations per 1,000 employees in each industry. The large-firm innovation rate is defined as the number of innovations made by firms with at least 500 employees, divided by the number of employees (thousands) in large firms. The small-firm innovation rate is analogously defined as the number of innovations contributed by firms with fewer than 500 employees, divided by the number of employees (thousands) in small firms.

The innovation rates, or the number of innovations per thousand employees, have the advantage in that they measure large- and small-firm innovative activity relative to the presence of large and small firms in any given industry. That is, in making a direct comparison between large- and small-firm innovative activity, the absolute number of innovations contributed by large firms and small enterprises is somewhat misleading, since these measures are not standardized by the relative presence of large and small firms in each industry. When a direct comparison is made between the innovative activity of large and small firms, the innovation rates are presumably a more reliable measure of innovative intensity because they are weighted by the relative presence of small and large enterprises in any given industry. Thus, while large firms in manufacturing introduced 2,445 innovations in 1982, and small firms contributed slightly fewer, 1,954, small-firm employment was only half as great as large-firm employment, yielding an average small-firm innovation rate in manufacturing of 0.309, compared to a large-firm innovation rate of 0.202 (Acs & Audretsch, 1988, 1990).

The most important and careful study to date documenting the role of German SMEs (enterprises with fewer than 500 employees) in innovative activity was undertaken by a team of researchers at the Zentrum fuer Europaeische Wirtschaftsforschung (ZEW) led by Dietmar Harhoff and Georg Licht (1996). They analyzed the findings made possible by the Mannheim Innovation Data Base. This database measures the extent of innovative activity in German firms between 1990 and 1992. Harhoff and Licht (1996) use the database to identify that 12% of the research and development expenditures in (West) German firms comes from SMEs (defined as having fewer than 500 employees).

Harhoff and Licht show that the likelihood of a firm not innovating decreases with firm size. For example, 52% of firms with fewer than 50 employees were not innovative. By contrast, only 15% of the firms with at least 1,000 employees were not innovative. More striking is that the smallest firms that do innovate have a greater propensity to be innovative without undertaking formal research and development. While only 3% of the largest corporations in Germany are innovative

without undertaking formal R&D, one-quarter of the innovative firms with fewer than 50 employees are innovative without formal R&D.

The study also shows that even fewer SMEs in the five new German Länder are innovative than is the case in former West German Länder. Over two thirds of the smallest SMEs in East Germany are not innovative, and they are less than half as likely to undertake R&D as Western counterparts are.

Systematic empirical evidence also suggests that considerable barriers confront the German Mittelstand to innovative activity. Beise and Licht (1996) analyzed the *Mannheimer Innovationspanel* consisting of 43,300 innovating firms to identify the main barriers to innovative activity confronting German small- and medium-sized enterprises. The major barrier to innovation listed in both 1992 and 1994 was too high of a gestation period required for innovative activity. In 1994 nearly 60% of German SMEs reported that too long of a high gestation period required to innovate was a very important barrier to innovative activity. Other major barriers to innovative activity include legal restrictions and restrictive government policies, too long of duration required to obtain government approval for a new product, a shortage of finance capital, a lack of competent employees, and too high of a risk.

Thus, there is considerable evidence suggesting that, in contrast to the findings for R&D inputs and patented inventions, small enterprises apparently play an important generating innovative activity, at least in certain industries. By relating the innovative output of each firm to its size, it is also possible to shed new light on the Schumpeterian Hypothesis. In their 1991a study, Acs and Audretsch find that there is no evidence that increasing returns to R&D expenditures exist in producing innovative output. In fact, with just several exceptions, diminishing returns to R&D are the rule. This study made it possible to resolve the apparent paradox in the literature that R&D inputs increase at more than a proportional rate along with firm size, while the generation of patented inventions does not. That is, while larger firms are observed to undertake a greater effort toward R&D, each additional dollar of R&D is found to yield less in terms of innovative output.

The Industry Context

In comparison to the number of studies investigating the relationship between firm size and technological change, those examining the relationship between innovation and the external industry structure or environment are what Baldwin and Scott (1987, 89) term “miniscule” in number. In fact, the most comprehensive and insightful evidence has been made possible by utilizing the Federal Trade Commission’s Line of Business Data. Using 236 manufacturing industry categories, which are defined at both the three- and four-digit SIC level, Scherer (1983a) found that 1974 company R&D expenditures divided by sales was positively related to the 1974 four-firm concentration ratio. Scherer (1983a, 225) concluded that, “although one cannot be certain, it appears that the advantages a high market share confers in

appropriating R&D benefits provide the most likely explanation of the observed R&D-concentrator associations.”

Scott (1984) also used the FTC Line of Business Survey Data and found the U-shaped relationship between market concentration and R&D. However, when he controlled for the fixed effects for two-digit SIC industries, no significant relationship could be found between concentration and R&D. These results are consistent with a series of studies by Levin et al. (1985, 1987), Levin and Reiss (1984), and Cohen et al. (1987). Using data from a survey of R&D executives in 130 industries, which were matched with FTC Line of Business Industry Groups, Cohen et al. (1987) and Levin et al. (1987) found little support for the contention that industrial concentration is a significant and systematic determinant of R&D effort.

While it has been hypothesized that firms in concentrated industries are better able to capture the rents accruing from an innovation, and therefore have a greater incentive to undertake innovative activity, there are other market structure variables that also influence the ease with which economic rents can be appropriated. For example, Comanor (1967) argued and found that, based on a measure of minimum efficient scale, there is less R&D effort (average number of research personnel divided by total employment) in industries with very low-scale economies. However, he also found that in industries with a high minimum efficient scale, R&D effort was also relatively low. Comanor interpreted his results to suggest that, where entry barriers are relatively low, there is little incentive to innovate, since the entry subsequent to innovation would quickly erode any economic rents. At the same time, in industries with high entry barriers, the absence of potential entry may reduce the incentives to innovate.

Because many studies have generally found positive relationships between market concentration and R&D, and between the extent of barriers to entry and R&D, it would seem that the conventional wisdom built around the Schumpeterian Hypothesis has been confirmed. However, when the direct measure of innovative output is related to market concentration, Acs and Audretsch (1988, 1990) find a pointedly different relationship emerges. In fact, there appears to be unequivocal evidence that concentration exerts a negative influence on the number of innovations being made in an industry.

Acs and Audretsch (1987, 1988, 1990) found that not only does market structure influence the total amount of innovative activity, but also the relative innovative advantage between large and small enterprises. The differences between the innovation rates of large and small firms examined in the previous section can generally be explained by (1) the degree of capital intensity, (2) the extent to which an industry is concentrated, (3) the total innovative intensity, and (4) the extent to which an industry is comprised of small firms. In particular, the relative innovative advantage of large firms tends to be promoted in industries that are capital-intensive, advertising intensive, concentrated, and highly unionized. By contrast, in industries that are highly innovative and composed predominantly of large firms, the relative innovative advantage is held by small enterprises.

The Geographic Context

The evidence revealing small enterprises to be the engine of innovative activity in certain industries, despite an obvious lack of form R&D activities, raises the question about the source of knowledge inputs for small enterprises. The answer emerging from a series of studies (Jaffe, 1989) is from other, third party, firms or research institutions, such as universities. Economic knowledge may *spill over* from the firm or research institution creating it for application by other firms.

That knowledge spills over is seemingly indisputable. However, the geographic range of such knowledge spillovers is greatly contested. In disputing the importance of knowledge externalities in explaining the geographic concentration of economic activity, Krugman (1991) and others do not question the existence or importance of such knowledge spillovers. In fact, they argue that such knowledge externalities are so important and forceful that there is no compelling reason for a geographic boundary to limit the spatial extent of the spillover. According to this line of thinking, the concern is not that knowledge does not spill over but that it should stop spilling over just because it hits a geographic border, such as a city limit, state line, or national boundary.

A recent body of empirical evidence clearly suggests that R&D and other sources of knowledge not only generate externalities, but studies by Audretsch and Feldman (1996), Jaffe (1989), Audretsch and Stephan (1996), Anselin, Varga and Acs (1997, 2000), Acs, Anselin and Varga (2002), and Jaffe, Trajtenberg and Henderson (1993) suggest that such knowledge spillovers tend to be geographically bounded within the region where the new economic knowledge was created. That is, new economic knowledge may spillover but the geographic extent of such knowledge spillovers is limited.

Krugman (1991, 53) has argued that economists should abandon any attempts at measuring knowledge spillovers because “. . .knowledge flows are invisible, they leave no paper trail by which they may be measured and tracked.” But as Jaffe, Trajtenberg and Henderson (1993, 578) point out, “knowledge flows do sometimes leave a paper trail”—in particular in the form of patented inventions and new product introductions.

Studies identifying the extent of knowledge spillovers are based on the knowledge production function. Jaffe (1989) modified the knowledge production function approach to a model specified for spatial and product dimensions:

$$I_{si} = IRD^{\beta_1} * UR_{si}^{\beta_2} * (UR_{si} * GC_{si}^{\beta_3}) * \varepsilon_{si} \quad (11.1)$$

where I is innovative output, IRD is private corporate expenditures on R&D, UR is the research expenditures undertaken at universities, and GC measures the geographic coincidence of university and corporate research. The unit of observation for estimation was at the spatial level, s , a state, and industry level, i . Estimation of

equation (11.1) essentially shifted the knowledge production function from the unit of observation of a firm to that of a geographic unit.

Implicitly contained within the knowledge production function model is the assumption that innovative activity should take place in those regions, s , where the direct knowledge-generating inputs are the greatest, and where knowledge spillovers are the most prevalent. Audretsch and Feldman (1996), Anselin, Acs and Varga (1997 and 2000), and Audretsch and Stephan (1996) link the propensity for innovative activity to cluster together to industry specific characteristics, most notably the relative importance of knowledge spillovers.

The Knowledge Production Function Reconsidered

The model of the knowledge production function becomes even less compelling in view of the evidence documented in Section 3 that entrepreneurial small firms are the engine of innovative activity in some industries, which raises the question, “Where do new and small firms get the innovation producing inputs, that is the knowledge?”

The appropriability problem, or the ability to capture the revenues accruing from investments in new knowledge, confronting the individual may converge with that confronting the firm. Economic agents can and do work for firms, and even if they do not, they can potentially be employed by an incumbent firm. In fact, in a model of perfect information with no agency costs, any positive economies of scale or scope will ensure that the appropriability problems of the firm and individual converge. If an agent has an idea for doing something different than is currently being practiced by the incumbent enterprises—both in terms of a new product or process and in terms of organization—the idea, which can be termed as an innovation, will be presented to the incumbent enterprise. Because of the assumption of perfect knowledge, both the firm and the agent would agree upon the expected value of the innovation. But to the degree that any economies of scale or scope exist, the expected value of implementing the innovation within the incumbent enterprise will exceed that of taking the innovation outside of the incumbent firm to start a new enterprise. Thus, the incumbent firm and the inventor of the idea would be expected to reach a bargain splitting the value added to the firm contributed by the innovation. The payment to the inventor—either in terms of a higher wage or some other means of remuneration—would be bounded between the expected value of the innovation if it implemented by the incumbent enterprise on the upper end, and by the return that the agent could expect to earn if he used it to launch a new enterprise on the lower end.

A different model refocuses the unit of observation away from firms deciding whether to increase their output from a level of zero to some positive amount in a new industry, to individual agents in possession of new knowledge that, due to uncertainty, may or may not have some positive economic value. It is the uncertainty inherent in new economic knowledge, combined with asymmetries between

the agent possessing that knowledge and the decision-making vertical hierarchy of the incumbent organization with respect to its expected value that potentially leads to a gap between the valuation of that knowledge.

Divergences in the expected value regarding new knowledge will, under certain conditions, lead an agent to exercise what Albert O. Hirschman (1970) has termed as *exit* rather than *voice*, and depart from an incumbent enterprise to launch a new firm. But who is right, the departing agents or those agents remaining in the organizational decision-making hierarchy who, by assigning the new idea a relatively low value, have effectively driven the agent with the potential innovation away? *Ex post* the answer may not be too difficult. But given the uncertainty inherent in new knowledge, the answer is anything but trivial a priori.

This initial condition of not just uncertainty, but greater degree of uncertainty vis-à-vis incumbent enterprises in the industry is captured in the theory of firm selection and industry evolution proposed by Boyan Jovanovic (1982). The theory of firm selection is particularly appealing in view of the rather startling size of most new firms. For example, the mean size of more than 11,000 new-firm startups in the manufacturing sector in the United States was found to be fewer than eight workers per firm. While the minimum efficient scale (MES) varies substantially across industries, and even to some degree across various product classes within any given industry, the observed size of most new firms is sufficiently small to ensure that the bulk of new firms will be operating at a suboptimal scale of output. Why would an entrepreneur start a new firm that would immediately be confronted by scale disadvantages?

An implication of the theory of firm selection is that new firms may begin at a small, even suboptimal, scale of output, and then if merited by subsequent performance expand. Those new firms that are successful will grow, whereas those that are not successful will remain small and may ultimately be forced to exit from the industry if they are operating at a suboptimal scale of output.

An important finding of Audretsch (1995), verified in a systematic and comprehensive series of studies contained in the reviews by Caves (1998), Sutton (1997), and Geroski (1995), is that although entry may still occur in industries characterized by a high degree of scale economies, the likelihood of survival is considerably less. People will start new firms in an attempt to appropriate the expected value of their new ideas, or potential innovations, particularly under the entrepreneurial regime. As entrepreneurs gain experience in the market, they learn in at least two ways. First, they discover whether they possess *the right stuff*, in terms of producing goods and offering services for which sufficient demand exists, as well as whether they can produce that good more efficiently than their rivals. Second, they learn whether they can adapt to market conditions as well as to strategies engaged in by rival firms. In terms of the first type of learning, entrepreneurs who discover that they have a viable firm will tend to expand and ultimately survive. But what about those entrepreneurs who discover that they are either not efficient or not offering a product for which there is a viable demand? The answer is, *It depends—on the extent of scale economies as well as on conditions of demand*. The consequences of not being able to grow will depend, to a large degree, on the extent of scale economies. Thus,

in markets with only negligible scale economies, firms have a considerably greater likelihood of survival. However, where scale economies play an important role the consequences of not growing are substantially more severe, as evidenced by a lower likelihood of survival.

What emerges from the new evolutionary theories and empirical evidence on the role of small firms is that markets are in motion, with a lot of new firms entering the industry and a lot of firms exiting out of the industry. The evolutionary view of the process of industry evolution is that new firms typically start at a very small scale of output. They are motivated by the desire to appropriate the expected value of new economic knowledge. But, depending upon the extent of scale economies in the industry, the firm may not be able to remain viable indefinitely at its startup size. Rather, if scale economies are anything other than negligible, the new firm is likely to have to grow to survival. The temporary survival of new firms is presumably supported through the deployment of a strategy of compensating factor differentials that enables the firm to discover whether or not it has a viable product.

The empirical evidence (Caves, 1998; Geroski, 1995; Sutton, 1997) supports such an evolutionary view of the role of new firms in manufacturing, because the post-entry growth of firms that survive tends to be spurred by the extent to which there is a gap between the MES level of output and the size of the firm. However, the likelihood of any particular new firm surviving tends to decrease as this gap increases. Such new suboptimal scale firms are apparently engaged in the selection process. Only those firms offering a viable product that can be produced efficiently will grow and ultimately approach or attain the MES level of output. The remainder will stagnate, and depending upon the severity of the other selection mechanism—the extent of scale economies—may ultimately be forced to exit out of the industry. Thus, the persistence of an asymmetric firm-size distribution biased toward small-scale enterprise reflects the continuing process of the entry of new firms into industries and not necessarily the permanence of such small and suboptimal enterprises over the long run. Although the skewed size distribution of firms persists with remarkable stability over long periods of time, a constant set of small and suboptimal scale firms does not appear to be responsible for this skewed distribution. Rather, by serving as agents of change, entrepreneurial firms provide an essential source of new ideas and experimentation that otherwise would remain untapped in the economy.

Knowledge Spillover Entrepreneurship

The reason why entrepreneurs are needed to create new firms in order to facilitate the spillover of knowledge from the organization creating it, to the new organization actually making the innovation and commercializing that knowledge, is attributable to what Braunerhjelm et al. (2010) term the missing link. These inherent conditions of new knowledge are responsible for the discrepancies in different economic agents' assessments of the potential values of an innovation. Carlsson et al. (2009)

accounts for these discrepancies with what they call the *knowledge filter*. Furman, Porter, and Stern (2002) arrive at a similar idea to the knowledge filter in *national innovative capacity*. This concept draws on Paul Romer's ideas-driven endogenous growth model (1990), the cluster-based theory of national industrial competitive advantage (Porter, 1990), and research on national innovation systems (Nelson, 1993). Acs and Varga (2002) develop an analogous formulation, drawing on the work of Romer (1990), Paul Krugman (1991), and Richard Nelson (1993).

The Knowledge Filter is a subset of institutions that hinder the commercialization of knowledge. The knowledge filter is the gap between new knowledge (K) and what Arrow (1962) referred to as economic knowledge. A greater knowledge filter indicates a more pronounced gap between new knowledge and economic or commercialized knowledge. As the value of any new idea is inherently uncertain and asymmetric, the mean expected value of any new idea will vary across economic agents, and the *variance* will also differ across economic agents. Moreover, the costs of transacting the perspectives of these individuals are often prohibitively high, making it nearly impossible to achieve consensus regarding the value of a new idea. It is the uncertainty inherent in new economic knowledge, combined with asymmetries between the agent possessing that knowledge and the decision-making vertical hierarchy of the incumbent organization with respect to its expected value that potentially leads to a gap in the valuations of that knowledge. A large and compelling literature has documented decision after decision reached at large corporations not to pursue new ideas that ultimately led to valuable innovations and, in some cases, triggered entirely new industries.

It is this knowledge filter that creates a space for entrepreneurship in bringing new innovations to market. In fact, in a model in which there is no knowledge filter and perfect information (with no agency costs), any positive economies of scale or scope would ensure that the appropriability problems of the firm and individual converge, leaving the individual with no need to start a new business. If an agent presents an innovation—a new product, process, or organization—to the incumbent enterprise, the firm (in this world of perfect knowledge) would agree with the agent's expected value of the innovation. To the degree that any economies of scale or scope exist, the expected value of implementing the innovation within the incumbent enterprise would exceed that of taking the innovation outside of the incumbent firm to start a new enterprise. The incumbent firm and the inventor, therefore, would be expected to reach an agreement sharing the value that the innovation would add to the firm. The inventor's share—collected either in a higher wage or some other means of remuneration—would be bounded on the lower end by the return that the agent could expect to earn if he launched a new enterprise for the innovation and on the upper end by the expected value of the innovation if implemented by the incumbent enterprise (Audretsch, 1995). In a world of imperfect information, however, there are inevitably divergences in the expected value of new knowledge. These divergences can impede the spillover of knowledge for commercialization and innovation when neither the incumbent firm nor the inventor pursues the innovation. But these divergences can also inspire the creation of new businesses when the economic agent chooses to leave the firm and start a new business.

As Albert O. Hirschman (1970) explains, an agent will, under certain conditions, exercise what he has termed as *exit* rather than *voice*, and depart from an incumbent enterprise to launch a new firm—a spin-off.

In practice, an innovation spills from a large corporation to a new small business when an employee (typically a scientist or engineer in a research laboratory) conducting research and development work for a large firm comes upon an innovation. When presented with this idea, the knowledge filter suggests that the incumbent firm is unlikely to assign the same expected economic value to the innovation as the employee. If the firm assigns a lower expected economic value to the innovation than the employee, the firm may not be prepared to compensate the employee at the level expected for the work involved in developing the idea, or the firm may choose not to pursue its commercialization at all. Even if there is little divergence in the expected values of the idea, the firm may conclude that the expected value of the new idea is not sufficiently high to warrant its development and commercialization. In these cases, the researchers, or other economic agents inside or outside the firm, may choose to pursue the innovation outside of the firm. Spin-offs are formed when researchers leave the corporation and establish new enterprises to appropriate the value of the knowledge that was undervalued by the corporation. Since the knowledge inducing the decision to start the new firm is generated by investments made by an incumbent firm, the startup serves as the mechanism by which knowledge spills over from the sources producing that knowledge to the (new) organizational form in which that knowledge is actually commercialized.

The *Knowledge Spillover Theory of Entrepreneurship* provides an explanation for an agent's decision to start a new business. In particular, the knowledge spillover theory of entrepreneurship posits that new knowledge created in the context of an incumbent organization but not completely and exhaustively commercialized serves as the source for new opportunities recognized and acted upon by entrepreneurs (Acs et al., 2009; Audretsch, 1995; Braunerhjelm et al., 2010). By starting a new organization, the entrepreneur simultaneously serves as a conduit for the spillover of knowledge from the incumbent organization creating it to the new firm where it is commercialized in the form of innovative activity.

The knowledge spillover theory of entrepreneurship represents a subset of the vast literature addressing the factors that influence the decision to become self-employed, a central question in labor economics (Lazear, 2005). In addition to specialized knowledge in Human capital theory suggests that the valuable knowledge to which research and development employees has access will affect their wage expectations in the present and the future. From this perspective, employees may be willing to accept lower wages because they are also acquiring valuable knowledge as part of their employment. Rosen (1972) and Pakes and Nitzan (1983) develop models of labor mobility that seek to explain how human capital affects an agent's decision about starting a new firm.

Møen (2005) tests both the Rosen (1972) and the Pakes and Nitzan (1983) models using data from Norwegian firms and finds that technical workers in R&D intensive firms pay for the knowledge they accumulate on the job through lower wages early in their careers. They later earn a return on these implicit investments through

higher wages. This finding suggests that potential externalities associated with labor mobility are, at least partially, internalized in the labor market. It also suggests that if the innovation would make the firm a monopolist, the firm will be willing to increase the worker's wages such that the worker will not leave. It will never be profitable for the firm and the scientist to split, in this case, as the rents in a duopoly will always be less than the monopoly rent. The Pakes and Nitzan model predicts that firms are able to avoid worker mobility by sharing the monopoly rents with workers.

The decision to start a new firm also depends on the intellectual property environment. When the intellectual property that results from an incumbent firm's investment in research and development is protected by patents or other legal means, the incumbent firm appropriates the returns on its investments in R&D, and the researcher does not have the option of appropriating the intellectual property and starting a new firm. If the intellectual property cannot be protected, however, the research and development capital that is embodied in the employees influences the decision to start a new firm. This perspective, modeled by Hellmann (2007), also generates new insights about intellectual property rights and the importance of the external environment. If the employee owns the intellectual property, the external environment becomes more attractive. If the firm owns the intellectual property, then the external environment only constitutes an opportunity for the firm.

To launch the new business, entrepreneurs must be able to obtain funds, hire workers, choose location and decor, obtain food supplies at a reasonable cost, keep the books, and market the restaurant. Even when these tasks are outsourced, the entrepreneur must possess enough basic knowledge to choose good vendors. Following from this line of reasoning, entrepreneurs do not need to be experts in any single skill but they must be sufficiently good at a wide range of things (Lazear, 2005). A theory of entrepreneurs as generalists, while those that are employees should be specialists, implies that human capital investment patterns should differ between those who choose entrepreneurship and those who work for others. This does not seem to be the case. While Lazear's analysis seems to apply for a "salary substitution" or "lifestyle" small business owner, this "generalist" view of human capital investment is less likely to hold for the launching of high-growth new ventures or "gazelles." Perhaps in these high impact firms the specialized—yet pooled—skills of a founding team of entrepreneurs may be the dominant pattern.

The size of the incumbent firm may also have an impact on the decision to leave the firm and start a new business. Hvide (2009) conducts an analysis of firm size (large versus small), finding that small firms are able to implement wage policies that are fine-tuned to workers' external options, while large firms have more rigid wage policies. As a consequence, workers' decisions to leave small firms are not influenced by economics. Instead, these workers start new firms to achieve private benefits, such as more flexible work hours or a sense of freedom. The more rigid wage policies at large firms, however, result in a loss of the best workers and ideas who will make more money as entrepreneurs. Entrepreneurs emerging from large firms, therefore, are of higher quality than entrepreneurs emerging from small firms.

The Knowledge Spillover Theory of Entrepreneurship relaxes two central (and unrealistic) assumptions of the endogenous growth model. The first is that knowledge is automatically equated with economic knowledge. In fact Kenneth Arrow (1962) emphasized knowledge as inherently different from the traditional factors of production, resulting in a gap between knowledge and what he termed economic knowledge. The second assumption involves the assumed spillover of knowledge. In the endogenous growth model the existence of the factor of knowledge is equated with its automatic spillover, yielding endogenous growth. In the Knowledge Spillover Theory of Entrepreneurship, *institutions* impose a gap between new knowledge and economic knowledge, which results in a lower level of knowledge spillovers.

The Knowledge Spillover Theory of Entrepreneurship captures this spillover process, reversing the knowledge production function (Acs et al., 2004, 2009; Audretsch, 1995). In this view, the firm is created endogenously through the agent's effort to appropriate the value of his knowledge through innovative activity. The degree to which economic agents recognize entrepreneurial opportunities emanating from knowledge spillovers and the decision to commercialize them through the startup of a new firm is captured by the equation reflecting occupational (or entrepreneurial) choice,

$$E = \gamma(\pi^* - w) \quad (11.2)$$

where E reflects the decision to become an entrepreneur (generally stated in terms of probabilities), π^* is the profits expected to be earned from entering into entrepreneurship, w is the wage that would be earned from employment in an incumbent enterprise and γ represents all other variables that influence entrepreneurship (Parker, 2004).

Since the expected profit opportunities accruing from entrepreneurship are the result of knowledge not commercialized by the incumbent firms, entrepreneurial opportunities will be shaped by the magnitude of new knowledge but constrained by the commercialization capabilities of incumbent firms.⁹ Knowledge opportunities can be expressed as K^θ , where K is the aggregate stock of knowledge and $\theta(0 < \theta < 1)$ refers to the share of knowledge not exploited by incumbents,

$$E = \gamma(\pi^*(K^\theta) - w). \quad (11.3)$$

The opportunity space for potential entrepreneurs is thus dependent on the efficiency of incumbents in exploiting new knowledge who are assumed incapable of fully exhausting the opportunities provided by new knowledge. In the knowledge spillover theory of entrepreneurship (Acs et al., 2009; Audretsch, 1995) the focus is on the interaction between incumbent firms and entrepreneurs when institutional factors generate opportunities for arbitrage in commercializing new knowledge.

⁹Since we are not interested in arbitrage, prices can be viewed as constant, e.g., monopolistic competition leads to equalized prices on differentiated products within an industry.

But who is right, the departing agents or those agents remaining in the organizational decision-making hierarchy who, by assigning the new idea a relatively low value, have effectively driven the agent with the potential innovation away? *Ex post* the answer may not be too difficult. But given the uncertainty inherent in new knowledge, the answer is anything but trivial a priori. Audretsch (1995, 48), “proposed shifting the unit of observation away from exogenously assumed firms to individuals—agents confronted with new knowledge and the decision whether and how to act upon that new knowledge.”

In the model, knowledge spillovers from new technology give rise to new opportunities (Shane & Venkataraman, 2000). Institutional constraints result in a subset of these opportunities not being exploited by incumbent firms, leaving a role for the entrepreneur (Acemoglu & Johnson, 2005).

Conclusions

Within a generation, scholarship has produced theories, evidence, and new insights that have dramatically changed the prevalent view about the role of entrepreneurship in innovation and technological change. The conventional wisdom held that small firms inherently have a deficit of knowledge assets, burdening them with a clear and distinct disadvantage in generating innovative output. This view was certainly consistent with the early interpretation of the knowledge production function. As Chandler (1990) concluded, “to compete globally you have to be big.”

More recent scholarship has produced a revised view that identifies entrepreneurial small firms as making a crucial contribution to innovative activity and technological change. There are two hypotheses why scholarship about the role of small firms has evolved so drastically within such a short period. This first is that, as explained in this chapter, the measurement of innovative output and technological change has greatly improved. As long as the main instruments to measuring innovative activity were restricted to inputs into the innovative process, such as expenditures on formal R&D, many or even most of the innovative activities by smaller enterprises simply remained hidden from the radar screen of researchers. With the development of measures focusing on measures of innovative output, the vital contribution of small firms became prominent, resulting in the emergence of not just the recognition that small firms provide an engine of innovative activity, at least in some industry contexts, but also of new theories to explain and understand how and why small firms access knowledge and new ideas. This first hypothesis would suggest that, in fact, small firms have always made these types of innovative contributions, but they remained hidden and mostly unobserved to scholars and policymakers.

The alternative hypothesis is that, in fact, the new view toward the innovative capacity of small firms emerged not because of measurement improvements, but because the economic and social environment actually changed in such a way as to shift the innovative advantage more toward smaller enterprises. This hypothesis

would say that the conventional wisdom about the relative inability of small firms to innovate was essentially correct—at least for a historical period of time. Rather, the new view of small firms as engines of innovative activity reflect changes in technology, globalization, and other factors that have fundamentally altered the importance and process of innovation and technological change. As Jovanovic (2001, 54–55) concludes, “The new economy is one in which technologies and products become obsolete at a much faster rate than a few decades ago . . . It is clear that we are entering the era of the young firm. The small firm will thus resume a role that, in its importance, is greater than it has been at any time in the last seventy years or so.” According to this view, small and new firms have emerged as an important conduit for the spillover of knowledge from an incumbent organization creating that knowledge to a new organization commercializing that knowledge through innovative activity.

Future research may sort out which of these two hypotheses carries more weight. However, one important conclusion will remain. Scholarship has clearly changed in its assessment of the role of small firms in the process of innovation and technological change from being mostly unimportant to carrying a central role.

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Chapter 12

Risk and Uncertainty

Sharon Gifford

Introduction

Imagine that you have a brilliant idea for a new business. In fact, your experience and expertise lead you to believe that this is a sure-fire winner. You approach the bank with your idea and they only laugh. You also discover that venture capitalists require a very high interest rate (or equity stake) in order to fund your venture. What's going on here? One explanation is that, because you are an entrepreneur, you are more willing than investors to undertake risk, that is, you are less risk averse. This is a long-standing argument in the literature on what makes an entrepreneur (Brockhaus 1980).¹ An alternative explanation is that entrepreneurs seeking funding think they are selling US treasury bills while investors think they are being offered pre-Castro government bonds.²

This example illustrates an underlying element of most economic theories of the entrepreneur: uncertainty and the accompanying risk. The entrepreneur functions in the economy only if the environment is uncertain. If all individuals in the economy had perfect information, then all profit opportunities would be exploited instantaneously and there would be no further entrepreneurial role. This is the reason for the absence of the entrepreneur in much economic analysis, which focuses on an equilibrium framework.³ An equilibrium is a set of prices at which there are no profit opportunities.

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¹ See also Stewart et al. (1999), and references therein. Empirical studies include Rees and Shah (1986) and Jennings, Cox, and Cooper (1994).

² Fernando Alvarez, private communication.

³ See Casson (1982), Hebert and Link (1988) and Barreto (1989).

Thus, uncertainty and risk, as well as a dynamic, as opposed to equilibrium, perspective, are necessary elements for any economic analysis that explicitly addresses the role of the entrepreneur. In an uncertain, dynamic world, the entrepreneur is often seen as bearing the risks implied by the uncertainty of the future outcomes of his or her decisions.

It has been suggested that one of the roles of the entrepreneur is to bear the risks that others avoid because entrepreneurs are less averse to risk (Kihlstrom & Laffont, 1979; Knight, 1921). Although this assumption is borne out by empirical research (Cramer et al., 2002), it leaves us with no explanation of why entrepreneurs should be less risk averse than other individuals (Scholtens, 1999). The purpose of this chapter is to propose an approach to decision-making under uncertainty that, instead of assuming that individuals are risk averse, derives risk-averse behavior as a result of limited attention. If we understood the sources of risk-averse behavior, we would be better able to predict entrepreneurial behavior.

The immediate implication of assuming limited attention is that, as a scarce resource, it must be allocated among alternative uses. Thus, at any point in time attention can be allocated to one of any number of currently known targets (Becker, 1965). However, for the purposes of analyzing the effect of limited attention on entrepreneurial behavior, we need to allow the entrepreneur to create new activities. For example, an entrepreneur may be the founder of a number of enterprises and still has the ability to found additional ones. Therefore, the number of activities that an entrepreneur allocates attention among is endogenous.

In this chapter we are concerned with how this ability to be innovative (start new activities) affects the willingness of the entrepreneur to do so. However, the willingness to innovate also depends on the ability to manage current operations. We expect such an effect because limited attention implies an opportunity cost of starting new activities embodied in the neglect of current activities. We will see that this endogenous opportunity cost of innovation generates what appears to be risk-averse behavior, but is only the result of limited attention. By explicitly modeling this relationship we can deduce how changes in the environment that decrease the opportunity cost of attention generate behavior which appears to be the result of lower risk aversion.

The primary result of the assumption of limited attention for a theory of risk-taking is that investment in knowledge, either in the form of information or human capital, is a primary determinant of risk-taking behavior. We will see that investments in human capital can generate an apparent increase or decrease in risk aversion, depending on the type of investment made. In either case, those with more knowledge may be apparently willing to take more risk, not because they are less risk averse, but because they have better information.

The next section of this chapter provides a brief review of the research on the role of risk-taking in theories of entrepreneurship. This is followed by a simple analogy illustrating the relationship between the accumulation of human capital and apparent risk-aversion behavior. The theory of limited attention and its implications for risk-taking behavior is then described. Concluding remarks follow.

A Brief Review of the Literature

Before offering a theory of the source of risk-averse behavior, this section briefly reviews the importance of this behavior for theories of entrepreneurial decision-making. This literature appears in a number of disciplines including economics, finance, and management. Because of the extent of this literature this review can offer only a general description of the main issues.

There are many possible explanations for why individuals might be averse to risk. Some economists have suggested that less risk-averse individuals become entrepreneurs (Kihlstrom & Laffont, 1979), implying that risk aversion is critical to the understanding of entrepreneurial behavior. Others have suggested that liquidity constraints are a significant hindrance to entrepreneurship (Evans & Jovanovic, 1989). Kihlstrom and Laffont point out that these two assumptions are related in that those with greater wealth will also be less risk averse. But the assumption of different liquidity constraints begs the question of why some decision-makers have more wealth than others do if their abilities are the same. There may be a feedback mechanism at play here. Those who are successful at perceiving and exploiting profit opportunities will have more wealth in the future, reducing their future liquidity constraints. These successful entrepreneurs with more wealth may be willing to take on risk projects because they have a high probability of success.

The argument that entrepreneurs are more willing to take risks than others are is intuitively appealing. After all, entrepreneurs are those who undertake risky decisions. Some empirical studies have borne out this conjecture (Hyrsky & Tuunanen, 1999; Pattillo, 1998) while others have found mixed results (Schiller & Crewson, 1997). However, using a measure of risk aversion as a criterion to identify entrepreneurs is quite difficult since it is widely believed that a person's attitude toward risk depends upon wealth, among other things. Kahneman and Tversky (1991) provide evidence that attitudes toward risk depend on the status quo and on whether outcomes are gains or losses. Their "prospect theory" approach to the analysis of behavior toward risk is one of several approaches that challenge Expected Utility Theory (EUT). EUT suffers from a number of well-documented problems. This is significant, since our views of risk aversion and its relationship to the shape of the utility function come from EUT. Starmer (2000) summarizes the problems inherent in the theory and a number of conventional and unconventional challenges to EUT.

The economics of limited attention is not a challenge to EUT. In fact, it is based on EUT. The difference is how each theory explains risk-taking, or averting, behavior. The primary difficulty with the risk preference approach of EUT is that risk aversion cannot be observed separate from other influences on choice. For example, the assumed dependence of risk aversion on wealth makes it difficult to separate a greater willingness to take risks, as a motivation for taking them, from the opportunities created by wealth. For example, Blanchflower and Oswald (1998) find that the probability of self-employment depends positively on whether the individual ever received an inheritance or gift. Having that wealth eliminates financial barriers to innovative activity, but it also reduces risk aversion.

The liquidity assumption also has significant implications for the role of risk aversion in entrepreneurial activities. Since many entrepreneurs do not have the necessary wealth to pursue perceived profit opportunities, they are dependent on others for financial backing. But the perception of risk is also assumed to play a critical role, or roles, in the relationship between an entrepreneur and lender. Differences in risk perceptions have been found between bankers and entrepreneurs (Sarasvathy et al., 1998). Hillier (1998) finds evidence that entrepreneurs are biased in their perceptions of risks and opportunities. This optimism, if known to lenders, can lead to credit rationing. On the other hand, entrepreneurs may practice self-restraint as a signal of their realistic perceptions of risks (Manove & Padilla, 1999). Coco (1999) argues that the use of collateral by lenders as a screen to identify safer entrepreneurial investments may prove impossible.

Palich and Bagby (1995) provide evidence that entrepreneurs are more optimistic than non-entrepreneurs but did not differ in their risk propensity. In addition, the optimism of entrepreneurs may be partly due to their ability to walk away from some debts. As pointed out in Hart and Moore (1994), investors cannot prevent an entrepreneur from withdrawing his human capital from the funded project. This possibility of default further reduces the availability of financing for risky ventures. Therefore, the questions about the accuracy of the perceptions of risk by entrepreneurs create significant problems in obtaining financing.

All of this interest in risk perceptions indicates that it is extremely difficult to determine the actual riskiness of a venture. Cheung (1999) provides a “rule-of-thumb” that might be used by entrepreneurs and bankers alike to ascertain the riskiness of a venture from data on similar businesses. Sykes and Dunham (1995) develop a process for risk management based on learning. But the decision to undertake risk has many components. Hai and See (1997) offer evidence that a tolerance for ambiguity and risk alleviates the stress due to the strains of the conflicting roles of the entrepreneur and thus improves the performance of the venture. Witt (1998) describes a theory of the firm in which “business conceptions” play a key role. A successful venture requires the coordination and motivation of the firm members through the “cognitive leadership” of the entrepreneur in implementing and defending the business conception. Khalil (1997) associates entrepreneurship with “self-competition,” or the desire to achieve ever-greater goals over time. However, this quest can lead to either immobilizing anxiety or entrepreneurial action. Van Praag and van Ophem (1995) find that willingness and opportunity are both necessary for entrepreneurial behavior, but that opportunity, especially financial, is usually lacking.

So far we have considered arguments that entrepreneurs are those with less risk aversion, and that this leads to problems obtaining financing. However, greater risk aversion can also provide an incentive to engage in self-employment, or ownership of a small firm. Firm ownership allows for greater control over decision-making and thus less moral hazard. Wiggins (1995) argues that risky activities are difficult to undertake in a large enterprise because of incentive problems due to risk aversion on the part of employees. Therefore, many risky ventures are carried out in

small firms, where these incentive problems do not exist. This argument implies that entrepreneurs choose to own their own businesses to avoid the risks of moral hazard in larger firms.

Observations of apparent willingness to take risks may have other explanations. Cooper and Artz (1995) suggest that job satisfaction plays a critical role in the decision to start and maintain entrepreneurial ventures. Baron (2000) presents evidence that entrepreneurs' lower perceptions of risk are due in part to a lower ability to engage in counterfactual thinking; that is, how past events might have turned out differently. Baron (1998) suggests a number of cognitive tools for determining who will behave entrepreneurially is based on these the sources of entrepreneurial errors. Empirical research by Simon, Haughton, and Aquino (2000) suggests that risk-taking is not due to differences in risk aversion, but to cognitive biases other than risk aversion, such as overconfidence in their knowledge or skills, or to the law of small numbers according to which individuals extrapolate from small samples of information.

Keynes and Schumpeter identified the entrepreneur with "animal spirits," or irrationality. Marchionatti (1999) argues that these animal spirits have had no place in mainstream economics, which relies on assumptions of rationality. In a bounded rationality approach, Marchionatti treats animal spirits as an entrepreneurial impulse that depends on many elements of the entrepreneur's environment. However, this seems no firmer a foundation on which to build a theory of entrepreneurship than willingness to take risks. In either case, the source of the differences between those who appear to be entrepreneurial and those who do not also require explanation.

An alternative explanation of apparent risk-taking is that entrepreneurs are more optimistic about the outcome of the venture because they have more knowledge in their abilities to bring about a profitable result (Hayek, 1945). This explanation does not require the irrationality, or differences in innate preferences, such as risk aversion and animal spirits. Clearly, inborn talents can be very useful to the entrepreneur and much time and effort has been spent trying to determine what these innate characteristics might be (Brandstätter, 1997). However, we can say something about the sources of *acquired* abilities. For example, Fiet (1996) argues that entrepreneurs engage in information acquisition in order to reduce the uncertainty and risks of a venture. Greater information gives the entrepreneur a greater ability to make good choices. This, and other, acquired abilities may lead the entrepreneur to be more optimistic about the outcome of the venture and make the entrepreneur appear to view the venture as less risky. Efforts to acquire abilities are essentially a form of human capital investment. The possession of these abilities may not be easily observable, say to the lender, and so the optimism that they engender might be interpreted as lower risk aversion or greater animal spirits. However, for the purposes of economic analysis, efforts to invest in human capital can be observed, from schooling and job experience to information acquisition. Thus, the question of the role of uncertainty and risk in the entrepreneurial process suggests that we consider the role of human capital investment as an alternative hypothesis for the entrepreneur's apparent willingness to take risks.

An Analogy

In this analogy, the role of the entrepreneur is played by the aspiring magician. The entrepreneurial activity is the effort to launch a new career. The role of the lenders is played by your sister and other relatives. The role of a venture capitalist is played by the established magician.

Assume that you want to start a career as a magician who “saws people in half.” You have seen others do this successfully and know that people are willing to pay to watch this amazing feat (as economists, we do not question why people might want to do this). You even have experience since you have been a butcher for many years, a job in which you “saw” with great precision. However, you have no experience sawing people in half. You approach your younger sister to “loan” you her body to be sawn in half. However, she is not as confident as you are in your skills and is concerned about being injured. Your optimism here may be perceived as low risk aversion, or plain foolishness, but, in fact, it is your sister, like any lender, who is bearing much the risk in this situation. Unfortunately, or fortunately, your sister, like a local banker, is aware of your inexperience and so refuses (local bankers are often in a much better position to assess the profit potential of a local venture because of their knowledge of the applicant and the situation).

After getting similar responses from the rest of your family members and close friends, you decide to read some books on the practice. Here you are endeavoring to invest in human capital by acquiring greater ability or at least the evidence of ability. Your confidence may even have been shaken (lenders’ questioning of the soundness of the proposed venture can often lead to improving the proposal). However, without any practice, you are still unable to instill confidence in your potential victims. Your investment in human capital alone is not sufficient. Others must perceive your newly acquired skills.

To establish a track record, you next apprentice yourself to a well-known magician for several years in order to learn his skills. This was not an easy decision. You have to allocate time away from other activities to do this and if you fail on your first public effort, the value of your investment in this human capital is diminished. After much practice you become very proficient in sawing the magician’s assistant in half and so you again ask for volunteers. However, your friends and loved ones are still reluctant to go under the knife with you. They have never seen evidence of your abilities and so are reluctant to take the risk.

Finally, you are allowed to perform in public using the magician’s experienced assistant (the magician has seen how skilled you are). You are a great success. Now your family and friends cannot wait to be relieved of their lower extremities (why they want to, even with the lack of risk, is not questioned). Your demonstrable abilities solve the problem of getting the loan of enthusiastic assistance and your career is launched. In addition, your success has enriched the magician, since he will be able to attract new apprentices.

This silly analogy has many of the elements of risk, information, and ability that are present in the entrepreneur’s problem of starting a new venture. An inexperienced entrepreneur will, perhaps justifiably, not be able to get financing. This

entrepreneur may, in fact, be suffering from animal spirits, or delusions, and the lack of financing is appropriate. However, the desire to start this venture is not evidence of a greater willingness to take risks if the entrepreneur can walk away from the debt, and so bears little risk. This is the source of the lender's reluctance to back the venture.

However, the entrepreneur's optimism may be based on investments in private but unverifiable information about the highly likely success of the venture. This private nature of the information makes this a problem of asymmetric information: the entrepreneur knows more about what he knows than the lender does. This investment was costly and was undertaken with the expectation of future success. If future efforts fail, then the value of this investment may be worthless. Therefore, the entrepreneur has a reputation at stake. Failure of the venture will reduce the entrepreneur's future "bankability." Now the entrepreneur still appears to be optimistic and willing to take risks, but in fact the entrepreneur is justifiably confident in the outcome of the venture. If the entrepreneur has enough at stake, such as collateral, the bank may take that as a signal of the good prospects of the venture.⁴

The apprentice needs the magician to vouch for his abilities. This role is often played by venture capitalists, who become closely involved in managing and controlling the venture in return for equity (Amit et al., 1998). A successful venture not only yields equity value for the venture capitalist, but also reputational capital, which attracts additional investors to the fund. Our parable ends with a successful outcome if the entrepreneur acquires the human capital and credentials that generate the confidence of investors.

To treat the problem as one of an innate willingness to take given but unknowable risks would leave us with little understanding of how these problems are resolved. Rather than analyzing the problem as a decision to take on risks, we see that it can be understood as a need for an investment in human capital.⁵ The problem is solved if the investment is in information, knowledge, skills, and experience that increase the expected value of the venture for all concerned. This may require bringing in a third party between the entrepreneur and the ultimate investors (banks, stockholders). This party (the magician, the venture capitalist) serves the role of certification, or verification, of the profitability of the venture. The quality of the reputation of the venture capitalist is reflected in the IPO market through less underpricing (Lin, 1996).

One thing that we have glossed over in our analysis of entrepreneurial risk-taking is the cost of the investment in human capital. As we saw in the magician analogy, in order to become more competent, you, the budding magician, apprenticed yourself to a professional magician for some time. The cost of acquiring the necessary skills

⁴ See Bates (1990) for an empirical investigation of the effect of investment in human capital on the willingness of investors to invest.

⁵ See Chandler, Galen, and Hanks (1998) for evidence that human capital and financial capital are partly substitutable.

was the opportunity cost of the time spent paying attention to the magician's instructions and practicing them. Economists have considered the opportunity cost of time since the seminal work of Gary Becker (Becker, 1965). Amit, Muller, and Cockburn (1995) provide evidence that those engaging in entrepreneurial activities have lower opportunity costs in terms of forgone wages. Cooper, Folta, and Woo (1995) provide evidence that those entrepreneurs with less experience search for more information, those with greater confidence search less. However, interaction effects indicate that less experienced entrepreneurs search less in unfamiliar domains than in familiar ones, suggesting a form of bounded rationality. More experienced entrepreneurs did not vary their search efforts.

More recently the opportunity cost of time, or attention, has been analyzed in a series of studies on the implications of limited attention when the number of targets of attention is endogenous (Gifford 1998, and references therein). This work considers the opportunity cost of allocating attention to adopting a new project (in this case, skill, knowledge, expertise), which is embodied in the neglect of ongoing current projects. The main insight of this work is that the opportunity cost of time is partly determined by how it is allocated. That is, the opportunity costs of acquiring new skills depends on how valuable the old ones are, which in turn depends on how much time was spent developing them.⁶

For example, instead of learning how to saw a person in half, you could have spent that time at your occupation as a butcher. You are quite skilled as a butcher because you have been doing it for a number of years. You could even have gotten better and perhaps eventually have your own slaughterhouse. All of that, however, was foregone, at least temporarily, when you decided to study magic. The economic, and psychic, value of those foregone activities is the opportunity cost of acquiring your new skills as a magician.

When this endogenous opportunity cost is taken into account we will see that a risk neutral individual will behave as though they are risk averse. This apparent risk aversion is seen in the fact that the entrepreneur does not take on projects with a positive "expected value." The issue is how this expected value is calculated.

Limited Attention

The model of limited attention shows how entrepreneurs can *display* a different degree of risk aversion although they are all risk neutral. The term "risk neutral" means that entrepreneurs care only about the expected value of their prospects. The riskiness of a new venture is irrelevant. We will see that entrepreneurs who have made human capital investments in the past to increase their ability to recognize a

⁶ The relationship between attention and risk preferences has also been addressed in March and Shapira (1987, 1992). Their analysis concerns how the focus of attention on aspects of the risky venture affect risk perceptions. Here, I suggest that the allocation of attention affects only the expected value of the venture.

profit opportunity will behave as if they are less risk averse than entrepreneurs who have made less investment in human capital.

In the analysis of the allocation of limited attention, the entrepreneur chooses to either consider a new venture or to pay attention to one of an endogenous number of current ventures.⁷ The reward to considering a new venture is the expected value of that venture. The reward to attending to a current venture is an increase in the profitability of the venture, which is stochastic. Therefore, the entrepreneur faces an uncertain environment. The relative value of these two choices depends on the abilities of the entrepreneur. These abilities are of two types: the ability to recognize a profitable new venture and the ability to improve a current venture. The first we will refer to as entrepreneurial ability and the latter managerial ability.⁸

In addition to allocating attention each period, the entrepreneur also chooses which venture to shut down. This action requires no attention. The entrepreneur always has the option of evaluating a venture and then choosing whether to shut it down or not. The entrepreneur receives a return from each the retained current ventures.⁹

After the entrepreneur has made these two decisions, the next period starts. If a new venture was evaluated then the entrepreneur may have an additional venture in her “portfolio.” This depends on her entrepreneurial ability. Alternatively, if a current venture has been evaluated, then this venture’s performance may have been improved. This depends on her managerial ability. The goal of the entrepreneurial is to maximize the discounted *expected value* of all ventures over time. Therefore, the entrepreneur is assumed to be risk neutral.¹⁰

The optimal course of action takes the forms of one of two rules. In the first, current projects are discarded, unevaluated, upon reaching a critical age and a new project is evaluated every period. In the second, each current venture is evaluated periodically and a new venture is evaluated if no current project requires evaluation. The first rule, which we will refer to as the innovation rule, is best if the entrepreneurial ability of the entrepreneur is sufficiently high. The second rule, which we call the managerial rule, is best if the managerial ability is sufficiently high. Therefore, we will consider these two alternative situations.

In the first, entrepreneurial ability is high relative to managerial ability and the entrepreneur does not try to improve the profitability of current ventures. Instead,

⁷ Another analogy is useful is to imagine a juggler who is rewarded according to the number of plates he can spin on the tips of long sticks. As soon as one plate is spinning, he can set up another one. However, as he continues to set up additional spinning plates, the first one starts to wobble, threatening to fall. The choice the juggler faces is to either continue to set up new plates or to go back and try to respin old plates. New plates may or may not be balanced and current plates that have fallen may be broken.

⁸ For a more detailed description of these abilities see Gifford (1993).

⁹ In some cases, the returns to the venture are received only when it is liquidated (Gifford, 1997).

¹⁰ This problem is solvable as long as the one-period return to any venture is bounded. The number of projects is not bounded.

the entrepreneur considers a new venture every period and current ventures are liquidated when their current returns fall to zero. In this case, the rate of innovation is constant and equal to entrepreneurial ability.

In the second case, entrepreneurial ability is low relative to managerial ability. The entrepreneur will evaluate each current project when its profitability is sufficiently low, but before it has fallen to zero. The entrepreneur will still consider new ventures, but only when there is no current venture that warrants attention. Therefore, in this case the entrepreneur is less innovative. For simplicity, we will first consider two types of entrepreneur, one that has high entrepreneurial ability and so follows the innovation rule and one that has high managerial ability and so follows the managerial rule. The first will be called the innovative entrepreneur and the latter the managerial entrepreneurial. Nevertheless, it is important to keep in mind that these entrepreneurs choose these different behaviors because of their different abilities.

Another implication concerning the frequency with which ventures are evaluated is that each venture will be evaluated before its expected returns fall to zero. An innovative entrepreneur will retain each venture until its current returns fall to zero. Therefore, the innovative entrepreneur is willing to take on more ventures than the managerial entrepreneur, making the former appear to be less risk averse than the latter. However, the actual distinction between the two is in the differences in their innovative and managerial abilities. Both are risk neutral. The prediction that a managerial entrepreneur evaluates current ventures before their current returns fall to zero also implies that this entrepreneur will appear not to be maximizing expected value, and so appear to be risk averse.

When two managerial entrepreneurs are compared, we see another indication that they appear to differ in risk aversion, even though they are both risk neutral. Of these two managerial entrepreneurs, the one with higher entrepreneurial ability will evaluate each current venture less frequently than the other. Therefore, this entrepreneur will innovate more frequently and be willing to maintain more current ventures. Both of these behaviors seem to imply that this entrepreneur is less risk averse. However, these behaviors are due only to the fact that this entrepreneur has higher innovative ability. Therefore, the managerial entrepreneur with higher innovative ability will appear to be less risk averse.

Two managerial entrepreneurs appear to have different degrees of risk aversion for another reason. This is because the optimal frequency with which a managerial entrepreneur evaluates each current venture is independent of the riskiness of the venture. Assume that two managerial entrepreneurs face environments that are the same in every respect except for the riskiness of the ventures.¹¹ Then the entrepreneur facing greater risk will evaluate each current project with the same frequency as an entrepreneur facing less risky ventures. This means that this

¹¹ Assuming that all else is equal, if one distribution $F(x)$ of a random variable x is a mean preserving spread of another distribution $G(x)$, then these two distributions have the same expected value but F has a greater variance and so is more risky.

entrepreneur will be equally as innovative and willing to take on as many ventures as the second will. This appears to be the result of lower risk aversion. However, both entrepreneurs are risk neutral.

These implications of the allocation of limited attention for a risk neutral entrepreneur give us an alternative theory for observations of apparent risk aversion. Although the model assumes that the entrepreneur is risk neutral, in that she cares only about expected returns, not the variance in these returns, the model generates commonly observed behaviors that others have attributed to risk aversion.

Thus, the theory can explain observed behavior, but more importantly, it does not depend on an exogenous assumption about preferences, such as risk aversion, to generate these predictions. Instead, these behaviors are due to differences in entrepreneurial and managerial abilities. The question then remains, how are these different abilities in individuals explained? To address this question we turn next to consideration of the role of investments in human capital.

Investing in Human Capital

From the analysis of the last section, we have seen that limited attention and risk neutrality can generate different behaviors in uncertain environments, depending on the entrepreneur's abilities to innovate new ventures and to manage current ventures. Differences in these abilities are critical to generating apparent differences in attitudes toward risk, even though the individuals are assumed to be risk neutral. Therefore, it is important to consider what affects these abilities.

From earlier research on the allocation of limited attention, we can draw a few conjectures about the implications of limited attention for the problem of investing in human capital. Investing in human capital requires attention to be allocated to learning new things. We will see that limited attention limits the amount of learning we will optimally do. The more valuable the skills we have already learned, the less willing we will be to allocating attention away from using those skills in order to learn new ones. In addition, greater opportunities for learning will increase human capital investment. Therefore, those who have few, or less valuable, current skills will be more inclined to invest in human capital. Those who have greater opportunities for acquiring new skills will invest more in human capital.¹²

This can lead to a variety of outcomes. We do not expect those with low skills to invest in human capital if the opportunities for doing so are low. Those who are highly skilled do not necessarily cease to invest in human capital if the opportunity for acquiring additional skills is high. Therefore, the decision to invest in human capital is a complex one. However, *all else equal*, a person with fewer skills will be inclined to invest more in human capital. A person with higher skills will use those skills and invest less in human capital. Those with higher opportunities for learning

¹² See Iyigun and Owen (1997) for a macroeconomic analysis of the effects on the economy of investments in human capital.

will invest more in human capital. These are intuitively clear. The contribution of limited attention is to recognize that the investment in human capital depends on the *relative values* of the ability to use current skills and the ability to obtain new skills.

The implications for entrepreneurial behavior of investments in human capital depend on what kind of investments is made. If someone focuses his or her attention on developing managerial skills by obtaining an MBA, and getting managerial experience, then this would imply that this person would not be very innovative. If someone decided to focus their attention on developing their innovative ability by acquiring better information about market or production conditions, then this person would tend to be more innovative. This decision depends on the person's perceived expected value of these two activities, without appealing to risk aversion.

There are social benefits from investments in human capital, as well. If others benefit from what we know, we will not know enough to satisfy them. This is due to the fact that we bear all of the costs of the investment in human capital but not the entire benefit. This is a form of moral hazard. However, the analysis of limited attention implies that this moral hazard can be efficient (Gifford, 1999). This is because the costs of investment in human capital are real costs, not only to the would be entrepreneur making the investment, but to society as well. While learning new skills (being a magician), the entrepreneur is not engaged in other activities (being a butcher).

So, how does this explain the difficulty entrepreneurs have in getting financial backing? If entrepreneurial behavior is motivated by a high ability to be successfully innovative, then why would not an investor be willing to back this entrepreneur? The reason is that entrepreneurial ability is not directly observable to the investor. The entrepreneur may want to undertake a new venture not because of a high probability of success, but because of a low opportunity cost.

For example, individuals with lucrative employment that consume most of their working time should be less inclined to undertake entrepreneurial activities than those who are not gainfully employed, all else equal. Even if a 100% sure profit opportunity is serendipitously discovered (Kirzner, 1997), the entrepreneur may still be unable to verify this to a financial backer. Therefore, the investor does not know the true expected value of the venture. The investor must go by the average expected value. This results in a higher interest rate required to compensate the investor for the low average expected value that results from the asymmetric information.

However, things get worse. The investor may be even more skeptical because this pre-contractual asymmetric information leads to the problem of adverse selection. In this example, adverse selection occurs when the lender charges a high interest rate, which is required to compensate for a lower average expected value. Then only the entrepreneurs with a lower intent to pay back the loan will apply for it. These are not the borrowers that the lender wants to attract; thus, the adverse selection. This in turn further reduces the average expected value for the lender, requiring an even higher interest rate. The end result is a missing market for ventures with high expected values.

One way to resolve the adverse selection problem is for entrepreneurs with ventures that have a high expected value to provide a credible signal of this, such as

collateral or other personal commitments that increase the cost of default to the entrepreneur.¹³ This, however, does not resolve the problem of moral hazard. If an investor does finance a venture with an entrepreneur, then the investor is affected by how much investment of time the entrepreneur has made, and continues to make, in the venture. The model of limited attention implies that the investor would like for the entrepreneur to allocate more attention to the venture than the entrepreneur is willing to and more than is optimal.¹⁴ This moral hazard reduces the expected value of the venture to the investor and so reduces the availability of funds.

Therefore, we see that risk aversion is not required to derive the adverse selection that leads to missing capital markets. Nor is it required to explain the moral hazard that occurs between the investor and the entrepreneur. Both of these problems contribute to capital constraints. A model of risk neutral entrepreneurs and investors can generate apparent risk-averse behavior because of asymmetric information concerning the entrepreneur's abilities.

However, from a research perspective, the fact that the entrepreneurial and managerial abilities of a particular entrepreneur are not observable to an investor does not generate the same concerns as unobservable risk aversion. This is because risk aversion is an assumption about preferences, which cannot be explained. Entrepreneurial and managerial abilities are the result of investments in human capital, which are partially observable through activities such as schooling, training, and experience. Therefore, we can test the hypothesis that entrepreneurial activities depend on investments in human capital, whereas we cannot test whether it is due to lower risk aversion (Cramer et al., 2002).

Conclusion

The assumption of limited attention made in this chapter is a natural one, although some may feel that they can attend to many things at once – multitasking (say driving, talking on the phone, and reading a map). The implications of limited attention are not affected by increasing the number of things that can be attended to at once, as long as this is a finite number. Efforts to increase attention require the delegation of decision-making to others, which is captured by the principal–agent model (Jensen & Meckling, 1976). Assuming that the entrepreneur has delegated decisions to others also does not change the implications of limited attention. The assumption of limited attention leads naturally to a theory of organizations and the existence of principal–agent relationships. A common explanation for the delegation of decision-making in organizations is the desire to make use of the expertise of others (Holmstrom, 1984). Limited attention implies another reason to delegate decision-making: to free up the principal's time in order to allocate attention to the

¹³ See Levy and Lazarovich-Porat (1995) for an empirical test of the effectiveness of such a “revelation mechanism.”

¹⁴ See Gifford (1997).

most import targets. Therefore, this research program also addresses the reasons for *why* organizations exist, in contrast to Gartner and Carter (this volume).

This chapter has presented the argument that explanations of entrepreneurial behavior based on risk aversion are inherently flawed by the fact that we cannot observe or explain risk aversion. Animal spirits and irrationality suffer from the same shortcoming. However, we can analyze the entrepreneur's decisions under uncertainty as a problem of allocating limited attention among activities, depending upon the entrepreneur's managerial and entrepreneurial abilities. These abilities in turn depend on the allocation of attention to investments in human capital. The difficulty for entrepreneurs of obtaining financing is due to asymmetric information concerning these abilities (adverse selection) and to the difficulty of enforcing effort by the entrepreneur after the investment (moral hazard). That is, we can analyze entrepreneurial behavior as a rational solution to a series of allocation problems. There is no need to rely on assumptions about unobservable risk aversion or animal spirits. The question of how entrepreneurs overcome the problem of asymmetric information about their experience, knowledge, and skills and subsequent effort can be advanced by the implications of the economics of asymmetric information.¹⁵

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¹⁵ See Bester (1987) for an early paper explaining credit rationing with asymmetric information.

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Part IV
The Social Context

Chapter 13

Looking Forward, Looking Backward: From Entrepreneurial Cognition to Neuroentrepreneurship

Norris F. Krueger, Jr. and Mellani Day

Introduction

Cognition research in entrepreneurship is currently very much *en vogue* – and studies have proliferated at a remarkable rate (Gregoire et al., 2009). A quick search of Google Scholar shows a surge in studies involving entrepreneurial intentions (and also entrepreneurial self-efficacy). Yet we also see a surge of studies on both topics where the authors ignore excellent prior research and relatively little research that drills down more deeply, e.g., into deeper knowledge structures.

In fact, more than a few people have noted that since the first version of this chapter reached print in 2003, the quantity of entrepreneurial cognition research has exploded, yet not enough progress has been made. One problem is that the very success of existing models (e.g., intentions models usually yield a good r-squared) has made cognition a safe, easy to adopt topic. However, what if these key models are based upon vulnerable assumptions (Krueger et al., 2007)? Further, our models tend to be static snapshots of dynamic processes. Fortunately, the neuroscience perspective offers both fresh theory to advance our thinking and well-honed methodologies to help us address thorny empirical problems raised by dynamic models. For example, entrepreneurship is starting to look at cognitive developmental psychology (Krueger, 2007, 2009b).

The intent of this chapter is threefold. First, we want to acknowledge and celebrate what entrepreneurial cognition has continued to bring to our understanding of entrepreneurs and entrepreneurship. Second, we want to introduce the theories and methodologies and fresh perspectives that neuroscience has to offer the ambitious (and tenacious) entrepreneurship scholar. Finally, studying entrepreneurial cognition is in many ways an ideal venue for neuroscientific investigation and vice-versa; even *Nature* thought so (Lawrence et al., 2008). To these ends we will again focus attention on what we believe to be the critical components of entrepreneurial cognition research thus far, while adding some initial (but potent) insights from

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neuroscience. While we cannot present here an exhaustive overview on all the work done to date in entrepreneurial cognition, we have identified that with the greatest potential impact.

Overview

If the “heart” of entrepreneurship is an orientation toward seeing opportunities (e.g., Stevenson & Jarillo, 1990), then from whence do perceptions of opportunity derive? Understanding entrepreneurial cognition is imperative to understanding the essence of entrepreneurship, how it emerges and how it evolves. This is especially true if we wish to move from descriptive research to theory-driven research. This chapter offers researchers an overview of the cognitive processes that drive “thinking entrepreneurially”:

- What is the nature of entrepreneurial thinking?
- What cognitive phenomena are associated with seeing and acting on opportunities?

Cognition research offers ways to bring the entrepreneur back into entrepreneurship and offers us multiple theory-driven and empirically robust mechanisms, to build a deeper, richer understanding of how we learn to see opportunities. Cognitive phenomena are important throughout this process: Opportunities themselves are perceived, if not enacted, as are the critical antecedents of opportunity perceptions. Entrepreneurial activity may require a tangible infrastructure of needed resources but we neglect at our peril what we might dub the cognitive infrastructure). What enables us to perceive (and learn to perceive) personally credible opportunities. Understanding the cognitive infrastructure undergirding entrepreneurial activity also affords us richer perspectives on how to nurture entrepreneurship (Krueger, 2000, 2007; Krueger & Brazeal, 1994; McMullen & Shepherd, 2006; Shepherd & Krueger, 2002).

If we are to better understand the entrepreneurial process, then we need to better understand how opportunities manifest themselves as credible (Shapiro, 1975, 1982, 1985). As with other nascent fields, entrepreneurship studies have long had a bias toward descriptive research, grounded more in practical concerns than in theory. The cry for “more strong theory in entrepreneurship research” continues to be a clarion call that still has not been heeded as enthusiastically as it should. One reason for this has been the tendency to use theory to explain one’s findings retrospectively, rather than identifying a useful, appropriate theoretical base from which to work prospectively. However, this is changing.

For example, early on the field featured considerable research into “budding” entrepreneurs, a vague definition. Today researchers talk about “entrepreneurial intentions,” a more rigorous (and theory-based) focus. Similarly, most of the research on “opportunity recognition” remains highly descriptive, yet we see increasing use of theory to drive the empirical research, not just finding theory to

explain the findings. The potential for continued progress lies not just in cognitive theory, but cognition research offers more than its fair share of potential for exciting, productive future research in entrepreneurship.

We are thus asking, “When someone is thinking ‘entrepreneurially,’ what does that mean in terms of cognitive processes?” As Robert Baron argues persuasively, we all share the same basic cognitive processes but entrepreneurs appear to face unique role demands that are accompanied by differences in the cognitive processes those role demands require.

We focus on the most critical distinction between entrepreneur and non-entrepreneur, the intentional pursuit of opportunity. As Stevenson pointed out long ago, the “heart” of entrepreneurship is the seeking of and acting on opportunities. As Shane (2003) echoed from Shapero, we must also focus on the nexus of entrepreneur and opportunity. To understand entrepreneurship then requires an understanding of how we learn to see opportunities and decide to pursue them. And that requires increasingly sophisticated theory and methods. Cognition research offers rich theory and well-developed if underutilized methods. As readers will see, it also offers considerable successes to encourage the entrepreneurship researcher. The study of human cognition has surfaced a remarkable variety of theoretical and methodological approaches to understanding how human beings apprehend data and process it. The rich variety of approaches can offer an equally rich variety of insights.

For example, entrepreneurs appear to identify opportunities based on cues or signals from the environment that they filter and process through a number of mechanisms (e.g., intentions). Cognitive psychologists would point out that entrepreneurs would likely recognize useful patterns in the myriad cues and signals we receive, patterns that suggest potential opportunities or not (Baron & Ensley, 2006). Shapero used the analogy of “antennae” – we all have our antennae tuned to certain “frequencies” and “directions.” Entrepreneurs are no different, except in what directions, etc., their antennae are tuned. However, researching pattern recognition is not terribly simple; it requires understanding the theories behind human pattern recognition and it requires understanding the rigorous methodologies needed to research in this arena. Another way to look at cognition research is Herbert Simon’s three levels of cognitive phenomena (1963): Semantic (surface) level, Symbolic (deep structures) level, and Neurological (biological) level (Fig. 13.1 below).



Fig. 13.1 Simon’s (1963/1997) three levels of analysis

However, the very breadth and richness of cognitive science also reflects a heterogeneous field. As such, we focus here on selected topic areas that seem the most promising and offer the most fertile ground for future entrepreneurship research.

Researchers face an interesting paradox: “How do entrepreneurs think?” is a very important, oft-asked question yet we have only rarely confronted it directly and with rigor. On the one hand, understanding the nature of entrepreneurial thinking is central to understanding both entrepreneurs and entrepreneurship. Thus, we need to understand how we learn to see actionable opportunities. Terms such as “thinking,” “perception,” and “intent” suggest that cognitive psychology should naturally offer invaluable insights. But, on the other hand, research into this question has taken many different forms, using many different approaches, often ad hoc descriptive analyses (again, which needlessly fail to incorporate a true theoretical grounding.)

As such, this chapter will emphasize existing research on entrepreneurial thinking that is founded on well-received theory from cognitive psychology, especially social cognitive psychology. However, the reader is warned that the disparate, eclectic streams of research into entrepreneurial thinking are not as well connected as one might prefer nor even as one might reasonably expect. Yet, this eclecticism can also be viewed as a far-from-complete “mosaic tile” where the quality “tiles” are building toward a more comprehensive picture. Again, the key is research based on theory a priori, not simply digging up theory to explain what might be a post hoc and spurious finding. The good news is that scholars such as Baron (1998, 2000a), Mitchell et al. (2000, 2002), and others (e.g., Gaglio, 1997; Gaglio & Katz, 2001; Shepherd & Douglas, 1997) have shown us that entrepreneurial cognition is incredibly fertile ground for important and interesting research – if done rigorously and with thorough grasp of theory (Gregoire et al., 2009).

Obviously, if the “heart” of entrepreneurship is this orientation toward seeking opportunities, developing a much deeper understanding of this cuts to the very essence of entrepreneurship. If we understand how we learn to see opportunities, we unlock much of the heretofore “black box” of entrepreneurship. Some of the most promising recent models of entrepreneurship focus on cognitive processes, showing the importance of an opportunity-friendly cognitive infrastructure (Alvarez & Busenitz, 2001; Krueger, 2007; Mitchell et al., 2000, 2002).

Yet even that may not offer us the most valuable payoff. If we understand the cognitive processes associated with entrepreneurial thinking and action then we have at least a tentative blueprint for influencing those processes. As with much research in cognitive psychology, there will be as many testable implications for teaching and for practice as there are testable implications for research.

Before taking entrepreneurial action a perceived opportunity must arise, e.g., via creativity (Section “Perceptions, Antecedents and Consequences”) and intentions toward pursuing that opportunity (Section “Current Thinking about Entrepreneurial Intentions”). Intentions are driven by critical attitudes and beliefs such as self-efficacy (Section “Self-Efficacy Beliefs: Critical Correlate of Intent”) and underneath those beliefs and attitudes are deeper structures that reflect how we structure knowledge representations. These deeper structures help inform us about how to nurture entrepreneurial thinking (Section “Implications for Entrepreneurial

Learning (and Education)”). We then look at some interesting domains where we can apply our analysis, e.g., social entrepreneurship (Section “Context Matters: Entrepreneurial Environments”) before concluding. Let us preview these subdomains of greatest interest.

1. Perception and Creativity: One critically important contribution that cognitive science offers the entrepreneurship researcher is that people apprehend reality through multiple perceptual lenses. Our brains grasp external phenomena through processes of perception. We are unlikely to pursue an opportunity that we do not perceive. What do we notice? How do we interpret what we do notice? What might bias our perceptions?

2. Intention: In cognitive psychology, intention is the cognitive state immediately prior to executing a behavior. The dominant class of formal intentions models employs two critical antecedents of intentions that can be classified (despite varying terminology) as (a) perceived feasibility and (b) perceived desirability. That is, intentions require the belief that the behavior is feasible and the belief that the behavior is desirable. However, we will see that our modeling needs serious revisiting.

3. Key Beliefs and Attitudes – Self-efficacy: If intentions depend on personal beliefs and attitudes, then researchers interested in entrepreneurial thinking should also explore the antecedents of intentions. In particular, we have seen a groundswell of interest in one key belief that has long been associated with initiating and persisting at goal-directed behavior: Bandura’s notion of perceived self-efficacy.

4. Deeper Beliefs and Knowledge Structures: Cognitive phenomena such as intentions lie relatively close to the surface in the architecture of our thinking. Underneath these surface structures are deeper cognitive structures of how we represent knowledge and how it all fits together. Cognitive science has long used methods such as causal maps, schemas, and scripts to illuminate these deeper structures. While this is perhaps the newest domain of cognition research to be applied to entrepreneurship, the potential is immense. Not only do researchers receive a more fundamental view of how we learn to think entrepreneurially, this more fundamental look affords us new ways to influence the processes that lie beneath entrepreneurial thinking. That means we have new, more powerful mechanisms by which we can enhance entrepreneurial thinking.

5. Entrepreneurial Learning: Entrepreneurship educators such as Ron Mitchell and others focus entrepreneurship training on changing students’ entrepreneurial scripts from relatively novice to relatively expert making this arena a most exciting and most fertile ground for entrepreneurship scholars. One crucial impact of cognition-focused research into entrepreneurship is that if we understand the “why” of entrepreneurial thinking, we can influence the “how.” That is, we can use the fruits of this research fairly directly in our teaching and training. The descriptive work done in entrepreneurship education has, of course, proven of great benefit but the next step for researchers is, as with intentions, to be much better grounded in theory and Section “Implications for Entrepreneurial Learning (and Education)” lays some useful groundwork for exploring how entrepreneurs learn.

Context Matters: Productive Domains for Entrepreneurial Cognition: Here we briefly examine several key research domains where entrepreneurial cognition research has been productive or shows clear potential for new insights. These include entrepreneurial communities and organizations, family business and social and sustainable entrepreneurship. More important, we see this as a potent arena for building our research agenda and in developing intelligent, informed prescriptions for public policy.

Caveat? Cross-disciplinary Definitional Issues

First, however, we need to address some issues raised by crossing disciplinary boundaries. To pursue the kinds of entrepreneurial cognition research we discuss here will likely involve great care in how we pursue them. Clarifying definitions is critical, so too is building adept cross-disciplinary research teams. In cross-disciplinary research efforts common specification of terminology and constructs becomes more important than ever. Over time as research silos develop the same terminology may be used in completely different ways and the same ideas and constructs may have different labels (e.g., the constructs: risk, uncertainty, ambiguity). Miller et al. (2008) refer to this as an epistemological pluralism that can actually enhance knowledge by providing a many-sided view perhaps and lead to a more successful integrated study. Further, the team approach brings experts from various disciplines together with limits of cross-disciplinary knowledge requiring a significant level of methodological respect (O’Cathain et al., 2008), trust, and cooperation.

In the academic realm this must be a very intentional process, since by default it is expected that academics become experts in the fields they are studying, and be able to stand behind any work published with confidence. As knowledge advances however (and it is no different in working to combine the realms of neuroscience, cognitive psychology and entrepreneurship), there is much additional learning and knowledge that must be gained to have such confidence. The academic could choose to take decades and study each discipline and eventually know enough to do a solo cross-disciplinary work. Or the academic can choose to partner with experts from other disciplines and work together to advance the research agenda. However, it is difficult enough to work with other academics within the same discipline. Is it easier or harder to work with those of unfamiliar disciplines? This can also create a dilemma for the journal editor. Cross-disciplinary research teams would seem to call for cross-disciplinary editorial review boards (Rotfeld, 2009).

Importance of Technical Competence: Entrepreneurship and cognition experts are certainly confronted with this dilemma when desiring to incorporate neuroscience-based methods. The past few decades have seen great strides in development of new instrumentation in the medical field and correspondingly the use of these devices in fields such as neuroeconomics. There is much to learn about the technical aspects of setting up experiments, sourcing equipment and technicians,

understanding software, and reading and interpreting results that accompany this type of research but this is indeed a new frontier (Krueger & Welpé, 2007). Some of these research elements may be incorporated by every researcher in the social sciences as a matter of course (e.g., what does the literature say about the brain-based correlates of the particular area of study), others will require cross-disciplinary teams trust, respect, and cooperation when using brain-based experimental approaches to test theories.

Perceptions, Antecedents and Consequences

If perception is central to understanding how we apprehend opportunities, then it is imperative that we understand perception (Douglas, 2009). Here, neuroscience has much to offer us. It also helps us to better understand mechanisms that facilitate or inhibit opportunity-related perceptions such as creativity.

Similar to studying black holes in space, brain-based research reveals that the subconscious is present and influential; however, it cannot be directly observed or measured (Blair, 2010). It is proposed here that the interface of cognition might be thought of as three somewhat fluid junctures of temporal, neurological space: (1) starting with “oblivious” where the subconscious may be working on it but the conscious has not perceived it also known as *pre*-cognition (Aimar, 2008; Hayek, 1952; Libet, 2004 [1999]); (2) to *para*-cognition (there is something nagging, on the tip of the tongue, at the edge of consciousness, you have almost got it); (3) to perception or *re*cognition (aha!) (Haynie & Shepherd, 2007; Schraw & Dennison, 1994). Further, there is a feedback loop that sends messages back to the subconscious for recycling and revision (Balzer et al., 1989) (Fig. 13.2).

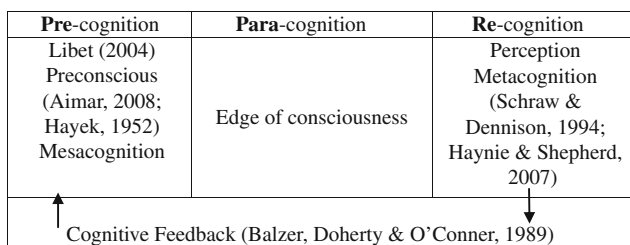


Fig. 13.2 The three junctures of temporal, neurological space

Metacognition is the ability to reflect upon, understand, and control one’s learning to formulate strategies for processing a changing reality (Schraw & Dennison, 1994). After the cycle from pre-cognition to recognition which can be in an instant or perhaps take months, capabilities for metacognition play a role. Finally, cognitive feedback “serves to aid the decision-maker in appropriately interpreting how the decision criteria relevant to a given task relate to each other holistically in the context of the decision outcome” (Balzer et al., 1989). How does this explain the thought processes of entrepreneurs? Are there differences in the way the entrepreneurial

brain works as versus the non-entrepreneurial brain at each of these cognitive junctures? We propose these hidden cognitive processes contribute to the difficulty in entrepreneurship research in identifying how opportunities are recognized and offer fertile ground for new thinking and research.

Before the Entrepreneur – An Entrepreneurial Mindset and Complex Thinking

Hayek (1952) defines mind as “a particular order of a set of events taking place in some organism and in some manner related to but not identical with, the physical order of events in the environment” (Horwitz, 2005). Koppl and Minniti (2003) briefly discuss some approaches to a theory of mind as related to entrepreneurial learning and knowledge structures though stop short of addressing biological interactions. Aimar (2008) analyzes the classic Austrian economists’ efforts to isolate and understand tacit and conscious knowledge and the difference between the preconscious (Hayek, 1952) and the conscious. McGrath and MacMillan (2000) portrayed the entrepreneurial mindset as a dynamic decision process that is central to success in an entrepreneurial environment. Ireland, Hitt, and Simon (2003) further developed the concept of entrepreneurial mindset and the necessary cognitive tasks as:

- Making sense of opportunities in the context of changing goals;
- Constantly questioning one’s “dominant logic” in the context of a changing environment; and
- Revisiting “deceptively simple” questions about what we think to be true about the markets and the firm.

Cognitive adaptability “captures some of the cognitive underpinnings of the entrepreneurial mindset” and proposes that it can be enhanced through the development of metacognition (Haynie & Shepherd, 2007). Psychologists use the term “executive system” to identify that part of the brain responsible for handling novelties with which it is confronted. Related to the C system (reflective system) as identified by neuroeconomists (Lieberman et al., 2002) it may function at the pre- and para-cognition levels for sense-making.

Miller and Cohen (2001) discuss how the pre-frontal cortex (PFC) is thought to participate in cognitive control in that it maintains “patterns of activity that represent goals and the means to achieve them.” These patterns “provide bias signals throughout much of the rest of the brain, affecting not only visual processes but also other sensory modalities, as well as systems responsible for response execution, memory retrieval, emotional evaluation, etc.” The example used is at the train station waiting to meet a friend who will be wearing a red coat. The brain filters and sees red in an effort to find the right red and find the friend. This is at the recognition level where the brain knows for what it is searching. Is there similar functioning at the

pre- and para-cognition levels? Shane (2003) argues that entrepreneurship uses a qualitatively different decision-making process for example, than that used in standard marketplace transactions (Krueger & Day, 2009). Pech and Cameron (2006) argue that information becomes the catalyst for entrepreneurial behavior but “only because the entrepreneur is actively searching for opportunities with potential.” However, in problem-solving for entrepreneurship ideas have come from complex intentional structured searches as well as the “aha” moment in the middle of the night. In both cases (the structured or the “aha” moment) the entrepreneurial idea can be either accidental, that is, something was discovered or uncovered that was totally unexpected leading to a new direction, or it can be a new solution (combination) enacted in answer to a specific problem that has already been identified. A theory of mind of the entrepreneur may be developed where social neuroscience (Cacioppo & Berntson, 1992) which focuses on brain-based underpinnings of social behavior of the entrepreneur, intersects with cognitive neuroscience which seeks to understand the neural substrates of mental processes and resulting entrepreneurial behavior of an individual.

Complex Thinking

“[T]he degree of complexity of the human mind is logically greater than the complexity of consciousness” (Aimar, 2008). As we suspected, there is much more going on in our brains than that of which we are conscious; there is “more than one set of cognitive structures that reflects the expert mindset, and it is also likely that there is more than one configuration of developmental experiences to get there” (Krueger, 2009a). We can argue that opportunity identification often reflects relatively sophisticated skills at counterfactual thinking (Gaglio, 2004) and an expert mindset (Krueger, 2008). Those “who access metacognitive processes are more adaptable given dynamic and uncertain contexts” (Earley & Ang, 2003; Haynie & Shepherd, 2007). Could it be, therefore, that the capability for complex thought is a prerequisite for entrepreneurship?

A New Look at Individual Differences?

It is anecdotally easy to perceive that entrepreneurs are somehow “different” at a trait level but very few rigorous studies found any such differences (De Carolis & Saporito, 2006; Shaver & Scott, 1991). What if the classic trait studies in entrepreneurship had little success because they measured the symptoms if you will, rather than the source of entrepreneurial behavior? Could the source of entrepreneurial behavior be deeper, somewhere in our neurology, reflected in the feedback (and forward) process of the “three junctures of temporal, neurological cognitive space?” Is there a genetic covariance associated with entrepreneurship

(Johnson, 2009; Nicolaou & Shane, 2009)? Are there strong “hard-wired” differences in metacognitive awareness (Haynie & Shepherd, 2007)? Han and Northoff (2008) recently showed how we can tease out nature and nurture through comparing cultural differences to differences in neural substrates.

Stanton and Welpé (2010) build on an emerging body of research in neuroeconomics on risk, uncertainty, and ambiguity and apply its findings to entrepreneurship with important implications. It has been found that different parts of the brain engage (light up, if you will) when under conditions of risk versus conditions of uncertainty. This finding alone can give us clues as to what is going on in the brain and specifically for our case the entrepreneurial brain in, for example, the recognition and exploitation of opportunities under these conditions. It provides another foundational pillar for theory-building and theory-testing in a variety of branches, showing, for example, that there are deep subconscious drivers of entrepreneurial behavior that when identified might lead to insights into previously inexplicable behavior and decisions.

The study of attitudes, self-efficacy, complex thinking skill, role identity (Krueger, 2008; Shaver & Scott, 1991), biases (existing, learned sense-making mechanisms, Haynie & Shepherd, 2007), emotions, heuristics (Pech & Cameron, 2006), and “metacognitive awareness” deserves another examination in light of neuroscience and genetics research methodologies that allow a deeper look. Consider, for example, gender-based studies that have begun to surface some tantalizing hints of consistent differences (e.g., Holmquist & Carter, 2009) that we may be able to link to neurological differences such as differences in oxytocin levels (Stanton et al., 2008).

Creativity

Let us now consider that opportunity recognition is very much a creative process (Hansen et al., 2006) and creativity is another domain where we can see the impact of brain-based science. It has been shown that social diversity and creativity have a positive relationship with new firm formation (Lee, Florida & Acs, 2004). Yet while there has been interest in the potential connection between creativity and entrepreneurship (e.g., Gilad, 1984; Whiting, 1988), studies of creativity and entrepreneurship have primarily examined the differences in entrepreneurial thought processes within creative industries, generally in micro-businesses (Colas, 2005; Poettschacher, 2005) and distinctive approaches to creative entrepreneurship in the management of and achieving goals for a particular business (Davies, 2005; Rae, 2005). Fewer studies have sought to explore creativity and the formation of new ventures directly.

Nyström (1993) defines creativity as the balanced unfolding and converging of experience, visioning and creating the future. In the creative process, Ward (2004) argues that “[c]reative ideas do not appear, ex nihilo, full-blown in the minds of their originators, but rather must be crafted from the person’s existing knowledge.”

He asks: “if new ideas are rooted in old ones, how does novelty emerge?” Rather than throwing out everything they know and starting fresh, in the creative process entrepreneurs build upon that deep, embedded, tacit knowledge and then use conceptual combination, analogical reasoning, and abstraction methods to apply it creatively to find novel and useful ideas to exploit in the marketplace (e.g., the process involved in the three junctures of cognitive space with feedback loop).

Further, Ward notes that “[b]y distinguishing between processes associated with initial problem formulation and subsequent procedures, such models draw attention to that fact that creativity may be more than just problem solving” (Ward, 2004). This is reminiscent of Shane’s argument that too often entrepreneurship research studies measure the precondition [pre-entrepreneurial decision processes (pre-stage) including cognition and affective influences (cf. Shane, 2000, 2003)] and the reaction to those preconditions (valuation then decision to exploit) as combined events, rather than separating these as very distinct processes. Dunham and Venkataraman (2006) propose that the human ability to act creatively has been poorly served by approaches that only consider rational choice. They go so far as to state that “we will not be able to develop compelling explanations of entrepreneurial activity until we make a fundamental adjustment to our underlying assumptions of human action. We suggest replacing our reliance upon a rational actor model of human behavior with a model that accommodates actors’ abilities to act creatively.” This is an area that demands much further investigation and the application of biological- and neurological-based methods could provide great insights to these processes.

Economic Depression, Psychological Depression, and Creativity

Kets de Vries (1996) famously argues that psychological negatives can drive positive entrepreneurial behaviors. In entrepreneurship research there have been some studies tying economic depression in a given economy to increased entrepreneurial activity (see, for example, Boyd, 2005; Pietrobelli et al., 2004; Yusuf & Schindehutte, 2000). In these studies, job loss is a measurable explanatory factor effecting new venture formation. However, there is typically no connection made at the individual level between job loss and any corresponding psychological depression; that is presumably left to the field of psychology. Anecdotally, it is a shock when one loses one’s employment and it is not a stretch to make such a connection. However, a link between artistic creativity to psychological depression and other affective disorders has indeed been established (Akinola & Mendes, 2008). Does artistic creativity follow the same processes as entrepreneurial creativity? Or are these distinct types with processes carried out in separate areas of the brain?

Akinola and Mendes (2008) carried out an experimental study of affective vulnerability comparing baseline and post-treatment measures of levels of an adrenal steroid, DHEAS (dehydroepiandrosterone sulfate) that has been linked to depression. They found the highest levels of artistic creativity in participants that presented with the lowest baseline levels of DHEAS. It would be interesting

to undergo a similar study comparing entrepreneurial creativity under varying conditions linked with depression. Perhaps even short periods of intensive negative emotions resulting from depression can result in great bursts of entrepreneurial creativity. Correspondingly, could there be any portion of increased entrepreneurial activity that might be explained by psychological depression or, like artists, the entrepreneurs' coping mechanism?

Current Thinking about Entrepreneurial Intentions

If we care about how entrepreneurs emerge, then it cannot be too surprising to see the extent of interest in critical preconditions that facilitate or inhibit this emergence (Davidsson, 1991; Krueger, 1993, 2000; McMullen & Shepherd, 2006; McMullen et al., 2007; Levie & Autio, 2008; Shapero, 1975, 1985). Entrepreneurship scholars once used terms such as "budding entrepreneurs" but adoption of the more specific term, "intentions" had added focus (and thus more rigor) to this fascinating research area. In return, this is an arena where entrepreneurs can perhaps "give back" fruitfully to other disciplines. For example, it is increasingly evident that simplistic modeling may yield a sizable r-squared but are we really understanding causation?

Is it not reasonable to consider that critical entrepreneurial behaviors are at least partly voluntary? Philosophers (we recommend Bratman, 1987) argue persuasively that intentions are central to voluntary human behavior. Indeed, psychologists and philosophers alike define "intention" as a cognitive state temporally and causally prior to the target behavior. That is, intent is the cognitive state immediately prior to the decision to act. Empirically, intentions are consistently the single best predictor of subsequent behavior (even if the predictive power is underwhelming.) Why? Conventional wisdom says that any planned behavior is intentional. Essentially, if a behavior does not result from stimulus-response, it is intentional. Or is it? It is certainly not that simple.

When is "intent" intent? Consider the classic work of Benjamin Libet et al. (1983) where experimenters can often detect human intent in advance, suggesting a *neurological* antecedent to intent and behavior. In turn, that opens the door for us to ask some new questions as well as shedding light on some older ones (such as the antecedents of entrepreneurial intent.) After wiring up the subjects the experimenter asks them to raise either hand. *Before* subjects are aware of it themselves the experimenter can quickly discern which hand each subject will raise. Next, the experimenter induces the subject to raise either the left or right hand. The subject perceives the completely induced choice as free will. A neuroscientist can see our intentions before we perceive we have formulated them. The implication: we may perceive intent toward a discrete behavior even where it is completely illusory. What does this mean for our models and measures of entrepreneurial intentions that we have carefully developed from proven theory and refined through rigorous empirical analysis? What does this say about all our other carefully considered

cognitive phenomena in entrepreneurship? It bids us to be cautious in our methods and rigorous in our theories but it also tells us of the great potential for future research.

If we are interested in studying new ventures, then we need to understand the processes that lead up to their initiation. From a cognition perspective, that entails a better understanding of the intent to initiate entrepreneurial activity and the reasons driving them (Shaver, 2007). Psychologists have long found intentions to be highly useful in understanding behavior. Also, an increased focus on intentions pushes researchers away from more retrospective research designs toward more prospective designs. It allows a greater emphasis on predicting versus explaining. However, it is not entirely clear that is what we are seeing empirically.

We seem to be blessed with theoretically sound, empirically robust formal models of human intentions toward a target behavior that appear to converge on highly similar sets of critical antecedents to intentions (e.g., Bagozzi and Warshaw, 1990). The breadth and depth of research on entrepreneurial intentions is well-documented elsewhere (e.g., Gregoire et al., 2009; Krueger, 2009b) but let us concisely recap its evolution.

Theory of Reasoned Action, Theory of Planned Behavior, and Shapero's Model of the Entrepreneurial Event

Ajzen and Fishbein's Theory of Reasoned Action and Ajzen's Theory of Planned Behavior (TPB) surfaced as the dominant class of intentions while, interestingly, the domain of entrepreneurship already provided a model quite similar to TPB presaging Ajzen's TPB by several years. Shapero (1975, 1982) proposed the following, the "entrepreneurial event" (initiating entrepreneurial behavior) depends on the presence of a salient, personally credible opportunity. Homologous to Ajzen, a credible opportunity depends on two critical antecedents: perceptions of desirability (both personal and social) and perceptions of feasibility plus the useful concept of the "precipitating event," something that would "displace" the decision maker from the inertia of existing behavior and drive the decision-maker to reconsider her/his opportunity set which might now have entrepreneurship as a salient and most credible personal opportunity.

First tested in the entrepreneurship domain was Shapero's model where it found considerable support (Krueger, 1993a). Subsequently, Krueger and Carsrud (1993) proposed consideration of Ajzen's TPB (Carsrud & Krueger, 1996). Others, especially Kolvereid (1996; Iakovleva & Kolvereid, 2009), have found great success in adapting TPB to entrepreneurial samples. This ultimately spawned a comparative test of TPB and SEE, finding support for both models (Krueger et al., 2000). Post hoc analysis suggested that the optimal model would include propensity to act from SEE and social norms from TPB (see Fig. 13.3). Both Ajzen and Shapero provide us a theory-driven and empirically robust model at the surface level (Simon's "semantic" level). However, theory and methods from cognition research offer us the opportunity to dig deeper into the underlying cognitive structures (Simon's "symbolic" level).

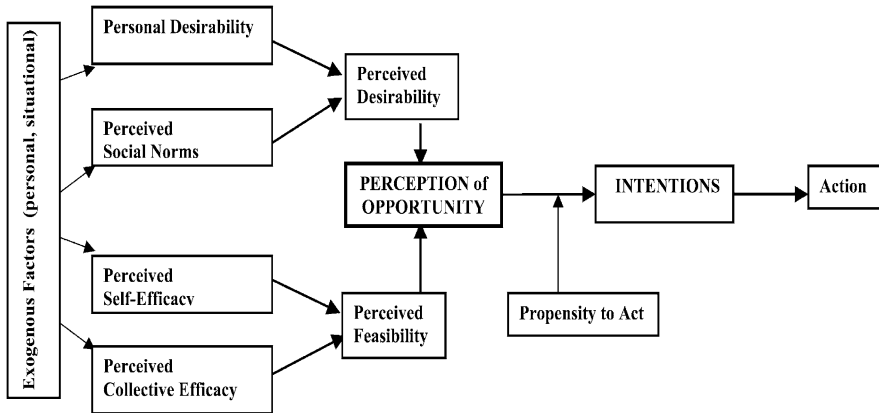


Fig. 13.3 Intentions model (Krueger, 2000; Krueger & Brazeal, 1994; Krueger et al., 2000; Shapiro, 1982)

If the field of entrepreneurship has now experienced a “boom market” in entrepreneurial intentions, in some cases, research has ignored much of the key literature (and some have ignored almost all of it). However, it does appear that the strengths of the formal intentions model have led scholars to use it with great confidence and perhaps too little critical thinking. As Libet’s findings show, chinks in the model’s armor are growing.

Disadvantages of Intentions Models

First, intentions can change, especially for relatively distal or complex behaviors. As such, the intent to start a business is far from persistent. However, this generates a golden opportunity for researchers to study the changes in entrepreneurial intentions. Changing intentions is relatively unexplored in any domain; the entrepreneurship domain should prove especially useful in explicating the underpinnings of changing intentions.

Direction of Causality? Next, there is still debate over the direction of causality. In particular, intentions can be seen as simply another attitude, just more visible. Robinson et al. (1991) argued for Allport’s (1935) approach where behavior depends on a troika of critical attitudes: Affective, cognitive, and conative [intent], even developing a much-underused measure of entrepreneurial attitudes.

More recently, work by Brännback et al. (2006) and Krueger and Kickul (2006) both stumbled across an unusual finding. While perceived desirability and perceived feasibility were significant antecedents of intentions, as expected, a rudimentary test found that desirability and intent also clearly predicted feasibility and that feasibility and intent clearly predicted desirability – almost equally. In fact, the Brännback et al.’s (2007) data seems to suggest that feasibility may prove – statistically – to be the dependent variable.

Dynamic Process, Static Snapshot? What if the intentions model as a dynamic formulation exhibits feedback loops? If we can convert the intentions model into a model of changing intentions, we can readily present strong theory for intentions influencing its “predictors.” Also, we know relatively little about the temporal dimension, thus we can explore intentions toward when a prospective entrepreneur might undertake an intended venture through the enactment of temporal issues (Bird, 1992; Fischer et al., 1997; West & Meyer, 1997).

Dynamic Modeling of Intent: Implementation Intentions

Gollwitzer (Gollwitzer & Brandstatter, 1997; Gollwitzer & Sheeran, 2006) and others have gone beyond intentions toward a goal and investigated intentions toward implementation. Strong intentions toward implementing an intended strategy may play a more significant role than we might think and often entail different dynamics than intentions toward the goal per se. That is, goal intent is not enough; a strong intent to implement may well represent a very different set of mental models much as Bratman (1987) argued that intent is not really a genuine intention without a significant level of commitment to that intended goal or behavior. Little research has looked explicitly at implementation intentions in entrepreneurial settings, although studies are currently underway (see Elfving et al., 2009, for supportive initial evidence).

Dynamic Modeling of Intent: Bagozzi's Theory of Trying

Figure 13.4 depicts one highly promising vehicle for embracing these specific dynamics in Bagozzi's Theory of Trying (ToT; Bagozzi & Warshaw, 1990; Bagozzi et al., 2003; Dholakia & Bagozzi, 2002). The parsimony (and seeming explanatory robustness) of the Theory of Planned Behavior allowed TPB to predominate intentions research. However, Ajzen's model presumes that the target behavior be under volitional control. That is, it assumes no particular barrier thus it does not actually lend it itself to addressing intentions toward a goal (under partial volitional control; simply put, something that requires trying to achieve). Moreover, part of the complexity of using ToT lies in explicit consideration of emotional reasoning. “Hot” cognitions are, however, necessary to consider in dynamic models of human cognition (Fig. 13.4).

Consider Bagozzi's most recent version, his theory of effortful decision-making (Bagozzi et al., 2003) in Fig. 13.4. Note that this variation on the Theory of Trying explicitly includes two phases of the decision process, goal intent, and implementation intent. But also note that rather than taking a simple snapshot of attitudes relating to the intent, the model explicitly considers the cognitive and emotive appraisal processes that we observe in any significant human decision-making.

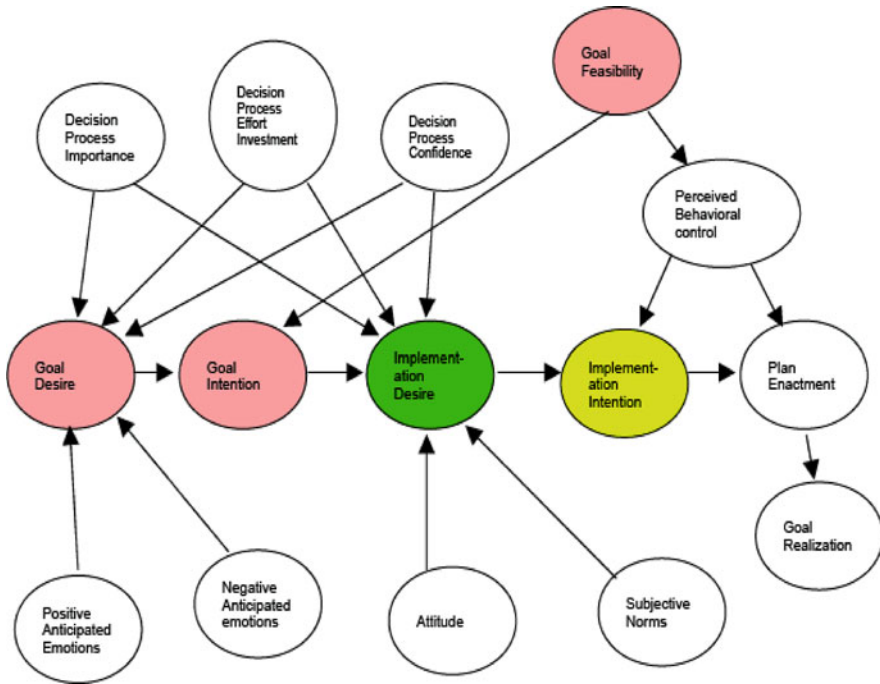


Fig. 13.4 Theory of effortful decision making (Bagozzi et al., 2003; Carsrud & Brännback, 2009)

In this case, we know that entrepreneurs engage in such appraisal and this has become an important research area of its own (e.g., Michl et al., 2009).

To put another way, the Theory of Trying captures that the process of how entrepreneurial intentions evolve entails hot cognitions not just cold cognition. Note the following experiment where serial entrepreneurs are compared to successful managers by Cambridge University's neuroscience experts in Barbara Sahakian's lab (Lawrence et al., 2008). On tests of pure "cold" cognition, they did not differ, but on "hot" cognitions (where emotions are closely engaged in decisions) the successful entrepreneurs clearly outperformed the managers. Successful entrepreneurial thinking appears to require expert management of both rational and emotional reasoning. Not terribly surprising to most entrepreneurs, but these insights surfaced much faster because Sahakian's team had an advantage in theory and methodology. Please note that this was good neuroscience but there was no need for expensive tools like the fMRI, only good theory and skillful experimentation. Of course, as we get better at using neuroscience, we will find the use of tools such as MRI, fMRI, etc., to be essential. What is important is to see that "neuro-entrepreneurship" is ready to join neuroeconomics, neuromarketing, neurofinance (and even neuroethics) as a productive field of study (Stanton et al., 2008, Krueger & Day, 2009).

Possible Evidence for Phase Changes?

If effortful decision-making changes qualitatively as intentions emerge, evolve, and coalesce into commitment and action, then it seems very likely that the intentional mindset changes qualitatively across the process. For a simple example, consider nascent entrepreneurs (i.e., those farther along than merely potential but not yet fully launched). Their launch is underway, but not yet completed, so they are still facing numerous complex decisions about future intentional behaviors. Of course, even a long-established entrepreneur faces many complex decisions but entrepreneurial nascency may impose a somewhat more structured set of issues. Research based on the rich data sets from the Panel Studies of Entrepreneurial Dynamics (PSED) is well underway and one must suspect that we will find some intriguing results – and not a few surprises. We will revisit this issue in the section below on entrepreneurial deep beliefs.

Passion, Affect, and Emotions

Is it possible to discuss entrepreneurs without discussing entrepreneurial passion (Cardon et al., 2009)? Whether scholar, educator, or public stereotype, we associate entrepreneurial activity with highly salient emotional engagement (and commitment?). Emotional (and rational) cognitive appraisal in entrepreneurs is another research area of immense promise (we recommend insights from Isabelle Welpel and colleagues, e.g., Michl et al., 2009). Any discussion of entrepreneurial thinking, including entrepreneurial intentions, requires careful, rigorous attention to the important aspects of how our decision-making is thoroughly intertwined with rational and emotional appraisal. Parallel to this, Baron (2008) recently mapped the remarkable breadth and depth of research issues touching upon entrepreneurial affect.

To study “hot” cognition in entrepreneurs requires careful experimental design (Krueger & Welpel, 2007) but that is already proving invaluable, especially in settings that unavoidably engage strong emotion such as failure (Shepherd et al., 2009) or fear of failure (Klauckien & Patzelt, 2009). Preliminary evidence suggests that leadership’s management of subordinate affect has a direct effect on entrepreneurial creativity (e.g., Kollman & Lomberg, 2009). Other recent experimental research has looked at differentiating how potential entrepreneurs appraise opportunities rationally and emotionally (Krueger & Welpel, 2008; Krueger et al., 2009). That is, the cognitive and emotional appraisal of opportunity identification, evaluation, and exploitation differs for the social dimension of an intended opportunity from the appraisal of the economic dimension. The economic dimension appears to engage primarily rational (“cold”) cognition while appraisal of the social dimension appears to engage both (“hot” cognition) which is useful in understanding the role of entrepreneurial passion (Krueger et al., 2009). The next step will be to begin delving more deeply into the key beliefs that anchor appraisal.

Non-Compensatory Decision-Making in Evoked Opportunity Sets

Why are anchoring beliefs important? Important human decisions are inherently complex. In purely compensatory decision-making, there are always tradeoffs, but in non-compensatory (or lexicographic) decisions, there will be non-negotiable decision criteria. Human decisions that involve multiple criteria almost always include at least one non-compensatory attribute (which neuromarketing argues is often far from obvious). Recent work by Krueger, Kickul, Gundry, and Verma (2006) examined the key attributes of intended ventures and found clear evidence for intentions reflecting significant lexicographic (non-compensatory) preferences. If human decision-making – such as decisions relating to the intent toward launching a venture – is a mix of compensatory and non-compensatory decision criteria, our linear additive models may leave much useful information unaddressed.

Self-Efficacy Beliefs: Critical Correlate of Intent

If underneath the intentionality of opportunity (and thus entrepreneurial) emergence are critical antecedents, it becomes critical to explore the sources of those antecedents. While we have already addressed the role of experience-driven perceptions, let us delve deeper into one specific antecedent, perceived feasibility, and the belief structure that drives it: Bandura's construct of self-efficacy.

One powerful attitude that drives human decision-making is our sense of competence, our belief that we can execute a target behavior (Bandura, 1986, 1995). Bandura would argue that sizable changes in self-efficacy reflect cognitive change at a very deep level. Self-efficacy is best influenced by direct mastery experiences, however, vicarious learning (e.g., behavioral modeling) is also well-documented. Since Bandura proposed self-efficacy theory over 20 years ago, its research literature has become broad and deep. Of late, entrepreneurship research has increasingly taken advantage of self-efficacy theory (Mauer et al., 2009).

While Bandura's description of the self-efficacious individual (optimistically persistent) sounds as though he is referring to entrepreneurs, the first inkling of self-efficacy's importance came from Robert Scherer and his associates (1989) who found that parents' impact on their children's entrepreneurial attitudes depended on whether they influenced their children's sense of entrepreneurial competence (see also Neergaard's work in Section "Deep Beliefs and Knowledge Structures" below.) Alan Carsrud and colleagues (1987) came to similar conclusions about role models and mentors, suggesting that changing critical attitudes such as self-efficacy perceptions is an important element in promoting entrepreneurial thinking.

Key Conceptual Work: Even earlier, Shapero (1975, 1982) discussed the centrality of perceived feasibility in judging that a potential opportunity is personally credible, though without using the term self-efficacy. This led to operationalizing Shapero's model of the entrepreneurial event with self-efficacy as the key antecedent of perceived feasibility (Krueger & Brazeal, 1994; Krueger et al., 2000).

While interest was slow to increase in using self-efficacy in entrepreneurship (Krueger, 1989), Brown (1996) proposed a look at self-efficacy regarding resource acquisition, marshaling resources being a crucial element in successful entrepreneurship. This narrower domain illustrates the need to focus on the critical dimensions of entrepreneurial competencies. While Brown focused on a specific dimension, Alex DeNoble et al. (1999) developed a measure to tap multiple entrepreneurial competencies while Chen et al.'s (1998) measure is broader still. Although Bandura considers self-efficacy as being task-specific, measures of general (not task-specific) self-efficacy have been proposed and validated, and Robert Baron argues that this broadest conception of entrepreneurial competency should also be useful. This suggests the value of a validity study that rigorously compares the existing measures (Kickul & D'Intino, 2005).

Key Early Empirical Work: While self-efficacy was originally conceived as a Person X Situation variable, some scholars have explored self-efficacy as a person variable. Although the term self-efficacy was not used, an interesting study by Chandler and Jansen (1992) developed and tested a measure of perceived competence to great success: Entrepreneurs do perceive themselves as highly competent. More recently, Baron found that entrepreneurs score higher on a measure of general self-efficacy. Gatewood and colleagues (2002) explored links between perceived ability and expectancies. These latter three studies reinforce the potency of self-efficacy as a useful construct in this domain, but they also suggest that we need to be careful that the theoretical basis for research is aligned with the empirical methods that we employ.

Work by Scherer, Shapero, and others led to a major experimental study that directly tested the impact of self-efficacy on opportunity and threat perceptions and on risk taking (Krueger, 1989; Krueger & Dickson, 1994). This study found that self-efficacy significantly influenced opportunity and threat perceptions. In turn, opportunity and threat perceptions influenced risk taking in two different tasks. More important, the findings show that the impact of self-efficacy was task-specific; that is, despite the two tasks being highly similar, self-efficacy on one task did not influence self-efficacy on the other.

Measurement is important and challenges remain in measuring entrepreneurial self-efficacy. Chen and colleagues (1998) developed a self-efficacy instrument that attempts to capture the key dimensions of entrepreneurial competency. DeNoble et al. (1999) developed an instrument that captures a narrower notion of entrepreneurial competency with less focus on managerial tasks. Both instruments appear psychometrically sound and demonstrate considerable validity. Similarly, students in entrepreneurship classes demonstrate small, but significant positive changes in entrepreneurial self-efficacy even over a semester (e.g., Krueger, 2001).

Future Directions for Entrepreneurial Self-Efficacy Research: Considerable work remains ahead in developing (and deploying) more refined self-efficacy measures. Brown's example of developing a reliable, valid measure of a more specific competency fits well with the conception of self-efficacy as task-specific; other competencies are worthy of similar analysis. We also need to assess the relative impact of more task-specific measures and of general self-efficacy.

We should also test the relationship between levels and changes in self-efficacy with deeper cognitive structures. If Bandura is correct, major shifts in self-efficacy should be associated with significant change in scripts and maps [see next section]. For example, is a high level of self-efficacy at opportunity recognition associated with evidence of an expert script for opportunity recognition? In many ways, the entrepreneurship domain should prove ideal for testing these as yet untested relationships.

However, the two most promising trajectories for entrepreneurial self-efficacy research are relatively new. Helle Neergaard and colleagues (Mauer et al., 2009) has turned the table and examined self-efficacy as a consequence (entrepreneurial self-efficacy as dependent variable, not independent). From whence do self-efficacy beliefs arise? How do they develop cognitively? For example, how do youthful experiences affect self-efficacy perceptions whether playing sports or even fairy tales?

The other key direction derives from the realization that self-efficacy is likely intertwined with other control beliefs. Monsen and Urbig (2009) have combined self-efficacy and locus of control into a very promising model of mixed control beliefs that has significant implications for other cognitive phenomena, including entrepreneurial intentions.

Deep Beliefs and Knowledge Structures

Most human decision-making occurs via automatic processing. Oversimplifying a bit, we possess a large set of if-then rules to guide our behavior. Many decisions simply derive from a relatively limited set of decision rules based on an equally limited set of very deep anchoring assumptions. Only relatively few human decisions are processing mindfully and even there we might find these deep assumptions still in play.

As such it becomes very important to understand as best we can what deep assumptions lie beneath our intentions (Krueger, 2007). Moreover, these assumptions also represent the critical architecture of how we structure our knowledge (including our cognitive scripts, schemas, and maps). This certainly seems to be the next frontier in entrepreneurial intentions research, if not entrepreneurial cognition in general, and we urge the reader to give significant thought to these issues.

If critical attitudes such as self-efficacy lie beneath intentions, what lies beneath *those* attitudes? In Simon's terms, we move now from the "semantic" level of knowledge representation to the "symbolic" level and explore how these levels interact.

Cognitive science has long shown how attitudes and beliefs expressed on the surface also reflect their genesis in deeper structures of how we represent knowledge and how knowledge is interrelated. That is, knowledge does not exist just as discrete "data" but knowledge is interconnected. Think of it as a relational database where data entries include how each datum is linked to other data. Again, this suggests

that skillful application of theory and methods relating to pattern recognition could prove extremely illuminating.

It is critical to understand how all these cognitive phenomena are interconnected. Bird (1992) argued early on that entrepreneurs' intentions are driven by deeper structures such as schemata. More important, though, is that this under-researched arena could prove immensely fruitful, not just for research but also for enhancing our ability to stimulate entrepreneurial thinking at a very deep level. It might, for example, allow us additional tools to compare different types of entrepreneurs (e.g., Westhead et al., 2005).

This is much more than metaphor. These deeper structures are powerful influences on how we think. If we are to enhance entrepreneurial thinking beyond a superficial level, we need to help entrepreneurs change these deeper structures in appropriate directions.

Automatic versus Intentional Processing

Deep beliefs come into play unobtrusively whenever we gain sufficient experience such that a once mindful process evolves into an automatic process. While we may often exhibit intentional, planned behavior, much of our decision-making operates via automatic processing, driven by deep assumptions of which we are likely unaware. This is highly adaptive in that we cannot consciously process every single decision we face. If we have automated how to drive out of a skid on an icy road, that is good. If our deep assumption is an ugly racial prejudice, that is very bad. What may seem purely instinctive is often completely learned. Understanding the deep "why" of our decision-making is imperative. Cognitive mechanisms worth considering here include mental prototyping, schemata (and schemas), scripts, and maps.

Since we operate under significant bounded rationality, there are many gaps that our minds readily fill – often based on very deeply seated assumptions. Consider, for example, role identity and related constructs such as perceived role demands. Our mental prototypes of "opportunity" and of "entrepreneur" differ widely and are almost certainly anchored by powerful deep assumptions (Krueger, 2007). Despite the effort required to surface these deep beliefs, it may be the only way to truly understand these mental prototypes that are so important (e.g., Baron & Ensley, 2006). We all have mental prototypes (not just stereotypes per se) of "opportunity" and of "entrepreneur." If someone's mental prototype of "entrepreneur" does not include them, it will be much harder for them to become (let alone succeed at) entrepreneurial (Baron, 2006; Krueger, 2007).

Schemata, Scripts, and Maps

This area has seen the most development and the most fruitful results. Kets de Vries (1996) has shown how deep beliefs about "how things work" and deeply seated "hot buttons" can have profound positive and especially negative (1996) effects

on entrepreneurial behavior which can be characterized as more entrepreneurial schemata (e.g., Alvarez & Barney, 2008).

In scripts, the work of Ron Mitchell and associates has been highly visible, even outside the field of entrepreneurship (e.g., Mitchell, 2005; Mitchell et al., 2000, 2009). The key trigger for this whole approach has been the realization that experts think differently than novices. How experts become experts is reflected in the development of an “expert” script. (A script is, as its name suggests, a cognitive mechanism that comprises the key elements in a decision situation and the likely ordering of events.)

The “expert” script can differ from the “novice” script in any number of ways: It can be more complex but can be more parsimonious. In most cases, the knowledge involved will differ (the obvious case being that experts will typically have more accurate information). We cannot readily identify a script directly, but we can recognize the degree to which an expert (or novice) script is present. We do so by identifying critical cues that signal expertise (e.g., Mitchell & Chesteen, 1995; Mitchell et al., 2000).

Mitchell’s original work focused primarily on differences between expert and novice scripts regarding entrepreneurship writ large (1995). However, he and his colleagues have continued by identifying expert scripts for subprocesses such as expert scripts for marshaling resources or for identifying opportunities (Gustavsson et al., 2007) while others have extended the approach to intriguing domains (Neck et al., 2007; Welsh & Krueger, 2009). As we shall see in Section “Implications for Entrepreneurial Learning (and Education)”, this has powerful implications.

Connie Marie Gaglio and Jerome Katz (2001) approach the same topic of entrepreneurial scripts but from the perspective of seeking opportunity, to use Kirzner’s (1982) term, entrepreneurial “alertness.” Understanding the overall expert script is invaluable but drilling down to more specific cognitive processes (e.g., counterfactual thinking) affords researchers a look at the most fundamental aspects of entrepreneurial thinking. This too has important implications for teaching and training.

Cognitive maps have not been widely deployed in entrepreneurship research until recently (Brännback & Carsrud, 2009). Jenkins and Johnson (1997) cleverly linked the cognitive maps of entrepreneurs to measures of intention. Given the evidence from Mitchell and his colleagues that entrepreneurial training can measurably change an individual’s scripts toward those of an expert, so too should we see measurable changes in an entrepreneur’s (nascent or otherwise) maps. We might also find it useful to see how maps and scripts relate to one another. Entrepreneurship could prove an ideal venue for such research that would offer a contribution far beyond entrepreneurship research.

Knowledge Structures Matter: Some Final Evidence

In recent years, we have realized new insights into how we learn to think entrepreneurially. We have found constructs that fully moderate the intentions

model. Differences in cognitive style can yield dramatically different pathways in the formation of intent. That is, the intentions model for learners who score as preferring intuitive thinking differs significantly from the model for those scoring as preferring an analytic cognitive style (Krueger & Kickul, 2006). “Another example:” “Push” or “necessity” entrepreneurs may differ from “opportunity” or “pull” entrepreneurs. Might one expect that an entrepreneur pushed into self-employment by necessity would focus first on feasibility perceptions whereas an entrepreneur “pulled” by an opportunity would consider desirability perceptions first?

This implies explicit consideration of differing initial beliefs (e.g., cognitive styles) among our students and, given the constructivist paradigm, implies encouraging a broad range of cognitive styles and other learning styles in our students. If the differences in something as simple as cognitive style matters that much, then what are the implications for all the other ways that students may differ cognitively?

One critical (and highly testable) implication is that learning processes can change deep mental models in the direction of better entrepreneurial thinking whether in terms of learning to see more/better opportunities or to see oneself as an entrepreneur (or as we have noted, both). Both Baron (2000b) and Gaglio (2004) demonstrate how the cognitive mechanism of counterfactual reasoning is a potent lever for stimulating students to question their existing mental models. This clearly suggests that measures of deep structures, whether scripts or maps or other possibilities, can be usefully deployed to research how entrepreneurial thinking changes as entrepreneurs learn to be entrepreneurial (and more expertly entrepreneurial) and thus examine how deep beliefs change across a training program (Krueger, 2001; Mitchell et al., 2000).

Future Research Direction: Phase Changes Revisited

Cognitive developmental psychology has long noted that human psychosocial development occurs in reasonably distinct stages connected by transition periods that are inherently experiential (Erikson, 1980). In children, it is the “terrible twos” that demarcates infancy and early childhood. We see very different knowledge structures in these different stages; we also see consistent (and diagnostically useful) phenomena that characterize transition. This affords us a good sense of someone’s psychosocial development and how to help them navigate transitions. What if entrepreneurial intentions evolve similarly, exhibiting phase changes?

If we plot intentions against a key attitude such as self-efficacy, we tend to see evidence that the optimal fit is not linear. It may be that noise and measurement error are amplified unpredictably, but one can also make the case that we are actually seeing one or two inflection points in the data that reflect a phase change in the evolution of individuals’ entrepreneurial thinking.

That is, as entrepreneurial intentions evolve, they go through different stages. Just as entrepreneurial ventures move from ideation to nascency to launch, might not intentions follow a similar pattern, moving from one cognitive regime to another?

If so, we should see interesting cognitive differences between the regimes. How do knowledge structures differ across the phases? What are the critical developmental experiences associated with each phase *and* with each transition? For example, Erikson (1980) would argue that transitions would necessarily engage hot cognitions. (Please see Fig. 13.5 below.) Such evidence would also be of invaluable diagnostic assistance to educators and to practitioners.

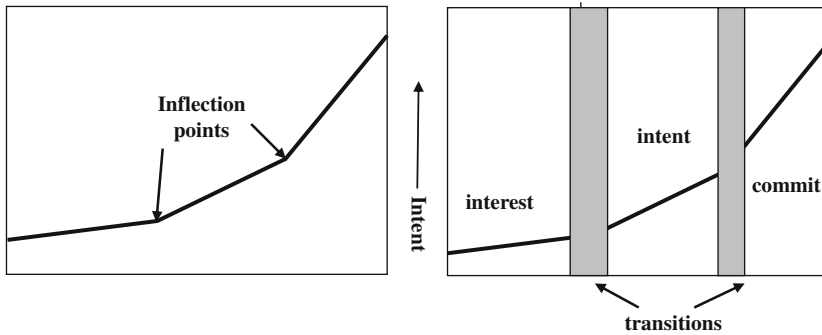


Fig. 13.5 Phase change model of intentions (Brännback et al., 2007; Krueger, 2009)

Implications for Entrepreneurial Learning (and Education)

What do entrepreneurs need to learn? How do they best learn that knowledge and the necessary skills? It seems reasonable to note that entrepreneurs need to learn how to identify opportunities. Most research into entrepreneurship education has been descriptive, despite an increasing interest in theory-driven research (much like research into opportunity recognition). This area cries out for extensive theory-driven research.

What we are learning has enormous potential implications for entrepreneurial education (and in some ways we see best practice in pedagogy that fits the dynamic model of intent even better than the static case.) The process of learning (and ideally the process of educating) does much more than add knowledge content to the learners. The old behaviorist model of students as relatively passive vessels to be filled with information has largely given way to the constructivist model which assumes that the real objective of education is to help learners to evolve how they structure that knowledge. In short, train minds not memories.

However, it is equally important to recognize that while this process may increase their attitudes and intentions toward entrepreneurship, we must also increase them in productive directions. Inspiring an ill-informed student to launch a venture borders on the negligent. The goal, of course, is to move learners from a mindset that is closer to a novice entrepreneur toward a mindset more like that of an expert entrepreneur with “informed intent” (Hindle & Klyver, 2009; Krueger et al., 2007).

“Filling a Pail” or “Lighting a Fire”?

There are two dominant paradigms in education. The traditional approach focuses on fact-based learning (includes rote memorization and repetitive drilling). Instructors typically provide the models and framework for knowledge being transferred to students. Constructivism argues for situated learning where students acquire knowledge but also have to develop their own ways of organizing the knowledge (building and changing their own mental models to represent knowledge). “Learning the answers” versus “finding the questions” is one way to think about the difference or one might use the words of W.B. Yeats paraphrased in the subhead above. Entrepreneurship educators tend to fall into the second camp (Krueger, 2009a).

Traditional methods provide greater control to the instructor and can appear as more efficient for large groups of students. Constructivistic methods tend to be much more student-centered, but this actually reflects how humans actually learn in daily life: by trial and error in a social setting. Moreover, if one wishes to change deeper cognitive structures such as scripts, then more student-centered learning is imperative. For example, Albert Bandura’s Social Learning Theory suggests an iterative process by which deeply held beliefs and attitudes co-evolve as learners actively acquire, process, and organize new knowledge.

Thomas Monroy (1995) was perhaps first to articulate that traditional classroom methods were not only less frequently used in entrepreneurship classes but probably are less effective than more experiential approaches. Rather, expert entrepreneurship educators tend to emphasize “problem-based learning” where learners focus on real-world issues, a focus that is a staple of most entrepreneurship courses. Indeed, the most popular and successful training techniques used in entrepreneurship tend to strongly reflect the constructivist model: Living cases (e.g., SBI), shadowing, etc. (Jack & Anderson, 1999; Krueger, 2009a; Krueger & Hamilton, 1996). Even when applied to more behaviorist tasks like business plans, reflective, constructivist approaches yield significant improvement (e.g., Honig, 2004).

Organizations (and communities) seeking a more entrepreneurial climate require more entrepreneurial thinking in its members (Krueger, 2000; Krueger & Brazeal, 1994). Classrooms are no different. As with organizations, educators must seek to develop a fertile seedbed that supports entrepreneurial thinking. This cognitive infrastructure supports entrepreneurial thinking and the changes in cognitive structures such as intentions and attitudes and even deeper cognitive structures such as students’ personal mental models of “what is an entrepreneur?” Am I an entrepreneur? But what influences change in such deep knowledge structures? What changes those deep anchoring beliefs?

Critical Developmental Experiences

Prior experience certainly influences perception of future opportunities (Shane, 2000) but this operates at a much deeper cognitive level (Krueger, 2007, 2009b). As learners move from novice mindsets toward expert mindsets, some changes are

highly incremental, especially where knowledge content is involved. However, the important changes involve knowledge structures where change is often more abrupt (e.g., “aha!” moments).

The Center for Creative Leadership has found that top managers share a surprisingly small set of critical developmental experiences [see Fig. 13.4] and an even smaller set of the lessons learned (McCall et al., 1988). We might profitably reprise that research for entrepreneurs. For example, we have some evidence that growing up in a family business influences attitudes and intentions toward entrepreneurship (Krueger, 1993b). Formal training/teaching can also matter as entrepreneurial training programs significantly influence the various antecedents of entrepreneurial attitudes and intentions (Cooper & Lucas, 2007). Even formal coursework (Cox, 1996; Krueger, 2001) appears to have a small but measurable impact on critical beliefs (e.g., self-efficacy) and attitudes (including intent) (Fig. 13.6).

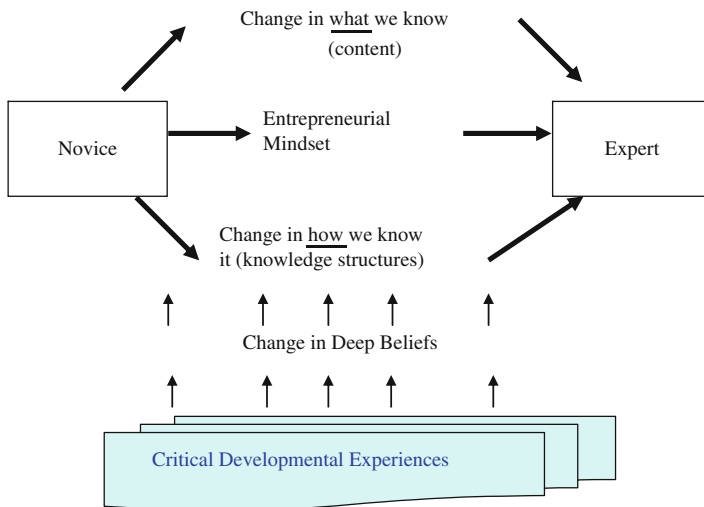


Fig. 13.6 Critical developmental experiences and deep belief change (Krueger, 2007, 2009a)

The issues surrounding how learning processes can change deeply held mental models in the direction of better entrepreneurial thinking, whether in terms of learning to see more/better opportunities or to see oneself as an entrepreneur (or, as we have noted, both) represent powerful research opportunities that also bring immediate practical impact. Consider that the University of Victoria, Texas Tech, Western Ontario and elsewhere have developed pedagogies that heavily emphasize helping students acquire expert scripts (e.g., Mitchell, 2005; Mitchell et al., 2000, 2009). This clearly suggests that measures of deep structures, whether scripts or maps or other possibilities, can be usefully deployed to research how entrepreneurial thinking changes across a training program (Krueger, 2001; Mitchell et al., 2000).

The rule of thumb is that to become an expert requires 10,000–20,000 hours of deliberate practice at activities which move one toward the expert mindset (Baron &

Henry, 2006; Ericsson & Charness, 1994). But what are those deep belief-changing activities? For example, both Baron (2000b) and Gaglio (2001) demonstrate how the cognitive mechanism of counterfactual reasoning is a potent lever for encouraging and reinforcing students to question their existing mental models.

In short, we have ample reason to believe that if the expert mindset exists, then we can use what we know about the expert mindset to guide our teaching (e.g., Krueger, 2009a; Mitchell, 2005) and move learners toward a truly informed intent. But to do so we need to begin learning from neuroscience. The constructivist model teaches us that learners, intentions and related attitudes will change but only insofar as they reflect changes in deep anchoring beliefs (Krueger, 2009a). To change how we structure what we know, especially in the direction of a more informed expert intent, the learner goes through multiple critical developmental experiences that change their deep beliefs. Imagine how much richer our efforts would be if we embraced the neuroscientific approach. Consider the following evidence from recent neuroscience efforts.

Cognitive Adaptability: Learning and Adapting

Lawrence et al. (2008) “propose that entrepreneurs represent an example of highly adaptive risk-taking behaviour, with positive functional outcomes in the context of stressful economic decision-making.” Sarasvathy (2001) argues that the entrepreneur should be put on center stage; that we “go beyond explanations based on economic forces and evolutionary adaptation to entrepreneurial effectuation.” One particular area of interest that relates to the physiological drivers of adaptation is that key brain systems responsible for recognizing the familiar and negotiating the unfamiliar have been identified. These have been termed by different researchers “System 1 and System 2” (Camerer et al., 2005; Kahneman, 2003) and the “C-system and X-system” (Lieberman et al., 2002; Satpute & Lieberman, 2006). It is probable that these systems are in play when it comes to adaptability. Put simply, the X-system recognizes patterns and symbols via a type of passive parallel processing, producing the continuous stream of consciousness we experience. When the X-system is confronted by sensory data that it does not recognize, it passes responsibility over to the C-system which uses a set of standards or rules that attempt to harmonize this new data with what is already known.

Pattern Recognition and Transfer

These brain systems give insight into a complex thinking matrix and would seem to represent the neural substrates underpinning for instance, analogical transfer (Magee, 2005) or conceptual combination analysis (Ward, 2004) where information and experiences, concepts, or images from what is known are used by the decision-maker(s) in an attempt to find a solution for a new, unfamiliar situation. Simon

(1997) writes “when the expert is confronted with a situation in his or her domain, various features of cues in the situation will attract attention” and the expert will act intuitively to come up with a solution. Simon argues that “[i]ntuition, judgement, creativity are basically expression of capabilities for recognition and response based upon experience and knowledge.” Each entrepreneur may experience this to varying levels when confronted with, for example, a stressful economic decision-making environment, which in turn might trigger opportunity recognition.

For researchers, we need a better empirical understanding of how entrepreneurship-related cognitive phenomena are interrelated across Simon’s (1963) three levels: Neurological, symbolic, and semantic. What “semantic” level cues are associated with “symbolic” level structures underlying opportunity perception? The rich cognitive science literature on pattern recognition could be exploited most fruitfully to address this.

Context Matters: Entrepreneurial Environments

Even a solo entrepreneur does not operate in a vacuum. As Granovetter famously pointed out, almost all economic activity is irretrievably embedded in its social context, yet we often neglect the often-complex social context (e.g., Dimov, 2007, Carsrud et al., 2007). Leo-Paul Dana has studied a dizzying array of economies around the world and finds that “opportunity” is very much culture-dependent (1995). One obvious impact is through the social norms antecedent of intentions (and self-efficacy), but social cues from community and family can also affect other cognitive phenomena, often in non-obvious fashion. Han and Northoff (2008) and others show that cultural differences can manifest in significant differences in cognitive processes, even at an early age.

Family norms add another dimension to the cognitive appraisal in the intentions process but may also bring other dimensions into bold relief. This is an exciting direction for family business research with broader implications for entrepreneurship (e.g., Carsrud et al., 2007; Stavrou, 1999). Likewise, high-tech opportunities merit more consideration; how do the processes differ in highly innovative organizations (Brazeal, 1993; Corbett, 2002; Neck et al., 2007). However, the fundamental question here that has seen far too little research efforts is this. If the entrepreneurial potential of an organization or a community is thus a function of the quantity and quality of its potential entrepreneurs, then should we not explore what kinds of environments support entrepreneurial activity by supporting and reinforcing entrepreneurial thinking (Day, 2002)? At the community level, there are visible differences in communities that are entrepreneurial (e.g., Audretsch, 2007; Peredo & Chrisman, 2004). What characterizes *them*?

Cognitive Infrastructure in Organizations: The intentions perspective affords us important insights into how to nurture the entrepreneurial potential of an organization or a community. Again: Entrepreneurial potential depends on the quantity and quality of potential entrepreneurs (Krueger & Brazeal, 1994). Increasing the quality

and quantity of potential entrepreneurs requires increasing the quality and quantity of entrepreneurial thinking. Thus, the entrepreneurial organization must operate in directions that support its members in perceiving more – and better – opportunities, such as beliefs and activities that foster internal entrepreneurs to see intrapreneurship as desirable and feasible (Brazeal & Herbert, 1999). It is reasonable to assume that modeling effects are critical – that the impact of mentors and role models serve to enhance processes of modeling entrepreneurial behavior and attitudes (Krueger, 2000; Shepherd & Krueger, 2002).

The entrepreneurial organization does require a tangible infrastructure of resources and mechanisms that support entrepreneurial activities, yet field research shows that this is clearly insufficient to yield significant levels of entrepreneurship. Rather, organization members must perceive that tangible infrastructure as a supportive one (Brazeal, 1993; Brazeal & Herbert, 2000; Brown & Wiklund 2001; Krueger & Brazeal, 1994). It is not enough to provide the “proper” reward system. What if organization members perceive the existing reward system as being actually hostile to entrepreneurship? (Day, 2002; Shane & Kolvereid, 1995)

This implies that organizations (or, for that matter, communities) need to provide and develop a “cognitive infrastructure” that nurtures entrepreneurial thinking. The intentions perspective implies mechanisms that increase the quantity and quality of perceived opportunities. This then requires mechanisms that broaden the set of possibilities that organization members perceive as feasible and as desirable and suggests that organizations seek to address each of the key antecedents: Personal attitude, social norms, self-efficacy, and collective efficacy (Krueger, 2000). Section “Implications for Entrepreneurial Learning (and Education)” above argues we can take these findings to design training programs and even coursework; Guth et al., showed how we can transform cognition research to successful practice (1991). How do we best train people to perceive themselves as entrepreneurial? How do we best train people to see personally credible opportunities?

The contextual perspective also offers two additional, important domains for ground-breaking research. First, as we better understand the “why” behind the entrepreneurial mindset, we can better understand the “how” of nurturing it (and the accompanying policy implications). Second, initial evidence is persuasive that studying social (and sustainable) entrepreneurs provides broad, deep insights into entrepreneurial thinking.

Cognitive Infrastructure in Communities: There is also immense potential in digging deeper into this cognitive infrastructure behind entrepreneurship within organizations and communities. This seems a most fruitful avenue for further study as researchers can test the impact of various strategic prescriptions on these key antecedents. Does the presence of strong champions enhance perceptions of efficacy (e.g., modeling successful behavior) or enhance social norms (e.g., by demonstrating that a community does support entrepreneurial activity)? We can diagnose shortfalls in entrepreneurial activity by testing these same antecedents. Similarly, highly entrepreneurial communities seem to share a cognitive infrastructure that rewards entrepreneurial activity and especially entrepreneurial thinking (Audretsch, 2007; Peredo & Chrisman, 2006).

Social and Sustainable Entrepreneurship: While a topic far beyond the scope of this chapter, these twin domains have grown immensely in recent years with a corresponding proliferation of definitions – much like entrepreneurship itself in its early days (e.g., Bacq & Janssen, 2008). Nonetheless, social (and sustainable) entrepreneurship offers multiple opportunities to enlighten us about the entrepreneurial process writ large (Mair & Marti, 2005). In particular, the cognitive processes of social and sustainable entrepreneurs have already taught us much about entrepreneurial opportunities (Krueger, 1998, 2005; Krueger et al., 2008; Welsh & Krueger, 2009). This is an ideal arena for exploring entrepreneurial thinking. In fact, social entrepreneurship research may be dominated by inconsistent definitions and dustball empiricism but it is already teaching us much about how we identify and evaluate opportunities (Krueger et al., 2008, 2009). Deep belief structures may be in play here as well, providing additional potential for neuroscience methods.

In Conclusion

The suggestions offered above are just the beginning, but we look forward to the ongoing adventure of answering those questions (and the questions those answers will inevitably raise). However, if we are ever to truly understand entrepreneurship, it is imperative that we understand the multifaceted nature of entrepreneurial thinking and of its genesis and there is much in past research that has been neglected in the rapid growth of research into entrepreneurial cognition.

The history of entrepreneurship research suggests that many surprises lie in store for researchers. As we discussed above, we know relatively little about how intentions change and even less about intentions about the timing of behavior. More important, we now know that we must delve ever deeper into “what lies beneath” entrepreneurial phenomena. Given that entrepreneurial intentions change quite significantly over time, entrepreneurship might well prove ideal for exploring these questions. Fortunately, the answers uncovered to date have, as always happens in science, also uncovered even more intriguing questions – and good places to start the next frontier. In this chapter, it has seemed useful to point out questions with great potential as we explored the disparate threads of entrepreneurial cognition.

We hope this chapter has helped the reader to see the potential for increasing our skillful, rigorous use of theory and tools from cognitive science. We also hope that readers also see that the even faster growth of research using theories and methods inspired by neuroscience offers equally great potential for those of us intensely curious about entrepreneurial thinking.

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Chapter 14

The Social Psychology of Entrepreneurial Behavior

Kelly G. Shaver

Introduction

The purpose of this chapter is to describe four major areas of theory and research in social psychology, and to indicate how each has found its place in the study of entrepreneurial activity. Economic conditions in an industry may favor the emergence of new entrants, venture capital may be readily available, technological advances may create market opportunities, but as Shaver and Scott (1991) have noted, there will be no new companies created without focused and sustained entrepreneurial *behavior*. Such entrepreneurial action may be the work of an individual, or it may be the work of a team. In either case, the behavioral processes involved are ones normally considered within the domain of social psychology. As team-based entrepreneurship is often treated separately from individual entrepreneurship (see, for example, Cooper & Daily, 1997; Stewart, 1989), this chapter will concentrate on what social psychology refers to as the “intrapersonal” processes of an individual entrepreneur. These include social cognition, attribution, attitudes, and the self. The specific topics to be discussed were selected because (a) they are traditional concerns of social psychology and (b) they have been the subject of numerous papers in entrepreneurship. Our review is necessarily selective, but will still advance a strong case for further consideration of the social psychological processes that guide the entrepreneur’s venture-organizing activities.

Some Initial Distinctions

Social psychology is “the scientific study of the personal and situational factors that affect individual social behavior” (Shaver, 1987, 18). The field is traditionally distinguished from psychology on the one hand and from sociology on the other, by the level of analysis inherent in most work in each field. Social psychology concentrates

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on the *socially meaningful actions* of an individual person (actions, for example, like those associated with starting a new venture). In contrast, the “dependent variable” for much of psychology is at a more molecular level. How much change must there be in the wavelength of a projected colored light for a person to shift from calling the light “blue” to calling it “green?” Is there a “critical period” among humans during which the person must hear other human speech in order to develop a full and sophisticated vocabulary? What does reaction time tell us about the internal structure of the cognitive apparatus? These questions, and others at a comparable level of analysis, have engaged psychological researchers for years, and have contributed to our overall understanding of human beings. But in virtually all of such studies, the dependent variables are not socially meaningful chunks of behavior.

As psychology concentrates on dependent variables “smaller” than the individual person, sociology concentrates on structures and processes that are larger than any *particular* individual. A business school consists of a Dean, area or department heads, faculty members, support staff, and students at various levels. Each participant in this system behaves in large part according to role expectations and social status. Of course, there are individual variations, but replacing one, or several, particular faculty members with other people whose training is comparable does not convert the business school to an art school. Demographics matter, culture matters, the structure matters; particular individuals typically do not matter.

Through the years of entrepreneurship as a separate field of inquiry, more than a few definitions have been offered for entrepreneurial action. Indeed, the diversity of chapters in this volume provides eloquent testimony to the intellectual eclecticism of the field. Yet there are important common threads – opportunity seeking and recognition, innovation, creation of value, assumption of risk, disregard for resources controlled (see, for example, Hisrich & Peters, 1998; Timmons, 1994). In a refreshingly open approach to the problem of definition, Mitton (1989) noted that “Entrepreneurship and pornography have a lot in common: they are both hard to define” (p. 9). He continued the analogy, building on Justice Potter Stewart’s comment, by saying “I can’t define it – at least not to everyone else’s satisfaction – but I know it when I see it” (p. 9). The reason that Mitton, and many of the rest of us, can “know it when we see it,” is that entrepreneurial behavior involves precisely the *socially meaningful actions of individuals* that are the province of social psychology.

Methodological Approach

Although one of the early extensive studies of entrepreneurial behavior was conducted by the psychologist David McClelland (1961) it is fair to say that, on balance, most research in entrepreneurship has not been informed by the extensive methodological contributions of experimental social psychology. Management scholars are well aware of classics like the “Hawthorne” experiments (Roethlisberger & Dickson, 1939), but have rarely conducted the sort of laboratory research that is the stock in trade of social psychologists. As a consequence, entrepreneurship

researchers trained in the management tradition are less likely to be skeptical about some of the traditional means of examining entrepreneurial behavior.

Because their research involves the meaningful actions of individuals capable of problem-solving and intentional action, social psychologists often talk about the “experimenter-subject interaction” as a particular sort of scripted interchange. This is especially true in a traditional laboratory setting, but applies with nearly equal force to other research venues as well. Regardless of where the work is conducted, the researcher begins a project with what Rosenthal (1966, 1994) called *experimenter expectancies* – a sort of personal prediction about what the data will likely show. Given that most experimental work involves hypothesis testing, rather than hypothesis generation, it is not at all surprising that the person conducting the research should have expectations about the outcome. The difficulty comes in the ease by which these experimenter expectancies can be communicated to the research participants, often in ways so subtle that they are well outside the conscious awareness of either party. Patterns of speech by the experimenter, degree and timing of eye contact, changes in body position, can all convey the “right answer” to a research participant. Expectancies have been implicated in everything from behavioral medicine studies of stress (Krantz & Ratliff-Crain, 1989) to police line-ups (Wells, 1993). The production of expected responses is not limited to interactions between researchers and participants, nor is it limited to face-to-face interactions. For example, in one early study of a domain that has become known as *behavioral confirmation* (Snyder, 1984) researchers produced important behavioral differences during telephone interviews (Snyder et al., 1977). In this study, male undergraduates were asked to conduct a 10 minute telephone conversation with female undergraduates, ostensibly for the purpose of getting acquainted. Before the conversation began, each male was given a folder containing biographical information about the female he was to call, and a Polaroid picture purported to be her photograph. In fact, the photographs had been pre-selected to be either highly attractive or unattractive (but in neither case were they the actual picture of the target female). The telephone conversations were unstructured and done through headphones and microphones so that each party’s side of the conversation could be recorded on a separate channel. The conversations of the female targets were later rated by judges who had no idea about the nature of the experiment (and who did not hear the males’ sides of the conversations). These ratings showed that females who had been talking to males who *thought* they were highly attractive were rated to be more attractive and socially skilled than females who had been talking to males who thought they were less attractive. The expectations of the male callers had somehow produced the very behavior they expected. In social interaction, what you get may be what you expect to see.

Not all of the potential biases in a research interchange are introduced by the experimenter; some are situationally induced and others are inherent in the participants. Whether they are undergraduates in a social psychological laboratory or presidents of start-up companies being interviewed in their offices, people who know that their behavior is being scrutinized are susceptible to several important biases. One of the situational biases is the presence of *demand characteristics*, the

sum total of cues that a participant uses to discover the “true purpose” of the research (Orne, 1959). The magical phrase “this is an experiment,” legitimizes almost any request, from the mindless turning of pegs in a board (Festinger & Carlsmith, 1959), through providing what were believed to be painful electric shocks to a hapless victim (Milgram, 1963) to being asked how much one likes the feel of a sex partner’s “sweat on my body” after having previously responded to a series of true–false questions about death (Goldenberg et al., 1999). In “research” apparently, anything goes, regardless of how dull, frightening, or intensely personal it might be in normal everyday life. And for their part, the problem-solving research subjects use whatever information is available to try to “understand” the interviewer’s objectives and help achieve them.

Unless, of course, helping the researcher conflicts with maintaining or enhancing one’s own self-esteem. This particular problem begins with what Rosenberg (1965) called *evaluation apprehension*: concern about the impression one is making with a researcher. This concern is so pervasive that it has almost attained the status of a ritual. When introduced as “a psychologist,” one can see the micromomentary expression – “Oh, my God! He’s *analyzing* me!” – on the other person’s face. One almost feels the need to put the person at ease either by pointing out that “No, I’m not *that* kind of psychologist” or by making the standard joke, “Yes, I *can* read your mind and you should be ashamed!” Having in one way or another acknowledged the person’s unease, you can then continue the conversation on a much more routine basis. When the interchange occurs in the structured setting that typifies most studies of human behavior, the research participant’s concern is likely to be greater than it would be in the context of everyday social exchange. And the researcher does not need to be a psychologist for evaluation apprehension to occur: a business professor (or even graduate student) with any extensive functional expertise will likely know more about his or her specialty than does the entrepreneur being interviewed. More importantly, the researcher has made the contact, structured the setting, constructed questions in advance, and (presumably) considered what the “right” answers might be. To borrow a term from the venture capital literature, there is “information asymmetry” between scholar and research participant.

How does a research participant behave when placed at this sort of disadvantage? He or she emphasizes the positive, minimizes the negative, and omits any details that would complicate the picture, thus falling into a *social desirability* response set (Crowne & Marlowe, 1964). The interviewee takes credit for success and deflects responsibility for failure, a frequent form of self-serving attributional bias (Bradley, 1978). Or falls prey to the “hindsight bias” (Fischhoff, 1975), evaluating the likelihood of choices on the basis of their known effects, regardless of whether those effects could have been anticipated at the time the original choice was made. If the research subject is led to feel inadequate in some area, he or she may attempt what Wicklund and Gollwitzer (1982) have called “symbolic self-completion,” the tendency to increase one’s self-esteem through associations with valued entities and people. It is important to note that none of these biases is the result of *deliberation* on the part of the research participant. On the contrary, most are so non-conscious

that the participant would be legitimately offended if the response sets, errors, and biases were pointed out.

Nearly, all of these complicating factors were originally identified by social psychologists (demand characteristics being the notable exception). For this reason, social psychologists have developed strong disciplinary preferences about which sorts of research techniques are least susceptible to the many potential complications. We prefer experiments to non-experimental methods, because the former permit random assignment of participants to conditions, thereby virtually eliminating subject-based response biases. Whether the method is experimental or non-experimental, we prefer to have the data collected by assistants who are unaware of the specific hypotheses of the research. We prefer closed-ended questions, designed using scales and adverbs with known psychometric properties, to open-ended questions that by their very nature are more likely to facilitate the appearance of unwanted biases. If we must resort to open-ended questions, we prefer to have them coded according to clear theoretical principles specified in advance, and to have the coding done by people who do not know the predictions to which those theoretical principles would lead. Taken together, these methodological preferences lead social psychologists to be highly skeptical of the results, for example, of a series of “in-depth interviews” conducted over time with a few haphazardly selected successful entrepreneurs by a researcher who has some preconceived opinion about what the data might, or might not, show. To no small degree, social psychology’s methodological preferences also influence my choice of what content to include in the remainder of the present chapter.

Social Cognition

Social cognition has been defined as “thinking about people” (Fiske, 1995, 151). This definition suggests that *social* cognition can be distinguished from abstract conceptual reasoning, problem-solving, or thinking about inanimate objects, all of which are surely cognitive processes, but none of which necessarily involve people as a critical part of the content. Thus, for example, an entrepreneur’s memory of an encounter with a venture capitalist would be a topic for social cognition, whereas the entrepreneur’s memory for the factors that affect first-year cash flow would not be. Social *cognition* is also described as a “cold” process, distinguished from internal processes that are “hot” – such as emotion and motivation – regardless of whether the content relates to people. So an entrepreneur’s beliefs about the industry preferences of a venture capital firm would be a topic for social cognition, but the entrepreneur’s disappointment at learning of this preference during a meeting in which a plan was rejected would not be.

In many respects, processes of social cognition are similar to those of *nonsocial* cognition. Both involve cognitive categorization (Bruner, 1957), internal representations of the external world (see Carlston & Smith, 1996) such as prototypes and schemata, and what Fiske (1995) calls “unabashed mentalism” (p. 154). This latter

focus on psychological processes that are not directly observable is a return to some of psychology's early roots in the study of sensation and mental states (see, for example, the "structuralism" of Edward Titchener, or the extensive theorizing of William James, both admirably described by Hilgard, 1987). Now, in the midst of "the cognitive revolution," it is difficult to believe that the prevailing ideology in psychological science was, for years, guided by Skinner's version of behaviorism (e.g., 1938) that denied the importance, if not the existence, of the mental.

Biases in Social Cognition

The processes of social cognition that have received the most attention within entrepreneurship are the cognitive biases and heuristics, and the principles of attribution. Cognitive heuristics were first identified by Kahneman and Tversky (1973) in a more general discussion of why people are poor intuitive statisticians. People, as opposed to statisticians (who happen to be thinking like statisticians rather than like people), have a proclivity to make judgments on the basis of particular individual cases rather than on the basis of base rate probabilities, even though those probabilities might be stated explicitly. For example, in one of Kahneman and Tversky's best-known examples, people were asked to judge the likelihood that a particular individual was either a lawyer or an engineer. Half of the research participants received a description of a gathering said to contain 30% lawyers, and 70% engineers, the other half received a description that claimed there were 70% lawyers and only 30% engineers. Then both sets of participants were given a series of brief descriptions, such as "Dick is a 30-year-old man. He is married with children. A man of high ability and high motivation, he promises to be quite successful in his field" (p. 242). After each description, the participants were asked to estimate the likelihood that the target person was either a lawyer or an engineer. Obviously, the "correct" guess, regardless of the description, is either 30 or 70%, depending on the condition or the question. The results showed why "cognitive heuristics" are often considered in the domain of *social* cognition: With no individuating information, the answers followed the base rates; when there was individuating information, however, the judgments differed significantly from the appropriate base rate.

In some ways, it is easy to suggest a very social explanation for studies involving failures of base rates. Assume for the moment that one asks, as social psychologists do, "What does the research participant think his or her task really is?" A research participant, concerned about what the researcher might think of his or her performance, would scour the demand characteristics of the study for the answer, assuming all the while that the answer sought could not *possibly* be mere repetition of the percentage value just mentioned. "This is really a test of my interpersonal perception ability . . ." Participants who had this view would attend to every detail of the description, and would respond on the basis of whatever personal cognitive structures were activated. So, for example, a person who believes (outside the laboratory) in a stereotyped view of engineers as computer-geeks who have no social

life would use that stereotype as justification for the assumption that, because Dick is married, he *must* be a lawyer. In this way, what began as an exercise in applied cognition concludes as a judgment adversely affected by a social stereotype.

Two other failures of the intuitive statistician may have played a part in the findings of a number of recent studies in entrepreneurship. These particular cognitive biases are the *availability heuristic* (Kahneman & Tversky, 1973) and the idea of *illusory correlation* (Chapman, 1967). As we have seen, people make mistakes in estimating relative frequency even when they have all of the information needed for the judgment. When there is uncertainty about the “truth,” estimates of relative frequency are likely to be based on the particular cases that can easily be recalled, ones that are “available” without a lot of detailed searching. Though availability affects thought in a wide variety of domains, its reliability in the entrepreneurship domain has turned it into a classroom exercise. Ask students in any undergraduate or MBA entrepreneurship course to write down the name of “the first entrepreneur who comes to your mind.” There will be lots of “Bill Gates,” some “Richard Branson,” some “Steve Jobs,” and perhaps some “Ted Turner.” What there will *not* be is a different person for every student in the class. This kind of demonstration of availability assumes greater importance when one realizes the number of people who – in order to decide whether they personally have “what it takes” – adopt one of these highly available targets as their standard of comparison.

Just as surely as availability compromises the selection of cases for review, illusory correlation can compromise the inferences made from those cases. Especially when (a) a data pattern is incomplete and (b) a perceiver brings his or her prior theories to the examination of that data pattern, the perceiver is likely to “find” an association that does not actually exist. Theory-confirming examples are noted, theory-disconfirming features of the situation are ignored.

For example, a venture capitalist might say “we’ve always had excellent success when we’ve gone with the management and the idea, instead of relying exclusively on the numbers.” Such an assertion could, in fact, be true. On the other hand, the statement ignores two blunt facts of the venture capital business. The first of these is that entrepreneurs whose business plans do not contain the right numbers will rarely, if ever, get to the point of an interview with a venture capital partner, so the sample of firms the partner sees is necessarily limited. The second fact, to put it mildly, is that some VC-backed firms fail to become roaring successes. It is within the realm of possibility that the particular venture capitalist may be associated with a firm that has never lost money on one of those good business ideas proposed by an excellent management team. On the other hand, to learn from the prior discussion of base rates, it is more likely that the venture investor is just not remembering the failures, or the good ideas and management teams that were rejected. From the combination of availability and illusory correlation, the venture capitalist has become *overconfident*.

Support for this speculation comes from recent research by Zacharakis and Shepherd (2001). These investigators asked venture capitalists to make two judgments – estimated likelihood of venture success and personal confidence in this likelihood estimate – for each of 50 brief investment cases. The cases had been

created with the assistance of venture capitalists not involved in the study, and all identifying information (entrepreneur identity, industry, even financial cues) had been purged from the cases. What remained as cues in the case differed across three experimental conditions. In the “base cognitive cues” condition, cases contained information about market familiarity, leadership experience, level of proprietary protection, market size, and market growth. In the “additional cognitive cues” condition the base cues were supplemented by information concerning start-up team track record, and the number and strength of direct competitors. Finally, in a “task cues” condition, the material from the other two conditions was replaced by four statistically derived index variables previously discovered (by Roure & Keeley, 1990).

Differences among the three conditions were used to test several of Zacharakis and Shepherd’s hypotheses, but for our purposes, it is more important to describe the overall outcome. Of the 50 cases presented to each venture capitalist, 25 had been based on actual funded ventures that, at the time of the research, had a known outcome. The “successful” venture with the smallest return on investment (ROI) had achieved a 31% ROI, the “failed” venture with the highest ROI had achieved a 6% ROI. The existence of these very clear cases allowed the investigators to compare the VC predictions to the actual outcomes, thus establishing the accuracy of the predictions (percentage of correct predictions out of 25). Now, in a perfect world, a venture capitalist’s confidence in his or her predictions ought to correlate perfectly with accuracy. After all, if your predictions are consistently faulty, you ought not be very confident in your ability. Not surprisingly, however, across the three treatment conditions, some 96% of the VCs were *overconfident* (percentage confidence exceeding percentage accuracy), with 29 VCs having at least 60% confidence in their judgments, regardless of their level of accuracy. Moreover, there were no differences in overconfidence based on years of experience in the business – VCs with years of experience were just as overconfident as VCs new to the business. The availability heuristic, and perhaps also illusory correlation, appears to be alive and well in the venture investor community.

It is important to note that similar findings of overconfidence have also been obtained in studies of entrepreneurs by Busenitz and Barney (1997) and Simon, Houghton, and Aquino (1999). The first of these is especially interesting from our perspective, primarily because of a metatheoretical assumption to which we shall return in a moment. Busenitz and Barney selected their entrepreneur sample from the records of a state comptroller’s office, limiting the search to seven SIC codes that included the manufacturing of plastics, electronics, and instruments, on the premise that these industries would represent a higher percentage of new firms. The managers were selected, with participation by their publicly traded parent companies, from five SIC codes, three of which were the same as those in the entrepreneur sample (62% of entrepreneurs, and 86% of managers came from these three industries). Once the data had been collected, the entrepreneur sample was further restricted to those who had (a) founded the firm and (b) done so within the past 2 years (or were planning another start-up). Managers had to have responsibility for at least two functional areas.

To assess overconfidence, all respondents were asked to answer a series of five questions used by Fischhoff and his associates (Fischhoff et al., 1977; Lichtenstein & Fischhoff, 1977). Each item is a two-choice question about what sorts of diseases and accidents produce the most fatalities. In addition to making the choice, respondents use a separate scale to indicate their confidence in the judgment. This scale ran from 50% (in a two-choice setting, this is clearly the value for “just guessing”) to 100%. Scores were transformed so that confidence could be compared to a “perfect calibration” line like that used by Zacharakis and Shepherd (2001). The results were as expected: Not only were entrepreneurs more highly overconfident than managers, the level of overconfidence was able to separate the two groups quite reliably (when some standard control variables were not). Comparable results were also obtained for the representativeness heuristic, with entrepreneurs falling into its trap more frequently than did managers.

Taking Busenitz and Barney’s (1997) results a step further, and combining overconfidence with two other biases – the illusion of control and the belief in the law of small numbers – Simon, Houghton, and Aquino (1999) tested the influences of cognitive biases on risk perception. These researchers asked MBA students to evaluate the well-known “contact lenses for chickens” case (Clarke, 1988). The “revolutionary” contact lenses are said to reduce the tendency to fight, and the reduction in injuries among confined chickens has substantial economic implications. To increase the risk involved, Simon, Houghton, and Aquino doubled the original product costs and made the claimed market demand less predictable. Respondents completed measures of three cognitive biases, estimated the risk of the venture, stated their willingness to start, and answered a number of control variables.

The results showed that as the perception of risk associated with beginning the venture decreased, likelihood of proceeding increased. This perception of venture risk, in turn, was decreased (a) as the illusion of control (being able to control events that others might not be able to control) increased and (b) by a belief in small numbers (e.g., the market can be assessed adequately by asking one or two people). Interestingly, the overconfidence bias did not affect perceived risk, nor did it affect willingness to begin the venture. The Simon, Houghton, and Aquino (1999) study, like many of its predecessors, measured overconfidence *outside* the domain of entrepreneurship. The authors argued that this should not have been a problem, “because people are overconfident across domains, . . . suggesting the items do not need to reflect the case. Furthermore, entrepreneurs’ decisions stem from a wide range of non-business and untraditional information, indicating that it is appropriate to use diverse items. . .” (p. 126).

Emotion and Cognition

As it happens, however, there may be a much more *social* and much less purely cognitive explanation. A recent review by Lowenstein, Weber, Hsee, and Welch (2001) argues that risk, and the perception of risk, involve hefty doses of *emotional*

content. Lowenstein, et al. point out that the study of judgments under risk grew out of economics and cognitive psychology, two disciplines that share an assumption that human decision-making is essentially rational. Rational decision-making may sometimes be in error, but it is not presumed to be affected adversely by feelings, emotions, or motivation. (This, of course, is not a widespread assumption in social psychology, despite the popularity of research in social cognition.) Drawing on literature from social psychology (e.g., Clore et al., 1994; Zajonc, 1980, 1998) and neuroscience (LeDoux, 1996) the authors present a “risk as feelings” model of decision-making. In this model, the emotions generated either by the fact of having to make the decision or by the nature of the consequences are given the same weight as the more cognitive features of the judgment task.

One statement from Lowenstein et al. (2001) that is especially relevant in the present context is the fact that the factors influencing people’s emotional reactions to risks “include the vividness with which consequences can be imagined, *personal exposure* to or experience with outcomes, and *past history* of conditioning. Cognitive assessments of risk, on the other hand, tend to depend more on objective features of the risky situation, such as probabilities of outcomes and assessments of outcome severity” (p. 271, emphasis added). This view has two implications for entrepreneurship research. First, on the methodological side, it might not be possible to obtain accurate estimates of overconfidence among entrepreneurs by asking the traditional questions that have nothing whatsoever to do with starting a new venture. Second, a related point is that because of entrepreneurs’ prior experience, the possibility of failure might simply carry less emotional content than it would for managers. Especially, in the case of “serial entrepreneurs” (Westhead & Wright, 1998), there might be very little real fear associated with the possibility of failure. One is reminded here of the often heard entrepreneurial claim “I’ve been poor, I’ve been rich, I’m poor again, but I’ll be rich again.” Such a claim might be nothing more than an elaborate form of self-deception, but it might also be an accurate expression of the very “routine-ness” of entrepreneurial behavior. In the language of another recent study, an entrepreneur’s beliefs concerning future success may be “comparative optimism” rather than “unrealistic optimism” (Radcliffe & Klein, 2002).

Person and Situation

As noted above, an interesting feature of Busenitz and Barney’s (1997) study is one of its implicit metatheoretical assumptions. The authors begin their paper by describing the decision environments facing entrepreneurs, and managers in large corporations (the two groups of people subsequently compared). Managers exist in a corporate environment where historical data provide a backdrop for decisions, the cost of gathering additional information is relatively low, and the time frame for most decisions is relatively forgiving. By contrast, entrepreneurs have limited “people resources,” essentially no hard historical data, cannot obtain (or afford) additional information, and must decide quickly. Appropriate research is cited to support both of these quite reasonable characterizations. Then they go on to say

“Thus, we argue that those who are more susceptible to the use of biases and heuristics in decision-making are the very ones who are most likely to become entrepreneurs. The more cautious decision-makers will tend to be attracted to larger organizations where more methodical information tends to be more readily available. Entrepreneurial activities simply become too overwhelming to those who are less willing to generalize through the use of heuristics and biases” (p. 14).

Without knowing that they have done so, Busenitz and Barney (1997) have just taken a position on one of the long-standing debates within social and personality psychology (Bowers, 1973; Funder & Colvin, 1991; Mischel, 1968; Pervin, 1989). In the early years of research on individual differences in behavior, personality theorists asserted that people could be characterized by their location on a variety of relatively enduring “traits” (see, for example, Allport, 1937). Identify the primary traits that describe a person, and you have gone a long way toward being able to predict what the individual will do in a novel setting.

Unfortunately, research examining the correlation between assessed personality traits and behavior in different settings began to find that traits were not very helpful in predicting “cross-situational consistency” in behavior (see reviews by Bem & Allen, 1974; Bem & Funder, 1978; Mischel & Peake, 1982). The failure of the “pure personality” approach led one highly influential writer to suggest that the study of personality be supplanted by the study of variations in situations (Mischel, 1968). The response was immediate and highly critical (see Bowers, 1973). Indeed, in the late 1970s the Society for Personality and Social Psychology (Division 8 of the American Psychological Association) nearly split into two armed camps – the “personological” personality researchers versus the “situational” social psychologists. The Society managed to avoid splintering apart, and its journal is still called the *Personality and Social Psychology Bulletin*. As for the conceptual controversy, most social and personality psychologists subscribe to some version of *interactionism*, a view that behavior in a given setting is a function of *both* the more personological individual differences and the more social features of the situation.

Returning to entrepreneurship, the interactionist position has been the basis for an argument against the existence of an “entrepreneurial personality” whose behavior is presumed to be constant regardless of the situation (Shaver, 1995). What is a bit surprising is that the myth of the entrepreneurial personality survived as long as it did. After all, the leadership literature – the topical focus of which is at least a first cousin to entrepreneurship – has subscribed to an interactionist view for over 30 years (at least since Fiedler, 1964).

Attribution Processes

The person and the situation can both be seen in the social psychological literature on *attribution*, the cognitive processes by which people explain their own behavior, the actions of others, and events in the world. Indeed, in the work that provided the foundation for attribution theory, Heider (1958) explicitly argued that behavior was a function of both person and external environment:

$$B = f(P, E).$$

For any particular behavior or event the perceiver's task is to determine the relative contributions of person and environment to the production of the effects observed. People bother to explain causes because doing so presumably helps them predict behavior and events in the future. If we can identify particular "dispositional properties" – enduring characteristics – of either persons or the environment, we are better able to predict what might happen in a novel setting. The possibility of distinguishing situational effects from personal effects has recently increased with the use in social psychology of statistical techniques for multilevel modeling (see, for example, Nezlek, 2001).

In Heider's view the "naïve" (really meaning "non-scientific") perceiver begins with an observed action or event, and then reasons backward to decide why the action or event occurred. For a person to have accomplished an action, the person's internal ability must typically have had to exceed the difficulty of the task (in Heider's terms, the person "can" perform the action). The qualifier, "typically," is there because opportunity or luck might have made the success possible this time, though it would not be possible in the future. Working still farther backward in the explanatory chain, being able to complete a task does not mean that the task will necessarily be accomplished. In addition to "can," there must be an intention to complete the task, and effort must be expended in order to reach the goal contained within the intention. Thus we believe that a successful performance will most often have involved some intention on the part of the actor, effort expended in the service of that intention, and a level of ability sufficient to overcome the natural difficulty of the task. When an action has moral overtones, we will hold the person "responsible" for the outcome only to the extent of the person's contribution to the occurrence.

Attributions of Causality

Because Heider's (1958) theory included both the determination of causality and the moral judgment of responsibility, its conceptual and empirical descendants have diverged into two separate literatures. Research on the attribution of causality is normally traced to Kelley's formalization of some of Heider's observations (Kelley, 1967, 1973), whereas research on the attribution of responsibility is usually traced to Jones's specification of how perceivers might determine *why* an action was undertaken (Jones & Davis, 1965; Jones & McGillis, 1976). Relationships among the three theories have been outlined in detail by Shaver (1975), who has also developed a comprehensive theory of the attribution of blame (Shaver, 1985).

Because entrepreneurship deals with positive outcomes (or, even in the case of venture failure, *unintended* negative ones) questions of responsibility are less frequent than questions of causality. So I shall concentrate on Kelley's (1967, 1973)

theory and research that follows in its tradition. Fundamentally, the theory argues that people have two different ways of coming to understand the causes of events. In one of these, multiple observations of the behavior or event are possible – starting a second or third company, conducting successive waves of market research, the daily (or more frequent) fluctuations in the financial markets. When multiple observations are possible, people rely on a principle of *covariation*. If there are no repeated occurrences, then people rely on the second way of deriving attributions, *schemata*.

First, consider covariation. Specifically, an event or behavior is attributed to presumed causes that vary with the occurrence of the presumed effect, rather than to presumed causes that remain constant over the multiple observations. Kelley's theory lists three attributional dimensions: entities (targets for the attribution), time/modality (the circumstances under which the multiple observations take place), and persons (the number of observers who share the perceiver's view of the situation. Whether the behavior or event will be attributed to the target individual with it depends on the status of three attributional criteria, one associated with each dimension. If the behavior is "distinctive" (not all entities perform it), if it is "consistent" over circumstances, and if there is consensus among the persons who view the behavior, then the action will most likely be attributed to the person. Alternatively, if the behavior is not at all distinctive (everyone does it), and there is consistency and consensus, then the action will be attributed to forces within the situation.

Turning to schemata (or "schemas" in some places), Kelley's use of the term is essentially the same as the original (Bartlett, 1932): a schema is a cognitive structure that serves as a template for organizing incoming information. How the cause is identified for a one-time occurrence depends on the features of the information. If there is only one cause of an event, the attribution problem is trivial. When there are multiple sufficient causes, the problem is much more difficult. Any one of the multiple sufficient causes might have produced the effect, or collections of them might have combined to do so (how this happens has been a matter of some debate). Because of these multiple possibilities, the *discounting* principle comes into play: the more plausible potential causes there are, the less certain the perceiver can be that any selected one of them is *the* cause. Did the new venture fail because there was insufficient cash? Because the development time was much longer than expected? Because the market evaporated? Because general economic conditions became unfavorable? Because the venture investor wielded too much (or not enough) weight in his or her position on the Board? Because the firm's management just was not up to the task? And the list goes on.

Causal Dimensions

Rather than attempt to identify specific causal patterns for every sort of event or action, attribution researchers have concentrated on dimensions, derived from Heider (1958), that simplify the judgment required. Specifically, potential causes of

events and behaviors can be separated on a dimension known as “locus of causality” into those that are *internal* to the person, and those that are *external*. Within these categories, potential causes can be separated along a dimension known as “stability” into those that are *stable* and those that are *variable*. The result is a fourfold table whose cells are the familiar ability (internal, stable), effort (internal, variable), task difficulty (external, stable), and luck (external, variable). It is important here to note that locus of causality, as used in the attribution literature, is *not* the same as “locus of control” (Rotter, 1966). The former characterizes events and behaviors, whether or not any individual person might be able to exert effective control over them. In contrast, the latter is regarded as an individual-differences variable that represents the extent to which people believe that they are able to produce outcomes – in social, political, and personal domains among others – that they seek. Although locus of control has been popular in the entrepreneurship literature, very few studies (such as Mueller & Thomas, 2001) have made certain that their versions of the scale were *unidimensional* (see Shaver & Scott, 1991, for a detailed critique). Because the social psychological approach concentrates more on situational variables than on individual difference variables, we shall not discuss locus of control further.

Returning to locus of causality, other attributional dimensions have been suggested, such as “globality” – the number of different domains across which a judgment is made (Abramson et al., 1978) – and “controllability” (Anderson, 1991). But these two are not likely to contribute added value to our understanding of entrepreneurship. In theoretical terms, new venture creation is an intentional act that involves repeated attempts to exercise control over the process in a specific domain, in order to achieve the desired outcome. This is exactly the sort of activity that Malle (1999) has argued ought to be described as “reason-based,” not “cause-based.” Whether true control *can* be exerted is not the issue. Indeed, it is entirely possible that for some activities, the environment’s contribution to success may exceed that of the person. But this particular empirical fact would not change the conceptual point: In principle, the act of business creation is *a* domain-specific intentional action (see Bird, 1988; Krueger et al., 2000) that requires control.

Just as the locus of causality and stability dimensions can be used to characterize an event that has already happened, they can also be used to help understand the reasons an entrepreneur might offer for going into business in the first place. The first entrepreneurship study to do an attributional classification of reasons to go into business was a study conducted among clients of a small business development center (SBDC) by Gatewood, Shaver, and Gartner (1995). At their first meeting with the SBDC staff, clients were asked why they wanted to go into business. Although this question was open-ended, and could have produced any number of responses, the modal number was only two. The four most frequently cited answers were (a) identified market need, (b) desire for autonomy and independence, (c) desire to make more money, and (d) desire to use existing knowledge and experience. All answers were first parsed into separate elements, then categorized as either external or internal, then as either stable or variable (details of attributional coding are described for another data set by Shaver et al., 2001).

A year after the initial testing, 85 of the original 142 clients estimated the amount of time they had put into each of 29 organizing activities during the intervening year. These activities included gathering market information, estimating potential profits, completing the groundwork, developing the structure of the company, and actually getting into business. Results showed that entrepreneurs whose reasons were internal and stable had spent more time on structuring their companies than had people with other attribution patterns. When only those respondents who had made a sale were considered, there was a sex difference in the attributional patterns. Women who had made sales had, a year earlier, provided primarily internal reasons for wanting to start. By contrast, men who had made sales had, a year earlier, provided primarily external reasons for wanting to start. So the “why” of entering seems to make a difference in the “what” is later accomplished, though the particular reasons differ across sex.

Within social (and indeed, clinical) psychology, the locus of causality dimension has known implications for self-esteem. The well-known “self-serving bias” (Bradley, 1978) in attribution is the tendency to attribute one’s successes internally, and one’s failures externally. By contrast, the alternative, attributing one’s successes to luck, and one’s failures internally (if this is across many domains) is a recipe for depression (Abramson et al., 1978). Consequently, people engage in “self-handicapping,” by attempting to create conditions for behavior that will favor externalization of failure and internalization of success (Berglas & Jones, 1978). After a failure, people offer excuses designed to absolve them of responsibility, if not of causal participation (Snyder & Higgins, 1988). Even the possibility of being held accountable is threatening, leading to *defensive* attributions of responsibility (Shaver, 1970). Given all of this evidence, we should not be surprised when an entrepreneur chooses to explain venture failure by pointing to uncontrollable external conditions, whereas the venture capitalist who has lost a great deal of money places the cause of failure squarely on the shoulders of the entrepreneur. Self-serving biases have been noted both in the management literature (Clapham & Schwenk, 1991) and in the entrepreneurship literature (Baron, 1998).

If the locus of causality dimension is implicated in feelings of self-worth, the stability dimension is implicated in the expectations for future success (Anderson et al., 1996). Specifically, one can hope to change the course of the future only if it can be considered malleable. In entrepreneurship the importance of the stability dimension has recently been shown by Gartner, Shaver, and Aggarwal (2001). As part of a large-scale survey of small business firms conducted by the *Los Angeles Times*, these investigators asked business owner/managers to identify what they considered to be the opportunities and problems facing their enterprises. In the overall sample of 1,686, 1,300 people answered the question about problems and 1,024 answered the question about opportunities (a total of 806 provided answers to both questions). The first opportunity mentioned and the first problem mentioned were each coded according to the two dimensions – locus of causality and stability. Thus for anyone who answered both questions, there are 16 possible attribution patterns (the combination of four codes for opportunities with four codes for problems). More than half of the people who answered both items gave descriptions of opportunities

that were external and *stable*. Similarly, more than half who answered both items gave descriptions of problems that were external, but *variable*. There were, however, only 261 people whose answers fit the modal response to both questions (external stable opportunities plus external variable problems). This *enterprise-serving* pattern makes it possible for the owner/manger to believe that (a) opportunities exist for the taking, now and in the future, and (b) problems are external, but solvable. The past growth obtained and the future growth expected were higher for the 261 people with the enterprise-serving pattern than they were for people with any of the 15 other patterns, or for people who had not mentioned both an opportunity and a problem. This is a good demonstration, in the entrepreneurship domain, of the traditional attribution theory view that changes in stability are implicated in expectancies for future success.

Attitudes

The concept of an attitude has been a central element of social psychology throughout most of the discipline's history. The first volume with the title, *Handbook of social psychology*, was published in 1935 (Murchison, 1935), but few of its topics have been retained in subsequent versions. The exception is a chapter on attitudes. The next *Handbook of Social Psychology*, published in 1954, did not call itself the second edition (Lindzey, 1954), and was to contain two chapters on attitudes (one omitted at the last minute). Subsequent editions have been numbered from the Lindzey version: the 2nd edition (Lindzey & Aronson, 1968–1969), the 3rd edition (Lindzey & Aronson, 1985), and most recently the 4th edition (Gilbert et al., 1998). The concept of an attitude assumes a prominent place in every edition. Beyond its content, attitude research has also contributed to the development of methodology in social psychology. Thurstone scaling (Thurstone & Chave, 1929), Likert scaling (Likert, 1932), and semantic differential scaling (Osgood et al., 1957) were all developed as attitude measurement techniques. In the 1960s the controversy between cognitive dissonance (Festinger, 1957) and incentive theory views of attitude change gave us the notion of evaluation apprehension (Rosenberg, 1965), the technique of “balanced replication” (Linder et al., 1967), and one of the very first physiological measures of a social psychological process (Brehm et al., 1964).

Components of Attitudes

It is easy to see why attitude research and theory have been at the core of social psychology. Traditional definitions of the concept divide an attitude into three components – a cognitive component, an affective component, and a behavioral component. The first represents one's beliefs about the attitude object, and many of these are organized according to processes of social cognition. The second component is evaluative, involving both judgments of the attitude target and one's own

reasons for holding the attitude (what Katz & Stotland, 1959, described as the “functions” of an attitude). The third component is often regarded as a general tendency to respond in a favorable or unfavorable manner toward the attitude object, represented more precisely by the notion of “behavioral intentions” (Fishbein & Ajzen, 1975). Including cognition, emotion, and behavior within a single concept makes that concept sound very much like the stated domain of the field: the socially meaningful actions of particular individuals. In entrepreneurship, this tripartite representation of attitudes is the basis for the Entrepreneurial Attitude Orientation (EAO) scale developed by Robinson, Stimpson, Huefner, and Hunt (1991). These investigators included dimensions such as innovation and achievement, but were particularly careful to tap behaviors as well as beliefs and values, thus covering all three of the elements of an attitude.

Cognitive Consistency

Recent treatments of attitudes have tended to concentrate on the evaluative or emotional elements (Tesser & Martin, 1996) particularly when the topic is limited to attitude change (Petty, 1995). This, too, is not surprising. After all, people rarely change their beliefs and attitudes unless there is some reason to do so. A long-standing tradition in attitude theory is that a primary motivation for change comes from an inconsistency between one’s expressed attitudes and one’s actual behavior. “If I believe that, why am I doing *this*?” The search for consistency between thought and action is best represented by *cognitive dissonance theory* (Cooper & Fazio, 1984; Festinger, 1957).

Typical of the cognitive consistency theories of attitude change, dissonance theory partitions the mental landscape into cognitive elements and the relations among them. Three such relationships are possible: consonance (agreement in content), dissonance (one implies the opposite of another), and irrelevance. The elements can represent emotions, beliefs, or behaviors, though the latter two are by far the most frequently studied. According to the more recent version of the theory (Cooper & Fazio, 1984), dissonance will occur if (a) one’s actions produce consequences one considers negative, (b) one cannot avoid personal responsibility for the consequences, and (c) the resulting general motivational arousal cannot be attributed to some external source. Because it is easier to change an attitude than to change a behavior (indeed, a person’s past public actions cannot be changed), the usual result of dissonance is attitude change.

Cognitive dissonance, and its first cousin, *escalation of commitment* (Brockner, 1992; Staw, 1981) would appear to have widespread applications in entrepreneurship. What is “single-mindedness of purpose” in the organizing phase of a new venture may become “unwillingness to listen to constructive advice” should trouble develop. Venture investors may continue to put cash into an enterprise that is well on its way to becoming one of the “living dead.” Members of advisory boards sometimes take strong public positions that effectively prevent them from modifying their

views in response to changing circumstances. Indeed, a recent study by Blanton, Pelham, DeHart, and Carvallo (2001) suggests a dissonance-based explanation of the overconfidence bias.

But those who would look for dissonance as an explanation for venture continuance need to be careful in their search. A first caution concerns the target chosen for study. Dissonance exists within the mind (based on the behavior) of one person. So, for example, to study dissonance as an explanation for continuation despite clear indications that the venture should be scrapped, all the data must be collected from the original *founder*. A manager will not do as a substitute, because dissonance is person-based, not firm-based. A second caution is based on the Cooper and Fazio (1984) revision of the theory. Merely having a bad outcome is not enough. Dissonance will result only if the bad outcome should have been anticipated, and there are few alternatives to accepting personal responsibility.

Planned Behavior

Although the components of attitudes and the motivation involved in attitude change have parallels in the entrepreneurship literature, by far the most influential attitude theory has been the theory of reasoned action (Fishbein & Ajzen, 1975) and its successor, the *theory of planned behavior* (Ajzen, 1991, 1996). The theory of planned behavior (TPB) begins with an assumption quite congenial to entrepreneurship, namely, that most important behavior is volitional. Such volitional behavior is presumed to be the product of intentions, which are themselves a function of the person's overall attitude and the "subjective norms" that represent social pressure either to perform or not perform the action. Regardless of attitude and subjective norms, intentions will be exercised only if the individual believes that he or she has perceived behavioral control.

In formal terms, the TPB holds that

$$B \simeq I \propto [\omega_1 A_b + \omega_2 SN + \omega_3 PBC]$$

where B is the behavior, I is the behavioral intention, A_b is the attitude toward the action, SN is the set of social norms, and PBC is the perceived behavioral control. The three weights are empirically determined.

Although the model is simple in principle, testing its implications requires substantial detail. The attitude toward the behavior or object (A_b) is often considered the sum of beliefs about the object, with each belief multiplied by its perceived goodness. So the question, "what is your attitude toward (some new product)?" really reduces to a series of smaller questions about its design, the likelihood that it will meet its market need, whether it can be produced with sufficient margins to make a profit, and so forth. Similarly, the social norms component (SN) is also a sum, this time of the judgments of any person whose opinion matters, with each judgment multiplied by the motivation to comply with the opinion. Finally, even the perceived

control component (PBC) is subdivided into the constraints as they exist, and as they are perceived.

As Ajzen (1996) notes, there is a sizable volume of research in social psychology that supports the overall predictions of the TPB. But perhaps for understandable reasons, the theory's influence in entrepreneurship has been more apparent in theorizing than in research. Social psychologists who are interested in testing the TPB often do not have a content objective beyond understanding the nature of attitude structure. So it is in their interest to identify all of the relevant beliefs about an attitude object and obtain evaluative ratings of each; to identify all the people who might contribute normative pressure and estimate the likelihood of compliance; to create relatively precise measures of perceived control in experimental settings where the range of possible values for actual control is either limited or nonexistent. For entrepreneurship scholars, however, the situation is quite different. If the attitude to be measured is one concerning a new process or product – or worse, a new industry – some of the “beliefs” are not likely to be known. The subjective norms involved are seldom those imposed by individual people, rather they are estimated by proxy from categories of targets (e.g., customers, suppliers, or the financial community). And the number of factors that can (and often do) limit the entrepreneur's freedom of action is quite large. Nevertheless, the TPB has made its way into entrepreneurship, primarily in the work of Krueger and his associates (Krueger, 2000, Krueger & Brazeal, 1994; Krueger et al., 2000). Much of this work has taken the position that perceived behavioral control is best estimated with measures of self-efficacy (Bandura, 1986), so its discussion will occur later in the chapter.

The Self

Who are you, and how did you get that way? This question covers more than your beliefs, biases, attributions, and attitudes. Indeed, searching a psychological data base for all “self-” compounds is a guarantee of eye strain. Part of the reason that the topic covers so much ground is that the self both “is” and “does” (a distinction originally made by William James, 1892). James considered the self-as-object (the “Me”) to include the material self (physical being and possessions), the spiritual self (personality traits, verbal skills, attitudes, inner experience), and the social selves (the plural indicates that we have, at minimum, a slightly different social self for every category of people with whom we come in contact). In contrast, James argued that there is only one self who “does.” This self-as-subject (the “I”), does the knowing, does the thinking, is the sum of our conscious processes. If all of this sounds like a version of the mind/body problem, that is because psychology's origins derive from a philosophy contrasting Hobbesian materialist identity theory with Cartesian dualism (see, for example, Churchland, 1988; Robinson, 1979). Not surprisingly, devising ways to study ongoing conscious processes has been a technical problem for scientific psychology ever since Wilhelm Wundt established what many consider the first psychological laboratory in 1879. But with modern advances

in neuroscience, this problem may be getting more tractable (see, for example, Zillmann & Zillmann, 1996). Despite the increasing contact between social psychology and neuroscience, most researchers have not yet had broad access to procedures (such as magnetic resonance tomography) now used to study the conscious mind as it thinks. As a consequence, a majority of the social psychological inquiry into the self has emphasized either the contents or processes of the “self-as-does.” And in entrepreneurship, there has been the most interest in what social psychology would describe as issues of self-evaluation.

Self-Evaluation

In the development of our social selves, we must often choose between accuracy and distortion. We need to know our capabilities, but we would like them to be more extensive than they are. We need to know what our core as a person might be, but we would also like people to think well of us. This conflict between accuracy and distortion can be seen in a great deal of theorizing about the self (Shaver, 1987).

One place where the tension is clear is in the case of *social comparison theory* (Festinger, 1954; Kruglanski & Mayseless, 1990, Suls & Wills, 1991). This theory has three fundamental elements. First, it holds that people have a drive to evaluate their opinions and abilities. Second, it claims that people will prefer objective standards for evaluation, when those standards are available. And finally, when there are no objective standards, people will use social comparison with others who are similar to them in ways relevant to the comparison. The original statement of the theory was not clear on the precise meaning of “evaluate.” Specifically, does it mean “locate relative to others” or does it mean “place a value upon.” Later work shows clearly that when people are faced with learning their “location” in a manner that might reduce their self-esteem, they will engage in “downward” social comparison, finding their location relative to people who are expected to be worse off (Wills, 1991).

At this point, social comparison theory has not made its way into entrepreneurship research. But a real opportunity exists. Consider the various organizations to which many entrepreneurs belong – local technology councils, breakfast roundtables sponsored by entrepreneurship centers, even more formal and expensive options like the Entrepreneur’s Edge or The Executive Committee. Why would an entrepreneur take time away from his or her business to “attend a bunch of meetings?” Certainly, part of the answer is that business networks provide sources of competitive intelligence, access to capital and suppliers, and the opportunity to get one’s business known in the local community. But there may be more. If it is lonely at the top of a large organization, it is every bit as lonely at the top of a small one. Worse, if you have started at the top of the small one, you lack the years of relevant company experience that can provide some comfort to the CEO of a large corporation. Not only can entrepreneurs learn “facts” from one another about how to solve problems facing their firms, they can also get a sense of how well they are performing in their role as CEO.

There is a practical research implication of considering “networking” from the standpoint of social comparison. To return to the issue of the “overconfidence bias,” suppose that a researcher attempts to collect performance expectations from all businesses within a narrow industry sector. Further suppose that the number of such businesses can be identified with confidence from local tax or unemployment records, but that for convenience the research is conducted at meetings of a local network organization for the industry sector. Finally, suppose that only 30% of the local companies belong to the organization. Then if the respondents say that their firms are in some way “better” than 70% of firms in the sector, this response could be “overconfidence bias,” or it could only be an accurate reflection of their belief that the organization members perform at a higher level than the remainder of the local firms in the sector. In short, social comparison theory would urge us to be careful in the specification of potential reference groups.

Consequences of Self-Concept

Social comparison processes describe the ways in which we come to understand just how well we do. Certainly, there are some objective benchmarks as well: firm size, revenue growth, market penetration. But what exactly does it *mean* to say that one’s firm has 15% of the market? Is that a lot? Is it a little? Is it enough to justify a large venture investment? The answer, of course, depends on the size of the market segment, the number of other firms in the segment, and on what their level of market share might be. In other words, there must be a kind of social comparison of the objective information. The question now is what we do with the performance information we glean. How does it enter into our self-concepts, and more particularly, how does it affect our behavior?

Although there are several theories in social psychology about the relationship between self-maintaining processes and social behavior, the one that has received most attention in entrepreneurship is *self-efficacy* (Bandura, 1986, 1997). Fundamentally, Bandura’s theory is one of personal causation, involving “the origins of efficacy beliefs, their structure and function, the processes through which they produce diverse effects, and their modifiability” (1997, 10), and is presumed to operate at both the individual level and the collective level. In a nutshell, perceived self-efficacy is a set of domain-specific beliefs about whether one can produce a certain action. In that sense it can be distinguished from locus of control beliefs and expectancies that presume to summarize the relationship between action, once performed, and outcomes or consequences of that action. A person’s self-efficacy increases as a result of his or her mastery experiences, modeling or “vicarious experience” (often obtained through a form of social comparison), verbal persuasion from others, and even from close monitoring of internal affective states during a performance or activity (how much does it really hurt to be a “weekend quarterback?”). The self-efficacy cues derived from all of these sources guide behavior in the future.

In one sense, the notion of self-efficacy has an interesting status as a concept. It is at once an individual difference variable and a capability susceptible to outside influence or training. This joint status makes it quite different from more than a few related ideas. For example, the usual connotation of “individual difference variable” is something equivalent to a personality trait – a relatively enduring, cross-situationally consistent, feature of the person. True, personality traits are clearly shaped during socialization, but over a long period of years. They are not regarded (at least by the therapeutic community) as changeable in the short term without truly dramatic interventions. On the other hand, a person’s beliefs can be shifted by persuasive communication, often with only minimal effort. So the idea of a set of beliefs – open to change through verbal persuasion – that nevertheless constitute an individual difference variable – on which people will be relatively normally distributed – is not always easy to translate into research practice.

Despite this obstacle, self-efficacy has found a home in entrepreneurship, largely through the work of Krueger and his associates (Krueger, 2000; Krueger & Brazeal, 1994; Krueger et al., 2000). Specifically, Krueger has used self-efficacy in the entrepreneurial domain as a replacement for the “perceived behavioral control” that is part of the theory of planned behavior (TPB). For example, Krueger (2000) describes self-efficacy as a personal estimate of venture feasibility, and extends the analysis to include the “collective efficacy” in an organization that might act to support or inhibit the perceived control of individual members of the team. Experiences that provide the opportunity for mastery will, of course, enhance perceived venture feasibility. In Krueger’s work self-efficacy is then combined with perceived desirability of entrepreneurial action (the social norms component of TPB) and with a version of the “entrepreneurial event” outlined by Shapero (1982) to create intentions for entrepreneurial action.

Conclusion

The creation of a new venture is a truly social enterprise. It begins with the recognition of an opportunity (an act of social perception), continues through an organizing process that necessarily involves interaction with others, and culminates in a business that will reflect a “corporate culture” derived (intentionally or not) from its founders. For this reason, the theories and methods of social psychology would seem to be especially appropriate as ways to help understand the process. When the discipline of social psychology requires nearly 2,000 pages to capture (the size of the 4th edition of the Handbook), it is clearly impossible to bring all of social psychology to bear on the phenomenon of entrepreneurial behavior. To do justice to the concepts involved, and to describe at least some of the resulting entrepreneurship research, this chapter has concentrated on the intrapersonal processes involved prior to the existence of an organization. To our consideration of social cognition, attribution, attitudes, and self-beliefs, many social psychologists might hope to add topics like equity, bargaining and negotiation, investments in close relationships, to

name a few. At this point in the development of the discipline of entrepreneurship, social psychological theories and methods have already had a significant impact. The sheer amount of what is *not* covered here suggests that social psychology's value to entrepreneurship can only increase in the future.

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Chapter 15

Entrepreneurship as Social Construction: A Multilevel Evolutionary Approach

Howard E. Aldrich and Martha A. Martinez

Introduction

Organizations are social structures – patterned and relatively stable arrangements of roles and statuses – that constitute the building blocks of modern capitalist societies. Efforts to understand their emergence typically focus on the role of entrepreneurs and concentrate on the firm level. Such firm-level analyses make sense in already existing populations and communities, because most new firms follow the paths of their predecessors and survive by filling an existing niche. However, in the case of new ventures that are the first of their kind, the formation of a firm cannot be the final step. Entrepreneurs creating organizations that depart from the established order must not only create a coherent and self-sustaining entity, but must also organize with other entrepreneurs to build a new, more favorable context.

In a fundamental sense, then, entrepreneurship involves the social construction of new social entities. Whereas entrepreneurs in established populations benefit from the work already completed by antecedent firms, entrepreneurs in new populations must create and give form to their own social environments. Entrepreneurs building new populations must engage in activities that range from making people and organizations aware of their existence and value to creating a system of cooperation and competition that facilitates their long-term survival. In these cases, entrepreneurial work does not stop at the organizational level, but goes on to involve the construction of populations and communities. Environmental change and entrepreneurs' capacities for adaptation to change, as well as the interaction of these two factors, influence the success or failure of such efforts.

The other chapters of this book provide an in-depth look at entrepreneurial processes at the firm and individual levels. In contrast, the purpose of our chapter is to review and analyze the multilevel selection processes that apply across three different levels of entrepreneurial social constructions: organizations, populations, and

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communities. We emphasize the inexorable tension between selection forces at the three levels that affect variations generated by entrepreneurs. Sometimes selection forces work in concert, but often they do not.

The Social Construction of Entrepreneurship at the Organizational Level

The concept of “nascent entrepreneur” captures the flavor of the chaotic and disorderly process driving the creation of new firms. A nascent entrepreneur is defined as someone who initiates serious activities that are intended to culminate in a viable business startup (Reynolds and White, 1997). In evolutionary terms, nascent entrepreneurs comprise a major source of organizational variations, beginning with their diverse intentions and continuing through a wide range of heterogeneous activities oriented toward a realized founding.

Recent data on startup rates shows the widespread prevalence of entrepreneurial activities not only in American society, but in other nations as well. If we define nascent entrepreneurs as those individuals engaged in two or more activities directed toward the founding of a firm within the past 6 months, then 4.3% of the population could be classified as nascent entrepreneurs in a representative sample of 683 Wisconsin residents in the United States in 1993. In a nationally representative sample of all adult residents of the United States in 1997, 3.9% were classified as nascent entrepreneurs (Reynolds, 1999). Another nationally representative study in the United States, conducted in 1997, arrived at comparable estimates, after allowing for slight differences in definitions (Dennis, 1997).

Extrapolating from these results, millions of adults participate each year in some form of entrepreneurial activity in the United States, even though most activities do not lead to firm formation or positive financial results in the short run. Perhaps as many as seven million people become involved in such activities each year, launching as many as 3.3 million firms that reach a point where they are potentially viable businesses. Viewed from the perspective of their working careers, about 40% of American adults experience spells of self-employment in their lifetime (Reynolds and White, 1997).

International information on startup rates is becoming available through various collaborative efforts, such as the GEM Project (Reynolds et al., 1999, 2000). The GEM project found that the rate of nascent entrepreneurship varies widely across nations, with the United States at the high end, with more than 1 in 12 people in 1999, versus about one in every 67 people in Finland. Rates in Australia are about 1 in 12, in Germany about 1 in 25, about 1 in 33 in the United Kingdom, about 1 in 50 in Sweden, and about 1 in 100 in Ireland. “In the highly active countries (i.e. U.S., Canada and Israel), it is rare to find a person who doesn’t personally know someone who is trying to start a business. In the less active countries (i.e. Finland and Japan), it may be rare to find a person who knows of anyone trying to start a new firm” (Reynolds et al., 1999). Countries also differ in the extent to which startups are sponsored by existing businesses and in the level of personal financial support invested in a new business.

Although this inclination toward entrepreneurship in some nations implies the potential for a torrent of organizational innovation, the actual pool of startups contains mostly mundane replications of the familiar. Based on survey and ethnographic accounts, the founding process appears complex, chaotic, and compressed in time, and highly vulnerable to intense selection pressures. Most entrepreneurs thus fail in their attempts to create new entities, and less than 1 in 10 new ventures grows (Duncan and Handler, 1994; Reynolds and White, 1997). Even when they succeed, the products of entrepreneurial efforts (stable, self-sustainable organizations) are typically simple replications of existing organizational forms (Aldrich and Fiol, 1994; Aldrich and Martinez, 2001; Gartner, 1985; Low and Abrahamson, 1997). Imitation and the reproduction of organizational forms constitute the norm, rather than the exception.

Of course, some mundane replications of the familiar carry the potential of becoming very large. For example, some people start new firms in the belief that they can create a new franchise chain. A franchise is a classic replication because, from the very beginning, new establishments are intended to be identical to the original template. However, even following the route of replication, rather than innovation, does not guarantee success, as most new franchise systems fail within 10 years (Shane, 1996).

For modern societies, apparently so oriented toward radical change, the small proportion of innovative entrepreneurs seems shocking. To explain this apparent anomaly, we consider three questions in this section on firm-level entrepreneurship: Why are entrepreneurs so inclined to imitate existing forms? In the face of powerful pressures, why does innovation nonetheless often occur? Finally, what selection forces face innovating entrepreneurs?

Imitation Reproduces Existing Forms

On a continuum between the two poles of reproducers and innovators, *reproducer organizations* are defined as those organizations started in established populations whose routines and competencies vary minimally, if at all, from those of existing organizations. They bring little or no incremental knowledge to the populations they enter, organizing their activities in much the same way as their predecessors. At the other end of the continuum, *innovative organizations* are those organizations started by entrepreneurs, intentionally or not, whose routines and competencies vary significantly from those of existing organizations (Picot et al., 1989).

The forces that favor imitation and the reproduction of existing structures, rather than innovation and replacement, lie at the core of sociological theory and have been given special emphasis by neo-institutional theorists. As with other wide-ranging perspectives, institutional theories have many faces (DiMaggio and Powell, 1991; Suchman and Edelman, 1996). At the most general level, institutional theories argue that reproduction takes place because of the existence of socially created “truths” about such questions as: what is possible and impossible, how do markets and industries work, what goals should organizations pursue, and what are the appropriate means to accomplish organizational goals (Meyer and Rowan, 1977).

Many definitions of organizational form have been proposed, as noted by (Carroll and Hannan, 2000). All definitions share a concern with characterizing a bounded population of organizations, but they differ in the principles used to achieve that goal. Many definitions treat an organizational form as a “cluster of features,” such as Weber’s definition of the bureaucratic form of organization (Carroll and Hannan, 2000), or McKelvey’s (1982) concept of organizational species as polythetic groupings. Although they began in the 1970s with conceptions emphasizing organizational architecture, population ecologists eventually adopted ideas from institutional theory and developed a conception of organizational forms as social constructions (Hannan, 1986).

Carroll and Hannan (2000) proposed a new definition of form as “a recognizable pattern that takes on rule-like standing.” Deeply grounded in a sociological view of organizations, this definition emphasizes cognitive recognition and external enforcement of the features an organization can legitimately display. Organizational forms thus depend for their existence on insiders and outsiders expecting particular features and negatively sanctioning organizations that fail to live up to their expectations. Defining organizations as social constructions, of course, immediately raises the issue of when and why a new kind of organizational form emerges. In this chapter, we focus on the role entrepreneurs play in constructing new forms.

Organizations are the dominant, taken for granted tools of collective action in our world. Indeed, knowledge of “organizations” as a social form is deeply embedded in the cultures of all industrial societies. At the individual level, the received idea of “organization” creates a strongly held set of expectations and behaviors, including the need to modify our ideas according to the opinions of other people (Blackmore, 1999; Zucker, 1977). Not surprisingly, as cultural products, particular strategies of action differ across societies. Resources for constructing strategies of action are generated by “the symbolic experiences, mythic lore, and ritual practices of a group or society {that} create moods and motivations, ways of organizing experience and evaluating reality, modes of regulating conduct, and ways of forming social bonds” (Swidler, 1986).

In most Western industrial societies, these rules constitute part of the behavioral repertoire of socialized adults who understand and use the rules as guides through most social situations. Used appropriately, such rules help individuals “economize on their interactions with others” (Drazin and Sandelands, 1992). Indeed, in all societies, fundamental rules of organizing are available to people from a very early age. “Models of organization are part of the cultural tool kit of any society and serve expressive or communicative as well as instrumental functions” (Clemens, 1993). Potential entrepreneurs usually take for granted such culturally defined building blocks of rules, thus channeling most new ventures in the direction of reproducing existing organizational forms (Carroll, 1993).

Beyond the general and very abstract effect of taken-for-granted “truths,” practical reasons may direct entrepreneurs to imitation. By definition, all first-time entrepreneurs are learning how to construct an organization, even while in the process of creating one. They learn by doing, as they engage in trial and error learning. *Learning by doing* puts powerful pressures on newcomers to adopt the role

of student vis-à-vis established entrepreneurs who already run successful organizations. In fact, managerial education, including programs designed for entrepreneurs and courses taught to MBAs, reinforces imitation by focusing on successful cases. Because failed organizing attempts are usually not available for study, whereas apparently successful ones are, nascent entrepreneurs will engage in quite a bit of superstitious learning.

People often pick models to imitate that contain subtle selection biases that are easy to overlook, as (Denrell, 2000) noted. For example, the business press frequently celebrates entrepreneurs as aggressive risk takers, noting that the most successful firms in an industry have pursued higher risk strategies than others. What such comparisons fail to note, however, is that many firms pursuing a high-risk strategy simply failed. Such firms are thus missing from the comparative assessments made by current commentators. A more balanced assessment would conclude that high-risk strategies are actually quite dangerous and unpredictable, as likely to lead to a firm's demise as its success. In truly uncertain environments, nascent entrepreneurs are, by definition, flying blind (Knight, 1921).

Under conditions of uncertainty, entrepreneurs' absorptive capacities influence their ability to see opportunities, as Shane (2000) pointed out, building on an argument by Dosi (1982) on technological paradigms. Human cognitive processes drive people to see things related to their existing knowledge. As a result, "creativity" is actually more about assembling prior knowledge in new ways than about dreaming up something totally new. Prior paradigms and problem-solving approaches thus constrain most innovative thinking, restricting potential variation in ideas.

Even if nascent entrepreneurs could resist isomorphic pressures (DiMaggio and Powell, 1983), they still face deep-seated temptations to imitate. With all the complexity, risks, and uncertainty related to the founding of a firm, the safest choice lies in imitating practices, products, and processes that have already proven successful. Obviously, imitation does not eliminate risks, because entrepreneurs do not have access to unbiased information about entrepreneurial failures that used the imitated practices, products, and processes. Nonetheless, imitation is a relatively inexpensive mode of social construction. By contrast, innovation is expensive and risky because it requires not only the acquisition of resources but also the creation of new knowledge.

Why Innovations Still Occur

Given powerful pressures to imitate, why and how do entrepreneurs ever innovate? First, individuals do not always act like simple machines, slavishly conforming to the world as they find it (Shane, 2000). As Harper (1996) argued, entrepreneurs make reasoned conjectures about the world and then act on them. Sometimes their conjectures are about worlds that do not exist yet. Second, innovations, as well as the behaviors that lead to them (experimentation, play, and make believe), have proved historically useful for human adaptation and survival (Campbell, 1969). Creativity,

experimentation and accidents, play, and make-believe, in contrast to the cultural conformity induced by social processes, are naturally occurring behaviors through which individuals “disobey” ingrained cultural routines, norms, and habits.

The continuum from reproducer to innovator is defined by outcomes, not intentions (Aldrich and Kenworthy, 1999). Some entrepreneurs deliberately intend to depart from existing knowledge, whereas others give it no thought. Irrespective of intentions, individuals face a tension between deviating from existing routines and competencies and conforming to them, as Campbell (1994, 35) noted: “There is, perhaps, always a potential conflict between the freedom to vary, which makes advance possible, (versus) the value of retaining the cultural accumulation.” Playfulness and experimentation are natural impulses that have been wired into humans because of their utility. However, the full expression of these tendencies is opposed by another set of wired-in impulses: humans’ tendencies to defer to the beliefs of others. Indeed, pressures for obedience to cultural routines can be powerful enough to intimidate individuals with unorthodox beliefs (Aldrich and Kenworthy, 1999).

Given that the odds of survival are low, under what conditions might people nonetheless become involved in innovative entrepreneurship? Campbell (1994) identified several dimensions that distinguish innovators from reproducers. First, individuals may just be plain egotistic or narcissistic, putting competitive behaviors and a sense of their “uniqueness” above group interests. Some people may thus believe that they can avoid group-level selection pressures, and set out to single-mindedly pursue their own idiosyncratic course of action. Discerning readers will recognize this description as the classic portrait of an entrepreneur, a depiction that has been substantially but not totally discredited by researchers (Aldrich and Wiedenmayer, 1993). It serves as a siren song, tempting new generations of researchers to employ it, regardless of the serious methodological problems frequently encountered but rarely solved (Baum, 2001).

Second, individuals may “doubt” the appropriateness, practicality, or simple functionality of current cultural templates. Innovation, whether intended or not, requires an ability to challenge, and often disregard, dominant cultural routines. Challenging the dominant paradigm constitutes an overwhelming obstacle for many entrepreneurs. For example, resource requirements for founding, via loans or venture capital funding, may result in coercive isomorphism (DiMaggio and Powell, 1983) with a new firm forced to adopt a taken-for-granted form. Strong selection pressures may thus quash individual variation in solutions chosen to startup problems.

Nonetheless, some entrepreneurs may succeed in maintaining their skepticism because they have confidence in alternative decision algorithms learned through experience, or because they are embedded in highly diverse social networks. Even if nascent entrepreneurs discover a very promising idea for a startup, they still require help from others to actually build an organization. About half of all nascent organizing attempts in the United States involve more than one founder who will also own equity in the new venture (Ruef et al., 2002). Given the lure of further experimentation and the diversity of their contacts, innovative founders and founding teams may dissipate their energies before an organization can take form.

Third, an alternative path to the nonconformist, innovative creation of new organizational knowledge may occur via ignorance of existing cultural norms. Circumstances may occur where individuals simply do not know what prevailing forces dictate. For example, truly innovative startups are often the result of creative experimentation with new ideas by outsiders to an industry. Indifference to industry routines and norms gives outsiders the freedom to break free of the cognitive constraints on incumbents. Innovative entrepreneurs often have human capital that has been developed outside of the industry they wish to enter. For these individuals, and the organizations they found, ignorance or blindness to the norms of the population encourages creative, innovative organizational emergence (Cliff, 1997).

Some theorists have argued that recognizably valuable opportunities are essential for the success of nascent ventures. Investors often talk of the importance of things like potential market size in funding ventures, for example. In a very well-articulated statement of this position, Shane and Venkataraman (2000) argued that “Although recognition of entrepreneurial opportunities is a subjective process, the opportunities themselves are objective phenomena that are not known to all parties at all times.” We acknowledge that, after the fact, objective observers may agree that an entrepreneur took advantage of an opportunity, but from an evolutionary perspective, we question whether a prior identification of objective opportunities should be built into a model of nascent entrepreneurship.

Entrepreneurs creating organizations in new populations face uncertainty, not simply “risk,” in making their decisions. Knight (1921), in his classic analysis of risk and uncertainty, “restricted the concept of risk to situations in which both the set of possibilities and the probability distribution over this set are known, either by argument a priori, as in calculating the expected results of throwing dice, or by statistical analysis of appropriate evidence” (Loasby, 2001). Under conditions of uncertainty, decisions are usually made on grounds other than logical calculation (Thaler, 1994). Evolutionary thinking posits an open future that is enacted by myopic agents who are hampered by ignorance and environmental complexity as they grapple with uncertainty. Entrepreneurs can assemble what they think they need, but whether their choices match up successfully with selection forces is an open question.

Selection Forces Affecting Innovative Entrepreneurs

Given their difficulties in acquiring resources, are innovating entrepreneurs subject to stronger selection forces than their imitating counterparts? Some innovative entrepreneurs create routines and competencies that vary in ways *avored* by selection criteria. The new organizational knowledge they generate may thus transform an existing population or create a new one, although the innovating firm itself may not survive. From a population point of view, they have created *competence-enhancing*, *competence-destroying* (Anderson and Tushman, 1990), or *competence-extending innovations* (Hunt and Aldrich, 1998).

Competence-enhancing innovations involve substantial improvements that build on existing routines and competencies within a product/service class and can be adopted by existing organizations (Abernathy and Clark, 1985; Utterback and Abernathy, 1975). For example, most typewriter manufacturers switched relatively smoothly from producing mechanical typewriters to producing electric ones. Competence-extending innovations permit existing firms to pursue new opportunities that allow them to stretch their existing competencies into complementary ventures. Unlike competence-enhancing opportunities, these new ventures are not straightforward extensions of current routines and competencies and therefore cannot be pursued with minimal effort. At the same time, however, these opportunities are not direct threats to existing firms' competencies. Instead, they are potential opportunities for expanding their domains. The World Wide Web (henceforth, just "the Web") and the biotechnology communities offer examples of this process. Most competence-enhancing and competence-extending innovations can be adopted by existing organizations.

Competence-enhancing and competence-extending innovating startups find themselves in a very weak position, because they encounter an environment already occupied with organizations that can easily absorb their very temporary competitive advantage. Existing organizations also have more experience with successful practices in their industry. Selection forces might thus give only a marginal advantage to startups based on such incremental innovations. Nonetheless, their efforts give birth to the population-level benefits of increasing the fitness and survival capabilities of all organizations in the population (even if they are part of it for only a short time).

In contrast to the incremental effects of competence-enhancing and extending innovations, competence-destroying innovations require new knowledge, routines, and competencies in the development and production of a product/service. They fundamentally alter the set of relevant competencies required of an organization. Accordingly, they put existing organizations at a disadvantage. The development of computers as word processors was a competence-destroying innovation that has driven the typewriter industry to near extinction. Typewriter manufacturers' attempts to offer some of the same features as word processors, such as being able to edit and save electronic documents, have been insufficient to maintain their position in the market.

Entrepreneurs who try to create organizations based on competence-destroying technologies thus plant the seeds that might germinate a new population, or at least lead to a mass extinction of existing organizations and their replacement by a new cohort of organizations. New industries, as opposed to new markets within existing industries, are typically opened by independent new ventures. New independent ventures often cannot rely on existing institutions to provide external legitimacy.

Because the new ventures constitute an entirely new population, much of the knowledge they need will not be available via experience and imitation (Van de Ven et al., 1988). Founders of the first innovative ventures in a new population operate in a situation with few, if any, precedents for the core new activity in which they are engaged. They must learn about new markets and develop the organizational knowledge to exploit them. They also often face situations in which potential members and

resource providers question their legitimacy. Learning and legitimacy are thus two of the most important factors for the survival of a firm, but individual firms only partially control their own fate. Much of the critical learning and legitimacy creation takes place at the population level, which we discuss in the next section.

Summary: Organizational Level Entrepreneurship

Nascent entrepreneurs face four powerful forces inhibiting innovation. First, given the chaotic and unpredictable process of creating new firms, reproduction is typically more cost-effective than innovation. Second, overarching institutional frameworks constrain imitators' thinking regarding what is possible or impossible, acceptable, or unacceptable. Third, innovators have a hard time convincing key constituencies to provide them the scarce resources required to build new firms. Finally, existing firms often assimilate competence-enhancing and competence-extending innovations, leaving innovators without a sustainable competitive advantage and lots of organizational problems.

Given these four problems, it is remarkable that entrepreneurial innovation takes place at all in modern societies. Nonetheless, several factors do contribute to the persistence of innovative efforts, even in the face of serious constraints. First, curiosity and the need for exploration are as highly engrained in human nature as is the need for stability. Second, the quite sensible act of doubting the system, a common phenomenon in many societies, gives people reasons to look for new ways to perform tasks. Some people are quite willing to face societal wrath in pursuit of their vision, regardless of the costs. Third, ignorance of existing forms can lead to accidental innovation.

However, simply creating an innovative venture is insufficient. In a world ruled by inertia, entrepreneurs must still discover how to make it last. Powerful selection forces conspire against most innovative foundings. Ultimately, successful collective action at the population and community levels allows entrepreneurs to create environments favorable to their existence.

Population Formation and Growth

Populations appear and disappear with great regularity in modern economies. Given a long-enough period of observation, almost all populations show an inverted-U shaped growth pattern, with numbers of organizations rising and falling as a population ages. In this section, we focus on two problems facing entrepreneurs in new populations: they must develop effective new routines and competencies, and they must carve out a legitimate niche for the population. When we assert that innovating entrepreneurs must create their own niches, we are referring to their need to obtain resources and legitimacy by acting on their environments. First, we describe the context in which these two problems arise. Second, we review the cognitive

requirements confronting startups and then examine common strategies enacted to meet them. Third, we conduct a similar analysis of sociopolitical requirements and strategies.

Problems Confronting Entrepreneurs in New Populations

Two specific problems confront nascent entrepreneurs in new populations. First, they must discover or create effective routines and competencies under conditions of ignorance and uncertainty. When the number of organizations in a new industry is small, organizational members must learn new roles without the luxury of established role models. Of course, not all information is population-specific, and thus occasionally new firms have an opportunity to learn from other populations. Second, new organizations must establish ties with an environment that might not understand or acknowledge their existence (Hannan and Carroll, 1992; Stinchcombe, 1965). In particular, they must search for strategies that give them legitimacy.

In Aldrich and Fiol (1994), two forms of legitimacy were identified: cognitive and sociopolitical. *Cognitive legitimacy* refers to the acceptance of a new kind of venture as *a taken for granted* feature of the environment. The highest form of cognitive legitimacy exists when a new product, process, or service is accepted as part of the sociocultural and organizational landscape. When an activity becomes so familiar and well-known that people take it for granted, founders can conserve time and other organizing resources, and their likelihood of success increases. From a producer's point of view, cognitive legitimacy means that new entrants to an industry are likely to copy an existing organizational form, rather than experiment with a new one. From a consumer's point of view, cognitive legitimacy means that people are committed users of the product or service. Cognitive legitimacy thus depends upon knowledge – in the form of routines, structures, products, and strategies – being acquired and then diffused.

Sociopolitical legitimacy refers to the acceptance by key stakeholders, the general public, key opinion leaders, and government officials of a new venture as appropriate and right. It contains two components: *moral acceptance*, referring to conformity with cultural norms and values, and *regulatory acceptance*, referring to conformity with governmental rules and regulations. Clemens (1993, 771) noted that “the adoption of a particular organizational form influences the ties than an organized group forms with other organizations.” Signs of conformity to moral norms and values include (a) the absence of attacks by religious and civic leaders on the new form and (b) heightened public prestige of its leaders. For example, in the nineteenth century, clergy and church leaders initially vilified the life insurance industry for profaning the sacredness of life (Zelizer, 1978). Signs of conformity to governmental rules and regulations include (a) laws passed to protect or monitor the industry and (b) government subsidies to the industry. For example, the passage of the Wagner Act in 1935 in the United States gave special status under federal law to unions that conformed to federal guidelines.

The process of learning and building legitimacy begins at the organizational level and continues up through the various levels: within populations, between populations, and the entire community of populations. Table 15.1 (Aldrich, 1999) summarizes the different strategies that organizations follow to gain knowledge and legitimacy at these different levels of selection. We use the term “strategy” in a generic sense to refer not necessarily to consciously articulated plans of action, but rather to a consistent stream of actions intended to further an entrepreneur’s objectives (Mintzberg, 1978). When achieved, legitimacy, and population-level knowledge become resources that cloak the foundations of all organizations in a population, regardless of their individual characteristics (Rao, 1994).

Cooperation versus Competition in New Populations

Building a new population involves the creation of a market, a very important collective task for entrepreneurs. In the process of constructing a market, tensions arise among new firms between pressures toward cooperation as opposed to competition. On the one hand, given the complexity of product and consumer needs (status, preferences, and roles), most markets cannot be dominated by a single firm (Podolny, 1993). Few markets resemble the “winner take all” conditions described by Shapiro and Varian (Shapiro and Varian, 1999) in which a single firm’s technology or marketing power allows it to crush its competitors. New ventures must thus compete, as individuals, to gain the most profitable segment(s) of their emerging market. On the other hand, new ventures must pursue collective efforts to efficiently accumulate knowledge and acquire legitimacy among the segments of society constituting their intended market or resource providers.

The balance a new population achieves between competition and cooperation internally and vis-à-vis other groups of organizations ultimately determines its boundaries. Members struggle with recognizing and responding to constraints and opportunities as they strive to construct a population’s boundaries. Their struggle is very much a collective effort, although not necessarily a collaborative one. Indeed, in the early days, founders might compete with each other to set a direction for the new population, pushing for a direction that will benefit their own firms.

Cognitive Requirements Confronting New Populations

The most pressing issues facing founders of entirely new activities involve cognitive rather than sociopolitical problems. In capitalist nations, firms benefit from a “diffuse belief that profit-seeking activities are valid, unless otherwise specified” (Delacroix et al., 1989). Though it may be legally validated in the form of a legal charter, an entirely new activity often begins with low levels of knowledge, depressed cognitive legitimacy, or both. Given the absence of codified knowledge, pioneering founders begin at the organizational level by creating a knowledge base

Table 15.1 Strategies facilitating the growth of populations

Level of analysis	Cognitive strategies		Sociopolitical strategies	
	Learning	Cognitive legitimacy	Moral Legitimacy	Regulatory legitimacy
Organizational	Create knowledge base through experimentation	Link new ventures to the past via symbolic language and behaviors	Build on local networks of trust	Avoid entanglement with government agencies as long as possible
Within-population	Deepen a knowledge base by encouraging convergence around a dominant design	Collaborate to create standard-setting bodies	Foster perceptions of reliability by mobilizing to take collective action	Present a united front to political and government officials
Between-population	Spread knowledge base by promoting alliance and third party activities	Create cross-population groups and associations	Develop a reputation of a new activity as a reality by negotiation and compromise with other industries	Co-opt government agencies as allies against competing populations
Community	Solidify a knowledge base by creating linkages with established educational curricula	Cooperate with independent certifying institutions	Embed legitimacy by organizing collective marketing and lobbying efforts	Embed the population within the political system via PACs and hiring of former government officials

Source: (Aldrich, 1999)

in their own organization. Early on, they might also struggle with the founders of other organizations in their emerging population. If the transfer of knowledge and evidence from other populations is acceptable in a particular situation, then entrepreneurs can base their initial trust-building strategies on objective external evidence from them. However, if such transfers are not possible, then they must concentrate on framing the unknown in such a way that it becomes believable (Aldrich and Fiol, 1994).

Learning and cognitive legitimacy must be developed not only at the firm level but also at higher levels of social structures. *Within-population processes* constrain the emergence of new populations by the way in which the environment for new ventures unfolds. Entrepreneurs, in their collective quest for knowledge and cognitive legitimacy, face two main problems. First, they need to develop effective routines and competencies. Second, they need collective agreement on standards and designs so that the population or its products and/or services can become a taken-for-granted reality for all relevant agents.

During the period following a radical innovation that potentially sparks a new population, an *era of ferment* may arise in which struggles occur between contending designs. Beneficial templates are scarce within an emerging population, thus hampering learning. Instead, pioneering entrepreneurs must learn new schemata or extensively modify old ones. In the early days of a new population, disagreement among firms on dominant design increases entry rates and holds down exit rates as contending firms struggle to have their design accepted. In their review of the literature on technology cycles, Tushman and Murmann (1998) noted that the emergence of dominant designs substantially affects population dynamics. By contrast, when a dominant design emerges, disbandings increase and entry slows because the incumbent firms are advantaged and new entrants have a much lower likelihood of changing the population's standards.

The era of ferment ends when participants settle on a dominant design, and it is followed by an era of incremental change (Anderson and Tushman, 1990). Convergence toward an accepted design occurs rapidly if new ventures find it easy to imitate pioneers, rather than seek further innovation. Early on, founders within a population implicitly compete to have their approach taken for granted, appealing to potential customers, investors, and others to accept their version (Aldrich, 1999). Although this competition may elevate their status in an incipient market, they face countervailing obligations to cooperate in the creation of a population standard. Otherwise, the competition between companies creates confusion, thereby undermining the cognitive legitimacy of the industry as a whole. If achieved, consensual standards and subsequent cognitive legitimacy will increase the number of imitators that will try to enter the new market. As Rosenkopf and Tushman (1994) noted, the process of achieving standards is a sociocultural one, rather than being purely technologically driven.

Populations with imitable innovations generate more collective action than populations with innovations that are difficult to imitate. If innovations, even when competence-destroying, are easy to imitate, founders will have to deal with new competitors. Thus, they gain a strong incentive to cooperate on stabilizing

conditions in the industry by creating standards that favor them. By contrast, when products or technologies are not easily imitated, founders can protect their core competencies from being widely diffused (Shapiro and Varian, 1999). Such fiercely competitive individual strategies hinder, or simply make unnecessary, a united collective front by a population. For example, since its founding, the so-called “e-book” producers have struggled over a common standard for the format of e-books’ content presentations, despite the clear benefits of an industry-wide resolution on a shared format. As of 2002, the struggle showed no signs of abating. Several different, incompatible, formats were contending for dominance, and consumers seemed to be holding back, waiting until a clear winner emerged.

Imitability’s effects appear paradoxical unless we pay careful attention to different levels of selection. For a population, easier imitability means growth. New firms enter more easily and an expanding market means that proportionately more entrants might survive. For individual ventures, however, easier imitability makes organizational survival more problematic, as their market becomes crowded with equally competent rivals and survival becomes contingent on fairly small differences between ventures. One common pattern involves the survival of new entrants at the expense of earlier entrants who have not learned fast enough to keep up.

However, for individual firms, extreme uniqueness may also be a disadvantage. The monopoly of a technological innovation by a single organization does not preclude success by others. Independent firms may choose to exchange and even diffuse their technologies (in contrast to protecting them under patent enforcement) to create a group of products that can be offered as a package to the market. The existence of imitators and complementary products increases the likelihood of a particular innovation being adopted and diffusing, creating economies of scale that can increase company profitability (Funk and Methe, 2001, 591).

The experience of Apple Computer provides a well-known example of the consequences of a firm not supporting open technological standards that would allow a limited degree of imitation. Although the Macintosh OS was considered a superior product to Microsoft’s Windows, Apple’s decision to not license the hardware, therefore closing the door to cheaper copies of their models, severely hampered their business. With only a limited number of computers able to run Macintosh software, the company never reached the economies of scale that allowed it to become a standard and promote the creation of suitable applications. Thus, neither extreme imitability nor extreme uniqueness apparently favors a firm’s survival within new populations. The net effect of imitability is contingent on whether a population has converged on a dominant design and on the relative balance between underlying growth in a market, new entries, and exits from the population.

The nature of relations *between industries*, whether competing or cooperating, affects the distribution of resources in the environment and the terms on which they are available to entrepreneurs. Lack of cognitive legitimacy may be both an advantage and a disadvantage for new ventures when dealing with already established populations. Sometimes a low level of cognitive legitimacy is an advantage, such as when established organizations do not treat the activity as a serious threat. For example, early ecommerce firms were simply ignored by established firms, which were very slow to move into on-line commerce. Neglect of the ecommerce space by

established firms gave Web-based startups a few month's or even a few year's head start, although the gap was eventually closed.

Organizations that feel threatened by a newcomer can undermine a new venture's cognitive legitimacy through rumors and information suppression or inaccurate dissemination. For example, early mail- and phone-order computer supply stores in the United States were highly specialized, selling mainly to people very knowledgeable about electronics who were building or modifying their own equipment. When the industry began to grow rapidly in the 1980s, selling to "amateurs," traditional walk-in stores argued that mail- and phone-order firms did not provide after-sales service and thus were an inferior form (Aldrich, 1999).

Similarly, health maintenance organizations (HMOs) confronted bitter opposition from traditional physician practices, which argued that HMOs violated customary expectations about effective physician-patient relationships, and thus delivered inferior services to patients (Scott et al., 2000). Physicians fought HMOs through a national organization, the American Medical Association (AMA), as well as state associations. They found a powerful ally in the American Association of Retired Persons (AARP), which argued that HMOs shortchanged senior citizens. HMOs grew slowly until other organizations intervened on their behalf, such as large insurance companies.

Community-level conditions affect the rate at which an industry grows by affecting the diffusion of knowledge about a new activity and the extent to which it is publicly or officially accepted. If founders have pursued effective trust-building and reliability-enhancing strategies within their emerging industry, and have established a reputation vis-à-vis other industries, they have laid the groundwork for attaining cognitive legitimacy at the community level. If not, then population survival becomes problematic. We will examine community level entrepreneurship more fully later in this chapter.

Cognitive Strategies in Populations

We turn now to the specific strategies that organizations follow to achieve shared learning and cognitive legitimacy: interorganizational relations, collective interest associations, and access to colleges and universities. Entrepreneurs who pursue strategies of total autonomy face formidable obstacles. By contrast, collective action, if successful, can spell the difference between success and failure for new populations. Collective action can be as simple as dyadic cooperation (Larson, 1992) or as complex as multi-organizational small firm networks (Human and Provan, 2000).

Interorganizational Relations

At the within-population level, *interorganizational relations* can be a route through which successful routines are transferred from one organization to another, as shown

in research on organizational and industry-wide learning curves (Auster, 1994; Zimmerman, 1982). In their study of Liberty Ship construction yards during the World War II, Argote et al., (1990) found that shipyards beginning production later in the war benefited from knowledge acquired from shipyards that had begun production earlier. In a study of 36 pizza stores operated by 10 different franchisees, Argote and her colleagues found evidence that knowledge acquired through learning by doing transferred across stores owned by the *same* franchisee (Darr et al., 1995). For example, one store discovered a better way of arranging pizza boxes next to the ovens, so that fewer steps were required and fewer pizzas dropped. This boxing innovation quickly spread to the other stores owned by the same franchisee, with the knowledge spread via phone calls, personal acquaintances, and meetings.

Interorganizational relations depend heavily upon trust, and trust arises from patterns of collective interaction over the long term. In such cases, the number of trust-based ties does not depend on strictly dyadic interaction, but instead develops from a collective understanding. Uzzi (1997), building upon earlier studies, conducted a field and ethnographic analysis of 23 women's dress firms in the New York City apparel industry. Although the firms often engaged in straightforward economic exchange relationships, they also depended very heavily on embedded relationships. Trust, rather than calculated risk, smoothed transactions between firms. Fine-grained information transfer allowed the spread of tacit knowledge across firms. Building on their underlying social relationships, they also were able to use joint problem-solving arrangements. However, Uzzi's (1996) study also showed that when firms increased their dependence on particular actors, instead of creating more within-population ties, their likelihood of survival decreased sharply. Thus, the totality of relationships between firms within a population, rather than relationships between just two or three firms, ultimately determines a population's fate.

Collective Interest Associations

Initial collaborations between organizations begin informally, in networks of inter-firm relations, but some later develop into more formalized strategic alliances, consortia, and trade associations (Powell, 1990). In some kinds of technology regimes, new-to-the-world innovations tend to be pursued by a handful of parallel, independent actors, as Van de Ven and Garud (1991) found in their study of the cochlear implant industry. People come to know one another through personal interaction and through traveling in similar social/technical circles, such as attending the same industry conferences and technical committee meetings. This small handful of actors can generate social networks that, in the aggregate, result in population-level collective action (Van de Ven, 1991). Some standard-setting bodies evolve into trade associations, but most do not.

The Bluetooth Special Interest Group is an example of inter-firm collaboration that may catalyze a new population. In February of 1998, Ericsson, Nokia, IBM, Toshiba, and Intel formed an alliance to promote a low power, low cost radio

interface between mobile phones and their accessories. Their announced ultimate goal was to eliminate cables between mobile phones, PC cards, headsets, printers, and other desktop devices (Bluetooth, 2000). The Bluetooth standard system was designed to minimize interference with other wireless protocols and provide increased security by offering a range of up to 33 feet for data transmission. As a special interest group, Bluetooth's main goal was to promote their wireless solution as *the* standard for person-to-person technologies and connectivity between closely located computer devices.

However, companies such as Apple and Lucent Technologies, who supported the HomeRF and 802.11b standards, questioned Bluetooth's claims of not interfering with other kinds of short-range wireless transmission. The Bluetooth chip can be used for wireless communication outside as well as inside the home but it has an extremely short range (10 meters at most). In contrast, the HomeRF was designed for wireless communication inside a house or a particular business, and the 802.11b technology works as a wireless Ethernet. The Bluetooth Special Interest Group has made a point of showing that their transmission technology is compatible with both HomeRF and 802.11b and that their system serves consumer needs in ways that offset compatibility issues. HomeRF and 802.11b are competing to become the predominant technology to serve the same basic need: wireless access to the Internet within particular buildings (Batista, 2000).

The creation of industry standards may increase the potential for synergy among participants in an informal network of organizations and increase the survival capabilities of the population in an aggregate, but standards also play a role in discouraging entry and eliminating some organizations within the industry. The application service provider (ASP) industry that began emerging in early 1999 provides an example of how standards might be beneficial for a population as whole but disadvantageous for single firms in the population. The industry leases software over the Internet to small and medium sized firms, and potential customers have been very concerned about issues of data security, privacy, and the reliability of the service. Spurred by the Application Service Provider Industry Consortium, formed in mid-1999, firms began offering service level agreements (SLAs) that spelled out strict security and reliability terms. As many segments of the industry appear to be moving toward "winner take all" markets, firms rapidly escalated their promises, with some promising 99.999% up time (the so-called "five nines" standard). Such SLAs substantially enhanced the cognitive legitimacy of the industry, but many small and under-capitalized new firms found the emerging standards inordinately expensive to meet.

Trade associations are an example of collective interest associations that work together to advance the interests of an organizational population. For example, trade associations pursue interests common to most firms in an industry by formulating product/process standards via trade committees and publishing trade journals. They also conduct marketing campaigns to enhance an industry's standing in the eyes of the public and promote trade fairs at which customers and suppliers can gain a sense of the industry's stability. Trade associations are *minimalist organizations* – able to operate on low overhead and quickly adapt to changing conditions – and thus are

easier to found than, for example, production organizations (Halliday et al., 1987). An *industry champion* often steps forward as a catalyst to an association's founding by volunteering to cover the costs of running the association until it recruits enough members to gain a stable dues base. Typically, the largest firms in an industry do this, and they dominate an association's board of directors. Many trade associations, following the example of state bar and other voluntary associations, operate out of the offices of member firms in their early years. Law firms representing the largest firms in the industry administer many smaller trade associations.

Trade associations can facilitate within-population learning, disseminating knowledge of effective routines and competencies. For example, state bar associations learned from early mistakes, as associations founded later in the population's growth apparently benefited from the knowledge gained from earlier foundings (Halliday et al., 1987). Similarly, Aldrich et al. (1990) found that trade association disbandings were reduced in specific industry niches that already had large numbers of existing associations. Previous associations had developed organizing templates that subsequent associations adopted.

At the between-population level, business interest associations and political action groups that organize across industry boundaries facilitate population-level learning and cognitive legitimacy. For example, in 1943, a diverse group of 25 California electronics manufacturers formed the West Coast Electronics Manufacturers Association (WCEMA) in response to the War Production Board's (WPA) announcement of a cutback in defense contracts awarded to west coast firms. The WCEMA – later renamed the Western Electronics Manufacturers Association (WEMA) – lobbied the WPA for a larger share of defense contracts. They argued that a disproportionate share was going to eastern firms, such as Raytheon and General Electric. In the 1960s, WEMA concentrated its efforts on the smaller entrepreneurial firms in Silicon Valley, and “sponsored seminars and educational activities that encouraged the exchange of ideas and information, including management training sessions on subjects ranging from finance and technology marketing to production and export assistance” (Saxenian, 1994). WEMA eventually expanded outside of California and was renamed the American Electronics Association (AEA) in 1978. The WCEMA's transformations into the WEMA and the AEA illustrate the advantages of cross-industry organizing efforts, as well as the flexibility of minimalist organizations.

Not all efforts at cross-population organizing succeed in promoting joint standards or a common public policy position. When the largest firms in cross-industry alliances disagree, they may impede convergence on a common standard. For example, throughout the 1980s, computer and software manufacturers, software users, and other interested parties struggled over Unix standards for technical workstations, an industry with over \$10 billion in sales by 1990 (Axelrod et al., 1995). The original Unix operating system was developed at Bell Laboratories during the 1960s, and subsequently software developers wrote more than 250 versions. An early attempt to develop a common standard, the X/Open group, failed when two large firms – AT&T and Sun Microsystems – pulled out and announced their own effort to develop a system that would be available under proprietary license to others.

Seven major firms, including IBM and DEC, formed an alternative coalition – the Open Software Foundation – and eventually recruited nine full sponsors. AT&T and Sun responded by forming Unix International, an alliance of 10 firms. Both alliances eventually released their own commercial versions of Unix. As this example illustrates, large firms play a crucial role in mobilizing other firms to join a standard-setting coalition, and conflicts between them can fragment alliances.

Educational Institutions

Finally, at the community level, *educational institutions* create and spread knowledge about dominant competencies (Romanelli, 1989), thus putting resources in the hands of potential founders. New populations must either build on the competencies already supported by educational institutions or find ways to encourage the provision of new ones. To the extent that specific competencies underlie particular populations, the activities of educational institutions may increase the diversity of organizational communities. Universities, research institutes, and associated programs not only conduct research but also train persons who become competent enough to exploit the latest research products. Educational institutions also “formalize and centralize information by establishing courses and degree programs that train students in basic competencies. Once technologies are understood, and stabilized and identifiable jobs (e.g., computer engineer) emerge in industry, colleges and universities take over much of the training of skilled personnel” (Romanelli, 1989). Historically, the growth of national educational systems has spurred founding rates by spreading generalized competencies that give nascent entrepreneurs the necessary skills to succeed (Nelson, 1994).

The wireless telecommunications industry has worked extremely hard to establish connections with academic research and educational programs. Academic wireless programs can be found at UC Berkley, Columbia, Purdue, the University of Washington, the University of Pennsylvania and Georgia Tech, among others. Most of these programs were funded by, and have direct links to, the main wireless telecommunications companies. For example, the MPRG program at the Virginia Polytechnic Institute and State University has formed an Industrial Affiliates Program with major firms as charter members: AT&T, FBU, GTE, Motorola, Apple Computer, Nortel, Bellsouth, Rockwell, and Southwestern Bell. Through their experience in the MPRG program, over 100 undergraduate and graduate students have taken state-of-the-art knowledge to the rapidly expanding wireless industry (MPRG, 2000).

Sociopolitical Requirements and Strategies

The acquisition of sociopolitical legitimacy for a new population depends on its capacity to create collective action and, therefore, on the willingness of individual

entrepreneurs to compromise their independent, possibly rebellious, dispositions. In a fashion similar to cognitive strategies, the key events affecting the emergence of new populations as stable entities involve the formation of other types of organizations (Delacroix and Rao, 1994). Gaining moral legitimacy for a new population involves altering or fitting into existing norms and values, something individual organizations sometimes lack the resources to accomplish. Similarly, winning legal and regulatory acceptance generally requires campaign contributions, political action committees, lobbying, and other costly activities that are often beyond the reach of individual organizations. Thus, early in a new population's growth, interorganizational collective action will have to address sociopolitical issues or the population will remain vulnerable to attacks on its legitimacy.

In the interior construction of a population, sociopolitical approval – especially regulatory approval from governmental agencies – may be jeopardized if collective action fails. Failure to agree upon common standards leaves a new population vulnerable to illegal and unethical acts by feckless members. Such actions may bring the entire population into moral disrepute and jeopardize its legitimacy. In contrast, mobilization around a shared goal may enable new populations to shape the course of government regulation and win favorable treatment. As Edelman and Suchman (1997) noted, organizations and associations not only submit to laws but also shape them. If early founders succeed in creating an interpretive frame that links a new population to established norms and values, subsequent founders will mobilize support much more easily.

Two examples show how associations may attempt to solicit their own regulation to ward off more drastic action by government. In the United States, both the Information Industry Association, representing the pay per call industry, and the American Gaming Association, representing gambling casinos, became involved in issues that initially raised questions concerning their populations' moral legitimacy. Ultimately, the issues they confronted were dealt with as regulatory matters. The Information Industry Association was formed only after the industry was stigmatized by the reckless actions of some firms, whereas the American Gaming Association was formed in response to the potential for greater federal regulation of an industry that has always had a rather shady reputation (Aldrich, 1999).

Populations that succeed in creating a strong organization to represent their interests may use their position to block the way for alternative organizational forms. Populations that not only solicit favorable treatment from the state but also cloak themselves in moral legitimacy are especially blessed. For example, funeral home owners in the United States enjoyed great success for many years in thwarting state regulation of the industry (Torres, 1988). Locally owned homes controlled most state boards regulating the industry by playing on the twin themes of local control of business and respect for the sacredness of their practices. For almost a century, state boards blocked alternatives to traditional means of disposal of the dead, opposing crematoriums, burial societies, and chain-owned funeral homes. Their actions kept the founding rates of technically superior alternatives very low, almost totally suppressing the emergence of competing industries. Only when changing political currents in the 1980s began to favor deregulation did regional and national chains gain the upper hand.

Many inter-industry relations involving moral and regulatory acceptance are more matters of education and negotiation than of zero-sum conflict. For example, *moral* legitimacy arguments for technology-intensive patient care emphasize the health-care system's obligation to do all it can for the quality of human life, and *regulatory* legitimacy arguments stress equitable treatment of citizens covered by government and private insurers. To benefit from complying with these legitimacy requirements, new biomedical and health-care industries must convince third parties – insurance companies and the government – to pay the costs that patients cannot bear, such as for CAT scans or cochlear implants. Thus, firms in the industry must cooperate to educate and influence these third parties to include the product or service in their payment reimbursement systems (Van de Ven and Garud, 1991).

Finally, lack of community-level support for new populations may undercut their efforts to secure sociopolitical approval. Most new forms of business enterprise have enjoyed at least moral and regulatory tolerance of their existence (Delacroix et al., 1989; Zucker, 1989). Nonetheless, this apparent easy success should not blind us to the many occasions on which support has been withheld. The first newspaper editor in the United States was jailed (Delacroix and Carroll, 1983), and many forms of inter-business alliances were ruled illegal in the nineteenth century (Staber and Aldrich, 1983).

The human genome project exemplifies the moral limitations of basic “business” concepts and institutions. Two different types of organizations have pursued this project: (a) publicly funded nonprofit institutes and agencies, and (b) private biotechnology firms. In the 1990s and into the early years of the twenty-first century, private biotechnology companies have been trying to obtain patents over particular sequences of genes, while the publicly funded project has been committed to the open publication and use of findings (Outlook, 2000). These two strategies follow from the moral legitimacy framework of Western political culture, which posits that government sponsored research should be public, whereas private companies should pursue the exclusive exploitation of their findings. Nonetheless, controversy over the property rights status of genes has exploded, particularly in the United States and Great Britain.

Although the US Patent and Trademark Office has given some patents for gene sequences, it has not yet processed a large backlog of claims. For example, over the past 5 years, a single company, ZymoGenetics, has applied for over 500 novel gene sequences (ZymoGenetics, 2000). In March of the year 2000, President Bill Clinton and Prime Minister Tony Blair publicly affirmed the need to maintain open access to the human genome raw genetics sequences. Immediately after their statement, the stock value of the biotech firms involved in the genome field decreased dramatically. Although the controversy has not been resolved, it appears that human genetic information has reached the limit of what our conventional concept of intellectual property rights can handle, thereby jeopardizing the continued acquisition of resources by biotechnology firms. The industry's future remains uncertain.

Some members of the public sector and the scientific community believe that patents on genes should just be prohibited, whereas others believe that simply modifying the patenting system to include the possibility of obligatory licensing systems would be adequate. The latter system would give firms the right to receive

compensation, but they could not restrict public access to information. Another suggested modification to the existing system would be to raise patent standards by asking for substantial, specific, and credible evidence of the use of a particular gene (Shulman, 2000).

Summary: Population Formation and Growth

In this section, we described the context in which learning and legitimacy problems arise for entrepreneurs in new populations. We also reviewed the cognitive and sociopolitical requirements confronting startups and examined common strategies enacted to meet them. We argued that organizations with competence-destroying innovations have two main tasks that are mainly accomplished through collective action: the creation of routines and working standards and the creation of ties with important societal actors. To survive, new organizations must create a balance between competition and cooperation. Successful efforts can enhance their positions in favorable segments of emerging markets, if they manage to collectively construct a clear image of themselves, their products or services, and their proposed advantages.

Although the process of learning and creating legitimacy starts at the organizational level, ultimately it requires actions at higher levels of the social structures. Collective efforts to create a knowledge base and gain legitimacy must take place within populations, between populations, and within communities. The process of collective action starts with the creation of interorganizational ties to companies within the industry, as well as with educational institutions. Some of these ties evolve into special interest groups, industry trade associations, and inter-industry interest associations.

Building Organizational Communities

An organizational community is a set of coevolving organizational populations joined by ties of commensalism and symbiosis through their orientation to a common technology, normative order, or legal-regulatory regime. Symbiosis denotes a mutual dependence between dissimilar units, whereas commensalism means that units make similar demands on the environment. Populations in different niches that are pursuing different resources and benefit from each other's existence are in a symbiotic relation. For example, information technology firms often provide the knowledge accumulation and retrieval systems for biotechnology firms. Commensalism, "literally interpreted, means eating from the same table" (Hawley, 1950), and this condition puts organizations from such populations in situations of potential competition from each other. We present many examples of commensalism in this section.

Investigators define a community for a particular historical period, and its geographic scope is an empirical matter. A community may well encompass an entire regional, national, or global economic system, depending on the core chosen. In this chapter, we focus on national communities. The extent to which social actors are interdependent is also ultimately an empirical question.

In this section, we first map out the eight possible relations between populations, showing that relations are more complex than a simple competition/cooperation dimension. We argue that three forces are primarily responsible for generating new organizational communities, although we focus mainly on one of them – technological innovation – in this section. Finally, we consider the selection processes affecting acceptance of a new community as legitimate, concentrating on collective action, government actions, and the role of community institutions.

Types of Relations between Populations

Populations are not equal within a community, but have different status and relationships, depending on their overall pattern of inter-population relations. The most common expression of commensalism is *competition*, in which populations, old and new, seek the same resources. For example, the telephone and cable industries have invested heavily in developing wired means for multimedia data transmission, forcing the telecommunications industry to improve its wireless data transmission technology to remain competitive in the e-commerce sector. Whereas telephone companies can now offer internet services with Digital Subscriber Lines (DSL) that provide speeds between 384 kilobytes and 1.5 megabytes per second (OIT, 2000), the wireless industry can currently only handle data transmissions of 144 to 300 kilobytes per second. Such slow speeds are far from the 2.4 megabytes per second required to provide services like e-mail, web browsing, and mobile e-commerce (Buckley, 2000). Thus, competitive pressures have compelled wireless firms to innovate or fall behind.

The extent of competition between populations depends on the relative size of each and the degree of similarity or niche overlap between them. Populations based on competence-destroying capabilities essentially aim to seize the resources of the old population they hope to replace. Commensalism can also lead to mutualism, if populations making similar demands on the environment combine their efforts, intentionally or otherwise. Cross-population mutualism, in the form of business associations or inter-industry councils, can improve the joint standing of those involved by increasing their capacity for sociopolitical legitimacy and their access to resources.

Relations between populations in an evolving community revolve simultaneously around symbiotic and commensalistic axes. Innovative entrepreneurs must be willing to compromise some of their autonomy to enter a complex set of cooperative relationships, while simultaneously competing in an even broader environment and with a greater variety of actors. Based on the distinction between symbiotic and

Table 15.2 Eight possible relations between organizational populations

I. Commensalism

- (−, −) Full Competition: growth in each population detracts from growth in the other. E.g., competition between voluntary associations for members from the same sociodemographic groups (McPherson, 1983).
- (−, 0) Partial competition: relations are asymmetric, with only one having a negative effect on the other. E.g., industrial unions suppressed the founding of craft unions in the 1930s (Hannan and Freeman, 1987).
- (+, −) Predatory competition: one population expands at the expense of the other. E.g., televisions stations' revenue grew at the expense of radio stations (Dimmick and Rothenbuhler, 1984)
- (0, 0) Neutrality: populations have no effect on each other. E.g., founding rates of commercial and savings banks in Manhattan had no effect on each other between 1792 and 1980 (Ranger-Moore et al., 1991).
- (+, 0) Partial mutualism: relations are asymmetric, with only one population benefiting from the presence of the other. E.g., the growth of brewpubs between 1975 and 1990 stimulated foundings of microbreweries, but not vice-versa (Carroll and Swaminathan, 1992).
- (+, +) Full mutualism: two populations in overlapping niches benefit from the presence of the other. E.g., small and large railroads and telephone companies benefited from the other's presence (Barnett, 1995; Dobbin, 1994).

II. Symbiosis

- (+, +) Symbiosis: two populations are in different niches and benefit from the presence of the other. E.g., venture capitalists make profits by investing in high technology firms, thereby enabling both populations to grow (Brittain, 1994).

III. Dominance

- A dominant population controls the flow of resources to other populations (Hawley, 1950). Effects depend on the outcome of commensalistic and symbiotic relations.
-

Legend: Signs in parentheses refer to the effect of one population, A, on a second population, B:

+ Positive effect

0 No effect

− Negative effect

Source: (Aldrich, 1999).

commensalistic relations, we can distinguish eight types of relations between populations, as shown in Table 15.2 (Brittain and Wholey, 1988). In this table, symbols in parentheses precede each form of interaction, denoting the impact each population has on the other. Six constitute various forms of commensalism (competition and cooperation), and a seventh is symbiosis. Aldrich (1999) included dominance as an eighth type of relation between populations. Dominance emerges as a hierarchical relation between populations, based on the outcome of symbiotic and commensalistic interactions.

Forces Generating New Organizational Communities

Communities emerge not only from forces that generate new organizations and populations, but also from new commensalistic and symbiotic relations between populations. In previous sections, we have explored the foundings of new organizations and the social construction of new populations. To those accounts we now add the activities that cut across populations and contribute to the social construction of communities. Discontinuities in existing populations and communities caused by technical, normative, and regulatory innovations that are exploited by entrepreneurs provoke transformations in existing populations or the emergence of new ones. Processes of competition, mutualism, and symbiosis sort the affected populations into differentiated niches, characterized by hierarchy and dominance. Depending upon their strength, these processes may bind populations into a community sharing a common fate.

Three kinds of discontinuities seem to play particularly important roles as catalysts for changes that generate new communities: (1) shifts in societal norms and values, (2) changes in laws and regulations, and (3) technological innovations. Shifts in societal norms and values may create conditions facilitating the development of new populations. If such populations develop mutualistic or symbiotic relations, they might become the nucleus of a new organizational community. Changes in laws and regulations might also lead to new organizational communities because of the resulting symbiotic networks of government agencies, nonprofit organizations, law firms, consultants, research institutes, and academic programs (Galaskiewicz, 1979). However, technological innovations have probably played the most important role in the creation of new communities in recent decades.

Rarely do single key events generate new organizational populations, based on a technological breakthrough (Ziman, 2000). Instead, from an evolutionary view, technological innovation typically involves a cumulative series of inter-related acts of variation, selection, and retention that might culminate in commercial applications (Garud, 1994). Long-term changes in scientific discovery in the twentieth century continually generated technological innovations with commercial potential (Dosi, 1988). Some of the innovations have been seized upon by entrepreneurs and pursued with such vigor that new populations were formed, such as the radio broadcasting industry in the 1920s (Leblebici et al., 1991). Although many of the new populations failed, some of those that prospered became segments of existing communities, whereas others became the nucleus of new organizational communities.

For the Web, the introduction of Mosaic software in 1993 was the major technological innovation that facilitated its emergence as a commercial community, but there were many previous events that set the stage for Mosaic to become a catalytic event (Hafner and Lyon, 1996). Many firms (e.g., Digital Equipment Corporation, MCI Telecommunications) were seeking ways in the 1980s and early 1990s to exploit the technology of the Internet for commercial gain. In addition, Mosaic technology was itself an innovation that improved upon the earliest Web browser created by CERN scientists in Switzerland as a more sophisticated means for getting

information from the Internet. Because these early efforts occurred in a mutualistic environment of open-sharing and standard-setting, many individuals contributed to the early enhancements of the Mosaic technology, enabling it to become the dominant standard very rapidly.

Technological innovations have been playing a similar role in the telecommunications industry, with the impending arrival of a third generation (3G) of wireless technologies. The jump to 3G technology has increased the chaotic nature of this emerging industry and created a perceived need for collective action among participants. The new technology will ultimately allow the transmission of multimedia information in a fashion similar to the way customers now receive wired Internet services provided by telephone companies and TV cable providers. The ultimate goal would be to offer web or internet-based commercial services through cellular phones and other similarly wireless devices.

However, achieving the final goal of radically increasing the data transmission capacity of 3 Megabytes per second (to support e-mail, Web browsing, mobile e-commerce and multimedia) implies a migration to different technologies that build upon each other. Depending on their starting technology, companies might have to update their software, make relatively minor investments in infrastructure, or transform their entire set of connectivity networks. Some starting technologies offer cheaper and better migration paths than others. For example, companies whose core technology is based on the CDMA (Code Division Multiple Access) and TDMA (Time Division Multiple Access) systems will have to spend 30% less in their upgrading to 3G capacity than those based on GSM (Global System for Mobile Communications) technology (Buckley, 2000).

From an evolutionary perspective, selection forces need not favor the cheapest transition, as regulatory and political considerations may favor more expensive solutions. The migration pattern from CDMA is based only on software enhancement and is cheaper than any other alternative. However, because the GSM migration path (the most predominant system in Europe) tends to converge with TDMA migration (which is the most popular current standard for the Americas), both paths enjoy a competitive advantage over GSM. Global standardization and earlier global connectivity, combined with the support of the 3GPP organization (Third-Generation Partnership Program) have created incentives for firms to follow either the GSM or TDMA technological paths (Buckley, 2000).

Because a population's product or service – hardware and software – is often part of a larger symbiotic system of components, its evolutionary path thus depends on changes in other systems. Some innovations are relatively discrete entities, but many innovations are related to some aspect of a technological system, which can be thought of as composed of core and peripheral subsystems (Tushman and Murmann, 1998). For example, most micro-electronic devices are sold as components of more complex systems (Barley et al., 1992), unlike biotechnology products. A period of incremental change may be relatively stable with respect to the core subsystem, but it may be quite dynamic with respect to innovations in peripheral subsystems. Individuals and organizations can cause temporary uncertainty by creating peripheral subsystems that complement the core technology.

These new innovations become the basis for populations symbiotically linked to the population producing the core subsystem.

Innovations that occurred in the early days of the Web's evolution into a commercial community fit the concept of core and peripheral subsystems. The introduction of a standardized browser technology was the key innovation that created the core subsystem of the Web's commercial community. Because the community converged around this technology relatively swiftly and Netscape Corporation asserted its dominance within a year after the technology was introduced in 1994, the Netscape browser quickly became the standard within the community. However, using its dominance in personal computer operating systems, Microsoft created an Internet Explorer browser that caught up and surpassed Netscape in subsequent years (Cusumano and Yoffie, 1998). With the core in place, efforts at enhancing the technology of the Web focused on subsystems, such as browser add-ons and other user interfaces. For example, one subsystem innovation involved the transformation of websites and applications to simplify their use in wireless browsers that the telecommunications industry will provide in 3G technology.

Innovative entrepreneurs play a vital role in capitalizing technological advances in a more rapid fashion than already established bureaucratic organizations and populations. In the Web Internet Service Provider (ISP) population, for example, the thousands of local ISPs that were founded in the mid 1990s overshadowed established firms. New firms took advantage of the slowness with which large firms, such as regional telephone companies, responded to the new technology. Between 1996 and 1997, in fact, more than 1,000 new ISPs were founded and the ISP population at the end of 1997 numbered over 5,000 (Yoshitake, 1997). Similarly, young entrepreneurs, fresh out of college, founded most of the Web consulting and design firms; some were fleeing established advertising and marketing firms.

In biotechnology, by the mid-1980s, "over 500 freestanding dedicated biotechnology firms had been established worldwide to pursue some form of genetic engineering" (Barley et al., 1992). The early biotechnology firms were mostly independent dedicated biotechnology firms, rather than divisions or spin-offs from existing companies (Hybels et al., 1994). Scientists striving to commercialize discoveries from their university laboratories founded many of these small, science-based companies. By the mid-1990s, independent startups appeared to have achieved more success than those initially sponsored by older and larger firms. Nonetheless, most biotech firms in the late 1990s were still fairly small, measured by their market value. In 1994, only eight biotechnology firms in the United States had a market value in excess of \$500 million. In mid-1998, of the 120 largest firms followed by BioVenture Consultants, only 19 exceeded \$500 million in market value (Robbins-Roth, 1998).

Is this social construction of communities by entrepreneurs an intentional process or one just driven by responses to environmental pressures? The search for dominance in a particular community may indicate that community formation, at least for entrepreneurs trying to dominate their environments, is at least partially propelled by strategic intent. Theories of capitalist class integration, upper-class cohesion, and bank centrality in capitalist economies go beyond simple ecological analyses

of dominance (Mizruchi, 1996). In these theories, dominance results from strategic acts by self-aware or at least self-interested actors. In most of these accounts, powerful actors use director interlocks to shape the flow of resources between organizations and owners or top executives. They need not be aware of a larger collective interest for their actions to have systemic effects. Even if the individual firms act primarily out of self-interest, the aggregate affect of their actions can be substantial, if a group of them behave similarly (Mizruchi, 1992). However, as Mizruchi (1996, 273) noted, “there are virtually no systematic data on firms’ motives for interlocking.” Researchers have inferred motives by examining patterns of interlocking, observing that interlocks seem to follow from the flow of resource dependence. Because researchers have not had direct access to directors, with a few exceptions (Hirsch, 1982), they have been unable to discern the motives underlying the interlocks.

Selection Forces Affecting New Communities

A developing community’s viability depends on the extent to which its core populations gain cognitive and sociopolitical legitimacy, as well as on the perceived value of the core populations’ products or services (Miner and Haunschild, 1995). Government and regulatory bodies, for example, face decisions regarding the extent to which they need to become involved in the burgeoning community, as overseers and as supporters. Innovating organizations must also consider how to modify or interpret the innovation so that it is readily understandable to their customers or constituency. In making modifications, organizations and regulatory agencies engage in collective action to establish standards, both within and across populations.

The more an emerging community depends on new organizational forms and new populations, the more serious its legitimacy problems (Baum and Oliver, 1992; Dacin, 1997). How does a developing organizational community achieve legitimacy? In most cases, no “guiding hand” governs from the community center, directing strategic moves toward legitimacy. Instead, community legitimacy depends on three processes. First, new organizations and populations must struggle to achieve legitimacy in their own right. Legitimacy problems are most acute for the first populations in the community. Later, follower populations will have an easier time. Second, organizations and populations achieve legitimacy more easily within the community if they work together to gain government support for industry standards. Third, across the entire community, institutional actors, such as educational organizations and the media, create the laws, regulations, and symbolic resources sustaining organizational communities. Organizational actions to achieve legitimacy have already been discussed in the first part of this chapter, and so in this section we will concentrate on the population and community levels for the acquisition of legitimacy.

Within- and Cross-Population Actions

Collective action organizations make population and community level learning much easier, as firms share information and work on solutions to common problems affecting many populations (Miner and Haunschild, 1995). Although individual firms might be able to achieve their own legitimacy, population and community level legitimacy becomes problematic if these firms engage in unbridled full competition to advance their own interests and fail to promote their mutual interests (Aldrich and Fiol, 1994; Garud, 1994). A lack of standard designs, for example, may block the diffusion of knowledge and understanding, thus constraining the new activities. Therefore, founders of new firms are compelled by selection pressures to find strategies for establishing stable sequences of mutualistic relations within their emerging population. They also benefit if they find ways to create symbiotic relations with organizations in other populations. Such actions include developing dominant designs and community-wide standards through the creation of industry councils, cooperative alliances, trade associations, and other vehicles for collective action (Haunschild, 1993).

Across the entire evolving community, partial or full mutualism heightens legitimacy and organizational learning. Such developments mean that new populations generated at later stages in the community's growth will experience more favorable founding conditions than earlier populations. For example, in biotechnology, American firms founded in the 1980s became embedded in mutualistic *networks of learning* that gave them access to knowledge gained through research and development by previous firms (Powell et al., 1996). Once established, these new collective units can concentrate on symbiotic relations with government, educational institutions, and the media. Following the logic of collective action, the combined activities of groups across populations has a more powerful influence on standards and regulations than the actions of isolated organizations or action sets (Aldrich and Whetten, 1981; Olson, 1965).

For example, in the cochlear implant industry, the American Association of Otolaryngology "initiated a committee of representatives from industry, clinics, audiology, psychoacoustics, and other disciplines to study and recommend technical standards" (Garud, 1994). In biotechnology, several practices promoted a relatively unified technological community: professors took sabbaticals at biotechnology firms, postdoctoral students circulated between universities and firms, and firms made laboratory conditions so attractive that they created a labor market for scientists that cut across universities and industry (Powell et al., 1996).

The Web is an interesting case precisely because collective action organizations – alliances, coalitions, and consortia – formed so quickly and managed to recruit the largest firms in the affected industries to join. As a community of symbiotically linked populations, many of the Web's interest groups were multi-industry, rather than limited to membership from only one population. For example, the World Wide Web Consortium, which set standards for the Web, included more than 100 members. All major software firms joined, as did the major hardware firms, such as

IBM, Sun Microsystems, and Silicon Graphics (Lohr, 1995). Other groups that were formed to promote Internet standards included the Internet Engineering Task Force (IETF), the Internet Assigned Number Authority, the Federal Networking Council, and the Internet Society. Between 1993 and 1997, four International World Wide Web Conferences were held in Europe and the United States, where Web service providers and businesses discussed ways to resolve some of the common issues they faced. The American Institute of Certified Public Accountants developed a certification program, called the CPA Web Trust, which gave a seal of approval to vendors doing business on the Web who followed secure practices.

Government Support and Regulation

Organizational communities benefit from a strong supporting state infrastructure, in addition to individual and collective efforts. Governmental support and assistance can create a stable nucleus for an evolving organizational community and thus accelerate the speed with which new populations linked to the community achieve legitimacy. State-sponsored associations, alliances, and other activities can also create strong incentives for organizations and populations to engage in mutualistic activities, as well as a compliance structure for reducing the likelihood of competitive activities. In her study of the diffusion of charter schools in the United States in the 1990s, Renzulli (2001) found that state laws treating charter schools favorably were a crucial factor affecting the number of submissions from school districts. Regardless of whether a community is generated by technological innovations, shifts in norms and values, or changes in laws and regulations, state actions play a key role in its evolution. Two domains are particularly significant: government support for research, and enactment and enforcement of new laws, regulations, and standards.

In communities with deep roots in technological innovation, the essential infrastructure was often built from research and development sponsored by the government, as documented in several studies. In the cochlear implant industry, for example, the first commercial activity was preceded by 22 years of noncommercial research (Van de Ven and Garud, 1993). Research on electronically enhancing human hearing was conducted by academics and sponsored by grants from government, public research foundations, and philanthropists. The commercial radio community grew not only from entrepreneurial activity and collective action by commercial firms, but also from “the emergence and active participation of military, legislative, and regulatory bodies” (Rosenkopf and Tushman 1994, 413–414). The US Navy was involved because it made heavy use of radio technology in its operations, and it lobbied for federal legislation giving priority to its needs. In the machine tool industry, the US Air Force played a major role in establishing numerically controlled machine tools as a standard versus the record-playback standard that some firms wanted (Noble, 1984).

Concerning government regulation, major differences exist between nations with decentralized versus centralized political systems. The United States has a political system of divided executive and legislative branches, containing independent regulatory agencies. Thus, newly organized industries ultimately must co-opt, neutralize, form alliances with, and otherwise come to terms with government agencies. Trade associations and other collective action entities focus much of their efforts on direct access to agencies themselves. By contrast, in political systems that have unified executive and legislative branches, as in most European and Asian nations, support from political parties and career civil servants is essential. For example, in Japan, Ministry of Finance career officials wield substantial influence over the banking system, and many retire from the Ministry to take high-level positions in financial institutions. Regardless of a political system's structure, without governmental approval, individual efforts to form organizations and create new populations will be severely hampered.

For example, the early biotechnology industry developed in an environment of great uncertainty, because firms did not have a clear idea of what products would be regulated and what safety tests would be required by the Environmental Protection Agency, the Food and Drug Administration, and the Department of Agriculture. Accordingly, the Industrial Biotechnology Association lobbied the FDA, the EPA, and other agencies in an attempt to create a more certain regulatory environment. An FDA ruling in 1981, approving the first diagnostic kit based on a monoclonal antibody, significantly raised the founding rate of biotech firms in the years that followed (Shan et al., 1991). However, for years the industry has been unable to resolve a controversy over their most promising research project – the human genome – and thus they were unable to gain the support of the US Trade Patent and Trademark office.

Unlike the experience of biotechnology, early associations in the Web community succeeded in promoting their collective interests, especially with respect to regulatory control over the community's activities. During the 1996–1997 session of Congress, for example, several efforts were made to enact legislation that would have forced independent service providers, such as America Online, to monitor messages sent through their servers. As a result of collective lobbying efforts by community members, however, none of these efforts were successful. By contrast, the biotechnology community fought a long-running battle with government regulators. Only in 1995 did the industry begin receiving the same treatment from the FDA as traditional pharmaceutical firms. The biotechnology community struggled for almost 20 years to achieve the kind of sociopolitical legitimacy that the Web community had apparently already won after only 3 years, even though investors poured billions of dollars into the biotech industry in the intervening years.

Government agencies can play a role in structuring the interorganizational environment of new industries in ways that encourage mutualism between firms and populations. Rappa's (1989) study of the development of the gallium arsenide integrated circuit in the United States, Japan, and Western Europe found that the United States had more firms and scientists involved, but that Japan had

greater coordination of its firms' and scientists' efforts. In Japan, the Ministry of International Trade and Industry (MITI), a government agency, encouraged inter-firm cooperation in the integrated circuit industry via trade committees, just as it facilitated the formation of research and development consortia in other industries (Aldrich and Sasaki, 1995). The cooperating firms jointly formulated industrial governance policies, developed a competence pool of scientists and managers through training programs and informal information sharing, and also worked on commercial applications of the technology (Fransman, 1990). By contrast, competition between firms in the United States inhibited the development of collective action within the affected industries.

In telecommunications, government plays an important role in two areas: technology regulations and spectrum allocations. Creating and diffusing a standard is almost impossible for a single firm and even very difficult for a population. Governments can either provide incentives for cooperation or define the standards to follow (Funk and Methe, 2001, 590). However, despite their oft-stated goals of acting as coordinators and organizers, governments may not adequately deal with global issues. Around the world, governments have favored different technologies, creating high uncertainty for the industry. Whereas European governments have forced telecommunication companies to adopt the GSM system, the American government has been reluctant to impose any particular standard, under the argument that they do not want to overly interfere with business and technological developments. The Chinese government apparently has favored the development of CDMA technologies through its alliance with Qualcomm (Buxbaum, 2000). These radically different approaches and selection criteria have delayed the establishment of a unique global standard.

Educational Institutions and the Media

Educational institutions also play a role in how rapidly emerging communities achieve legitimacy. Budding populations can establish symbiotic links with educational institutions by incorporating the skills and knowledge needed for success in the populations into school curricula. In the United States, biotechnology firms attempted to enhance their legitimacy by identifying themselves with elite research universities, such as Harvard, Stanford, and the University of California-San Francisco (Deeds et al., 1997). In many cases, faculty inventors of key technologies actually started new firms. The perceived value of the new firms arose from inventive technological advances, such as the use of restriction enzymes and recombinant DNA. In turn, the legitimacy of the firms and their technologies was heightened by links to the universities.

With respect to the Web, the commercial–university link exemplifies the significance of symbiotic relations in growing communities. In the beginning, the Internet was the sole province of academic and research institutions, and later commercial sites benefited from their early experimental efforts. After commercial enterprises

began using the Web, however, private firms initiated most of the developments and changes. Many of the Web entrepreneurs founding organizations in the new Web-based populations were young people who had learned about computers in college classes and part-time jobs.

Mass and specialized media – television, magazines, journals, newsletters, and newspapers – also play a symbiotic role in communities, disseminating information within and between populations. Information diffusion increases the likelihood that potential entrepreneurs will perceive opportunities for combining old resources in new ways, or at least recognize opportunities in already existing populations. The media – especially journalists in print media – played a very key role in establishing the legitimacy of the Web. In 1993, for example, there were only 34 magazine articles and 13 articles in major newspapers that mentioned the Web. During 1994, however, those figures had jumped to 686 and 743 respectively; and during 1995 they reached totals of 6,365 and 10,054. In those early days, many of the articles were published in technical journals and focused on describing what the Web was and how browser technology worked. Eventually, articles appeared in mainstream outlets, focusing on how the Web could affect commercial activity. As the legitimacy of the Web became even more established, references to the Web (usually through provision of a home page address) became integrated into stories of all kinds, such as announcements of upcoming rock concerts and descriptions of new movie releases (Hunt and Aldrich, 1998).

Summary: Building Organizational Communities

Communities are defined as a set of co-evolving populations joined by ties of commensalisms (populations make similar demands on the environment) and symbiosis (mutual dependence between dissimilar units). Communities arise from the creation of new populations, as well as from new symbiotic and commensalistic relations between already existing populations. In this section, we focused on technological change as one of the most important factors for the transformation of new communities. Some entrepreneurs will be successful in implementing new and revolutionary commercial applications of scientific discoveries and be the seed for the creation of successful populations. Some of these populations will join already existing communities (altering the balances of competition–cooperation and symbiosis–commensalism), or will become the central node of new communities.

The survival of a community with new innovative organizations and populations is strongly related to the ability of these two kinds of social actors to achieve legitimacy. Populations that start a new community have to devote more resources and efforts to the construction of legitimacy. At the same time, populations within a community have a better chance of achieving legitimacy by using cross-population collective action. Finally, collective action from the whole community instead of isolated populations and/or organizations is more effective in gaining the support of institutional actors like the government, educational institutions, and the media.

Conclusions and Future Directions

Our main goal has been to describe the entrepreneurial process as a form of social construction that goes beyond the firm itself to the creation of populations and communities. In contrast to the view that the “best” companies will prevail in the modern economy, we have ample evidence that collective action early in the life of a population affects which firms prosper and which do not (Aldrich, 1999). Following an evolutionary argument, the survival of a firm, population, or community depends as much on the existence of favorable environmental forces as on the effectiveness of individual entrepreneurs. We have emphasized the importance of collective actions in providing entrepreneurs with the capacity to shape their environments.

We view this statement as the starting point for a myriad of interesting and unanswered questions at all levels of analysis. At the firm level, we may ask how innovative entrepreneurs become able to collect scarce resources. Are certain markets, organizational fields, or societies more open to providing resources for innovative entrepreneurs than others? What are the specific selection criteria within particular environments? We do not even have an estimate of the prevalence of innovative products, technologies, or organizational forms in the total universe of entrepreneurs. How much greater is their likelihood of failure than their non-innovative counterparts?

Even at the firm level, methodological and practical problems make it difficult to study “innovative entrepreneurship,” for two reasons. First, although as many as 1 in 10 adults in the United States are engaged in firm formation activities, locating them and soliciting their cooperation has proven difficult. Even when large-scale national surveys are used to locate nascent entrepreneurs, the yield rate is between 4 and 6% of the total sample called (Reynolds et al., 2000). Given strong pressures toward imitation, most of these entrepreneurs will not fall into the category of innovators, even in the competence-enhancing sense. Therefore, getting a representative and large enough sample of innovative entrepreneurs is both complicated and expensive.

Second, innovation is defined by outcomes, not by intentions. Therefore, the label of reproducer or innovator can only be attached after entrepreneurs have had at least some success in the construction of their firms. Investigators need to follow firms through the early phase of their life course to see which succeed and which succumb. Building fully specified historical models of the process requires a study design that can take account of age, period, and cohort effects (Aldrich, 1999).

Populations and communities, as subjects of research, have been approached in the past through the analysis of specific empirical cases, such as those we have used as examples in this chapter. As in other studies related to entrepreneurship and management in general, investigators tend to choose populations and communities for study that have been successful or that attract more media attention, such as high technology industries. Investigators have not randomly sampled populations or communities, and thus we have very little idea of the distribution of strategies that deal with the balance between competition and cooperation.

We also know very little about how new or changing populations may affect the symbiotic and mutualistic balance within a community. Short-run demands

direct entrepreneurs' attentions to organizational issues, where selection pressures are most keenly felt. However, additional selection pressures arise because new organizations are embedded in the larger, more encompassing social structures of populations and communities (Dacin et al., 1999). Founders can pursue strategies individually, but at the more encompassing levels, very little will be accomplished without collaboration with other founders.

Collective action, if successful, leads to the reshaping of population- and community-level environments and benefits the entire population. However, we lack knowledge of what population or community configurations increase the likelihood for their survival. Is there such a thing as too much cooperation and collective action among the members of a population? Are communities where negative mutualism abounds more likely to disappear?

Two tasks appear necessary to advance our knowledge of entrepreneurship as an evolutionary process of social construction. First, we need more fully developed evolutionary models that specify the conditions under which successful innovators, new populations, and new communities emerge. Second, we need methods for understanding how successful innovators at the firm level affect the specific configuration of cooperation and competition within populations. We also need to understand how the interplay of these two elements affects the balance of new and already existing communities. Both tasks require the use of longitudinal and historical data that is unbiased by success, as well as the creation of explanatory models of populations and community structures (Aldrich, 2001). Ideally, our research designs should encompass the systematic comparison of different industry and community arrangements over broad sweeps of historical time.

In the end, we propose a multilevel model that encompasses how interaction between entrepreneurs affects the configuration of populations, and how the configurations of inter-related populations shape community structure. Finally, a comprehensive model should explain how the structures of different communities and their inter-relationships shape societal institutions and the path of social change.

Obviously, data requirements for these kinds of multilevel studies are extremely difficult to overcome. However, they are not so different from some of the goals that general non-evolutionary approaches to entrepreneurship are trying to accomplish. As Katz (2000) argued, entrepreneurship research in general needs to use large representative samples, improve its measures, replicate studies, and use a longitudinal approach. Such methods allow researchers to study the effects of dynamic processes that have strong selection effects. In this sense, we agree with Katz's argument that the only way to study entrepreneurship in general, and through an evolutionary lens in particular, is through collective action by researchers to jointly build high-quality datasets. Not surprisingly, as we emphasize the collective nature of entrepreneurial efforts to create and alter their own environments, we also stress the need for collaborative and cumulative work for studying entrepreneurship, such as in national panel studies of startups (Reynolds et al., 2000).

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Part V
The Global Context

Chapter 16

International Business, Entrepreneurship and the Global Economy

Siri A. Terjesen, Zoltan J. Acs, and David B. Audretsch

Introduction

In the opening pages of the *New York Times* bestseller, *The World is Flat*, Thomas Friedman (2005, 12–15) recounts the story of Rao, a Mumbai native who founded an India-based accounting firm which performs accounting work for American firms. Rao and the millions of other “international entrepreneurs” around the world who do business across national borders have captured the interest of business and government leaders, as well as scholars across a broad range of disciplines, including international business, management, economics, geography, sociology, and entrepreneurship.

This phenomenon has come to be known as “International Entrepreneurship”: “the discovery, enactment, evaluation and exploitation of opportunities- across national borders- to create future goods and services” (Oviatt & McDougall, 2005, 540).¹ According to Oviatt and McDougall (2005, 540)

The phrase “across national borders” is highlighted above because it has particular meaning in this context. Actors (organizations, groups, or individuals) who discover, enact, evaluate, or exploit opportunities to create future goods or services and who cross national borders to do so are internationally entrepreneurial actors. Scholars who study those actors, how they act, and the effect of their actions are studying international entrepreneurship. So too are scholars who compare domestic entrepreneurial systems, culture and behaviors across national borders. *Thus, there are two branches to the study of international entrepreneurship, one focusing on the cross-national-border behaviour of entrepreneurial actors and another focusing on the cross-national-border comparison of entrepreneurs, their behaviors, and the circumstances in which they are embedded.* [italic emphasis added]

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¹This definition was broadened from an earlier definition (McDougall, 1989: 387–399): “the development of international new ventures or start-ups that, from their inception, engage in international business, thus viewing their operating domain as international from the initial stages of the firm’s operation.”

International entrepreneurship draws principally not only from the foundations of international business and entrepreneurship, but also from economics, history, psychology, and sociology (e.g., Portes et al., 2002) and other areas within business such as finance, marketing, operations management, and strategic management (e.g., Zou & Stan, 1998). International business research explores firm internationalization and was initially dominated by research on large multinational enterprises (MNEs) (e.g., Buckley & Casson, 1976) but now includes small and medium size enterprises (SMEs) and new venture internationalization (e.g., Oviatt & McDougall, 1994). Historically, entrepreneurship research focused on new and small firms and did not explore international activities (e.g., Casson, 1982; Drucker, 1985). Scholars have pushed for the integration of IB and entrepreneurship theories (Coviello & Jones, 2004; Keupp & Gassmann, 2009; Mathews & Zander, 2007).

As the study of entrepreneurship has evolved to include the examination of “entrepreneurial” firms that vary in size, age, and other factors, international entrepreneurship research correspondingly responded by encompassing a broad range of “entrepreneurial” activities. The domain of international entrepreneurship can include economic development, financing, and corporate environments, however, these topics are addressed in separate chapters of this handbook (see Acs & Virgill, 2010; Gompers & Lerner, 2010; Kuratko, 2010, this volume) and are outside the scope of this chapter.

This chapter begins by briefly reviewing the two stands of international entrepreneurship research: comparative international entrepreneurship and cross-border entrepreneurship, and answering key questions. The next section is an overview of different theoretical perspectives. The conclusion suggests theoretical, methodological, and pragmatic implications for further development of the field.

Comparative International Entrepreneurship

Comparative international entrepreneurship research examines cross-national differences in entrepreneurial activity, including of new and small firms, as well as “entrepreneurial” large and established organizations. Comparative international entrepreneurship studies can utilize quantitative and/or qualitative approaches, however, uniform data collection procedures are required, which can be challenging (Coviello & Jones, 2004).

A principle research question in comparative international entrepreneurship is: *How does entrepreneurial activity differ across countries?* The Global Entrepreneurship Monitor (GEM) was created with the explicit purpose of filling a measurement void to answer this question. Table 16.1 depicts the differences in entrepreneurial activity rates in 41 countries based on GEM data and World Bank data. As shown in Table 16.1, TEA nascent entrepreneurship rates vary from 0.96% in Japan to 16.01% in Uganda. “Formal” entrepreneurship rates vary from 0.66% in Uganda to 12.73% in New Zealand. While these data sets are different what they measure is systematic across countries.

Table 16.1 Nascent, young, and formal entrepreneurship rates

Country	“Nascent”	“Young”	“Formal”	SPR_B_C	SPR_N_C
Argentina	9.17	5.65	1.67	3.98	7.50
Australia	7.32	5.58	6.70	-1.12	0.61
Austria	3.02	2.37	3.10	-0.73	-0.08
Belgium	2.64	1.25	4.83	-3.58	-2.19
Canada	5.88	3.66	6.35	-2.69	-0.47
Chile	8.49	6.23	1.58	4.65	6.91
Croatia	2.84	1.49	3.60	-2.11	-0.76
Cz. Republic	6.41	1.98	3.77	-1.79	2.64
Denmark	2.68	2.86	6.04	-3.18	-3.36
Finland	3.29	2.26	3.24	-0.98	0.05
France	3.47	1.02	3.00	-1.98	0.47
Germany	3.16	2.31	0.84	1.27	2.34
Greece	3.92	2.54	0.43	2.10	3.49
Hong Kong	1.61	1.58	10.29	-8.71	-8.68
Hungary	2.96	2.28	3.35	-1.07	-0.40
Iceland	7.83	4.46	11.64	-7.18	-3.81
India	5.42	5.31	0.10	5.21	5.32
Indonesia	9.63	11.51	0.18	11.33	9.45
Ireland	5.05	4.03	5.56	-1.53	-0.51
Israel	4.32	2.53	8.59	-6.06	-4.27
Italy	2.49	1.90	4.37	-2.47	-1.87
Japan	0.96	1.21	3.02	-1.81	-2.06
Jordan	10.38	8.26	2.94	5.32	7.44
Latvia	4.17	2.77	12.33	-9.56	-8.16
Mexico	4.59	1.36	6.54	-5.18	-1.95
Netherlands	2.43	2.01	8.96	-6.94	-6.53
N. Zealand	9.02	7.82	12.73	-4.92	-3.71
Norway	4.14	4.11	9.69	-5.58	-5.55
Peru	31.36	12.93	3.05	9.88	16.00
Poland	3.92	5.20	1.85	3.35	2.07
Russia	3.46	1.71	4.69	-2.98	-1.23
Singapore	3.33	2.98	3.03	-0.39	0.02
Slovenia	2.62	1.08	2.64	-1.56	-0.02
South Africa	3.40	1.79	1.86	-0.07	1.54
Spain	2.95	2.97	6.90	-3.93	-3.95
Sweden	1.81	2.37	5.02	-2.64	-3.21
Switzerland	3.49	3.71	2.71	1.00	0.78
Turkey	2.20	4.01	1.25	2.76	0.95
Uganda	16.01	18.02	0.66	13.00	15.35

Table 16.1 (continued)

Country	“Nascent”	“Young”	“Formal”	SPR_B_C	SPR_N_C
UK	3.41	3.07	5.01	−1.94	−1.60
USA	8.12	4.98	2.55	2.43	5.57

Source: Acs et al. (2008).

Note: Shown are averages of non-missing variables for 2003, 2004, and 2005. “Nascent” is the number of people actively involved in starting a new venture, as a percentage of adult population, “Young” is the number of people that are owners/managers of a business that is less than 42 months old, as a percentage of adult population, and “Formal” is the percentage of newly registered limited-liability firms (less than 1 year), as a percentage of adult population. SPR_B_C is the spread between Young and Formal entrepreneurship rates. SPR_N_C is the spread between Nascent and Formal entrepreneurship rates.

Other studies have used the GEM data to examine distinct types of entrepreneurs and populations across countries, such as high impact entrepreneurship (Autio, 2006), female entrepreneurship (Elam & Terjesen, 2007; Baughn et al., 2007), and social entrepreneurship (Bosma et al., 2010). Other researchers have focused on a particular region such as Latin America (Amorós & Cristi, 2008) or Asia (Terjesen & Hessels, 2009). Researchers have used GEM and other data to identify variances across countries in terms of “entrepreneurial cognition” (Mitchell et al., 2002), entrepreneurial orientation (Kreiser et al., 2002), and entrepreneurial preferences (Acs et al., 2004).

The World Bank Ease of Doing Business data has provided an important source of international data. It explores the role of costs in starting a new firm on entrepreneurial activity. The data has been used in a host of studies answering questions previously not approachable. Table 16.2 provides an overview of the costs of starting a new firm in 42 countries. As shown, countries vary dramatically in terms of the number of procedures (2 in Canada and Australia versus 21 in the Dominican Republic), time in days (2 again in Canada and Australia versus 152 in Madagascar), and direct costs as a percent of GDP (0.50 in the United States versus 463.09 in the Dominican Republic).

Differences Across Countries

In the global context, local, regional, and national governments have pursued policies to stimulate the establishment of new firms. However, in developing effective entrepreneurship policies, government leaders typically begin by asking another important question in comparative international entrepreneurship research: *Why does entrepreneurial activity differ across countries?* Cross-country comparisons of the determinants of entrepreneurial activity often utilize an institutional perspective, examining economic, technological, demographic, social, cultural, and other factors. GEM and other research programs examine a variety of individual, firm, and

Table 16.2 Costs of starting up a new firm in 42 countries

Country	Number of procedures	Time (days)	Direct costs (% GDP)	Time and direct costs (% GDPPC)
Canada	2	2	1.45	2.25
Australia	2	2	2.25	3.05
New Zealand	3	3	0.53	1.73
Denmark	3	3	1.00	1.12
Ireland	3	16	1.16	1.80
United States	4	4	0.50	1.69
Norway	4	18	4.72	11.92
UK	5	4	1.43	3.03
Hong Kong	5	15	3.33	9.33
Mongolia	5	22	3.31	12.11
Finland	5	24	1.16	10.76
Israel	5	32	21.32	34.12
Sweden	6	13	2.56	7.76
Zambia	6	29	60.49	7.09
Switzerland	7	16	17.24	23.64
Singapore	7	22	11.91	20.71
Latvia	7	23	42.34	51.54
Netherlands	8	31	18.41	30.81
Taiwan	8	37	6.60	21.40
Hungary	8	39	85.87	101.47
South Africa	9	26	8.44	18.84
Thailand	9	35	6.39	20.39
Nigeria	9	36	257.00	271.40
Chile	10	28	13.08	24.28
Germany	10	42	15.69	32.49
Cz. Republic	10	65	8.22	34.22
India	10	77	57.76	88.56
Japan	11	26	11.61	22.01
Egypt	11	51	96.59	116.99
Poland	11	58	25.46	48.66
Spain	11	82	17.30	50.10
Indonesia	11	128	53.79	104.99
China	12	92	14.17	50.97
South Korea	13	27	16.27	27.07
Brazil	15	63	20.14	45.34
Mexico	15	67	56.64	83.44
Italy	16	62	20.02	44.82
Vietnam	16	112	133.77	178.57
Madagascar	17	152	42.63	103.43
Russia	20	57	19.79	42.59
Bolivia	20	88	265.58	300.78
Dom. Rep.	21	80	463.09	495.09
<i>AVERAGE</i>	<i>10.48</i>	<i>47.49</i>	<i>47.08</i>	<i>65.98</i>

Source: Peng (2005).

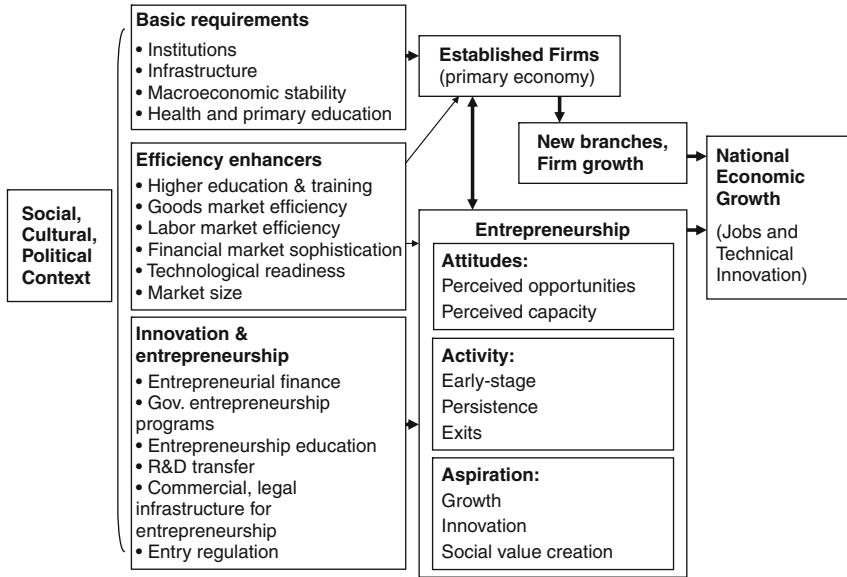


Fig. 16.1 GEM model of entrepreneurial activity
 Source: Bosma, Acs, Autio, Coduras & Levie (2009).

environmental factors related to entrepreneurial activity. Figure 16.1 depicts the GEM model of entrepreneurial activity.

Figure 16.2 depicts the relationship between early-stage entrepreneurial activity rates and GDPPC in 43 countries.

Scholars have attempted to interpret the U-shaped nature of this curve- that entrepreneurial levels are high at low levels of economic development, then decrease with development, and increase again at the highest levels of development.

The GEM model set out in Fig. 16.1 documents how entrepreneurship is affected by national conditions. It also shows that GEM considers three major components of entrepreneurship: attitudes, activity, and aspirations. GEM monitors entrepreneurial framework conditions in each country through harmonized surveys of experts in the field of entrepreneurship. Components of entrepreneurship are tracked using the adult population surveys. Thus, GEM generates original data on the institutional framework for entrepreneurship and entrepreneurial attitudes, activity, and aspirations using its own methodology that is harmonized across countries.

This relationship between entrepreneurship and economic development is a rather complex one as we see in Acs and Virgill (this volume). Different types and phases of entrepreneurship may impact economic growth differently in different parts of the world (Sternberg & Wennekers, 2005). In addition, in theory the relationship works both ways: entrepreneurship may impact economic development,

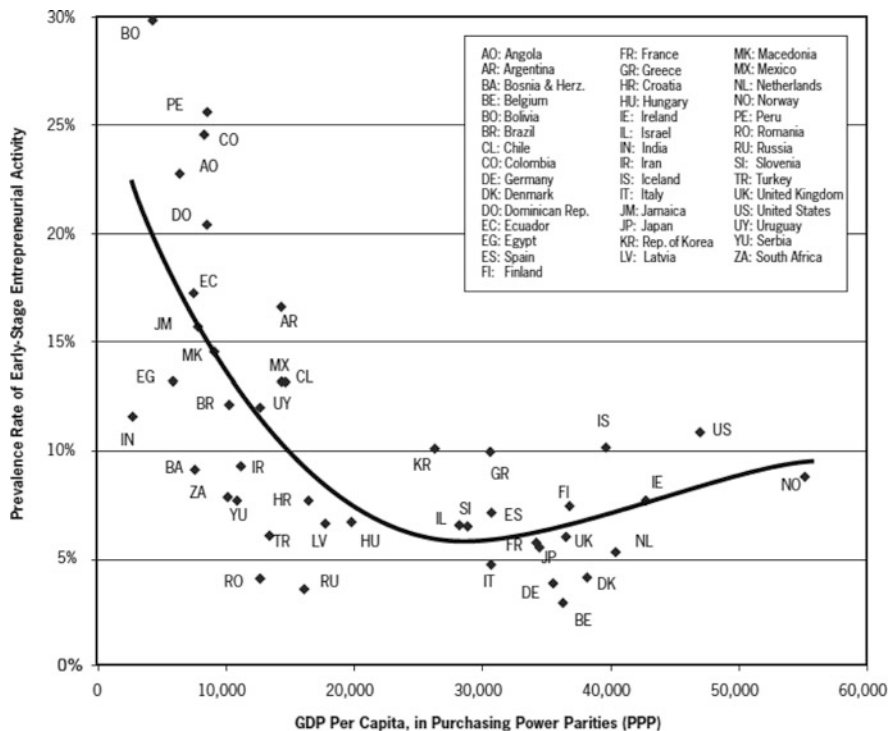


Fig. 16.2 Early-stage entrepreneurial activity rates and per capita GDP (2008)
 Source: Bosma, Acs, Autio, Coduras & Levie (2009).

which in turn may impact entrepreneurship. Disentangling these reinforcing relationships requires a careful time series analysis (Bosma et al., 2010).

Based on the existing evidence on the link between entrepreneurship and economic growth, and “projecting” this evidence on the GEM data, Zoltan Acs and Laszlo Szerb (2009) developed a global entrepreneurship index (GEI). Two main assumptions served as their point of departure: (i) attitudes, activity, and aspirations need to be included in such an index; (ii) the effect of these components on economic development is a function of the presence and level of specific institutional conditions.

They identify several components for each sub-indicator. Typically, these components consist of one genuine entrepreneurship indicator (mostly derived from GEM data) and one institutional climate indicator (mostly from sources outside GEM). Acs and Szerb argue that opportunity-driven entrepreneurial activity makes a bigger contribution to economic development when doing business has been made easier in the country. Thus, they combine the GEM measure of opportunity-driven early-stage entrepreneurial activity with the World Bank’s measure of “ease of doing business”

into one measure.² This measure is in turn combined with five other measures dealing with entrepreneurial activity, forming a sub-indicator of entrepreneurial activity. Finally, combining three sub-indicators dealing with entrepreneurial attitudes, activity and aspiration results in an overall index for entrepreneurship: the global entrepreneurship index (GEI).

It is possible for national and regional policy makers to track the components that score relatively poorly and those components that appear to be relatively healthy. To this end, a policy tool has been developed which provides a picture of the state of entrepreneurship in a country or region. In conclusion, the global entrepreneurship index and the GEM model are compatible in that they follow the same model. But whereas the *monitor* (GEM) focuses on giving the results based on primary data collection, the *index* (GEI) uses these results, assumes certain links with institutions and economic development, and combines the measures to form an index (Bosma et al., 2010). The results suggest that the relationship between entrepreneurship and economic development is S-shaped and not U-shaped (Acs & Szerb, 2009).

Comparative Entrepreneurship Data

To explore answers to these and other issues, an important question is: *Where can I find comparative entrepreneurship data?* Statistics (e.g., foreign direct investment, international trade) gathered by international organizations such as the United Nations and World Bank do not generally denote “entrepreneurial organizations” and thus provide limited insight into comparative international entrepreneurship (Hessels, 2008).

The most comprehensive and successful effort to collect comparative international entrepreneurship research data is the multi-country annual Global Entrepreneurship Monitor (GEM) study (Shorrock, 2008). GEM has been cited extensively in leading news outlets (e.g., *Economist*, 2007, 2009) and utilized in research published in leading academic journals (e.g., Bowen & De Clercq, 2008). GEM was initiated by Paul Reynolds in 1999 and expanded to over 50 national teams. The GEM project was established to enable cross-national comparisons of national entrepreneurial activity levels, examine the role of entrepreneurial activity in national economic growth, determine factors that contribute to national-level differences in entrepreneurial activity, and to help facilitate policies to enhance entrepreneurship. Each year GEM surveys, by telephone or door-to-door, representative population samples of between 1,000 and 42,000 randomly selected adults in each participating country. The annual surveys are gathered between May and August, and the data is weighted to reflect the population (e.g., age, gender, education) and harmonized with the other countries. The surveys are conducted in the national language and facilitated by the translation and back-translation of questions.

²See www.doingbusiness.org

The principle GEM measure is total early-stage entrepreneurial activity (TEA). TEA captures the percentage of the adult (age 18–64) population that is actively involved in entrepreneurship in two populations: nascent entrepreneurs and young business owners. Nascent entrepreneurs are individuals who have, during the last past 12 months, taken tangible action to start a new business, would personally own all or part of the new firm, would actively participate in the day-to-day management of the new firm, and have not yet paid salaries for anyone for more than 3 months. Young business owners are defined as individuals who are currently actively managing a new firm, personally own all or part of the new firm, and the firm in question is not more than 42 months old. In some cases, an individual may report both nascent and young business ownership activity, however, this individual will only be counted once toward the TEA percentage in the adult population. TEA indices have high validity and reliability (Reynolds et al., 2005). See Reynolds et al. (2005) for an extensive overview of GEM methodology and data and Levie and Autio (2008) for a theoretical grounding and test of the GEM model. The GEM survey also includes a measure of cross-border international entrepreneurship related to the extent of international customers for both nascent and young firms.

Other harmonized multi-country datasets include the ENSR Enterprise Survey from the Observatory of European SMEs for the European Commission. Recently, the OECD and Eurostat started the Entrepreneurship Indicators Programme (EIP).³

Cross-Border Entrepreneurship

A second branch of international entrepreneurship research, cross-border entrepreneurship, explores firms' international activities in one or more countries, including new ventures (McDougall, 1989) and SMEs (Lu & Beamish, 2001). Cross-border entrepreneurship research is increasing (Coviello & McAuley, 1999; Keupp & Gassmann, 2009; Rialp et al., 2005), and encompasses the scope, drivers, processes, characteristics, and impacts of cross-border activities. To date, most cross-border entrepreneurship research is based on surveys and case studies, and investigates the micro-level antecedents, directing limited attention to the outcomes of internationalization (Hessels, 2008).

The global economy is characterized by an increasing number of firms of all sizes undertaking international activities. This change is facilitated by reduced trade and investment barriers, improved technology to increase communication, enhanced information flows across countries, regional economic agreements, and the globalization of consumer preferences (Friedman, 2005; Moen, 2002; Reynolds, 1997).

³Information about these datasets can be found at: http://www.ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/sme-observatory/index_en.htm and http://www.oecd.org/document/0/0,3343,en_2649_34233_39149504_1_1_1_1,00.html

Traditionally, MNEs were responsible for most international trade and foreign direct investment (FDI) flows. Compared to large MNEs, SMEs are typically regarded as resource-constrained, lacking market power, knowledge, and resources to operate viably in international markets (Acs & Terjesen, 2006; Coviello & McAuley, 1999; Fujita, 1995). Despite liabilities of small size and foreignness, an increasing number of SMEs pursue international markets to sell their goods and services (OECD, 2000; Reynolds, 1997; Rugman & Wright, 1999). New and small firms' transaction costs of doing business abroad (e.g., costs associated with delivering goods or services to international customers) are particularly cumbersome (Zacharakis, 1997), however, these costs have been reduced due to technological advances in telecommunication, transportation, and information technology (OECD, 2000; Reynolds, 1997). More than ever before, these entrepreneurial firms can easily communicate with foreign customers and partners. Exporting is the first and most common step in a firm's international expansion (Young, 1987; Young et al., 1988), including for new ventures (Zahra et al., 1997).

The intent of this chapter is not to review all existing literature in the cross-border entrepreneurship arena. There are several recent outstanding literature reviews that serve this purpose, Keupp and Gassmann's (2009) "The Past and Future of International Entrepreneurship: A Review and Suggestions for Developing the Field" reviews 179 articles on cross-border entrepreneurship by method, research focus, dependent variable, theoretical framework, and analytical method. Eleven of the 167 studies analyzed focus on country-level factors that determine the propensity to internationalize and/or export performance. Rialp, Rialp, and Knight (2005) focus on a subset of 38 studies of early internationalizing firms and the main objective and type of research, theoretical frameworks, methodological issues, and main findings. Coviello and Jones (2004) systematically review 55 articles for methodological issues: time frame, research context, sample characteristics, data collection/analysis procedures, and equivalence issues. Seventeen of the 55 articles included comparisons across countries, however, many cross-cultural assessments, such as entrepreneurial orientation were not included. Zou and Stan's (1998) export performance literature review covers mostly small to medium sized enterprises, including countries of study, sample size, industry type, firm size, data collection method, analytical approach, unit of analysis, theoretical basis, and measures of export performance and independent factors.

Given that firms of all ages and sizes might potentially engage in cross-border trade, a critical research question is: *Why is it important to distinguish the internationalization of "entrepreneurial" (e.g., new, small) firms from other ("non-entrepreneurial") firms?* "Entrepreneurial" firms are set apart from other firms based on resource constraints and corresponding liabilities of foreignness, smallness, and newness, as well as the perspective of the decision-maker(s) and the process. Compared to large firms, small and new firms have fewer financial, human capital, and other resources (Coviello & McAuley, 1999). Due to their age, young/new firms face "liabilities of newness," leading to a greater risk of failure. Furthermore, "liabilities of foreignness" describe the disadvantage relative to local firms when operating in foreign markets as compared to larger firms. In

terms of decision-making, the small and new firms' founder/owner(s) make most of the critical decisions such as internationalization (Coviello & McAuley, 1999). This is in contrast to large firms where more players are generally involved in such decisions. Furthermore, there is evidence that the internationalization process of entrepreneurial firms is not easily explained by traditional internationalization theories that were developed for large firms (McDougall et al., 1994).

Characteristics

Within entrepreneurial firms engaged in international activity, another important research question is: *Which entrepreneurial firm activities are cross-border?* Importantly, the internationalization of firm activities includes inputs and outputs. Extant research focuses primarily on outputs, specifically export sales (e.g., Bloodgood et al., 1996; McDougall & Oviatt, 1996). However, internationalization could also be facilitated by other output modes such as indirect export (i.e., export intermediary agents and distributors) and international joint ventures (Peng, 2005). Entrepreneurial firms may also have international inputs, such as indirect imports (i.e., import intermediary agents and distributors), licensing, and strategic alliances (Fletcher, 2001; Peng, 2005; Welch & Luostarinen, 1988).

Another key research question and point of considerable debate is: *How quickly do entrepreneurial firms pursue cross-border activities?* The process theory of internationalization or "stage" theory (Johanson & Vahlne, 1977, 1990) describes how a firm first establishes in a domestic market and subsequently internationalizes in small steps. According to this incremental model of increasing risk and commitment, a firm might start internationalizing through indirect export then establish a sales subsidiary in another country and then establish a production factory in another country. However, more recent research suggests that firms explore international operating domains from at or near inception (Moen & Servais, 2002; Oviatt & McDougall, 1994; Rennie, 1993). These early internationalizing entrepreneurial firms are labeled "international new ventures" (INVs) (Oviatt & McDougall, 1994), "born globals" (Rennie, 1993), and "micro multinationals" (Ibeh, 2006). For example, Oviatt and McDougall (1994, 49) define an INV as "a business organization that, from inception, seeks to derive significant competitive advantage from the use of resources and the sale of outputs in multiple countries." These firms typically take less than 3 years from inception to initial foreign market entry (McDougall & Oviatt, 2000). Importantly, internationalization is not always a path-dependent process; some firms de-internationalize (Fletcher, 2001; Welch & Luostarinen, 1988).

Drivers

An extensive literature explores the antecedents of cross-border entrepreneurship (Aaby & Slater, 1989; Bilkey, 1978; Fletcher, 2001; Keupp & Gassmann, 2009; Rialp et al., 2005), answering the question: *What are the drivers of cross-border entrepreneurship?* Generally speaking, this research has generated few consistent

findings, perhaps due to the different operationalizations of internationalization (e.g., export probability, export intensity) and the lack of a cross-country perspective (Hessels, 2008; Keupp & Gassmann, 2009). Furthermore, much of the empirical research is based on case studies involving one or at most a few companies and/or countries (Coviello & Jones, 2004). Antecedents of cross-border entrepreneurship include both facilitating and inhibiting forces and can be divided into three broad subcategories: individual entrepreneur-specific factors, firm-specific factors, and environment-specific factors. Individual-specific factors mainly relate to characteristics of the entrepreneur such as age (Westhead, 1995), education (Simpson & Kujawa, 1974), and work experience (Bloodgood et al., 1996; Eriksson et al., 1997; Hessels, 2008; Reuber & Fischer, 1997).

Firm-specific factors include firm size (employees, sales) (Chetty & Hamilton, 1993; Lefebvre & Lefebvre, 2002; Westhead, 1995), resource base (Akoorie & Enderwick, 1992; Cavusgil & Nevin, 1981), technology, research and development, management capabilities (Autio et al., 2000; Cavusgil & Nevin, 1981; Lefebvre & Lefebvre, 2002), industry structure (Fernhaber et al., 2007), and a desire for profit (Fan & Phan, 2007).

Environment-specific factors impacting cross-border entrepreneurship include both domestic and foreign market conditions. Environment-specific factors positively related to internationalization include a fall in production costs in the home market (Axinn, 1988), a small size of the home market (Fan & Phan, 2007; Rasmussen et al., 2001;), and other institutions (Terjesen & Hessels, 2009).

Impact

What are the outcomes of cross-border entrepreneurship? Compared to research on antecedents, the impact of entrepreneurial firm internationalization is a more limited literature (Keupp & Gassmann, 2009; Lu & Beamish, 2006; Zahra, 2005) and can again be viewed in terms of individual, firm, and environment levels. Most research emphasizes the potential of value creation through internationalization, however, negative outcomes are also possible (Hessels, 2008).

Individual outcomes reported include development of human capital and social capital. At the firm level, there are no consistent findings concerning a relationship between the level of internationalization and firm performance (Riahi-Belkaoui, 1998). Some studies report evidence that internationalization results in greater profits, employee growth, and innovation (Lu & Beamish, 2001).

At the environment level, establishing transactions, partnerships, and operations in foreign countries can open access to new markets, less costly sources of labor and other resources. Further gains are realized from exposure to ideas for new products and services, new technologies, and workplace innovations (Zahra et al., 2001). Exports have also been found to aid the growth of home countries' economies by improving a nation's foreign exchange reserves, developing national industry, and creating employment (Girma et al., 2004). Research into the outcomes of entrepreneurship in multiple countries devotes considerable attention to

the impact of entrepreneurship on employment creation, innovation, and economic growth (Audretsch & Thurik, 2001; Carree & Thurik, 2003; Thurik et al., 2008; van Stel, 2006), although this research does generally distinguish cross-border entrepreneurship (Hessels, 2008).

Theoretical Frameworks

Existing international business theories have largely failed to explain entrepreneurship (McDougall et al., 1994; Yeung, 2002). Scholars have subsequently utilized a variety of lenses from other disciplines to examine international entrepreneurship. For example, Keupp and Gassmann (2009) reported 25 theories used to examine international entrepreneurship: internationalization theory (including Upsala), organizational learning, OLI paradigm, alliance or interfirm network, resource-based view, transaction cost, experiential learning, foreign direct investment, social network, entrepreneurial orientation, industrial economics, social cognition, international new venture framework, agency, resource dependency, product life cycle, contingency, ethnic entrepreneurship, knowledge-based view, evolutionary economics, strategic entrepreneurship, neoinstitutional, economic theory of entrepreneurship, economic geography, and attention-based theories. This section outlines the following 11 theoretical frameworks which are particularly promising for the further development of the field: early internationalization, process/stage, social capital, intermediated internationalization, resource-based view, resource dependency, institutional, varieties of capitalism, knowledge spillover, foreign direct investment, and practice theories.

Early Internationalization Theories

Early internationalization theories emerged from theories about why nations trade. These theories include absolute advantage (Smith, 1776), comparative advantage (Ricardo, 1817), and the Heckscher-Ohlin model (Ohlin, 1933) (Hessels, 2008). Over the past four decades, firm internationalization theories developed from theories of monopolistic advantage (Caves, 1971; Hymer, 1976), product life-cycle (Vernon, 1966), transaction costs (Williamson, 1975), and Dunning's (1981) eclectic paradigm (Hessels, 2008). These theories were principally used to explain the internationalization of large firms, and have only been applied to entrepreneurial firms in limited ways, for example, Zacharakis' (1997) study of transaction costs.

Process/Stage Theory

The process or stage theory of internationalization (Johanson & Vahlne, 1977, 1990) posits that internationalization is a gradual process that occurs after firms have established themselves in the domestic market and then extend to foreign markets. While

this theory is well-supported in research on large firms, it fails to explain the paths of entrepreneurial firms (Oviatt & McDougall, 1994).

Social Capital Theory

Social capital theory is concerned with an individual's position in a social network of relationships and the resources embedded in, available through or derived from these networks (Nahapiet & Ghoshal, 1998). Individuals draw value from trust, reciprocity, information, and cooperation from these associations. Social network structures have been shown to enable access to resources, which can lead to success when entering international markets (Coviello & Munro, 1997; Oviatt & McDougall, 2005; Yli-Renko et al., 2001).

Intermediated Internationalization Theory

Direct exporting is a common path to internationalization and is well-addressed in the extant literature. In the case of exporting, firms have two channel options: (1) export directly to customers abroad or (2) export indirectly through an intermediary (Acs & Terjesen, 2006; Peng & York, 2001).⁴ The direct mode leads to the international new venture, however, it is not always optimal given new venture's high trade barriers abroad; low levels of innovation; predominant focus on domestic niches; and lack of necessary financial capital, information, and ability to protect property rights abroad. Faced with these barriers, new ventures may choose the second path of intermediating their innovation through an established multinational enterprise. This process creates a feedback mechanism from new ventures to existing organizations, as new ventures become a part of existing multinationals' supply chains. Supply chain management takes place through formal and informal governance structures. The new venture's decision to pursue direct or intermediated paths to internationalization is based on an assessment of the costs of property rights protection, transactions, and rent extraction.

An emerging strand of research explores how new and small firms pursue an indirect path to internationalization (e.g., Acs et al., 1997; Acs & Terjesen, 2006; Hessels & Terjesen, 2010; Peng & York, 2001; Terjesen et al., 2008), using local and foreign intermediaries to sell their goods and services across national borders. New and small ventures use intermediaries to overcome knowledge gaps, find customers, and reduce the uncertainties and other risks associated with operating in foreign markets (Terjesen et al., 2008). Examples of indirect forms employed include local and foreign export intermediaries (Peng, 2005) and subsidiaries of multinational

⁴Intermediation is central to entrepreneurship: the term "entrepreneur" stems from the French verb "entreprendre" derived from "entre" (between) and "prendre" (to take) and has long been used to describe individuals who are "in the middle" of business activities.

firms (Acs et al., 1997; Terjesen et al., 2008). An example of local firm intermediation is Dublin-based Cylon, a building control systems manufacturer that supplies products to a local subsidiary of ABB which then sells the product around the world. A case of a foreign firm intermediary role is Delhi-based software firm Softcell that sells to the European headquarters of a Fortune 100 energy company, which then distributes the product globally across the firm (Terjesen, et al., 2008). In some countries, such as Japan and Korea, export intermediaries handle about half of total exports (Peng & Illinitch, 1998).

Resource-Based View

The resource-based view (RBV) assesses the firm as a bundle of resources, possessed internally, which can be deployed toward competitive advantage (Barney, 1991; Wernerfelt, 1984). Resources are inputs to the production process, and include tangible and intangible assets such as equipment, intellectual assets, and patents. A large body of empirical research investigates how an entrepreneurial firm's current resource base impacts export activity (e.g., Akoorie & Enderwick, 1992; Autio et al., 2000; Cavusgil & Nevin, 1981; Chang, 1995; Tesfom et al., 2004; Westhead, 1995).

Resource Dependency Theory

Resource dependency theory is concerned with a firm's need to access resources from other actors in the environment. Resource scarcities force organizations to pursue new innovations that use alternative resources (Pfeffer & Salancik, 1978; Sherer & Lee, 2002). To obtain resources, new and small firms are particularly dependent on their environment.

Resource dependency theory has been a useful framework for examining a firm's need to obtain resources required for exporting (e.g., Tesfom et al., 2004). In this regard, resource dependency theory explains how a firm's location in a desirable home market can aid the accumulation of resources that are required to export (Hessels & Terjesen, 2010). Porter (1990, 1998) describes how firms based in national markets enjoy certain competitive advantages due to the presence of related and supporting activities (e.g., presence of customers and suppliers) and certain factor conditions (e.g., availability of capital, knowledge, technology, resources, level of production costs, legal protection of property rights, quality of government regulation for business).

Institutional Theory

Institutional theory addresses the process of establishment of structures into authoritative guidelines for social behavior and how such environments affect organizational forms and processes (Scott, 1995). Institutional theory predicts that

organizations are inclined to imitate the behavioral norms of other actors in the organization field, adapting practices that are considered acceptable and legitimate.

A growing body of entrepreneurship literature explores the role of formal and informal institutions in facilitating entrepreneurship, often focusing on how institutions enable varying degrees of capital accumulation that promote investment and growth in entrepreneurial activities. In one of the seminal studies, Baumol (1990) highlights how the presence of innovation and corruption result in different levels of productive, unproductive, and destructive entrepreneurship. Subsequent scholars have shown that entrepreneurial activity rates are impacted by national government differences in taxation, registration, and incorporation rates; financial and educational capital (Autio & Acs, 2007; Bowen & De Clercq, 2008); government support for internationalization (Wilkinson, 2006); environmental turbulence (Westhead et al., 2004); and the characteristics of foreign (e.g., the level of competition abroad) (Thirkell & Dau, 1998) and domestic markets (e.g., production costs in the home market) (Axinn, 1988; Hessels & Terjesen, 2010) and informal or “soft” institutions such as culture (Elam & Terjesen, 2010). Opportunity-motivated entrepreneurial activity is associated with property rights and necessity-motivated entrepreneurial activity is related to fiscal and monetary freedoms (McMullen et al., 2008).

Extant research indicates institutions impact entrepreneurship, however, this impact varies with the many measures of institutions and of entrepreneurial activity. The lack of consistent definitions and measures of institutions and entrepreneurship, coupled with a lack of theory and a multitude of countries under study, suggest the need for a more careful and theoretical approach to examining linkages.

Varieties of Capitalism Theory

A related theory is varieties of capitalism (VOC) which assumes that national governments shape institutions which in turn structure economic activity, set behavioral norms, expectations, and strategies (Hall & Soskice, 2001, 9), including internationalization (Whitley, 1998). Scholars have employed VOC to explore how differing structures of national institutions are reflected in the quantity and quality of export-oriented entrepreneurial opportunities present in the environment and, if such opportunities exist, the ability of local entrepreneurs to take advantage of these (Terjesen & Hessels, 2009).

Knowledge Spillover

The knowledge spillover theory of entrepreneurship (Acs et al., 2009) focuses on individual agents who possess new knowledge, often developed by a third party and initially geographically bounded (Audretsch & Feldman, 1996) that may or may not be economically valuable. This uncertainty, paired with asymmetries that the agent possesses, leads to variations in the gap of this knowledge and its value.

The idea that a firm may be more inclined to engage in export activities if it is exposed to other economic actors' international activities is also found in the emerging export spillovers literature on the impact of foreign multinational enterprises on domestic firms' export activity (e.g., Aitken et al., 1997; De Clercq et al., 2008; Greenaway et al., 2004; Kneller & Pisu, 2007). The export spillover literature complements the institutional theory perspective by providing a broader perspective of the channels through which spillovers occur. More specifically, export spillover research recognizes a demonstration or imitation effect and suggests that commercial linkages, training, and increased competition from an international actor can increase a domestic firm's likelihood of exporting (Hessels, 2008).

Foreign Direct Investment (FDI)

FDI plays an important role in economic development, including the growth of indigenous enterprises. FDI inflows bring in leading technology and new jobs and can lead to tradable goods. FDI enables the transfer of intangibles, including knowledge spillovers, and thus can play a role in stimulating the establishment of homegrown enterprises in the host country, leading to further economic development (Young et al., 1994). Extant research indicates that FDI forms vary in their potential for knowledge spillovers and indigenous entrepreneurship. Furthermore, host countries with higher levels of human capital (formal education, on-the-job training including industry, management, and business development experience) are more likely to take advantage of spillovers and start higher value-added firms. The higher the technology intensity of the FDI, the more likely there will be knowledge spillovers (Buckley et al., 1988). These knowledge spillovers can also be identified by individuals working in MNEs who may feel unable to realize returns in an existing firm or that the bureaucratic MNE does not value this knowledge and may start a new entity. Indigenous entrepreneurship is also fostered by personal and cultural contexts that value entrepreneurial activity (Acs et al., 2007). Indigenous entrepreneurship is more pervasive in sectors where entrepreneurs are exploiting opportunities related to MNE economic activity (Acs et al., 2007; Acs & Varga, 2005).

Theory of Practice

Bourdieu's (1977, 1990) theory of practice considers both micro- (individuals, actions, cognitions and beliefs) and macro-level constructs (structural and institutional contexts) in determining an individual's ability to act (practice). Scholars have developed the theory of practice to explore how distinctive worldviews (as an approximation of habitus) and resources (forms of capital) uniquely position transnational entrepreneurs to pursue international markets and meet the navigational requirements of multiple institutional environments within a subjective field of economic activity (Drori et al., 2006; Terjesen & Elam, 2009).

Discussion

We discuss the field of international entrepreneurship in terms of Howard Aldrich's (1992) three perspectives on the progress of entrepreneurship research. First, following Kuhn's (1970) logic, Aldrich (1992) proposes a unified or normal science view of progress as being achieved once there is a collection of well-grounded generalizations and the hypotheses are rigorously tested. Excellent data and statistical methods are required to test theory. Previous findings must be replicated and confirmed to and scholars must work together to achieve continuity (Aldrich & Baker, 1997). Aldrich's (1992) second perspective is the diversity of theories and methods with subgroups of entrepreneurship researchers in communities using a variety of methods and standards (Gartner, 2001). Aldrich's (1992) third perspective is pragmatic: issues must have a greater status than methods. The researcher's purpose and conditions change over time. Thus, the pursuit of uniqueness is considered to be more valuable than the pursuit of continuity (Mone & McKinley, 1993). Investigations must be driven by phenomena and offer implications for education, practitioners, or policy (Hoy, 1997).

With respect to Aldrich's (1992) three perspectives, what can be said of the progress of the field of international entrepreneurship? First, concerning the unified science view, there is progress with well-grounded generalizations and rigorously tested hypotheses. High quality data is now available (Shorrock, 2008) and researchers are applying increasingly sophisticated tests (Coviello & Jones, 2004). While some entrepreneurship studies draw on statistically generalizable samples (e.g., GEM's population-based research), most utilize convenience samples. As also the case with the broad base of entrepreneurship research, international entrepreneurship research is biased against replication and confirmation and publication of negative findings. Edelman et al.'s (2009) review of 1,046 articles in the broad field of entrepreneurship research also indicates progress on normal science dimensions.

Second, progress in international entrepreneurship research can be considered with respect to the diversity of theory and methods. In this regard, international entrepreneurship research has, like broad entrepreneurship research (Edelman et al., 2009), made progress, with scholars exploring a variety of theories and methods. Finally, it is possible to examine international entrepreneurship research through a pragmatic lens. In this regard, recent research has explored issues considered important by stakeholders such as immigrant/transnational entrepreneurship, balance of export trade, and economic development.

Future Research Directions

Based on our assessment with respect to Aldrich's three perspectives, we suggest several promising directions for theoretical, methodological, and practical directions for IE research.

Theoretical

Scholars have called for new theories of the internationalization of new ventures (Autio, 2005; Keupp & Gassmann, 2009), especially multi-level models given the complex process of business creation (Davidsson & Wiklund, 2001). There have been calls for comparative, theory-based research in international entrepreneurship (Baker et al., 2005), the integration of political economy perspectives (Carney, 2004; Whitley, 1999), and research outside advanced economies (Coviello & Jones, 2004; Zahra, 2005).

In addition to building on the 11 theories highlighted earlier, scholars could apply emerging themes from entrepreneurship research, e.g., effectuation, opportunity intention, search and discovery, and bricolage. The emerging field of strategic entrepreneurship offers both comparative and cross-border opportunities to apply strategy concepts such as specialized knowledge management, learning processes, core competencies, path dependency, absorptive capacity, entrepreneurial orientation, managerial decision-making, and entrepreneurial firms' internationalization strategies. These theories could be explored in tandem, testing their relative power in explaining international entrepreneurship.

Methodological

International entrepreneurship offers a variety of methodological opportunities (Coviello & Jones, 2004). Scholars could utilize robust qualitative methods such as life history calendar, ethnography, repertory grid, and media content analysis. Quantitative methodological development possibilities include multi-level (country, firm, individual), longitudinal, and comparative historic and geographic analyses. Data could be collected through coordination with supra-national agencies such as the UN, and especially on previously neglected countries. The development of global scholarship networks (e.g., GEM consortium, Max Planck Institute for Economics, as described in Acs and Audretsch, 2010, this volume) could facilitate these efforts. Multi-method research combining both qualitative and quantitative techniques might yield new insights.

Pragmatic

International entrepreneurship research could be further developed by focusing on critical phenomenon such as transnational entrepreneurs and immigrants (Economist, 2008; Hart et al., 2009) and major global events such as economic crisis, war, and terrorism. Context such as corporate environments and the focus on social and sustainable outcomes could also be explored. Research must also investigate practical issues relevant to other stakeholders, for example, the results of government policy toward entrepreneurial firm internationalization.

At the firm level, research must investigate the phenomena. Researchers could explore the directions in which firms are evolving, exploring the prevalence of direct, hierarchical, and intermediated modes. Another promising stream of research explores the geographic location of new venture activities, answering questions such as: Are INVs, in fact, mostly regional rather than international?, and do new ventures select particular intermediaries based on the advantages they offer vis-à-vis a particular regions? At this level, managers' concerns must also be addressed, including the impact of international inputs and outputs on firm performance.

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Chapter 17

The Globalization of Innovation and Entrepreneurial Talent

Robert Wuebker, Zoltan J. Acs, and Richard Florida

Introduction

Venture capitalists find, fund, and assist *high-impact entrepreneurs*—individuals whose firms are instruments of Schumpeter’s (1939) “creative destruction” and the “creation of new economic spaces” (Acs, 2008). These entrepreneurs form firms characterized by a lack of substantial tangible assets, the expectation of several years of negative earnings, and extremely uncertain prospects. Venture capitalists provide these high-potential ventures with capital, advice, contacts, and experience. They bring to the table a host of financial and organizational “technologies” including screening capabilities, due diligence processes, staged financing, investment syndicates, compensation contracts, and corporate governance practices. Through these activities, venture capitalists help bring unproven, innovative ideas to market, overcoming the uncertainty and risk associated with new business development (Berger & Udell, 1998; Gompers & Lerner, 2001; King & Levine, 1993).

An examination of recent patterns of venture capital investment suggests that the venture capital industry is in the early stages of a profound transformation catalyzed in part by the globalization of high-impact entrepreneurship (Acs et al., 2001; McDougall & Oviatt, 2000). In the past decade international participation has become an increasing component of venture deals (Aizenman & Kendall, 2008). In the last 5 years, US venture capital firms increased international investment activity, as Table 17.1 details. This change in the allocation of early-stage venture investment has important implications for the financing of young firms, the speed of innovation and technological transformation, and the locus of long-term economic growth.

We are in the midst of a significant shift in the locus of innovation, entrepreneurial activity, and economic growth driven in large part by changes in stock and flows of human capital (Florida, 1997, 2005). The financing of high-impact entrepreneurial firms now occurs in a “post-American world” (Zakaria, 2008) one

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Table 17.1 Time series of cross-border investment by US venture capital firms

Year	Number of rounds	Number of cross-border rounds	New venture capital firms making investment	New portfolio firms receiving investment	Amount of investment (T \$US)	Cross-border investment (T \$US)	Cross-border investment as % of total investment
1980	113	1	1	1	779,297	600	0.08
1981	178	1	1	1	1,719,322	4,595	0.27
1982	166	1	1	1	1,167,006	13,402	1.15
1983	294	1	1	1	2,164,085	1,485	0.07
1984	325	6	4	6	2,054,618	8,196	0.40
1985	325	3	3	2	3,235,563	6,456	0.20
1986	340	6	4	5	2,487,413	38,832	1.56
1987	539	11	5	8	3,818,567	38,051	1.00
1988	511	10	4	8	3,566,571	56,155	1.57
1989	561	17	6	15	3,410,363	194,796	5.71
1990	563	21	2	20	3,394,723	286,854	8.45
1991	451	18	3	17	3,519,737	233,613	6.64
1992	519	23	2	21	3,296,816	244,528	7.42
1993	449	26	4	22	2,934,770	135,277	4.61
1994	500	29	6	29	2,994,212	109,325	3.65
1995	772	49	12	42	5,780,596	345,457	5.98
1996	1,069	52	10	47	7,041,125	327,308	4.65
1997	1,198	57	9	54	7,691,384	265,674	3.45
1998	1,414	96	21	88	10,187,456	847,039	8.31
1999	1,948	165	34	153	13,438,393	1,049,983	7.81
2000	2,639	304	50	279	18,873,699	2,099,777	11.13
2001	1,509	158	32	136	9,391,162	770,701	8.21
2002	1,194	110	18	91	7,155,296	907,809	12.69
2003	1,130	90	12	76	8,164,334	1,758,831	21.54
2004	1,313	117	15	107	7,822,323	945,015	12.08
2005	1,294	105	17	92	7,048,623	560,450	7.95
2006	1,500	147	14	132	7,729,981	885,241	11.45
2007	1,600	154	19	138	8,502,639	963,032	11.33

The sample is 24,326 rounds of venture financing from the set of firms that received their first round of venture finance after January 1, 1980 to December 31, 2007. The table shows the round year, the number of cross-border rounds, the count of new venture capital firms making their first cross-border investment, the count of new portfolio firms receiving cross-border investment, the total amount of investment in thousands of 2007 dollars, and cross-border investment represented as a percentage of total US venture investment.

in which innovation, talent, and consequent entrepreneurial activity are no longer the exclusive provenance of well-known centers of innovation (Bresnahan et al., 2001; Carlsson, 2006; Florida, 2005a; Howells, 1999). Changes in innovative capability driven by flows of talent, capital, and entrepreneurial opportunity have the potential to alter the geography of venture investment and its associated regional development. As Olson (1982) notes, some established regions cannot adapt, and

other regions enjoy propulsive development. We are now learning that Schumpeter's "creative destruction" effects are as much geographic as they are technological and organizational.

Table 17.2 helps to underscore the significant growth in early-stage venture investment by US firms by highlighting the shift in the geography of venture capital allocations. After a period of relative diffusion, cross-border venture capital investment is concentrating again, and that concentration is more intense than in previous years. Where before cross-border venture capital transactions occurred in roughly equal measure across Asia, Canada, Western Europe and the United Kingdom, the new geography of venture capital investment is distributed in two regions: China/Japan (roughly 43%) and Europe/UK (roughly 20%). In 2000, cross-border deals in China represented a fractional amount of the top 20 countries for US cross-border investment, with Europe and Canada garnering the lion's share. Today, the story has changed. In 2007, China attracted almost half (46%) of all early-stage venture investment by US venture capital firms. In 2008 venture capital allocated to early-stage firms located outside of the United States rose another 5% to \$13.4 billion, with an increasing amount of that investment heading to the energy sector and emerging markets. This activity comes at the expense of Europe, which experienced a 15% drop in investment in 2008 (Dow Jones VentureSource, 2009).

Until extremely recently, the impact of globalization on venture capital investment has been relatively limited, and has not necessitated a significant amount of adaptation by firms or the industry as a whole. While financial globalization has most certainly increased the amount of capital available for early-stage investment in high-impact entrepreneurial firms (Meggison, 2004), the differential in returns of US venture capital firms compared to returns of their foreign counterparts (Murray & Marriott, 1998) ensured that US firms had plenty of capital to invest, which they did—locally (Aizenman & Kendall, 2008; Chen et al., 2009; De Clercq et al., 2006). In the last 5 years, however, the process of globalization has accelerated and its character has changed in ways that are likely to impact where venture capital is put to work, rather than simply where it is aggregated and managed.

After a half-century of funding firms that exist for the purpose of commercializing breakthroughs and transforming industries, venture capital may be in the early stages of a transformation of its own. This activity "represents a puzzle" (Kenney et al., 2007) in two respects. First, it confounds earlier work found that venture capital in the United States grew organically out of the high-tech complex (in particular Silicon Valley) and the social structure of innovation itself (Florida & Kenney, 1988b). In this view, aligned largely with the history of venture investment, early successful entrepreneurs and early angel investors grew into more formal, institutional venture investors. For example, Florida and Kenney (Florida & Kenney, 1988b) found that very view key players relocated from financial hubs such as New York, Boston, or Chicago to these new investment hubs, preferring instead to ship their capital to those locations and serving as limited partners. Second, venture capital investment is typically conceptualized in extant research as a local business, in large measure due to the requirement of venture investors to monitor portfolio firms closely (Gompers, 1995; Sorenson & Stuart, 2001) and the crucial

Table 17.2 Geographic patterns of US cross-border venture capital investment

	1992–1997			1998–2002			2003–2007			1992–2007		
	Rounds	Amount	% Total	Rounds	Amount	% Total	Rounds	Amount	% Total	Rounds	Amount	% Total
Asia (excluding China and Japan)	59	461,468	32.13	69	1,191,845	21.02	19	200,110	3.96	147	1,853,423	14.52
Australia New Zealand	4	19,497	1.31	5	5,728	0.10	2	31,891	0.63	11	57,116	0.46
Canada	12	108,078	7.39	64	522,288	9.28	47	440,781	9.00	123	1,071,146	8.96
Central/ Eastern	4	38,774	2.79	16	135,316	2.39	4	44,482	0.88	24	218,572	1.76
Europe	7	53,374	3.85	24	231,378	4.10	111	1,145,360	23.39	142	1,430,112	12.71
China	45	370,799	26.26	173	1,395,772	24.80	71	858,395	17.20	289	2,624,966	21.55
Europe	5	28,837	2.08	35	253,246	4.60	30	169,083	3.50	70	451,165	3.85
India	15	75,145	5.43	45	345,201	6.18	27	288,551	5.95	87	708,898	6.00
Israel	2	7,005	0.48	16	147,999	2.64	6	1,072,898	20.79	24	1,227,902	10.54
Japan	2	13,840	0.94	24	327,503	5.67	5	51,899	1.00	31	393,242	3.10
Latin America/ Caribbean	27	250,752	17.32	105	1,075,606	19.22	62	661,101	13.69	194	1,987,459	16.55
United Kingdom												

Data are 1,142 rounds of venture financing by US venture capital firms that received venture financing between January 1, 1992 and December 31, 2007. The data are organized by region, providing number of rounds, amount of financing in thousands of 2007 dollars, the regional percentage expressed as a percentage of the total amount and total rounds over 5-year windows (1992–1997, 1998–2002, 2003–2007) and across the entire sample (1992–2007).

importance of syndication and alliance networks (Hochberg et al., 2007a; Hochberg et al., 2007b). As detail emerges demonstrating that venture capital investment is globalizing, evidence is emerging that suggests that, contrary to predictions, venture investors do not view investment in distant firms as riskier (Guler & McGahan, 2006), and are not adapting their investment practices or management strategies to account for the potential for increased risk. While the venture capital canon has provided great insight into the structure and operations of the ideal-typical venture firm, existing work provides few answers as to why a venture capital firm might choose to internationalize; what mechanisms influence a firm's ability to do so; and how (or if) venture capital firms might evolve their investment and management strategies in response to changes in their competitive landscape.

This chapter examines what we know about globalization, high-impact entrepreneurship, and venture capital investment. Its main contribution is to link these literatures together and to examine the results of that union, highlighting what we know and what remains to be done.

Our work is structured as follows. Section 2 contrasts the venture capital canon with a parallel body of work examining questions in international venture capital investment, and the challenge that the globalization of venture investment presents to this state of affairs. Section 3 draws from the globalization, innovation management, and human capital literatures to put the recent acceleration of cross-border venture investment in context. Section 4 proposes that insights from economic geography and entrepreneurship literatures provide a theoretical framework for understanding high-growth new firm formation around the world. Section 5 explores the implications for venture capital research in a "post-American" world of diffused innovation, talent, and entrepreneurial activity. Section 6 summarizes and concludes.

Venture Capital Research: A Tale of Two Literatures

Venture capital scholarship can be divided into two general categories. The first—also the most well-developed and influential—focuses on the activities and dynamics of the venture capital market in the United States. The seminal work in this stream represents the venture capital canon, and that literature has been covered in detail in this Handbook in previous chapters. Through this work we have gained significant insight into how venture capital firms raise the funds they invest (Gompers, 1996) screen prospective projects (MacMillan et al., 1985; Shepherd & Zacharakis, 1999) make investments (Gompers, 1995; Hellmann & Puri, 2002), and exit portfolio firms (Brau et al., 2003; Lerner, 1994). And we have a clear picture of the venture capitalist as an active investor who assumes a monitoring role for the innovative entrepreneurial firm (Lerner, 1995; Sapienza et al., 1994) and uses specialized knowledge to add value to their portfolio firms (Gifford, 1997; Hsu, 2004, 2006; Sapienza et al., 1996; Wang et al., 2009).

A second literature compliments and contrasts this first stream, focusing almost exclusively on venture capital as it occurs outside of the United States. This literature receives comparatively little scholarly attention (Wright et al., 2005). These two literatures have evolved in parallel, with very little overlap (Cornelius & Persson, 2006). Each follows a distinct research program, employing its own theoretical perspectives and examining an idiosyncratic set of research questions.

The reason for this divide is that the international aspects of venture capital investment “have not been an important research topic for U.S. for scholars” (Kenney et al., 2007). International venture capital investment represented a vanishingly small amount of overall investment—approaching zero—through the end of the twentieth century and into the twenty-first century (Aizenman & Kendall, 2008). Cross-border activity by US venture capital firms was largely confined to ad hoc “missionary efforts” (Kenney et al., 2007). Reflecting this perspective, international venture capital received only a passing mention in major reviews of the literature (Cornelius & Persson, 2006; Gompers & Lerner, 2001, 2004b; Wright & Robbie, 1998).

In contrast to the activities of US firms, Asian and European venture capital organizations internationalized early. Aizenman and Kendall (2008) note that in the case of both venture capital and private equity outside of the United States, cross-border participation has been (and remains) commonplace. The European Venture Capital association estimates that around 30% of the amount invested by European venture capital firms in 2003 was transacted outside of the home country (EVCA, 2004). In the case of venture capital firms in the United Kingdom, that percentage increases to almost 50% (Manigart et al., 2006). International venture capital research evolved to address research questions raised by these investment patterns (Wright et al., 2005; Wright & Robbie, 1998). The evolution of this literature matched the spread of venture capital around the world, and growth in this literature continues to this day. In the 1990s, only 29% of venture capital research was undertaken outside of North America. However, in the past 5 years, more than half of the research on venture capital has been completed by scholars outside the United States, largely in the European Union but includes representatives from every continent (Cornelius & Persson, 2006).

Early “international venture capital” research was exploratory and descriptive in nature, focusing on detailing the inception, evolution, and performance of domestic venture capital industries. A stream of predominantly qualitative research examined the inception and evolution of national venture capital industries outside the United States (Avinimelech et al., 2004; Clark, 1987; Dossani & Kenney, 2002; Manigart, 1994). Other international venture capital scholars used interview and surveys to complete cross-country comparisons of national environments (Sapienza et al., 1996; Wright et al., 2002a). A thin stream of research incorporated surveys and in-person interviews to examine questions related to cross-country differences in firm operations (Bruton & Ahlstrom, 2003; Bruton et al., 1999; Bruton et al., 2005; Pruthi et al., 2003; Sapienza et al., 1996; Zacharakis et al., 2007). Taken as a whole, this work provides a rich picture of the development of domestic venture

capital in the United Kingdom, Asia, Japan, and India (Avinimelech & Teubal, 2004; Clark, 1987; Dossani & Kenney, 2002; Ooghe et al., 1991).

An important finding from these studies is that, despite significant effort by governments and regional policy-makers, US-style venture capital investment has not diffused easily (Hege et al., 2003; Murray & Marriott, 1998). Efforts to stimulate venture capital domestically have met with mixed results (Gompers & Lerner, 2001). Even technologically advanced countries such as Germany and Japan have struggled to develop a vibrant venture capital industry, and this in spite of strong government and corporate backing (Becker & Hellmann, 2005; Kenney et al., 2004).

The “tale of two literatures” detailed above—US research on one hand, and international venture capital research on the other—underscores the lack of convergence in theoretical perspectives and research programs. While scholars believe that both perspectives have provided valuable insight into venture capital investment, both literatures have developed and operated largely in parallel, with researchers operating in either one domain or the other. The seminal work on venture capital investment has been written by financial economists using samples of US firms, employing theoretical perspectives based on neo-classical economics (Cornelius & Persson, 2006). In contrast, international venture capital research has been largely descriptive, survey-based, and incorporates theory familiar to management scholars (Cornelius & Persson, 2006; Wright et al., 2005). Institutional theory is the dominant theoretical perspective in this stream of research (Bruton & Ahlstrom, 2003; Bruton et al., 1999; Bruton et al., 2005; Zacharakis et al., 2007).

Until recently, there has been no reason to integrate these two literatures. The rise in cross-border investment by venture capital firms over the past decade—and the recent rise of cross-border investment by US firms in particular—has changed this state of affairs. For the first time, these two literatures are examining a question of mutual interest.

From Cross-Country Comparisons to “Crossing Borders”

At the time of this writing, the bulk of scholarly research on cross-border investment by venture capital firms is neatly tucked into the well-developed and active stream of international venture capital research (Wright et al., 2005). At the end of the twentieth century international venture capital scholars began noting the existence of a “new phenomenon. . . [that] funds were increasingly being raised for investing in foreign markets” (Sapienza et al., 1996, 451). More recently, Wright et al. (2005) note in their review of the international venture capital literature that research on venture capital firms “crossing borders” represents a major research gap. International venture capital scholars note that due to lack of comparable statistics and collection standards, very little financial data exists to empirically examine this question (Wright et al., 2005). While development of regional venture capital organizations has improved data accessibility and quality to some extent, major challenges remain,

and it is argued that this hampers progress in this domain (Kenney et al., 2007; Megginson, 2004).

While it is true that international venture capital scholars have recently begun to research “crossing borders” (Kenney et al., 2007; Wright et al., 2005) challenges to the development of this literature remain. First, research remains largely descriptive and exploratory, due to the data constraints noted above. Second, studies often focus on the broad class of private equity investment, rather than the financing of high-impact entrepreneurial firms (Baygan & Freudenberg, 2000; Hall & Tu, 2003). Third, it often contains itself to a very narrow collection of cross-border investment activities, deals originated and executed in Europe. Research examining the cross-border investment activities of US venture capital firms is confined to a clutch of exploratory research and a few working papers (Aizenman & Kendall, 2008; Guler & Guillen, 2005; Guler & McGahan, 2006; Kenney et al., 2007).

While the first two issues are challenging, it is the third that is particularly troubling. Narrowly focusing on deals transacted in Europe is unlikely to reveal interesting or novel aspects of cross-border venture capital investment. Despite the fact that US venture capital firms invest a smaller proportion of the total amount of venture capital in cross-border deals, the amount US firms do invest swamps cross-border investment by all individual countries, most regions, and represents close to half of all cross-border investment to date (Aizenman & Kendall, 2008). Since a significant portion of the funds raised by non-US venture capital firms come from US institutional investors—which often include venture capital firms—the total impact of US venture capital is likely to be much higher.

Despite its importance, we know very little about cross-border venture capital investment generally, and next to nothing about the internationalization activity of US firms. The outcome of this state of affairs is that for the most simple and straightforward questions—for example, “do larger venture capital firms engage in cross border investment, or remain close to home”—scholars have failed to tender a simple, straightforward answer. Answering these basic questions represents an important first step. The recent increase in cross-border investment by US firms provides scholars with opportunities to engage in empirical work using well-developed and accepted sources of venture capital data.

Beyond the data and the sample, cross-border venture capital investment raises a number of challenges related to theoretical development. Venture capital scholarship has largely failed to shake off its reputation as being largely descriptive and atheoretical (Wright & Robbie, 1998) and many studies seem to treat theory as a post-hoc bolt on to “explain” an observed phenomenon. International venture capital research seems to have a particular bias against “Anglo-American” theoretical approaches in both current research and for a future research direction (Wright et al., 2005). As noted by Cornelius and Persson (2006) in their bibliographic analysis of the venture capital literature, the differences between finance and management researchers are quite profound. It is not immediately clear that the theoretical perspectives used in international venture capital investment are suitable for examining the salient issues in this domain. In response, international venture capital scholars have

proposed incorporating insights from the resource-based view, dynamics capabilities, and network theory (Wright et al., 2005).

The “Anglo-American” perspective has challenges of its own. In this literature, venture capital investment has been conceptualized as a local phenomenon (Sorenson & Stuart, 2001). As Kenney et al. (2007) note, the internationalization of US venture capital firms is puzzling because the conclusion one would draw from received research is that it is unlikely to happen often, or at scale. Increased distance and variation in institutional infrastructures introduces additional uncertainty and risk (Lerner, 1995; Sorenson & Stuart, 2001) and, thus, cross-border venture capital investment ought to exacerbate agency problems (Gupta & Sapienza, 1992). Investing in distant firms potentially adds a host of new challenges as well. Firms investing out-of-country must often compete with regionally dominant and well-established national firms. Evidence suggests that these entrenched and well-networked firms have a local advantage and are difficult to displace (Hochberg et al., 2007a). Venture capital firms may have to do additional work to understand local conditions, and the legal and institutional environment in the target country influences the ability to extract economic returns from the innovative ideas that they finance (Bruton et al., 2005). Thus, venture capitalists are likely to respond by adapting both screening, monitoring, investing, and contracting behavior in a way that reduces these agency problems.

In defiance of theory, the preliminary findings suggest that our understanding of how (or if) US venture capital firms adapt is incomplete. Comparisons across countries (Sapienza et al., 1996) and between foreign and domestic firms (Pruthi et al., 2003) do not show strong support for the idea that venture capital firms generally, or US firms specifically, engage in more detailed or context-specific screening or monitoring behavior (Pruthi et al., 2003; Sapienza et al., 1996).

The internationalization of venture capital firms offers scholars with the opportunity to examine altogether novel research questions resulting from this change in investment activity. For example, some working papers explore how syndication ties with foreign venture capital firms influence investment (Mäkelä, 2004) new venture internationalization (Mäkelä & Maula, 2005) and exit market selection (Jääskeläinen, 2005). From this point of view, local investors play a certification role regarding potential opportunities for incoming investors and, by being in close proximity to the investments, also provide monitoring and value-added activities that a distant partner cannot provide (Mäkelä & Maula, 2008). These relationships are reflected in the syndication ties between foreign and local venture capital firms, where the local firm invests in the earliest stages and foreign capital arrives in later stages (Jääskeläinen, 2005). A major contribution of this new research is that it provides an example of cross-border capital “added value” for both the foreign and the local firm that may drive both to partner, rather than to compete.

The surge in cross-border investment generally, and US venture capital internationalization specifically, has recently attracted scholarly interest. This attention is welcome, and in our view well overdue. A coherent research program is likely to emerge over the next decade, and a diversity of theoretical perspectives and empirical approaches will help this literature—largely isolated and parochial—link itself

to broader perspectives and more potent research questions. Cross-border venture capital investment, sitting at the intersection of two literatures concerned with the activities of venture capital firms, provides a fertile context for scholarship. It could not come at a more opportune time. Venture capital firms, operating largely in sheltered local markets, are now preparing for a new competitive context. And venture capital scholars—their research also largely sheltered and local in scope—must take into account global changes that they, to a large extent, have been able to safely ignore until now.

The Globalization of Innovation, Talent, and High-Impact Entrepreneurship

What explains the recent and dramatic acceleration of cross-border venture capital investment worldwide, and the increasing internationalization of US venture capital firms? We are proposing that the context in which venture capital investment occurs has changed; that this change is persistent; and that venture capital firms will be compelled to develop capabilities that allow them to compete successfully in it. While internationalization for US firms has indeed been slow going (Kenney et al., 2007) recent empirical work provides compelling evidence that the globalization process is now well on its way (Aizenman & Kendall, 2008).

But what, exactly do we mean by the globalization of venture capital and what does it imply for venture capital firms? Understanding this context is crucial to develop hypotheses that detail the capabilities that support internationalization efforts or successful cross-border investment. This section draws from the scholarly literature on globalization and innovation to detail how research in these domains provides insight for venture capital scholarship.

The Globalization of Goods, Capital, and Firms

Broadly speaking, globalization refers to the web of linkages and interconnections between states, societies, and organizations that make up the present world economic system (Acs & Preston, 1997). The typical conceptualization of globalization—the movement of capital that provides a “celestial mechanism of discipline” (Zakaria, 2008) for corporations and nation-states—is incomplete for our purposes as it fails to capture its historical arc. Though the actual dates at which different phases of globalization began remains a matter of debate (McCann & Acs, 2008), its recent conceptualization as having occurred in three phases over several centuries (Friedman, 2005; Maddison, 2007; Steger, 2003) is satisfactory for our purposes.

The first wave of globalization occurred much earlier in economic history. Innovations in shipbuilding and navigation in the fifteenth century enabled goods

to become mobile (Maddison, 2007). Over the course of the nineteenth and twentieth century, trade barriers lowered, markets deregulated, and domestic economies were exposed to the rigors of international competition and competitive advantage. Economic historians point to the massive waves of migration, with Europeans moving by the tens of millions to the Americas and Australia, and the disruptive influence of cheap grain from the Americas and the Ukraine as examples of this first major wave of globalization (Jacks et al., 2006). The beginning of the Great War (1914–1918) put an untimely end to this process (Maddison, 2007).

A second wave of globalization began at the end of the World War II and continued through the end of the century (Friedman, 2005). This movement toward global integration, inaugurated in the early 1940s and accelerating through the 1990s, can be best understood as an extension of the division of labor and specialization across national borders, and is considered by many scholars to be a key to understanding recent economic history. The integration of financial markets has been a very significant aspect of this process and has received significant attention in recent years (Bekaert & Harvey, 1995; Campbell & Hamao, 1992; Huang & Wagjid, 2002; Obstfeld & Taylor, 2003). Financial integration, combined with the advances in communication technology that dramatically decreased transaction costs for firms, globalized companies (Cairncross, 1997; Obstfeld & Taylor, 2003) and helped to create the “flat world” that we live in today (Friedman, 2005). Differences across regions—labor and manufacturing costs, policy regimes—combined with a dramatic drop in communications costs and integration of trade and investment policies enabled jobs to go to where people were, in contrast to the first wave, where people migrated to where the jobs were.

While this second wave of globalization influenced aspects of the venture capital cycle, it did not warrant significant adaptation by the industry as a whole or US firms in particular. Financial globalization accelerated the free movement of capital. In principle, the globalization of capital markets enables funds earmarked for early-stage investment to be invested in venture capital firms all over the world. In practice, however, US venture capital firms saw an influx of early-stage capital, following the example of New York and Chicago, which also shipped capital to these regions (Florida & Kenney, 1988a, 1988b). Not unexpectedly, venture capital investment continued to occur locally, primarily in two geographic regions in the United States and overwhelmingly in Northern California.

Today, we are in the midst of a third wave of globalization. The most recent wave of globalization influenced venture capital fundraising. We are suggesting that this current wave—the globalization of innovation and talent—will engender a new effect, contouring its allocation as well.

The Globalization of Talent, Innovation, Entrepreneurship

Scholars cite technological change through the diffusion of research and development by multinational enterprises as a driving force in economic growth (Acs et al.,

2009; Aghion & Howitt, 1998; Audretsch & Thurik, 2002; Grossman & Helpman, 1991; Murphy et al., 1991; Romer, 1986; Solow, 1956) enabling more and more nations to reach a medium-to-high stage of economic development and establish the conditions in which regional clusters of innovation can thrive. Research demonstrates that these activities have been necessary, but not sufficient, conditions to ignite high-impact entrepreneurship and a vibrant domestic venture capital industry (Gompers & Lerner, 2004b). However, the maturity of these regional clusters of innovation, along with the proliferation of global research and development centers by top-tier multinational firms, has created a climate with the drive to attract (and support) mass movements of talent. This movement of talent has the potential to create the conditions necessary for new firm formation and to attract the attention of venture capitalists.

Scholars have noted that globalization has significantly increased the mobility of these highly talented individuals (Antras & Helpman, 2004; Lewin & Peeters, 2008; Manning et al., 2008). That being said, the mobility of this talent has not historically been of particular concern for venture investment. Akin to the lessons learned in our survey of the globalization of venture capital investment, while in principle talent is more mobile than ever before, in practice “mobility” has historically means that it has become easier than ever before for talent to get from “anywhere else” to the centers of innovation located in the United States (Freeman, 2006; Martin, 2005). Labor “mobility” of this type has worked out quite well for US venture capital firms, as they have funded this highly educated and local talent pool (Audretsch, 2006, 2007; Hill, 2007).

Recent work has underscored the importance of this process for technology-driven economic growth in the United States (Autor et al., 2003; Hill, 2007; Lee et al., 2004; Murphy et al., 1991) and scholars are quite right to do so. More than half of the startups in Silicon Valley have one founder who is an immigrant or first-generation American (Saxenian, 2002). Surveys of technology and engineering companies started in America from 1995 to 2005 indicate that somewhere between 16 and 25% of these firms employed an immigrant as a chief executive or chief technologist in the founding team (Hart et al., 2009; Wadhwa et al., 2009).

In recent years, however, it has become more difficult for these traditional hubs of innovation and entrepreneurial activity to retain the world’s best and brightest (Chanda & Sreenivasan, 2005; Lieberthal & Lieberthal, 2003; Saxenian, 2006; Zwieg, 2005), as demonstrated by the flow of high-potential immigrant talent from the United States to India and China (Hart et al., 2009; Wadhwa et al., 2009). Florida (2005b) documents the exit of US-born foreign nationals. These “new Argonauts” (Saxenian, 2006) are leaving the United States for overseas opportunities at an increasing rate (Wadhwa et al., 2009). The National Science Foundation (2008) reports that stay rates for students completing graduate education in the United States continue to decline. In the last two decades over 50,000 immigrants left the United States and returned to India and China, and 100,000 more are expected to make the return trip over the next 5 years (Wadhwa et al., 2009). Companies are increasingly sourcing and using talent in globally dispersed locations (Antras &

Helpman, 2004; Lewin & Peeters, 2008; Manning et al., 2008) that correspond to the development of new science and engineering clusters located in or around new urban centers (Bresnahan et al., 2001; Carlsson, 2006; Florida, 2005a; Howells, 1999).

A central concern of those who interpret events through the narrow perspective of immigration policy (Zakaria, 2008) or innovation policy (Auerswald, 2006; Gompers & Lerner, 2004a; Hart, 2003; Hill, 2007; Kenney et al., 2007) suggests that the main issue here is that talent is heading “home.” Evidence suggests, however, that a broader trend is afoot. Drew Faust, the current president of Harvard Business School, notes that “China, India, and Singapore . . . have adopted biomedical research and the building of biotechnology clusters as national goals. Suddenly those that train in America have significant options elsewhere” (Faust, 2008). For the first time in a half-century, there are significant opportunities—both technical and economic—outside of the United States, in a host of other developed, “spiky” regional innovation hubs capable of attracting and supporting the creative class (Florida, 2005b; Saxenian, 1994). These individuals are the high-impact entrepreneurs of the future (Acs, 2008; Baumol et al., 2007) and venture capitalists depend on them to start the innovative, high-growth firms they fund (Acs & Armington, 2006; Lee et al., 2004; Saxenian, 2002; Shane, 2008).

As a result, the innovative activity that attracts venture capital investment seems to be diffusing globally (Cantwell, 1995; Engardio & Einhorn, 2005; Ernst, 2005), and doing so at an increasing rate. Opportunities to work on interesting technology and get paid well for it are now abundant all over the world (Porter, 2000). In the case of certain technologies, to be on the cutting edge one relocates to Haifa, Berlin, or outside Beijing (Ernst, 2002). Global-class technology is being developed all over the world (Reddy, 1997; Zhou & Leydesdorff, 2006). For a number of the most promising technologies the United States is no longer the clear technical or market leader, and in some cases up to a decade behind other nations (Hill, 2007). Some have estimated that the United States lags by more than a decade in renewable energy technology, which in 3 years has become the third largest venture capital investment category behind software and biotechnology. In this emerging sector, the United States leads only in venture capital allocated. *Where* is it being allocated? Europe and Asia. A multitude of renewable energy startups operate worldwide, the majority of which are located outside the United States (Friedman, 2008).

Recently, scholars have noted the “seemingly unlimited availability of science and engineering talent in emerging economies and the increasing difficulty of finding such talent in advanced economies” (Manning et al., 2008). In the case of multinationals, who have diffused increasingly complex business processes including research and development, engineering, and product design (Engardio & Einhorn, 2005; Lieberman, 2004; Patel & Vega, 1999; Subraminiam & Venkatraman, 2001) they are now hiring and using talent with these crucial skills and at increasing rate (Lewin & Peeters, 2008). Small- and medium-sized businesses are not immune to the influence of these trends (Acs & Armington, 2006; Acs et al., 1997; Lu & Beamish, 2001; Wright et al., 2007) and are partnering with external

service providers to augment their limited research and development capability. This talent pool—always mobile, now relocating—represents the global pool of high-impact entrepreneurs. New high-growth firms will form where these individuals agglomerate.

Fred Wilson of Union Square Ventures, a New York City-based venture capital firm, notes that in the late 1990s he would “look at a deal if it was between 34th Street and Canal Street and between 1st Avenue and 10th Avenue” (Wilson, 2008). Those days are over. The Union Square Ventures portfolio now includes startups in Paris, London, and Berlin. More than half of the US venture capital firms surveyed by Deloitte Touche Tomatsu’s Technology, Media & Telecommunications Group in 2006 indicated that they planned to expand their investment focus internationally in the next 5 years (Brightman, 2007). Today is an open question as to whether future breakthroughs in crucial next generation technologies will occur in Beijing, Burlingame, or greater Berlin. In response to these changes, US venture capital firms—long accustomed to investing close to home—are now compelled to invest in distant ventures and develop global strategies.

Until extremely recently, the impact of globalization on the venture capital industry has been relatively limited, and has not necessitated a significant amount of adaptation (Gompers & Lerner, 2004). In the last 5 years, however, the process of globalization has accelerated and its character has changed in ways that are likely to impact the *allocation* of venture capital, not merely its aggregation. After a half-century of funding firms that exist for the purpose of commercializing breakthroughs and transforming industries, venture capital seems to be in the early stages of a transformation of its own.

Merely detailing these trends begs an important question, which the globalization and innovation literature has not resolved: why would the mobility of talent and the geographic dispersion of innovation—which, as detailed above, is heading to established overseas firms or the research outposts of established multinationals—have *any impact on the establishment of high-impact entrepreneurial firms in that region?*

Scholarship to date assumes—inappropriately, given the depth and breadth of development in the entrepreneurship literature—that the globalization of innovation implies, in some mystical way, the advent of entrepreneurial activity. Talent does not move overseas simply to start a new entrepreneurial firm. As detailed above, these individuals are going to established companies and research labs where they get paid for being the superstars that they are. Innovation is reflected in increases in patenting rates, which is a feature of developed firms with resources that can support and fund the patent process; this data does not describe the typical high-growth entrepreneurial firm working on a shoestring budget.

Thus an explanation for the formation of high-impact entrepreneurial firms is required for any credible “globalization of innovation, talent and entrepreneurship” narrative. The following paragraphs synthesize insights from economic geography and entrepreneurship to provide that explanation.

Talent, Knowledge Spillovers, and Venture Capital Investment

The knowledge-based view of the firm argues that competitive differences between firms are the result of the creation and application of privately held, tacit knowledge (Teece et al., 1997). Scholarly research and the history of technology highlight the fact organizations often do not succeed in transforming their scientific or industrial knowledge into what Arrow (1962) called *economic knowledge* due to a plethora of reasons including a lack of managerial resources (Penrose, 1959) organizational inertia or risk aversion (Cyert & March, 1963) an overweening focus on existing customers (Christensen & Bower, 1993) and agency issues (Jensen & Meckling, 1976). A substantial portion of the knowledge created by an incumbent firm may languish, unexploited. Knowledge, however, is distinct from other resources given its characteristics as a public good. It is non-rival, and non-excludable, thus creating opportunities for spillovers. And since organizations engaging in knowledge work lead to the development of human capital (Yli-Renko et al., 2001) a crucial conduit for knowledge spillovers—especially the kinds that drive high-impact entrepreneurship—is talent (Coff, 1997). While top talent likely starts out in established firms, not all of it ends up staying there. The Knowledge Spillover Theory of Entrepreneurship (Acs et al., 2009) provides a theory for understanding that process, and the *knowledge filter* (Braunerhjelm et al., 2009) outlines the mechanisms that enable potential entrepreneurs to exploit new knowledge in the context of a new firm.

An important insight of the Knowledge Spillover Theory of Entrepreneurship is that the opportunity for entrepreneurs to exploit new knowledge is significantly related to both the ability of the incumbent firm to exploit that knowledge completely, and thus reap the rewards and the cost and benefit to a prospective entrepreneur in exploiting that knowledge. The greater the knowledge filter, the greater the gap between new knowledge and economic knowledge. It is this knowledge filter that creates a space for the entrepreneur to bring new innovations to market. As Arrow (1962) notes, knowledge is valued differently by different actors. If the gap in the valuation of the expected return between the incumbent firm and the inventor is sufficiently large, and the barriers involved with starting a new business sufficiently low, the employee may decide to leave the incumbent organization and establish a new firm.

The history of technological entrepreneurship is replete with examples of this phenomenon: the “Traitorous Eight” defecting from Shockley Semiconductor and forming Fairchild (Shurkin, 2006), which begat the many “Fairchildren” firms such as Intel (Berlin, 2001); Steve Wozniak, who had to be pried out of his job at HP to focus on Apple Computer (Wozniak & Smith, 2006); and more recently, Sabeer Bhatia, who himself hunkered down at Apple Computer while figuring out HotMail, the first web-based e-mail service (Bronson, 1998). For a high-impact entrepreneur, the first “seed investor” is most often the firm at which they are currently working.

Two aspects of the knowledge filter are of particular interest in relationship to venture capital investment. The first relates to the mobility of labor within a country or a region. Unsurprisingly, studies investigating the role of the knowledge filter in

new firm formation have shown that labor mobility is an important source of these spillovers (Audretsch & Stephan, 1996). In a survey of immigrant entrepreneurs in Silicon Valley, Saxenian (2002) finds that over half had set up subsidiaries, joint ventures, or other business ventures in their home country, and that more than 80% said they shared information about technology with people back home. Globalization and entrepreneurship are related. Saxenian (2002) documents how the activities of entrepreneurs in the United States fuel the emergence of entrepreneurial networks in other regions. And, since successful high-impact entrepreneurs often become venture capitalists themselves, these findings foreshadow changes to how and where venture capital funds are raised (where will the new limited partners come from); which venture organizations and regions that capital is aggregated (what firm-specific resources are important for venture capital firm success, and are they a source of advantage or easily gained); and where those venture capital funds are disbursed.

A second filtering mechanism—barriers to entrepreneurship—is currently conceptualized in the literature primarily as the institutional environment, primarily as regulations and incentive structures (Braunerhjelm et al., 2009; Carlsson et al., 2007). However, in the case of high-impact entrepreneurship it might also be useful to consider the overall cost of starting a technology business—e.g., relative changes in operating leverage for businesses across regions, policy regimes, and industries. Today, most nascent information technology companies require very little money to prove their viability, so much so that larger venture capital firms have been put in the curious position of having to struggle to find deals capable of consuming allocated capital. Advances in development tools, infrastructure, and communications protocols and the innovations built on top of them such as on-demand computing power and storage has enables scores of technology startups to create incredibly high operating margin businesses. Startups can do a whole lot more, with a whole lot less capital, than ever before. The nature of operating leverage in technology business has changed, yet, again. These two factors are likely to reduce the knowledge filter for high-impact entrepreneurs, and each has an amplifying effect on entrepreneurial activity.

We believe that the diffusion of innovation and talent and the consequent globalization of high-impact entrepreneurship are inexorable forces, the result of a natural, normal movement toward greater balance in global innovation capabilities (Auerswald, 2006). Regional centers of innovation stocked with multinational corporations now routinely produce global-class technology (Reddy, 1997; Zhou & Leydesdorff, 2006), and this process is accelerated by the migration of talent educated largely in the United States to these new regional centers of innovation (Ernst, 2002; Porter, 2000). The cost of starting entrepreneurial firms in the information technology and biotech sectors has declined, and will continue to do so.

The development of breakthrough innovation in new nations; the global dissemination of talent; the rise of the multinational organization; the economics of startups; and the reality of knowledge spillover-driven entrepreneurship compel venture

capital firms to consider global strategies and to make cross-border investments. To do so successfully, they must develop strategies for the internationalization of investment and management of distant firms.

Venture Capital Research in a Post-American World

The venture capital literature provides little guidance as to how its focal phenomena might internationalize. This is quite surprising, given two decades of research by international venture capital scholars and the opportunity that the study of internationalizing venture capital firms provide for developing the international business agenda (Buckley & Lessard, 2005; Peng, 2004; Wright et al., 2007). In light of this paucity of research it has been suggested that other literatures must be tapped to provide the appropriate conceptual frameworks for analyzing the internationalization of venture capital firms beyond a mere description of the phenomena. A logical first starting point would be the international business literature, where several theories for internationalization have been proffered and where venture capital scholars first turned for insight (e.g., Hall & Tu, 2003; Pruthi et al., 2003; Wright et al., 2002; Manigart et al., 2006).

A key insight of traditional international business research is that multinationals face a substantial “liability of foreign-ness” which leads to non-trivial costs. Transaction cost theory (Coase, 1934) suggests that firms choose the least-cost international location for each activity they perform, and grow by internationalizing markets, bringing interdependent activities under common ownership and control up to the point where the benefits of further internationalization are outweighed by the costs. The benefits of international expansion are new market opportunities, through which the firm leverages what it produces over a broader array of markets (Kim et al., 1993; Vernon, 1966), increasing growth and profitability (Buckley & Casson, 1976; Geringer et al., 1989) and the chance to stabilize firm earnings through economies of scope (Caves, 1982). Thus, internationalization, despite its costs, increases the chance of firm survival (Hitt et al., 1997; Hitt et al., 1994; Sapienza et al., 2006). Building on this original insight, stage models of internationalization (Johanson & Vahlne, 1977)—with their intellectual antecedents in the behavioral theory of the firm (Cyert & March, 1963) and Penrose’s (1959) theory of firm growth—depict a gradual process in which firms respond to pressures to internationalize with marginally increasing resource commitments to enter new markets.

This perspective is plausible enough as stories go, but not a particularly good fit for the venture capital context. The traditional stage model of internationalization struggles to explain the early internationalization of smaller firms (McDougall et al., 1994) or the rationale for internationalization in the case of knowledge-intensive firms (Autio et al., 2000; Hitt et al., 2006). Venture capital firms are both. Further, the limitations and applicability of transaction cost theory outside of the

manufacturing sector have been questioned (Dunning, 1988). Although Zacharakis (1997) has developed a theoretical application of the transaction cost approach to exporting by smaller firms, this is unlikely to apply to services firms without a great deal of shoehorning, and venture capital scholars are doubtful as to its applicability to venture capital firm internationalization (Wright et al., 2005).

Given that internationalization in the services sector differs significantly from manufacturing (Anand & Delios, 1997; Brouthers & Brouthers, 2003; Domke-Damonte, 2000) and also demonstrates significant within-sector heterogeneity (Buckley et al., 1992; Miller & Parkhe, 1998) it is not surprising that some scholars have proposed that venture capital firms may have characteristics resulting in distinctive implications for their international behavior (Wright et al., 2002b; Wright et al., 2005). Given the tour of the literature above, is also unsurprising that venture capital scholars—those most aware of the linkages between international business and venture capital investments—have been slow to adopt frameworks from international business in venture capital investment (Wright, et al., 2005).

If the internationalization literature has been found wanting, what about the emerging body of work examining the internationalization of smaller firms from an entrepreneurial point of view? The inability of traditional internationalization theories to explain why some small firms internationalize has led to the development of a stream of work incorporating internationalization and entrepreneurial theory (Hitt & Barkus, 1997; McDougall & Oviatt, 2000; Oviatt et al., 1994; Zahra, 2005; Zahra & George, 2002). This perspective is grounded in the logic of opportunity recognition (Shane & Venkataraman, 2000) and depicts internationalization activity as the reflection of the capacity of the top managers of the firm and/or a strategic response to opportunities unseen by competitors. In this view, firms are engaged in the act of creatively discovering and exploiting opportunities that lie outside of the firm's domestic market in the pursuit of competitive advantage (Zahra & George, 2002).

Viewing the internationalization of venture capital firms from this perspective affords some clear advantages. Interviews with venture capitalists conducted by Haemmig (2003) highlight the significant discretion that individual general partners have over fund decisions (and thus the decision to internationalize) and their perspective that international investments are made in response to an opportunity, in contrast to research modeling internationalization choice as part of an overarching strategic logic (e.g., Guler & Guillen, 2005). Studies examining the internationalization of other professional services firms suggest that they, too, do not undertake a systematic analysis of the international markets before entry (O'Farrell et al., 1995; O'Farrell & Wood, 1994, 1998; Westhead et al., 2001)

While there is a great deal of overlap between the central concerns of entrepreneurship and venture capital research—in particular the logic of opportunity recognition, the role of cognition, and the importance of managerial discretion in strategic decision-making—this literature remains in its nascent stages and has not developed enough to serve as a comprehensive framework. Even its advocates acknowledge that a unifying and clear theoretical direction has not yet been presented (Acs et al., 2003; Autio, 2005; McDougall & Oviatt, 2000; Wright et al., 2007; Young et al., 2003). As the international entrepreneurship literature develops,

this perspective may afford deeper insights. The contribution of this work cannot be understated, however, as it has helped to pave the way for the incorporation of important perspectives in strategic management, in particular the resource-based view, into the international business literature (Peng, 2001). And it is in this well-developed and theoretically rich literature venture capital scholars may find traction. In its static conception, the resource-based view emphasizes the idea that resource superiority is crucial to overcome the cost associated with internationalization, and its focus on the role of resource availability influencing the mode of internationalization the form in which firms conduct international business is a crucial insight in a venture capital context. This perspective also represents a promising way forward for understanding internationalization activities of venture capital firms (Wright et al., 2005) and the outcomes of those actions on entrepreneurial firms (Fernhaber & McDougall, 2009) because firm-specific capabilities enable or limit markets into which firms can enter and the profits that firms can expect, and contour how they can contribute to the development of their portfolio companies (Hellmann & Puri, 2002; Hsu, 2006).

Like the international business literature, the venture capital literature has been historically characterized as phenomenon-driven and theoretically bereft (Wright et al., 1998). Scholars currently pursue a diversity of topics from multiple disciplines, largely from one or two dominant perspectives (Cornelius & Persson, 2006). Opportunities exist for venture capital research to have a lively give-and-take with the strategy and international business literatures, gaining from them and contributing to them. It is relatively unsurprising, therefore, that the resource-based view has been identified as a potentially fruitful theoretical perspective for cross-border venture capital research, and scholars have called for work in this area (Wright et al., 2005). We agree with the insight of Wright and his colleagues, and also believe that extending the insights of the resource-based view with the capabilities literature will turn out to be most fruitful.

Concluding Remarks

Many of the challenges facing venture capitalists in the process of funding entrepreneurial firms are inextricably wedded to the activity itself (De Clercq et al., 2006; Gompers & Lerner, 2000). Early-stage venture capital investments are inherently uncertain. These inherent issues lead to a higher cost of capital for debt and equity financing (Jensen & Meckling, 1976) and are a crucial part of the rationale for the existence of professional venture capital in developed economies (Auerswald, 2006; Berger & Udell, 1998; Gompers & Lerner, 2001; King & Levine, 1993).

Venture capital firms have evolved a series of structural and contractual mechanisms to overcome challenges inextricably wed to the financing of high-impact entrepreneurial firms. This perspective helps to explain, at least in part, why venture capital firms have been (in contrast to the hopes of international venture capital scholars) historically more alike than different. There has been a striking

commonality to how venture capital firms are organized, staffed, and compensated (Gompers & Lerner, 1999; Manigart et al., 2006; Sahlman, 1990), as the challenges inherent to venture investing have led to uniform approaches for investment and management decisions (Hall & Hofer, 1993; Pruthi et al., 2003; Zacharakis et al., 2007). All over the world venture capital firms are built on the US model (Avinimelech et al., 2004; Murray & Marriott, 1998) and often employ professionals educated and trained in the United States (Dossani & Kenney, 2002; Kenney, 2004, 186; Kenney et al., 2007). Perhaps local firms may not necessarily have an advantage in terms of their organizational form or their approach to investment. The evidence emerging from studies focusing on cross-border venture capital investment suggests that this may be the case.

Scholars most familiar with the venture capital industry believe that we will see significant changes in the next decade (Aizenman & Kendall, 2008; Gompers & Lerner, 2001; Kenney et al., 2007; Megginson, 2004; Wright et al., 2005) in part driven by the globalization of innovation, talent, and entrepreneurship. While there is a growing realization among scholars that changes are afoot, much work remains to be done. Our scholarly conception of venture capital investment—characterized as a local business due to agency issues (Gompers, 1995; Sorenson & Stuart, 2001) and strong institutional influences (Bruton et al., 1999, 2005) has not yet addressed many issues raised by the increasing globalization of venture capital fundraising, allocations, and investment in entrepreneurial firms. Mounting evidence suggests that US venture capital firms do not adapt investment or syndication patterns to account for the increased risk in cross-border deals. What is unclear is whether this is due to lack of interest (Haemmig, 2003), more intensive screening and due diligence processes, as suggested by Guler and McGahan (2006) changes in contracting activity (Cumming, 2008), the opening of a branch office to facilitate local monitoring (Wright et al., 2005) or the development of capabilities (such as alliances or partnerships) or organizational forms (like franchises) that mitigate the risks associated with cross-border investment in new ways (Wuebker, 2009). For those in the business of scholarly investigation of venture capital, what we currently think we know about investment, monitoring, and value-added activity may need to be reconsidered, extended, reworked, and ultimately integrated with the broader literatures and theoretical perspectives.

At present there is no theory of international venture capital investment, highlighted by the major research gap in cross-border investment noted by those most familiar with the subject (Wright et al., 2005). After almost 20 years of research on various aspects of international venture capital investment and a substantial body of research across disciplines such as finance, economics, strategy, entrepreneurship, international business and economic geography scholars still have a patchwork of explanations for why venture capital firms engage in cross-border investment, why they invest in one country over another, what contractual and structural mechanisms actually matter, and what theoretical framework is suitable for analysis. The parallel development of venture capital literature—one stream focusing on the United States and the other on “international investment” outside of the United States—today seems needlessly parochial, especially given the mounting evidence

that the theories that inform our understanding of venture capital practices are incomplete.

These changes have also disclosed novel opportunities for research in venture capital scholarship, in particular the incorporation, articulation, and development of new theory. Although the globalization of venture capital investment is an increasingly important aspect of venture capital research, scholars at the forefront of this investigation readily acknowledge that we lack theories capable of explaining or predicting firm investment and management activities in an increasingly global context (Gompers & Lerner, 2004b; Kenney et al., 2007; Megginson, 2004; Wright et al., 2005).

A half-century of financial and technological globalization has enabled more people than ever before to apply their creativity to create breakthroughs in medicine, communications, materials, and social systems. We are learning to harness that creative energy to the capital markets in the form of entrepreneurship, supporting individuals as they develop innovative businesses that generate wealth or novel organizational structures that increase our well-being. One can hope that the new class of complex, interrelated challenges disclosed by what has come before can be solved by the world's best and brightest—wherever in the world they can be found.

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Chapter 18

Entrepreneurship in Developing Countries

Zoltan J. Acs and Nicola Virgill

Introduction

Between 1945 and 1980 nearly 100 colonies in Africa, Asia, and the Caribbean gained their independence and began the process of initiating a development strategy for their citizens. Sadly, many of those countries experienced neither significant per capita growth nor economic development (Easterly, 2001, 141–43). Indeed, moderate and extreme poverty remains a significant concern for many developing countries (Sachs, 2005, 22–23).

While developing countries have used a number of policies and strategies in their development pursuits, two forms of industrial policy were particularly prominent. The first was import substitution – a process of industrialization by producing previously imported goods for the country’s domestic market. However, by the 1980s, in the face of economic crisis, many developing countries then turned to a second strategy – export promotion. However, with the exception of some countries in East Asia, neither industrial strategy has resulted in meaningful economic development. Both development approaches relied on strong state intervention and persistent market distortions to sustain their viability – thus often crowding out or thwarting altogether the traditional and important role of the entrepreneur.

Hence, after failed attempts at development through import substitution and infant industry protection programs and somewhat mixed results from export promotion strategies, developing countries are beginning to focus on their business environments and creating an economic space which is conducive to private enterprise – both domestic (i.e., local entrepreneurs) and foreign (i.e., foreign direct investment). Indeed, the promotion of entrepreneurship and the promulgation of small- and medium-sized enterprise (SME) policy has become an important development prescription in recent years (World Bank, 2005). Entrepreneurship policy, then, joins a list which includes reforms to countries’ macroeconomic, exchange rate, trade and industrial policies and improvements in governance (Hart, 2003).

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Both national governments and the major international organizations, as part of their poverty reduction, growth and economic development programs, are beginning to focus on improving countries' business and investment environments for entrepreneurship. The World Bank and United Nations Industrial Development Organization (UNIDO), for example, have each established units to promote private sector development in developing countries and to provide technical assistance in the formulation of SME and entrepreneurship policy. In 2003, the World Bank began an initiative to measure and rank countries' business sectors and investment environments (World Bank, 2005). Additionally, a number of developing countries have recently drafted SME legislation and launched programs to assist small businesses and domestic entrepreneurs.

While a focus on entrepreneurship for development may appear to be a separate approach to development, this study offers that it is consistent with and even complementary to the older and more traditional development strategies. We survey the literature on entrepreneurship in developing countries which, admittedly, is wide and covers a range of issues from culture and values; institutional barriers such as financial sector development, governance, and property rights; to the adequacy of education and technical skills. A broad literature has also developed on foreign direct investment and its positive and negative effects on technology transfer and entrepreneurship. After the collapse of the Soviet Union, a number of studies examined the development of small- and medium-sized enterprises in transition economies. As these economies moved from centralized economies to market economies, enterprise and entrepreneurship became important (Acs & Audretsch, 1993). Yet, other studies examine the effects infrastructural development and the macroeconomy on entrepreneurship. With such a wide scope of issues, a framework for synthesizing the literature is needed. This study offers that the identification of the externalities which affect entrepreneurship provides a useful framework to examine the literature on entrepreneurship in developing countries (Audretsch et al., 2006). These externalities have resulted from and have become embedded in countries' institutions and help to explain the level of entrepreneurship in an economy.

This survey proceeds as follows. First, we examine the evolution of development policy – beginning with the colonial period and the immediate postcolonial era. In both of these periods, there was strong government intervention and a heavy emphasis on government planning for development. An important cornerstone of the postcolonial period was the use of import substitution programs. Import substitution was an attempt by developing countries to industrialize by producing goods which had been traditionally imported. Second, with the failure of import substitution, many developing countries then switched to outward-oriented strategies, beginning with many of the Asian economies. Again, export promotion relied on strong government intervention.

Third, we set out a framework to explore the literature on entrepreneurship in developing countries based on the existence of network, knowledge, and demonstration and failure externalities. Each of these types of externalities is discussed in greater detail in the following sections. Fourth, this review identifies the core policy

issues to address these externalities. Internalizing these externalities, it is argued, by finding mechanisms to reward and encourage the firms and people which produce them should increase the level of productive entrepreneurship in developing countries.

The Evolution of Development Policy

Import Substitution

The search for policies to bring about both growth and development has been the focus of economic discovery since the very beginning of the science. A primary goal of developing countries immediately after independence became *industrialization* as a means to *economic development*. The first major attempt at industrialization in developing countries was through import substitution programs – producing goods that were imported to the local market.

An analysis of the experiences of countries which pursued import substitution strategies reveals the absence of a space for the entrepreneur. First, it is important to examine how the questions of what to produce and for whom were answered. In market economies, these decisions are left largely to enterprises and entrepreneurs who are guided by prices and profits. However, for countries pursuing import substitution, there was strong government intervention. Second, the guiding forces for production were quite different. While distortions are a by-product of errors in market economies and provide opportunities for correction by entrepreneurs, import substitution required long-lasting distortions. Finally, the enormous bureaucracy which had to be constructed to support import substitution lent itself to the perpetuation of permanent inefficiencies in industry and corruption in government – both important barriers to productive entrepreneurship (Baer 1972, 103; Krueger 1998, 1515). The complex bureaucracy also supported corruption (Krueger 1993, 353; Steel 1972, 222). Given the inefficiency of the import substitution strategy and the complexity of the bureaucracy created by import substitution, this review offers that entrepreneurs would be more likely to engage in rent-seeking, evasive, and “unproductive” entrepreneurial activities rather than in socially “productive” entrepreneurship (Baumol, 1980).

Outward Orientation

With the failure of import substitution and the success of the newly industrializing Asian countries, the “conventional wisdom” changed to the promotion of exports and an acceptance of international trade as a means of development (Krugman, 1995, 725). Krueger points out that the “experience has been that growth performance has been more satisfactory under export promotion strategies” (Krueger, 1980, 288). Indeed, because open economies are exposed to world prices derived

from global productivity differences, domestic resources can be more efficiently allocated compared to countries where distorted domestic prices are the main guide for a country's production mix (Krueger, 1980, 289).

Given the importance of the outward orientation strategy, an important question became – How do exports affect growth? First, export orientation is associated with growth through its impact on foreign exchange earnings. Export orientation also generated needed foreign exchange to fund capital investments thereby eliminating the need for excessive government intervention as required under import substitution (Krueger, 1998, 1516). Export orientation is also associated with structural changes within an economy which can have positive effects on economic development (Krueger, 1998, 1515). Indeed, export promotion could become a catalyst for these structural changes (Balassa, 1988, S280; Krueger, 1980, 288; Krueger, 1998, 1515). Finally, production is also more likely to occur along a country's comparative advantage under an outward-oriented strategy (Balassa, 1971, 180-181; Balassa, 1988, S281).

Entrepreneurship and Development

Given the poor experience with import substitution and export promotion, countries have begun to examine the role of entrepreneurship in development. With this shift in development policy came a greater focus on the role of the private sector as an important engine for economic growth and a de-emphasis on the role of government planning.

Why is Entrepreneurship Important for Development?

Brinkman points out that economic development implies “a process of structural transformations” leading to an overall higher growth trajectory (Brinkman, 1995, 1183). For Leibenstein,

Per capita income growth requires shifts from less productive to more productive techniques per worker, the creation or adoption of new commodities, new materials, new markets, new organizational forms, the creation of new skill, and the accumulation of new knowledge. . . the entrepreneur as gap filler and input-completer is probably the prime mover of the capacity creation part of these elements in the growth process. (Leibenstein, 1968, 77)

Again, economic development involves change and the entrepreneur becomes the best agent for this change. Indeed, entrepreneurship matters for developing countries because markets matter. Hayek recognized that knowledge was “dispersed” throughout society (Hayek, 1945, 520) with each person having a unique stock of information (Hayek, 1945, 521). However, the market, through its frequent *adjustments* in response to the “separate actions of different people” and “the conditions of supply of various factors of production,” communicated new information through

prices which enabled the efficient allocation of resources (Hayek, 1945, 526–530). With the collapse of centrally planned economies, it has been seen that governments cannot allocate resources efficiently and that markets are, indeed, necessary.

The empirical evidence is also strong in support of a link between entrepreneurship and economic growth. Studies have found that regional differences in economic growth which are correlated to levels of entrepreneurship. The recognition of the importance of the entrepreneur and the necessity of the markets for the entrepreneur to operate has led many countries to begin to work on perfecting their markets by eliminating barriers to entrepreneurship and other market failures. However, policy-makers must also take the additional step to ensure that the positive externalities – knowledge, network, and demonstration and failure externalities – can assist in the growth of entrepreneurship and economic development. As Leff concludes, entrepreneurship is essential for development because in developing countries entrepreneurs fill in important gaps¹ left by incomplete and underdeveloped markets (Leff, 1979, 46–47). He states,

Indeed a key function of entrepreneurship in developing economies is precisely to mobilize factors such as capital and specialized labor which, being imperfectly marketed, might otherwise not be supplied or allocated to the activities where their productivity is greatest. (Leff, 1979, 48)

However, even when market imperfections are severe, entrepreneurs still exist. Indeed, entrepreneurs respond to these market imperfections by using various *gap-filling* and, perhaps, second-best solutions. In extreme cases, where market and non-market failures are pervasive, entrepreneurs are pushed out of the formal sector into the informal sector. In less severe cases, large diversified indigenous business groups have formed in many developing countries in response to market failures (Leff, 1978). The “group . . . is thus an intrafirm mechanism for dealing with deficiencies in the markets for primary factors, risk and intermediate products in the developing countries” (Leff, 1978, 667). Many of these groups were found to combine both banking and industrial operations (Leff, 1978, 664) and account for large portions of business activities in many developing countries (Leff, 1978, 665). Large groups were formed in India to correct the information and capital market deficiencies (Ghemawat & Khanna, 1998, 39). Importantly, these groups engage in entrepreneurial behavior (Leff, 1978, 669) while also “provid[ing] the capital and the technical and managerial resources” (Leff, 1978, 670). In this way, the “group” economizes the entrepreneurial efforts necessary in developing countries (Leff, 1978, 669–672). Nevertheless, these groups are not the optimal structure for entrepreneurship in developing countries as they result in “a special form of monopoly capitalism” which can be disruptive to overall long-term economic development (Leff, 1978, 673). It is, therefore, still necessary to continue to perfect markets in developing countries rather than only relying on second-best options.

¹ For a discussion of the “gap-filling” role of entrepreneurs, see Leibenstein (1968).

What Does Entrepreneurship Look Like in Developing Countries?

It is important to clarify what is meant by entrepreneurship in developing countries. A number of terms are used interchangeably to describe entrepreneurial activities. For example, entrepreneurship and small- and medium-sized enterprises (SMEs) have been used synonymously. Discussions of entrepreneurial activities in developing countries have also included the informal sector and petty capitalism (Smart & Smart, 2005). Many African manufacturing firms, for example, had fewer than 150 employees (Fafchamps, 2001, 114) and therefore would fall into the SME sector. Fafchamps writes that “market intermediation in Africa is characterized by a plethora of small traders, seldom exceeding a handful of employees and family helpers” (Fafchamps, 2001). The World Bank, in its efforts to target entrepreneurship, has focused on both the small business and the informal sectors. In 2003, the World Bank released a new database on the SME sector and the accompanying study found that when both the SME and the informal sectors are considered, “the joint contribution . . . to GDP remains approximately constant across income groups at around 65–70 percent. As income increases however, there is a marked shift from the informal to the SME sector” (Ayyagari et al., 2003, 11). This finding indicated that the informal sector in developing countries is an important source of economic activity. Another concept is petty capitalists, or small businesses which employ relatively few employees and rely heavily on their owner’s and the owner’s family’s labor, include a wide spectrum of entrepreneurs – from the numerous export enterprises of Hong Kong (see also Yu, 1998), the maquila workshops in Mexico which produce garments for export, the furniture manufacturers in Italy, to Taiwan’s integrated circuit producers (Smart & Smart, 2005). In developed economies, however, scholars have argued for a distinct concept of entrepreneurship. Carland et al., for example, writing on the American economy, make a strong distinction between the SME sector and entrepreneurship (Carland et al., 1984). They find that,

Although there is considerable overlap between small business and entrepreneurship, the concepts are not the same. Entrepreneurial firms may begin at any size level, but key on growth every time. . . .The entrepreneur is characterized by preference for creating activity, manifested by some innovative combinations of resources for profit. (Carland et al., 1984, 357)

However, while SMEs and entrepreneurship have different meanings, both are important in an economy (Thurik & Wennekers, 2004). Indeed, the small business sector may serve as a “vehicle both for Schumpeterian entrepreneurs introducing new products . . . and for people who simply run and own a business for a living” (Thurik & Wennekers, 2004, 140). Similar distinctions have been made between survival or necessity entrepreneurs and opportunity entrepreneurs.

Do these distinctions matter for developing countries? As the major share of firms in developing countries are small, in terms of the number of employees and assets; and many operating in the informal economy using family labor, this review’s distinction of entrepreneurship cannot, therefore, be based on size. Any

distinctions drawn in this review between entrepreneurship, the small business sector, petty capitalism, and the informal sector will be based on the Schumpeterian concept of innovation – new products, new markets, and new processes. However, as Schumpeter pointed out, that “the ‘new thing’ need not be spectacular or of historical importance. . . . To see the phenomenon even in the humblest levels of the business world is quite essential though it may be difficult to find the humble entrepreneurs historically” (Schumpeter, 1947, 151). Therefore, this study adopts the widest possible definition of entrepreneurship.

An Externalities-Based Framework

This review introduces an externalities-based framework to examine the literature on entrepreneurship in developing countries because of the breadth and scope of the subject. What are the relevant externalities in the case of entrepreneurship? Audretsch, Keilbach, and Liemann, writing on the Knowledge Spillover Theory of Entrepreneurship (Acs & Armington, 2006; Acs et al., 2005; Braunerhjelm, 2010) in developed countries identify *network, knowledge, failure and demonstration* externalities as reasons for government intervention into entrepreneurship (Audretsch et al., 2006). First, they find that dense networks of entrepreneurial firms are beneficial to entrepreneurial activity (Audretsch et al., 2006). Hansen (1992) had previously pointed out the importance of cooperative networks and how industry clusters could be facilitated by a region’s social capital (Hansen, 1992). Acs also offered that regional clusters and networks “foster fast learning” (Acs, 2002, 171) and perpetuate spillovers (Acs, 2002).

Second, Audretsch, Keilbach, and Liemann find that there is an inherent tendency to under-produce knowledge (Audretsch et al., 2006, 174) because it is a “non-rival, partially excludable good” (Acs, 2002, 9). Knowledge expansion results in productivity improvements within the firm which created it and other proximate firms and thus promotes economic growth (Acs, 2002, 10). Indeed, the under-production of knowledge and education can be particularly problematic in developing countries as “a low level of human capital accumulation will slow down technological change” (Nijkamp & Poot, 1998, 21). Additionally, for developing economies, knowledge is important in the product and production discovery process (Hausmann & Rodrik, 2003). Knowledge and information spillovers will be particularly helpful where there are high transactions costs to discovery or large information asymmetries.

Finally, Audretsch, Keilbach, and Liemann point to failure and demonstration externalities (Audretsch et al., 2006, 174). New firm creation, firms’ lifecycles and even firm failures are found to be beneficial for other entrepreneurs (Audretsch et al., 2006). Entrepreneurs learn from examples around them. An important element, therefore, is market entry. In fact, for Kirzner, market entry was essential. Kirzner states,

To induce dynamic entrepreneurial competition we require the fulfillment of only one condition: guaranteeing free entrepreneurial entry into any market where profit opportunities may be perceived to exist. (Kirzner, 1997, 74)

While the Knowledge Spillover Theory of Entrepreneurship (Acs et al., 2005) was intended for developed economies, the externalities identified by Audretsch, Keilbach, and Liemann (2006) are valid for developing countries. The major themes which appear in the literature on entrepreneurship in developing countries relate to one or more of these failures. Each set of failures and the issues which contribute to them will be explored in the next few sections. While not tested in this review, our hypothesis is that economies which are able to generate more of these positive externalities through its institutions and policies will produce greater levels of entrepreneurship.

The idea that examining market imperfections provides insights into understanding entrepreneurship is by no means a completely new one. However, it may have been overlooked. Leibenstein, after all, pointed out that,

For policy purposes...development economists [should] focus their attention when concerned with specific countries on studying the gaps, obstructions, and impediments in the market network of the economy in question and on the gap-filling and input-completing capacity and responsiveness to different motivational states of the potential entrepreneurs in the population. (Leibenstein, 1968, 83)

It is, therefore, important to study how markets function and how they fail in order to discover how to expand entrepreneurial activities in an economy.

Buchanan and Faith had also examined the effects on entrepreneurship of different methods of internalizing negative externalities (Buchanan & Faith, 1981). They examine Coase's property rights theorem which requires an *ex ante* resolution (i.e., the assignment of property rights and thus a payment for potential damages before the transaction) compared to a liability rule which results in an *ex post* payment in the event of damages resulting from negative externalities from entrepreneurial activity (Buchanan & Faith, 1981, 97). They conclude that there has been a shift from using the law to recognize liabilities (an *ex post* solution) to a greater emphasis on *ex ante* internalization of externalities through regulation (Buchanan & Faith, 1981, 103–04). This new approach can be seen in the increase in regulatory activities which, "in effect . . . becomes the institutional equivalent of a modified 'property rule'" (Buchanan & Faith, 1981, 106). Furthermore, if the "public interest agent" or the regulatory authority becomes politicized, entrepreneurship can be severely curtailed, even though market and legal solutions to remedy the negative externalities are available (Buchanan & Faith, 1981, 108–11).

Hupp, in an examination of ways to internalize and encourage positive land use spillovers, offers useful insight on the effects of positive externalities on entrepreneurial activities. While research has generally usually focused on approaches to internalize negative externalities and has neglected beneficial externalities (Hupp, 1979, 457), in many instances assigning property rights or implementing the liability rule is not effective in the case of many positive externalities (Hupp, 1979). Instead, she proposes the establishment of an "administrative agency" that would reward the generators of positive externalities. This approach should result in the socially optimal solution being implemented (Hupp, 1979, 472). The argument presented by Hupp would appear to work best where there is a public good and thus would provide a way of encouraging the private provision of public

goods and other goods with positive spillovers where user fees cannot be assessed. Such an approach may be useful in fostering the positive spillovers which encourage entrepreneurial activity.

Demonstration and Failure Externalities

The relatively small number of examples of successful entrepreneurship renders demonstration and failure externalities extremely important in developing countries. King and Robson described a similar effect as “learning by watching” where “new investment projects in one sector of the economy have a demonstration effect on the efficiency of other sectors” (King & Robson, 1993, 449). An important aspect of their model is that the spillovers are generated by the act of investment itself and do not depend on the actual outcome of the project (King & Robson, 1993). Therefore, each new investment yields productivity spillovers. However, the model assumes that the positive externalities to observing new projects (i.e., the increases in productivity) gradually decline over time (King & Robson, 1993) and that the productivity growth rate (defined as the technological progress frontier) eventually levels off (King & Robson, 1993, 451). In a similar way, there are important spillover effects from having examples of business formation and from entrepreneurs observing successful going concerns. Potential entrepreneurs observe the strategies and business operations of existing entrepreneurs and gather information about potential markets, input suppliers, and production techniques. As such, market entry becomes increasingly important for generating these externalities. Additionally, potential and existing entrepreneurs also learn from failing and failed businesses. They learn what not to do or what to do differently. Markets must, therefore, be free from excessive interventions which do not allow firms to fail for these failure externalities to be effective.

We identify four core themes in the literature which affect demonstration and failure externalities through their effects on entrepreneurial entry, business operations, and entrepreneurial exit: (1) culture, values, and norms; (2) views on outsiders and inclusiveness, (3) the level of economic freedom, and (4) an economy’s fundamentals including its macroeconomic stability, infrastructure, and the level of development of its financial markets.

(a) Culture, Values, and Norms

Geertz describes culture as the “webs of significance” that man has “spun” for himself (Geertz, 1973, 5). Culture, therefore, provides the framework within which individuals make sense of their lives and live in and adapt to their worlds. It is, consequently, not surprising that culture, values, and norms can have an effect on entrepreneurial entry and general business culture and thus on demonstration and failure externalities. Lavoie and Chamlee-Wright offer that one cannot study economic development without exploring culture (Lavoie & Chamlee-Wright, 2002, 17). Indeed, a number of studies on entrepreneurship in developing countries

have focused on the issue of culture as a source of entrepreneurial advantage or disadvantage in an economy.

An important question which has been explored in the literature is whether there are similar traits which exist between entrepreneurs across all cultures. Is there an “ideal” entrepreneur type? Thomas and Mueller, for example, point out that, “the term entrepreneur implies a configuration of psychological traits, attributes, attitudes, and values of an individual motivated to initiate a business venture” (Thomas & Mueller, 2000, 291). Thomas and Mueller’s study finds that personality traits considered relevant to entrepreneurship such as having a high energy level, feeling personally in control of one’s own destiny (internal locus of control) and having a high-risk tolerance were significantly negatively associated with entrepreneurs’ cultural distance from American culture (Thomas & Mueller, 2000). In their study, therefore, entrepreneurs from countries which were more culturally similar to the United States were more likely to possess these qualities. However, innovation, which is perhaps the prime driver of entrepreneurial activity, was found to be unrelated to having a cultural similarity to the United States (Thomas & Mueller, 2000).

One *ideal entrepreneur type* portrayed in the literature is that of an entrepreneur who possesses the Protestant Ethic. Writing on African entrepreneurs, Elkan finds that among indigenous Africans, “there is one quality that most successful African businessmen have in common. They share the local (and often Muslim) equivalent of the Protestant Ethic” (Elkan, 1988, 173). In a study of The Bahamas, Storr identifies a cultural trait termed the “Junkanoo Ethnic” which embodies Weber’s “spirit of capitalism” as an explanation for the existence of entrepreneurship in that country and also as a cultural trait of successful Bahamian entrepreneurs (Storr, 2006). This “ethic” is important for the development of “modern capitalism” (Landes, 2000, 11). Thomas and Mueller (2000) offer that, “the ideal profile of the entrepreneur continues to reflect the characteristics of Protestantism and achievement” (Thomas & Mueller, 2000, 290). Hoselitz (1952) also points to traits oriented toward “productivity, working and creative integration” and leadership and innovation (Hoselitz, 1952, 106–108). There, therefore, appears to be some evidence that some personality traits are common among entrepreneurs.

In addition to those studies focused on commonalities between entrepreneurs, other studies have discussed whether some cultural traits will need to adjust as entrepreneurship becomes more prevalent in developing countries. Zapalska and Edwards, for example, offer that “culture is a dynamic factor in regional development in the context of reforming the Chinese economy” (Zapalska & Edwards, 2001, 286). They propose that while some aspects of Chinese culture are conducive to entrepreneurship (Zapalska & Edwards, 2001, 289), other cultural traits are changing to adapt to a market economy (Zapalska & Edwards, 2001, 290). Dana found that the “combination of social structure and cultural values has constrained entrepreneurship in India” (Dana, 2000, 86). Specifically, it was suggested that India’s caste system and the passive nature associated with some aspects of Indian culture may not be as well suited to the “creative destruction” needed for entrepreneurship (Dana, 2000, 87–88). On some of the cultural barriers to

entrepreneurship, the 2001 Global Entrepreneurship Monitor (GEM) report on India stated that,

Sociocultural rigidities persist. In addition, there are several inhibiting factors such as custom and tradition, low status given to businessmen, the high risks involved in enterprise, absence of vertical mobility on the social ladder, market imperfections and arbitrary changes in the laws of the land and their administration. (Manimala et al., 2002)

Cochran performed a study in Latin America and concluded that “certain characteristics of Latin American culture have been relatively unfavorable to economic development” and, therefore, to the success of entrepreneurship (Cochran, 1960, 517). It was observed that entrance into the professions was more socially respected than becoming a business owner. In Botswana entrepreneurship was generally shunned by younger Batswana in favor of government employment (Tesfayohannes, 2005, 6). While, the country’s educational system and “socio-cultural” factors were cited as explanations for these views on entrepreneurship (Tesfayohannes, 2005), it is also important to question why public sector employment appears more attractive. Finally, the business culture which developed in the former Soviet Union under socialism was thought to “stifle independent innovative culture” (Aidis, 2005, 13).

However, it is not clear how binding culture is on entrepreneurship and how much depends on reinforcing economic and social systems. First, entrepreneurs in India, China, and transition economies have responded quickly as liberalization occurred. Indeed, Chinese and Indian entrepreneurs are key participants in the world economy as the globalization phenomenon opens up new opportunities (Friedman, 2006). Additionally, Chinese and Indian immigrants, in particular, have played an important role as entrepreneurs in entrepreneurial countries such as the United States (Saxenian, 1999, 22) and in developing countries such as Mauritius and developing Asian countries. In a study of Cuba, one of the last remaining centrally planned economies, it was noted that, “Cuban immigrants in Miami established a thriving Spanish-speaking enclave economy that offers entrepreneurs substantial profits” (Evans, 1989, 950).

It would therefore appear that entrepreneurial opportunity allows those individuals who possess an entrepreneurial “spirit” to transcend any cultural boundaries. However, culture and opportunity appear to re-enforce each other. Acs et al. sum up nicely that, “a strong cultural context that supports entrepreneurial activity” is one which “will lead to more individuals perceiving entrepreneurial activity as a desirable economic choice” (Acs, O’Gorman et al., 2007, 124). Indeed, Hoselitz noted that countries need to create a climate which allows entrepreneurs to pursue opportunities, while also encouraging the personality traits which leads to entrepreneurial activities (Hoselitz, 1952, 108).

(b) “Outsiders” and Inclusiveness

A country’s acceptance and tolerance of “outsiders” and its levels of inclusiveness can impact entrepreneurial entry. Here, the concept of social capital – “an instantiated set of informal values or norms shared among members of a group that permits

them to cooperate with one another” (Fukuyama, 2000, 98) – becomes important. The “trust,” engendered by social capital enables members of a society to coordinate their activities with lower transactions costs (Fukuyama, 2000, 99). A society’s level of inclusiveness determines how large its radius of trust extends. Elkan finds, for example, that there is a “distrust of outsiders” which has limited the growth of firms in many African economies (Elkan, 1988, 177). More generally, in developing countries entrepreneurs have often utilized their extended families as these “kinship relations” are the extent of the radii of trust in these societies (Leibenstein, 1968, 81). However, this close control of business operations can negatively impacts business success (Elkan, 1988, 172), as outside managerial and technical talent is often excluded.

The high level of ethnic fragmentation in many developing countries is also important for explaining entrepreneurship. For example, that “outsiders” such as ethnic minorities in developing economies often move into entrepreneurial activities because they are excluded from other types of employment (Leibenstein, 1968, 81). This exclusion, therefore, lowers the “opportunity costs” of entrepreneurship (Leibenstein, 1968). Elkan, for example, finds that ethnic Asian and Lebanese minorities in African countries were prominent enterprise owners (Elkan, 1988, 185) and that “their feelings of insecurity [as minorities] may have encouraged them to seek economic success” as business owners (Elkan, 1988, 171). While some cultural groups do appear to be more entrepreneurial as immigrants than others, in a study of Australia, it was argued that the size of the immigrant group in the host country and the relative “linguistic isolation” of that group affect the likelihood of members of a particular immigrant group engaging in entrepreneurial activities in addition to other factors such as education and skills (Evans, 1989, 958). Similar conclusions have been made in studies of immigrants to the United States (Mora & Dávila, 2005). While both of these studies relate to developed countries, the results could be useful for understanding the differences in entrepreneurship levels for some ethnic minorities in developing countries. Ethnic minorities which are relatively isolated from the indigenous population would be more likely to engage in high rates of entrepreneurial activity.

On the other hand, however, while some groups are often pushed into entrepreneurship, “restrictions” may be placed on ethnic minority and non-indigenous local entrepreneurs in many developing countries when they are perceived as being too entrepreneurial (Leff, 1979, 51). A study of SMEs in the South Pacific found that there were genuine differences between indigenous and non-indigenous entrepreneurs in the South Pacific Islands. More importantly, however, there was a perception among indigenous Pacific Islanders that “non-indigenous entrepreneurs . . . [had] ‘a depth of experience and resource to draw from’ which may have provided them with an advantage in their entrepreneurial activities” (Yusuf, 1995, 70–71). Indeed, it was found that government policies were biased against non-indigenous entrepreneurs to compensate for this “advantage” (Yusuf, 1995, 71).

The literature reveals that there is a push–pull effect to entrepreneurship in developing countries with deep ethnic fragmentation. On the one hand, ethnic minorities

may be pushed into entrepreneurship; while on the other hand barriers may constrain their activities. Where there are severe ethnic tensions, “outsider” groups may be excluded altogether such that the society loses the benefits of their business demonstration externalities.

(c) Economic Freedom – An Expansion of the Scope for Entrepreneurship

Economic freedom affects demonstration externalities by its effects on both entrepreneurial entry and activity. Mises finds that economic freedom “paved the way” for the substantial improvement in living standards in capitalist countries (von Mises, 1949, ch.6 xxix.16). For entrepreneurial activity to occur, potential entrepreneurs must be able to not just perceive an opportunity, but to also be able to legally act on it – to become an “acting man” (von Mises, 1949, ch.4 xiv.72). Hoselitz adds that a society’s “cultural norms” should allow persons to be free to choose their occupations (Hoselitz, 1952, 109). Without this economic freedom, Mises (1949) points out that “then the market, interpersonal exchange, private ownership of the means of production, entrepreneurship, and private initiative, virtually disappear altogether” (von Mises, 1949, ch.6 xxx.3). Elkan finds that,

Giving the private sector a greater role in development has two facets: first, a change in policy regime that removes restrictions on the private sector; second, the divestiture of activities from the public sector – privatization. (Elkan, 1988, 179)

Two strands of the literature are therefore explored. The first deals with excessive government involvement in the private sector and the second with the growing trend toward privatization.

First, some countries’ governments “discouraged” entrepreneurship; while in others government activity is so pervasive that it “crowds out” private entrepreneurship opportunities (Elkan, 1988, 177). Where government activity is pervasive, a managerial type of business culture is likely to prevail rather than one which supports innovative entrepreneurship (Hoselitz, 1952, 100). In China, although there has been some decentralization of economic activity, government officials interfered in the affairs of “enterprise managers” (Zapalska & Edwards, 2001, 290). For example, Zapalska and Edwards find that,

Mobility of entrepreneurs seeking new opportunities is obstructed. Entrepreneurs wanting to retain the advice and expertise of foreign consultants are blocked by the fact that investment decisions are controlled outside the enterprise by higher authorities. (Zapalska & Edwards, 2001, 291)

They offer that until a market economy is fully implemented, entrepreneurship will not reach its full potential (Zapalska & Edwards, 2001). China’s complex business environment may act as a barrier to private investment (Zapalska & Edwards, 2001). A survey of 32 Nigerian SMEs respondents reported that there is “frequent harassment by government officials who extort money from businesses” (Mambula, 2002, 59). An examination of postcolonial Nigeria and Tanzania explored the role of socialist ideology and the strong negative views toward capitalism in strangling private enterprise and entrepreneurship (Heilman & Lucas, 1997, 146). Dana had

similar findings in a study of India and notes that the post-independence strong state-led economy stifled opportunities for entrepreneurship (Dana, 2000, 87–90). Indeed, the strong hold of government over all spheres of economic life led to vibrant informal sectors in many African countries such that, “the informal sector and small scale income generating projects became a form of resistance to the state controlled economy which forced the government to tolerate and eventually encourage private sector activities” (Heilman & Lucas 1997, 159). A similar phenomenon was observed in former Soviet countries where the informal economy flourished in spite of their being a formal non-market economy (Aidis, 2005, 15). However, through the work of business associations such as chambers of commerce, a new paradigm is being built with “a new relationship between the state and its citizens . . . which encourages private sector activities and entrepreneurship” (Heilman & Lucas 1997, 155).

A second phenomenon which has led to new opportunities for entrepreneurship in many developing and transition countries is the wave of privatizations – generating new demonstration and failure externalities. The creation of markets, through privatization, provides the space for entrepreneurs to operate and to innovate, using prices and other information as a guide. The transition economies provide an interesting case for analyzing the importance of entrepreneurship. Like other regions, entrepreneurship is associated with economic growth. For example, although Russia has generally performed poorly in terms of the policy environment for entrepreneurship, Berkowitz and DeJong find that regions with higher entrepreneurial activity within Russia also experienced stronger economic performance (Berkowitz & DeJong, 2005, 25). They also find that,

The view that entrepreneurial activity is an important engine of growth emerges from the observation that post-socialist economies that have experienced relatively robust patterns of entrepreneurial development have tended to enjoy relatively high rates of economic growth. (Berkowitz & DeJong, 2005, 26)

A review of the literature reveals that the key feature of the transition was the privatization of large government enterprises. Indeed, immediately after the collapse of the socialist system there were high rates of new firm startups (McMillan & Woodruff, 2002, 154). While business formation proceeded at a rapid pace, the formal institutions which were needed to support increasing complex forms of enterprises were nonexistent (McMillan & Woodruff, 2002, 155) and informal institutions developed to compensate for the inadequacies of these new market economies (McMillan & Woodruff, 2002, 159–60). The creation of conditions which would assist in the development of entrepreneurship was not the focus of the reforming countries nor the international agencies initially (Arzeni, 1996, 52). However, this lack of formal institutions created high barriers to entrepreneurial activities in the years following the transition which has slowed the growth of new businesses (Aidis, 2005, 2). McMillan and Woodruff point out that,

Entrepreneurs require more from the state, in the medium and long-run, than the absence of interference. If firms are able to grow to yield economies of scale, they need laws of contract so they can take on anonymous dealings and financial regulation so they can get bank loans and outside shareholding. (McMillan & Woodruff, 2002, 165)

Indeed, a major issue for transition economies is the lack of formal institutions related to property rights, supervision of market activities, dispute resolution mechanisms, and improved financial and accounting systems (Reynolds, 1996, 29–30). Therefore, the transition to entrepreneurship in the formerly centrally planned economies of Eastern Europe is not complete. While private enterprises are now the norm, thus expanding the scope for entrepreneurial activity, the business and regulatory environment does not yet address the imperfections in their new markets related to high transactions costs, information asymmetries and the missing markets for financial services in many countries.

(d) The Fundamentals – Financial Markets Development and Physical Infrastructure

Issues pertaining to a country's macroeconomic stability, the state of its financial markets and its infrastructure are pervasive in the literature on entrepreneurship in developing countries. A survey of Nigerian entrepreneurs, for example, finds that access to credit, poor transportation infrastructure and a lack of dependable utilities are a leading constraints to firm growth (Mambula, 2002, 59, Table 1). In a study of firms in Romania, Brown, Earle, and Lup find that "the availability of loans is an important factor in promoting the growth of small start-up firms" (Earle, Brown et al., 2005, 62). Yusuf and Schindehutte study the effects of macroeconomic performance on the types of entrepreneurial activity. They survey 160 entrepreneurs who had formed businesses during periods of economic decline in Nigeria (Yusuf & Schindehutte, 2000, 45). This decline resulted from a number of poor policies (Yusuf & Schindehutte 2000, 43) such that despite Nigeria's considerable oil income, the government's reinvestment activities "did not accelerate growth" (Eifert, Gelb et al., 2002, 21). However, the authors point out that post-colonial Nigerian government, unlike many other African countries, was not overly hostile to the private sector and had developed a number of programs to support the development of indigenous SMEs (Yusuf & Schindehutte, 2000, 44). The study revealed that entrepreneurs started businesses for a number of reasons during the period in review. However, "extrinsic rewards" related to securing income were more important than purer "Schumpeterian" type entrepreneurial motivations (i.e., innovation) (Yusuf & Schindehutte 2000, 49). It would therefore appear that in periods of economic hardship necessity entrepreneurship rather than opportunity entrepreneurship becomes more important (Yusuf & Schindehutte, 2000).

The inadequacy, in terms of both quantity and quality, of infrastructure in developing countries is another important factor which limits successful business entry and growth and thus demonstration externalities. Writing on the Chinese economy, Liao and Sohmen find that,

Lack of infrastructure may limit areas of future entrepreneurial growth. Technology is a relatively labor-intensive and capital-unintensive industry. Likewise, service industries typically require little initial capital input. Yet other areas that will require privatization in the future may face obstacles due to the lack of an efficient credit system and lack of necessary infrastructure. (Liao & Sohmen, 2001, 31–32)

In addition to physical infrastructure inadequacies, entrepreneurs in developing countries such as Cyprus also face the inadequacies of “policy infrastructure” (Hadjimanolis, 1999, 562). The Economic Commission for Africa (ECA), in their review of the effects of energy infrastructure on international trade, find that the low penetration of electricity in Africa limits the ability of countries to trade (Economic Commission for Africa, 2004). Indeed, the scarcity of good infrastructure directly increases the costs of doing business and reduces the reliability of production, thereby increasing costs indirectly (Economic Commission for Africa, 2004). The ECA also find that,

... small firms cannot afford to make costly investments to meet their power needs. Given that SMEs are greatly affected by unreliable power supply, the growth of these firms and the generation of employment are negatively impacted. (Economic Commission for Africa, 2004).

Similar conclusions can be drawn from the lack of infrastructure related to transportation (i.e., roads and ports), communication (i.e., telephones, internet penetration), and land improvement systems (i.e., irrigation).

Knowledge and Information Externalities: What To Produce and How To Do It

Knowledge and information externalities affect entrepreneurship in developing countries in two important ways: these externalities affect the ability of entrepreneurs to discover what to produce and they impact the technology and processes used in production. Knowledge and information externalities are impacted by information asymmetries, transaction costs, education levels, research and development opportunities, and foreign direct investment.

First, information failures regarding what to produce characterize markets in developing countries (Hausmann & Rodrik, 2003). Mambula points out that because of high discovery costs, entrepreneurs enter “well established sectors rather than seeking new production and new market niches” (Mambula, 2002, 63). There are also high costs to discovering *what to produce* and that these costs cannot be fully appropriated by an entrepreneur (Hausmann & Rodrik, 2003). Therefore, in a market situation without government intervention there is unlikely to be the socially optimal amount of entrepreneurship and investment in business activities. Additionally, if entrepreneurs who enter the market are allowed to exist as monopolies, then again the market fails as there will be over-production of goods which do not embody the country’s comparative advantage. Information and search costs, therefore, may lead to lower levels of entrepreneurship (Hausmann & Rodrik, 2003).

In addition to information failures, the paucity of available educational resources is a major limiting factor for knowledge spillovers in developing countries. In a study of African entrepreneurs, it was found that African entrepreneurs’ ability to move into the formal industrial sector increased with education (Elkan, 1988, 175). Additionally, persons with experience in “large expatriate or Asian-run businesses” (Elkan, 1988, 174) and members of the educated political elite were more

likely to become entrepreneurs (Elkan, 1988, 175). Berkowitz and DeJong, in their study of the effects on entrepreneurship and economic growth, find that education has a strong and positive effect on entrepreneurship (Berkowitz & DeJong, 2005, 27). Mambula points out that “most Nigerian SME owner/managers are not adequately organized, qualified or trained. This seriously hampers their performance and their international competitiveness” (Mambula, 2002, 61). However, in a study of Zambian entrepreneurs, entrepreneurs generally had more years of formal education than employees (i.e., 16% of entrepreneurs held university degrees compared to 2% of employees) (Fehr, 1995).² The mix of educational attainment also revealed some important differences between ethnic groups. Indigenous African entrepreneurs were more likely to have a secondary or university education; Asian entrepreneurs generally attained secondary, university, and professional education; and entrepreneurs of European origin in Zambia generally had secondary school, university, and technical training (Fehr, 1995, 7). These differences may affect the types of entrepreneurial activities that are attempted by the different groups. Bell and Pavitt offer that,

It is widely recognized that education policy has a strong influence on the effectiveness with which technologies are assimilated and improved. Thus, literacy is advantageous in supplier-dominated technologies, and higher technical and graduate engineering skills are necessary in scale-intensive and specialized-supplier technologies. (Bell & Pavitt, 1992)

The knowledge filter (Acs et al., 2004, 2005) – the ability to transform knowledge created by firms and in laboratories into marketable products – is likely to be extremely dense in developing countries. A study of the biopharmaceutical industry in Nigeria acknowledged that there are many obstacles to knowledge transfer. First, knowledge and innovation policy had been very disjointed (Oyelaran-Oyeyinka & Sampath, 2006, 7). For example, “national technological infrastructure tend to give little support to domestic firms that would benefit from the evolutionary process of technological deepening through learning that is the hallmark of dynamic latecomers” (Oyelaran-Oyeyinka & Sampath, 2006). Innovation is further stifled because research organizations lack funding (Oyelaran-Oyeyinka & Sampath, 2006, 19), and fail to collaborate with each other (Oyelaran-Oyeyinka & Sampath, 2006, 23).

Finally, there is a large and well-developed literature on the effects of foreign direct investment on development through its role as a transferor of technology. Buckley and Ruane point out that,

FDI may assist developing countries through: the provision of capital, the inflow of technology, the inflow of managerial know-how, and their impact on the creation of efficient markets. (Buckley & Ruane, 2006, 1612)

Ireland’s miracle growth over the last 70 years can be an important example for developing countries. Indeed, Ireland’s transformation is attributed to the country’s ability to attract FDI inflows through its newly formed export processing zones beginning in the 1950s (Buckley & Ruane, 2006, 1613). However, the FDI was

²See Table 2.4.

strategically attracted – leading to clusters of high-skill activities in the electronics, chemicals, and pharmaceuticals sectors. (Buckley & Ruane, 2006, 1620–1621). Buckley and Ruane also point out that the “Irish education and training policy was also coordinated to ensure that a supply of skilled labour suited to the sector, so that costs remained competitive” (Buckley & Ruane, 2006, 1621). In this respect, comparisons have been made between Ireland’s development and India’s high-tech clusters. Finally, Ireland has been successful in forming those important backward linkages which transmit knowledge spillovers from FDI (Buckley & Ruane, 2006, 1623). However, it is recognized that “it takes time for MNEs to acquire local suppliers, and active policy that can reduce the ‘learning phase’ about local supply may increase the speed at which linkages can occur” (Buckley & Ruane, 2006, 1623; Schrank, 2001).

There is an important lesson to be learned from the case of Ireland: using FDI to achieve knowledge spillovers requires accompanying policy, including education policy. Therefore, policies to generate knowledge spillovers in developing countries require more than facilitating the flow of ideas and information between firms by reducing the “knowledge filter” (Acs et al., 2004, 2005), but also facilitating the provision of basic and higher levels of education, skills while also encouraging knowledge spillovers from FDI through linkages with the domestic economy and domestic entrepreneurs.

Network Externalities

Network externalities have emerged as a major theme in the literature on entrepreneurship in developing countries. There are a number of dimensions. First, there are networks between entrepreneurs within the country (i.e., domestic associations) and then there are networks which extend internationally. Much of the literature also focuses on the lack of indigenous business networks in some countries and the importance of ethnic minority networks in others. A second, but related, strand of the literature examines the development of industrial clusters between firms in developing countries and their links to international clusters. Indeed, network externalities of all types are important because the small size of many enterprises in developing countries often negatively affects transactions costs, scales of economies, and the consistency of production quality (Fafchamps, 2001, 114–118). Business networks and industrial clusters can assist in overcoming some of the disadvantages of smallness through their creation of positive externalities (Mambula, 2002, 61). These networks may also help to overcome some of the information failures associated with markets in developing countries.

Networks of entrepreneurs within developing countries can have important impacts on shaping policy conducive to entrepreneurship in developing countries. Brautigam, Rakner, and Taylor introduce the concept of “growth coalitions” or partnerships between business networks and the government for the purpose of promoting economic growth and development (Bräutigam et al., 2002, 520). They find that these groups are most successful where they consist of a wider cross section of businesses rather than only one specific industry (Bräutigam et al., 2002,

522). This greater inclusiveness diminishes the possibilities for purely rent-seeking activities (Bräutigam et al., 2002). Business networks should also be sufficiently organized and be able to “credibly engage the state in technical policy discussions” (Bräutigam et al., 2002). Business associations in Nigeria and Tanzania have made some important inroads in influencing public policy toward the private sector and private enterprise. These groups have recognized that change is necessary and coalitions have formed across ethnic groups and large and small capitalists to advocate for further liberalization (Heilman & Lucas, 1997, 155 and 163). Heilman and Lucas conclude that,

In countries where the power of capital is not yet institutionalized, the fate of capitalism may well depend on the ability of capitalist social movements to promote the policies, institutions and reforms necessary to long-term growth. (Heilman & Lucas 1997, 165)

Therefore, networks are extremely important in developing countries in ways which go beyond the traditional network externalities of connecting firms with information on suppliers, markets, and production techniques.

Within country and external networks of firms are often ethnic-based. Brautigam defines ethnic business networks as “the professional and social relationships among entrepreneurs sharing a particular ethnic or cultural background” (Bräutigam, 2003, 449). These networks fill important gaps in underdeveloped market systems related to “finance, technical knowledge, and marketing information” (Bräutigam, 2003, 447). Business networks were observed among non-indigenous entrepreneurs in the South Pacific where these networks offered “an established reputation, greatest access to capital and lines of credit” (Yusuf, 1995, 1). Brautigam (2003) studied the business networks in two countries and found important differences between them and their ability to facilitate entrepreneurship (Bräutigam, 2003). First, a dense network of business relations had been established in Mauritius around the country’s export processing zones linking local Chinese entrepreneurs with manufacturers in China, Hong Kong, and Taiwan (Bräutigam, 2003, 456). Many of these Sini-Mauritian networks were based on kinship and other personal ties which engendered a strong sense of trust (Bräutigam, 2003, 456–457). However, an important feature of the Chinese networks was their role as “a gateway for overseas Chinese entrepreneurs interested in investing both in Mauritius and elsewhere in Africa” (Bräutigam, 2003, 460). Second, while indigenous Nigerian entrepreneurs in Nnewi, Nigeria, a town which manufactured spare auto parts also formed beneficial business networks with overseas Chinese manufacturers, Brautigam points out that “these overlapping networks did not lead to extensions of credit, something that is common in the internal operations of ethnic business networks” (Bräutigam, 2003, 464). While not as dense as the Chinese-Mauritian networks, the networks between Nigerian and Chinese entrepreneurs were useful for establishing access to inputs and technology (Bräutigam, 2003, 464). It would, therefore, appear that the strength of social capital impacted the strength of these business networks.

There have also been a number of studies which have focused on industrial clusters in developing countries (Humphrey, 2003, 3). These clusters exist in both developed and developing countries (Rocha, 2004). Humphrey (2003) examined

a number of clusters in developing countries and finds that competitive and successful clusters focus on continuous “innovation and upgrading” (Humphrey, 2003, 5). Writing on Brazil’s shoe-manufacturing cluster, he finds that many developing country clusters have been poorly designed (Humphrey, 2003, 9) and have focused exclusively on production for the local economy (Humphrey, 2003, 7) and others many have been integrated into the global value chain (Humphrey & Schmitz, 2001) in disadvantageous ways (Humphrey, 2003, 10). In a study of Latin America, significant barriers to cluster formation are found to exist because of “scarcity of entrepreneurial spirit, barriers to information-sharing, lack of trust, and similar ‘soft’ constraints” (Altenburg & Meyer-Stamer, 1999, 1694). In Latin America three types of clusters have been observed: necessity clusters which often emerge in the informal sector; domestic enterprise clusters (often of mixed sized enterprises); and clusters of multinational firms conducting “complex activities” located within the country (Altenburg & Meyer-Stamer, 1999, 1695). The study reveals mixed effects for different types of clusters of entrepreneurial activity. Indeed, they find that the,

positive externalities of clustering reduce the barriers to entry for new firms, thus contributing to create an excess supply of the cluster’s main product. In a low-skill environment this leads to ruinous competition instead of giving rise to rivalry-driven upgrading as observed in innovative dynamic clusters. (Altenburg & Meyer-Stamer, 1999, 1697)

Both the socio-political and business networks of entrepreneurs and firms appear to be important in developing countries. The socio-political networks, which often take the form of business associations, including chambers of commerce, are vital agitators for change in many countries; provided they can overcome the rent-seeking tendencies associated with small, closed groups. Business networks of firms are also necessary to facilitate knowledge and demonstration spillovers.

New Policy for Entrepreneurship in Developing Countries

This survey has reviewed the literature on the evolution of development policy from colonial-era policy to import substitution to export promotion and specifically the use of export processing zones. Given the failure or poor performance of some of these economies for many developing countries, entrepreneurship is being explored as an alternative approach. This research on entrepreneurship and development shows how demonstration and failure, knowledge, and network externalities are affected by a range of issues in developing countries. Based on this review, the study hypothesizes that economies which are able to generate more of these positive externalities will produce higher levels of entrepreneurial activities.

Demonstration Externalities

Encouraging demonstration externalities is perhaps the most important issue for developing countries. This study identified culture, values, and norms, a country’s

views on inclusiveness; its degree of economic freedom and its fundamentals as having an impact on demonstrational externalities. The main goal is ensuring market access so that talented potential entrepreneurs with good ideas are able to enter, set up businesses, and thrive (or fail) without unnecessary barriers.

While culture is important in this analysis of entrepreneurship in developing countries, this survey also recognizes that culture is not static and therefore, the discussion of culture and entrepreneurship is not deterministic – with some cultures being forever ill-suited to entrepreneurship compared to others. Indeed, Lavoie and Chamlee-Wright suggested that “cultural patterns conducive to economic growth may emerge from vastly different sources” (Lavoie & Chamlee-Wright, 2002, 14). This review has shown that a society’s culture, values, and norms can impact market entry in two main ways: by influencing the attractiveness of entrepreneurship and second, as a “barrier” to entrepreneurial activities. A third issue is the identification of common traits among entrepreneurs.

First, demonstration externalities and culture intersect and influence a society’s perceptions about entrepreneurship. In some cases entrepreneurship may be viewed as an unattractive occupational choice compared to other options. Although “socio-cultural” factors are undoubtedly important, this review posits that the incentive structures in the labor markets of many developing countries are another explanation. This is especially the case where there are strong labor unions and weak merit-based institutions. Policymakers in developing countries should examine the risk-rewards pay offs to different sectors. While entrepreneurship will always involve more risk than wage employment, institutions such as bankruptcy rules lower the expected opportunity costs. Such changes may improve the cultural acceptance of entrepreneurship.

Developing countries should also address cultural barriers to entrepreneurship. Again Botswana is an interesting case study as the country has taken a direct approach to addressing some of its cultural barriers. For example, the Botswana government’s efforts to address the biases against female entrepreneurs and other cultural obstacles which prevent certain members of society from engaging in entrepreneurial activity (Tesfayohannes, 2005, 6). This will likely be a slow process. However, as the literature review revealed, cultures change and adapt in response to new information and opportunities. Schramm concurs, and offers an optimistic view that “developing countries and development agencies, then, should not worry too much about cultural intangibles . . . with the knowledge that culture can change as incentives and conditions change” (Schramm, 2004, 5).

Finally, the literature reveals that there are some common traits across very different cultures which are found in entrepreneurs. While some research is focused on whether these traits are innate (nature) or whether they can be taught (nurture) – whether we can teach people to be more entrepreneurial – this review recognizes that entrepreneurs cannot flourish without an amenable institutional environment. Lavoie and Chamlee-Wright point out that,

The culture must be one that, in general, supports commerce and entrepreneurship, but the particular manner in which the spirit of enterprise can be encouraged will be culturally specific. (Lavoie & Chamlee-Wright, 2002, 13)

Therefore, policymakers should focus on creating an enabling environment in which persons who possess entrepreneurial personality traits can flourish.

Policymakers will also need to take the steps to ensure that their formal and informal rules do not discriminate against “outsiders.” The literature has shown that ethnic minorities, returning émigrés and expatriates can provide important entrepreneurial capital to developing economies. While building social capital is a slow process, requiring repeated interactions, there are compensatory policy measures which can be taken. For example, to encourage trust in business dealings, an economy’s legal system can become an important factor. An independent judiciary and enforceable contract laws facilitate impersonal transactions and replicate the assurances and trust gained from years of repeated dealings or through familial and kinship relations. Other institutions such as credit bureaus facilitate modern banking systems and provide the information needed to facilitate arms length transactions. The aim of policymakers should be to ensure a playing field where all potential entrepreneurs have an opportunity to generate and benefit from the demonstration externalities. Therefore, institutions which reduce information failures and protect property rights should be constructed and enhanced (Boettke & Coyne, 2003; Coyne & Leeson, 2004).

On the other hand, developing nations face important political economy considerations with respect to indigenous entrepreneurship. In many cases, indigenous groups have been the subject of previous discrimination. A study of a program to promote indigenous Malaysian Bumiputra entrepreneurship using a public contract farming scheme provides an example of an ill-fated attempt to create a “level-playing field” (Morrison et al., 2006).³ While the program provided important skills and training to the Bumiputra and resulted in higher incomes, the program was conducted outside of the market and therefore became more of a welfare program than an entrepreneurial training program. Indeed, the program’s participants rarely, if ever, moved on to become entrepreneurs in the private contracting sector. This lack of transition to the private sector indicates that while the program addressed important social concerns, it did not address genuine entrepreneurship (Morrison et al., 2006, 200–201). A first-best approach, even where past discrimination is an issue, would have been to perfect Malaysia’s markets while also improving the educational services provided to the Bumiputra.

A third issue which affected demonstration externalities was economic freedom. Economic freedom encompasses a range of issues. However, the main point is that potential entrepreneurs should be able to act. Certainly, expanding the scope for their actions through privatization of the economy is important. But it is also important to ensure that government activity encourages rather than thwarts private enterprise. In many developing countries, government activity is too pervasive. There is overly excessive and complex regulation of business activities increasing the potential for rent-seeking, on the part of firms, and corruption on the part of government officials

³ The private contract farming system in Malaysia provides the important function of reducing uncertainty for local farmers and improves opportunities for credit as banks are aware that there is a guaranteed buyer for the farm produce, p. 193. However, critics have also said that such programs transfer “the risk from the firm” which buys the farm produce “to the farmer”, p. 198.

(Virgill, 2006). A review of the literature has shown that even where markets have been created, through privatizations (for example, in the transition economies), the formal institutions are still necessary to enable entrepreneurship.

Finally, with respect to demonstration externalities, a country's fundamentals (i.e., its macroeconomy, financial markets, and infrastructure) matter. Countries in economic turmoil have difficulties supporting innovative entrepreneurs. While not examined in this survey, the effects of physical conflicts and wars should also have similar effects. Second, this review has shown that entrepreneurs need good infrastructure and functioning financial markets. An important question arises: Does entrepreneurship require economic growth? Similar questions have been asked in the development literature related to poverty alleviation. In the case of the poverty literature, a growing economy means that there is a "growing pie" or increasing resources with which to deal with poverty. Economic growth is indeed a necessary precondition for addressing poverty (Dollar & Kraay, 2002). Poverty reduction strategies without growth would be merely redistributive. Similarly, promoting entrepreneurship by itself, without focusing on the macroeconomy may be redistributive – taking from some parts of the economy to support others. Therefore, a country's entrepreneurship policy must evolve together with its pro-growth policies.

Policy Recommendations:

1. Assess which cultural traits within a country are barriers to entrepreneurship or to groups of potential entrepreneurs;
2. Assess whether a country has institutions in place which support arm's length transactions and reduce information and transaction costs;
3. Assess whether a country's business and regulatory environment acts as a barrier to entrepreneurial activities;
4. Assess whether a country's macroeconomy, infrastructure, and financial markets support entrepreneurship.

Knowledge and Information Externalities

This review has explored the question – how do developing countries generate knowledge and information externalities? We know that in all economies, there is a tendency to under-produce knowledge, particularly basic knowledge. However, in many developing countries, even basic education is inaccessible to a major share of the population. Technology, research, and development are lagging, and in some cases, nonexistent. Indeed, Elkan points out that, "As for making good technological choices, Africans are at a disadvantage simply through lack of experience" (Elkan, 1988, 176). Oyelaran-Oyeyinka and Sampath offer that,

Translating research to innovation requires a system of knowledge infrastructure of certain quality. It provides the organizational incentive for the long and often complicated process of innovation. Knowledge infrastructure is required at the most basic level of education (training scientists and engineers), as well as at the level of public scientific research and development. (Oyelaran-Oyeyinka & Sampath, 2006, 22)

These knowledge institutions will need to be created, in some cases, or transformed (in terms of their goals and approaches to collaboration) in others to facilitate knowledge spillovers in developing countries. A second, but related concept was the considerable costs to discovering what to produce (Hausmann & Rodrik, 2003). These conditions limit knowledge spillovers and thus contribute to the under-production of entrepreneurship in developing countries.

Innovative entrepreneurship requires a strong educational foundation. Human capital is needed to create ideas (Romer, 1992) and therefore as human capital expands through education, so too will the realms of possibilities for innovation. Countries will need to refocus their educational policies along the lines of their industrial policies at the higher end, while also improving basic education. Schramm correctly pointed out that education, both at the primary and the tertiary levels is important for entrepreneurship in developing countries and provides the example of India's Institutes of Technology which have allowed "high-impact entrepreneurs [to] emerge" (Schramm, 2004, 5). Further research will be necessary to examine the approaches which have been used by developing countries to align their educational systems with their overall development strategies. These reforms are expensive, but necessary undertakings.

Given the constraint on the domestic economy, a country's foreign investment and international trade policies are, therefore, useful tools for encouraging knowledge spillovers. Indeed, this review's analysis focused on the successful transformation of Ireland using the twin pillars of strategic FDI and a strong education policy. Both of these approaches assisted in the spillover of knowledge between entrepreneurs within Ireland and allowed Irish entrepreneurs to absorb spillovers from outside of the country. However, Ireland and the Asian miracle countries are outliers in terms of generating these positive knowledge spillovers. Even when FDI is present, linkages and spillovers are often weak – especially when EPZ-type assembly FDI is used (Warr, 1989). The Irish model suggests that aggressive education upgrading must be combined with FDI policy in order to benefit from these knowledge spillovers.

Policy Recommendations:

1. Address educational deficiencies at the basic and tertiary levels;
2. Assess whether current knowledge and innovation activities provide spillover opportunities;
3. Assess whether there are high costs to discovering what to produce;
4. Assess whether the country's FDI strategy promotes entrepreneurship.

Network Externalities

Network externalities in developing countries related to both associations of entrepreneurs and clusters of firms. Each had different purposes. This review explored the socio-political importance of groups in developing countries.

Increasingly, these groups are powerful lobbyists for economic liberalization. However, it was acknowledged that these groups can be captured and engage in rent-seeking behavior, especially when there are dominated by one industry. The formation of multi-industry business associations should be encouraged and facilitated.

Cluster formation, especially where there is international production should be encouraged. Humphrey offers a number of suggestions for policy to foster stronger industrial clusters. First, he points out that policy should be aimed at achieving “completeness” (Humphrey, 2003, 14) within the cluster. On the other hand, however, formally integrated clusters are not the only solution. Taiwan’s semiconductor industry, for example, was dominated by a large number of “small firms that target certain market niches and collaborate under different roofs” (Hsu, 2005, 145). Developing countries, therefore, should study their industries to see which clustering strategies are most successful.

LDCs will also need to improve infrastructure, remove barriers to imported inputs and immigration regimes will also need to be rationalized to allow access to “specialist foreign labor” (Humphrey, 2003, 15–16). Education will be important to provide the necessary technical and managerial skills (Humphrey, 2003, 16). Additionally, FDI will need to be strategic to ensure that local entrepreneurs enter the global chain at the right place (Humphrey, 2003, 16–17). This requires a better understanding of export markets.

Policy Recommendations:

1. Encourage the involvement of multi-industry, multiethnic business associations in public policymaking;
2. Assess whether existing industry clusters are complete;
3. Assess export markets to determine whether clustering strategies are appropriate;
4. Facilitate the access to information to entrepreneurs so that they better understand their export markets.

Conclusion

Developing countries have tried a myriad approaches to achieve economic development and growth. After gaining political independence, in many cases, turned toward planning and began to implement import substitution programs to jumpstart their industrialization processes. Indeed, at the time of independence, many of these policies were supported by the major international development agencies and leading economic theorists. Krugman concludes that “35 years ago . . . the key elements of a successful development strategy were government planning and import substitution . . . it was widely taken for granted that centrally planned economies, whatever their other weaknesses, were very good at generating industrial growth” (Krugman, 1995, 718). Krugman further explained that, “almost all serious people endorsed the idea of development through import-substituting industrialization, so of course

it had to be right” (Krugman, 1995, 729). However, the large government apparatus used to administer the import substitution system often created severe market distortions, some of which exist even today. These distortions included foreign currency controls, strong government intervention and ownership in the economy, high tariffs, and strong protection of inefficient firms, and complex bureaucracies which facilitated corruption.

As import substitution strategies failed, governments turned to greater export openness – many chose selective opening, through EPZs and other enclave measures to attract FDI. However, in many cases, these new strategies did not dismantle the wider institutions established for import substitution. The vestiges of the import substitution strategy, it is argued, continued to contribute to persistent market distortions. A central argument, then, is that given the current market conditions in many developing countries, it would be very difficult, though not impossible, for local entrepreneurs to function.

As in developed economies, entrepreneurship also has the potential to be the engine of economic growth through its impact on technology and innovation and the allocation and mobilization of the factors of production. However, severely distorted markets thwart the proper functioning of the entrepreneur. Entrepreneurship, therefore, is being proposed as a policy goal where significant benefits to development also accrue during the process of moving to a more entrepreneurial economy. Some of these policies, for example, would be aimed at building better business environments and strengthening governance so that entrepreneurs, both domestic and foreign, can flourish. An entrepreneurship-based development strategy should also positively affect economic growth by creating an environment in which more firms enter markets, operate and fail, thus encouraging learning spillovers and demonstration and failure externalities. By allowing the market to function with fewer encumbrances and through the actions of alert entrepreneurs, it is expected that resources (capital and labor) in developing countries will be allocated more efficiently – leading to higher economic growth.

A development strategy which encourages entrepreneurship will also focus on education, skills improvements and innovation. Such a focus will have a lasting effect not only on economic growth, but also on economic development and poverty.

Entrepreneurship is also important for new firm creation, job creation in the private sector and legitimate wealth creation. In many developing and transition countries, the public sector is a major employer and public sector employment is often a drain on economic growth as scarce government revenue must be allocated to salaries rather than to other investments such as education and infrastructure. Entrepreneurial policy will, therefore, encourage private sector development and offer productive alternatives to public sector employment.

Finally, for many developing countries, entrepreneurship, albeit necessity entrepreneurship, is already important and prevalent in their economies. However, the forms of entrepreneurship and the volume may be problematic for growth. Additionally, in many developing countries, particularly in Latin America, another type of entrepreneur – the large diversified industrial group – has been identified and serves the “gap-filling” role as entrepreneur where traditional entrepreneurs do

not exist. However, these large groups (which often form monopolies in developing countries) are not the optimal form of entrepreneurship and can be disruptive to long-term economic development. In many developing economies foreign firms (through FDI) are the main sources of entrepreneurial activity. Also governments have tried (usually unsuccessfully) to be entrepreneurial. An entrepreneurship-based development strategy will, therefore, open new avenues for the currently dormant, potential local entrepreneurs (i.e., those people with the necessary skills and capital) to play a role in the economy and to create wealth throughout the economy.

Therefore, an entrepreneurship-based development strategy which creates the institutions and incentives for productive, innovative entrepreneurship can positively impact growth and development in developing countries by (1) removing many of the distortions currently present in their markets, (2) encouraging human capital development (3) better allocating scarce resources through market processes, and (4) providing employment alternatives to the public sector. History has shown that governments, especially those in developing countries, are less efficient compared to the market in allocating resources. Indeed for developing countries which are rife with market distortions and uncertainty, the calculations and planning which would have to be completed by governments would likely fail. Entrepreneurs, therefore, acting through markets and supported by market-friendly institutions, are the best agents to achieve economic growth and development.

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Part VI
The Entrepreneurial Society

Chapter 19

The Geography of Entrepreneurship

Lawrence A. Plummer and Aviad Pe'er

Introduction

From the earliest records of ancient civilizations to present-day accounts of the knowledge-economy, the geographic concentration of people and their activity has been and always will be a constant feature of human existence. In broad historical terms, the concentration of people in villages, towns, and cities has served many cultural, security, and commercial ends (Kotkin, 2005). Dense pockets of people enable a shared culture, ease enforcement of the rule of law, facilitate a common defense, allow efficient economic exchange, and free people to acquire specialized skills and knowledge. In the modern era, the defensive walls of ancient cities have given way to the provision of public goods and the operation of local markets open to all to buy and sell consumer and commercial necessities.

Over time, the concentration of people and businesses has steadily increased. Early in the twentieth century, for example, the industrial revolution, record numbers of immigrants, and historical events raised urban population densities in the United States to unprecedented levels. The US Census records that in 1900, 40% of the population was concentrated in the nation's urban areas, but by 1920 the urban percentage of the US population had increased to 51%. From that decade on, the urban population grew steadily. Indeed, as of the 2000 Census, 79% of the US population and nearly 78% of all housing units were compressed into the nation's urban areas, which together comprise less than 3% of the country's total land area.

As went the people, so went the geographic distribution of businesses in the United States. Early in the previous decade, for example, data from the Small Business Administration indicated that 74% of all employer business establishments and 83% of all jobs were located in the nation's urban and suburban communities. Against this backdrop, firms and establishments in many industries have tended to

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congregate in particular locations, such as financial firms in New York City, furniture makers in North Carolina, domestic car production facilities in the Midwest, foreign car makers in the Southeast, music in Nashville, film production in southern California, and software development in the San Jose area. Yet, at the same time, notable companies like Microsoft, Gateway 2000, the Pella Corporation, and Ben and Jerry's Ice Cream have formed and prospered in remote corners of the United States.

Of course, the question is, "Why?" Why do entrepreneurs locate their enterprises where they do? After all, whether or not they do so consciously, entrepreneurs must choose the location for their endeavors and often opt to locate near rival operations. Theoretically, at least, the choice of region, neighborhood, or street corner is not trivial, since any location serves as a market "beachhead" for entering the competitive fray and, thus, has long-term implications for the ultimate success of new enterprises (Dierickx & Cool, 1989). In practice, this idea is not lost on the business press. No fewer than six national business publications (including *Business Week*, *Inc. Magazine*, *Forbes*, *Money*, *US News and World Report*, *Entrepreneur*, and the national family of *Business Journals*) publish competing rankings of the "best places" to start or locate a business (rankings that rarely correspond).¹

One explanation for the spatial distribution of entrepreneurial activity is the reduced transaction costs (broadly defined), particularly lower transportation and communication costs, that result from the geographic concentration of people, households, and businesses (Leamer, 2007). Greater proximity erodes physical, cultural, linguistic, and institutional barriers and reshapes the competitive forces in the marketplace by emphasizing "nearby" business and economic relationships. As a result, profitable opportunities, the entrepreneurs who pursue them, the means of exploitation, and the new firms that emerge from the entrepreneurial process are each geographically concentrated. More interesting still is the premise that the geographic distribution of economic activity is itself a product of the entrepreneurial process (Hoover & Giarratani, 1999). In short, entrepreneurship is, *and always has been*, both a cause and an outcome of the geographic distribution of economic activity.

If this has always been the case, then why has the literature seen a tremendous surge of research on the geography of entrepreneurship in the last two decades? Part of the answer is by now nearly a cliché. Thanks in no small part to the conspicuous success and prosperity of Silicon Valley's entrepreneurial firms, scholars in an array of academic fields have combined to make deciphering the near magical qualities of the San Jose area—and of industrial clusters or agglomerations in general—one of the most heavily studied interdisciplinary topics (Scott, 2000). As noted by many scholars, the timing of this research seems to conflict with the popular premise that the location of entrepreneurial activity matters little, if at all, to its emergence or success (Sorenson & Baum, 2003). Logic seems to indicate that geography,

¹Added to this mix are specialty publications like *Site Selection Magazine* and online-tools like *ZoomProspector.com* aimed at arming entrepreneurs with the tools and information they need to pick business locations wisely.

distance, proximity, agglomeration, and location are irrelevant in a modern jet-setting, web-enabled, wireless, globalized world.

In fairness, declaring the irrelevance of geography and location is not entirely unreasonable given modern-day trends. By the end of twentieth century, with the co-revolutions in transportation and communication technologies timed with the “globalization” of economic activity, it seemed as if the location of business activity no longer mattered. As a result, some declared “the death of distance” (Cairncross, 1997), pondered the “death of cities” (Kolko, 2000), and advised would-be entrepreneurs to ignore location altogether since “location is not an impediment to entrepreneurial success—you can start your firm in any location regardless of tax rates, living conditions, or other touted advantages” (Kirchhoff, 1997, 472). By 2005, this popular view reached a zenith of sorts with Thomas Friedman’s best-seller, *The World is Flat*, which contends that new technologies and business practices allow for the sharing of work and knowledge irrespective of time, distance, and even language.²

Despite such claims, geography’s demise has been more apparent than real. Cheaper means of transportation and communication *have* changed the economic landscape but not by making geography irrelevant (Rietveld & Vickerman, 2004). Instead, while transportation and communication advances diminish the role of geography in some ways, for most economic activities, such advances reaffirm the relevance of geography in new and compelling ways (Morgan, 2004). Indeed, this is why Silicon Valley and the knowledge-economy are of such interest. Given the received spatial theories, it follows that firms selling intangible (i.e., knowledge-based) goods and services not subject to transportation and communication costs should be far more “footloose” as compared to firms selling physical goods and, therefore, less likely to congregate. Yet, Silicon Valley reflects the opposite result: freed almost entirely from delivery and communication costs in the product market, it appears that knowledge-intensive firms agglomerate in order to ease costs in factor markets. In other words, geography still matters and influences entrepreneurial activity in ways that are both puzzling and fascinating.

Thus, the purpose of this chapter is to provide an introduction to, and review of, the extant literature concerning the geography of entrepreneurship. This chapter is, of course, not the first to review the relevant entrepreneurship and geography literatures (see, e.g., Rocha, 2004; Rosenthal & Strange, 2004); however, in fulfilling its purpose, this chapter offers a more integrative perspective by highlighting the interconnection between entrepreneurship and spatial economic theories. Throughout this chapter, entrepreneurship refers to the process by which profitable opportunities are discovered and exploited (Shane & Venkataraman, 2000) and to the new organizations that form as a result (Gartner, 1988). In turn, spatial economics concerns the allocation of scarce resources over space, the geographic distribution of

² In his review and critique of *The World is Flat*, Edward Leamer (2007) suggests that Friedman’s book would have been better titled *It’s a Small World After All* to reflect how cheaper transport and communication technologies now expose workers and firms to far-away competition.

economic activity, and—most crucially—the choice of location for business activity (Duranton, 2008).

From a theoretical point of view, the received literature suggests that entrepreneurship and spatial economic theories integrate in one of two ways. The majority view, emphasized especially in entrepreneurship journals, treats *geography as a proxy for local contexts*. From this perspective, the entrepreneurship process remains inherently non-spatial but varies in form, function, and outcome according to the (exogenous) spatial heterogeneity of local determinants and conditions conducive to entrepreneurial activity (e.g., social networks, institutional arrangements, knowledge spillovers, etc.), some of which are difficult to observe (cf. Armington & Acs, 2002; Stuart & Sorenson, 2003a). The minority, and more provocative, perspective envisions *entrepreneurship as an inherently spatial process* (cf. Andersson, 2005). In this view, (endogenous) spatial “frictions” (Duranton, 2008) manifest in the “spatial positioning” of entrepreneurs and “the unavoidable spatial consequences of all entrepreneurial actions” (Andersson, 2005, 35).

Given its purpose, this chapter is organized as follows. The next section provides an overview of the empirical research concerning the geography of entrepreneurship and categorizes the studies based on their respective emphases on the spatial distribution of entrepreneurs, profitable opportunities, new ventures, and the spatial nature of post-startup performance and growth. From there, the third section of this chapter highlights the (often stylized) role of the entrepreneurs in two main theoretical branches of spatial economics concerning location theory and agglomeration. In turn, the fourth section explores the role of geography in five theoretical perspectives in entrepreneurship. The fifth section then returns to the theme of this chapter, namely, the integration of spatial and entrepreneurship theories, by focusing on the challenges future research needs to overcome. The chapter concludes with some brief remarks in the sixth and final section.

Entrepreneurship, Location, and Geography

Entrepreneurship is the competitive process by which perceived profitable opportunities are discovered and exploited by alert individuals (Shane & Venkataraman, 2000) and the new organizations that emerge, grow, prosper, or fail as a result (Gartner, 1988). At the heart of this perspective are the actions of alert individuals endowed with the knowledge, experience, and insight to exploit profitable opportunities. These profitable opportunities emerge from a combination of factors, especially market imperfections and new knowledge creation (Eckhardt & Shane, 2003) and exist as objective artifacts independent of the entrepreneur (McMullen et al., 2007). In turn, it is assumed that the principal mode by which entrepreneurs exploit these opportunities is the formation of new firms—especially *de novo* entrants not legally related to incumbent firms. Finally, it is expected that the geographic distribution of people, resources, and businesses are both a cause and a consequence of the entrepreneurship process.

Therefore, it follows that researchers should, and do, find a clear empirical connection between the spatial economy and the specific constructs at the heart of the entrepreneurship process. As a result, this section categorizes the extant literature by their respective focus on the spatial distribution of individual entrepreneurs, perceived profitable opportunities, new firms, and the spatial nature of post-startup growth and performance. As is evident in the discussion, there is quite a bit of overlap in these classifications mostly because, in empirical terms, the entrepreneur cannot be observed until they start a new firm or otherwise engage in entrepreneurial activity. This overlap is also explained by the spatial distribution of the resources entrepreneurs need when exploiting opportunities, which is not explicitly surveyed in this section.³ The distribution of resources, however, is a central theme in the discussion of spatial economic theory.

Two additional clarifying points are necessary. First, space limitations preclude a full summation of the entire literature. For further reading, Cooper and Folta (2000), McCann and Folta (2008), Scott (2006), Baum and Sorenson (2003), and Rocha (2004) offer excellent reviews of and commentaries on the link between entrepreneurship and the spatial economy. Second, there are two somewhat competing assumptions in the discussion that follows (cf. Thornton, 1999). On the one hand, supply-side arguments emphasize the influence of local conditions, such as existing levels of entrepreneurial activity or human capital, on the likelihood that individuals will choose to become entrepreneurs and are especially evident in the literature on the spatial distribution of individual entrepreneurs. On the other hand, demand-side arguments stress the emergence of local opportunities, such as those arising from local market imperfections or new additions to local stocks of knowledge, as being the incentives for entrepreneurs to emerge, a view apparent in the literature on the spatial distribution of entrepreneurial opportunities.

The Spatial Distribution of Individual Entrepreneurs

The geographic distribution of entrepreneurs is not random. Indeed, the literature shows significant differences in the behavioral patterns of de novo enterprises as a function of their founders' wealth, experience, managerial skills, access to networks, knowledge, and legitimacy (Kerr & Nanda, 2007; Klepper, 2002). Successful serial entrepreneurs, for example, bring better knowledge of the founding process and greater access to social networks to their enterprises and confer a higher level of legitimacy on their enterprises compared to first-time inexperienced founders. The heterogeneity in resource levels and enterprise capabilities immediately after they appear is a good indicator as to the endowments that founders bring to the enterprise (Helfat & Lieberman, 2002). This implies several explanations for the spatial distribution of entrepreneurs; nevertheless, this discussion focuses on three overlapping

³See Sorenson and Stuart (2003a) for a discussion of the spatial distribution of venture capital.

(supply-side) conversations in the literature concerning local search, spin-offs, and occupational choice.

First, it seems that a theoretical account of the entrepreneur scanning vast areas of the economy for profitable opportunities is not an accurate description of most entrepreneurial activity. Since some of the knowledge and social capital (such as local credibility and established relationships with venture capitalists, potential strategic partners, suppliers, and customers) that entrepreneurs accumulate are anchored in the location of their former employers, they may have an advantage in locating new enterprises in those locations (Shane & Stuart, 2002). Moreover, work practices, culture, and technical terminology are often peculiar to, and vary dramatically across, specific regions (Saxenian, 1994), thus creating incentives for potential entrepreneurs to search for opportunities in locations where they have been employed previously. More generally, the search costs are lower when entrepreneurs use local social networks since spatial proximity greatly facilitates relationship formation, information exchange, and local knowledge diffusion (Krugman, 1991; Porter, 2000; Saxenian, 1994). Thus, entrepreneurs who plan to start an enterprise in a particular industry are likely to establish organizations in which they can draw on their experience in a particular location (Barnett & Carroll, 1987).

Second, along this line of argument, Steven Klepper (2002, 2004; Klepper & Sleeper, 2005) has studied industry dynamics in various sectors, including automobile, laser, and tire production. One class of entrants that has drawn his attention includes spin-off firms founded by employees of incumbent firms in the same industry. As Klepper and Thompson (2005) argue, employees leave their firms to found spin-offs in order to exploit opportunities when their view of what the parent firm should do differs significantly from the parent's strategic choices about how to proceed. In the industries Klepper and others have studied, spin-offs account for a substantial percentage of industry entrants (i.e., 17–26%); perform better compared to de novo entrants; and, in some cases, even outperform their parent firms.

This spin-off perspective is backed by ample evidence that entrepreneurs tend to stay in the immediate area where they have local connections and familiarity with local institutions (Cooper, 1984; Klepper, 2002; Reynolds, 1997; Sorenson & Audia, 2000; Zucker et al., 1998). For instance, the majority of new entrants into the chip sub-sector in Silicon Valley emerged from employees of spatially proximate firms (Boeker, 1989); the same is true for new law firms (Jaffee, 2003). In addition, more than 70% of the founders of biotechnology firms in the state of Washington founded their firms near their residence (Haug, 1995). Founders of spin-offs in the automobile industry located their firms in the Detroit area, and founders in the laser industry were likely to locate their firms in Silicon Valley (Klepper & Sleeper, 2005). Thus, based on a study of Swedish nascent entrepreneurs, Delmar and Davidsson (2000) conclude, “people stay where they are, and do not move to where new jobs are (or could be) created” (p. 14).

This conclusion also fits well with the additional evidence that employees of a given organization gain knowledge of how to operate its production technology (Sorenson & Audia, 2000), including explicit knowledge learned through instruction and tacit knowledge learned through experience. Through their normal

work, employees have low-cost access to a stock of knowledge that outsiders can obtain only at great costs (Greve, 2000). Given this view, then, it is less surprising that several American and European studies provide evidence that no more than one third of new manufacturing firms are established by unemployed individuals (Storey, 1985; Tveterås & Eide, 2000).

Finally, Parker (2004), using a simple occupational structures model, contributes to this discussion by explaining the variation in the distribution of entrepreneurs across regions and countries not completely captured by the usual economic and demographic covariates. In his model, multiple equilibriums arise when individuals observe the existing occupational structure and use the information they gain to make occupational choices that, in turn, feed into the level of human capital these individuals acquire. The high-level (low-level) entrepreneurship equilibrium arises when individuals in a given region deduce from the current local occupational structure that they have a high (low) probability of being able to prosper as entrepreneurs and, hence, choose (not) to acquire higher levels of complementary human capital. In sum, individuals will choose to become entrepreneurs when they observe the successful entrepreneurial behaviors of others. In addition, such choices ultimately perpetuate the regional level of entrepreneurial activity.

The Spatial Distribution of Entrepreneurial Opportunities

Taking a broad perspective, entrepreneurs exploit opportunities to introduce new goods and services into the market. Two commonly conceived sources of opportunities are new additions to a stock of knowledge (Schumpeter, 1934) and market imperfections due to information asymmetries (Kirzner, 1979). The extant literature suggests both sources of opportunity are decidedly spatial in character. On the one hand, the spatial distribution of knowledge and knowledge-creating activity is the central focus of the growing literature on the “geography of innovation” (Audretsch & Feldman, 1996; Feldman, 1994). On the other hand, as will be discussed later in this chapter, the spatial economics literature suggests that geography, distance, and location are in fact central sources of market imperfections, such as price distortions and information asymmetries across locations (Scotchmer & Thisse, 1992).

There is growing evidence that stocks of knowledge are geographically restricted to the region in which the knowledge was first created (Jaffe, 1989; Jaffe et al., 1993; Varga, 1998). Indeed, direct evidence provided by Anselin, Varga, and Acs (1997; 2000), using metropolitan statistical area (MSA) data, suggests that the spread of knowledge is limited to a range of approximately 50 miles. Intuition suggests that this 50-mile range is a function of the typical distances traveled by car for business purposes (Acs, 2002). It may also be suggestive of other factors, such as the structure of social networks (Sorenson, 2003; Sorenson & Baum, 2003), patterns of worker mobility (Almeida et al., 2002; Almeida & Kogut, 1997; Song et al., 2003), the distribution of knowledge-workers and scientists (Zucker et al., 1998, 2002), or localized knowledge “contagion” (Hagerstrand, 1967; Rogers, 1995).

Such localized knowledge creation, of course, translates into a range of opportunities including the potential for new products and processes, the use of specialized (shared) resources, and new organizational knowledge about effective routines and competencies. However, such knowledge tends to be “sticky” (Harhoff et al., 2003; Morrison et al., 2000) and thus less likely to migrate between locations than one might expect. As a result, Sorenson and Audia (2000) argue that the location choices of de novo entrants exhibit “geographic inertia” driven by the local identification, evaluation, and legitimization of opportunities made possible by geographically bounded social networks and other strategic factors. Pe'er, Vertinsky, and King (2008), however, argue that while the location choices of de novo entrants *across* metropolitan areas display geographic inertia (cf. Klepper, 2002; Sorenson & Audia, 2000), the location choices *within* metropolitan areas appear to be motivated by other economic strategic factors (Delmar & Shane, 2003).

The Spatial Distribution of New Ventures

As mentioned, most business activity—including the formation of new firms—takes place in “clusters,” or geographic concentrations of interrelated companies and institutions in a particular industry (see, e.g., Ellison & Glaeser, 1997; Henderson, 2003; Porter & Stern, 2001; Pouder & St. John, 1996). There is ample evidence that de novo firms often locate in existing clusters (Dumais et al., 2002; Helfat & Lieberman, 2002; Rosenthal & Strange, 2003; Stuart & Sorenson, 2003b). De novo semiconductor firms, for example, concentrate in California’s Silicon Valley and Boston’s Route 128 (Krugman, 1991; Porter, 1998; Saxenian, 1994); new biotechnology firms cluster in San Francisco, San Diego, and Boston (Stuart & Sorenson, 2003a); and new players in the US fashion sector concentrate in Manhattan’s garment district (Rosenthal & Strange, 2001). The result of such clustering is much the same in Europe. For many years, for example, about 80% of new entrants in the Italian ceramic tile sector located in the Sassuolo district (Porter, 1990; Santarelli, 2006).

What are the determinants for the concentration of new firms? Using data from US manufacturing industries, Rosenthal and Strange (2003) find that same-industry employment and business concentration impact the formation of new ventures at the zip-code level. Pe'er et al. (2008), using a longitudinal dataset of *every* incorporated Canadian establishment, find a moderating effect of initial endowments of resources and capabilities on the relationship between a location’s economic characteristics and the probability of entry. They find that a marginal increase in local resources or capabilities attracts de novo entrants but repulses diversifying entrants (cf. Shaver & Flyer, 2000). Rather than causing entrepreneurs to flee agglomerated areas, a marginal increase in resources causes them to seek out such locations. Finally, Prevezer (1997) and Aharonson, Baum, and Feldman (2007) provide evidence of clustering in the biotechnology industry, noting that the main attraction agent for new firms entering the biotechnology industry was the presence of a strong relevant science base (universities, laboratories, large research productive incumbents, etc.)

in a particular location. Similarly, Zucker, Darby, and Brewer (1998) suggested that clustering of new biotechnology firms is associated with higher numbers of “star scientists.”

It is quite clear, then, that the pattern of new firm concentration is quite complex. Dumais, Ellison, and Glaeser (2002), for instance, decompose dynamic changes in agglomeration into plant entries, expansions, and closures by new and existing firms. The timing and magnitude of the effects of agglomeration externalities associated with these components are quite different. In particular, the results indicate that new firm plants have a “de-agglomerating” effect in that such entries generally locate away from the periphery of existing agglomerations where labor is more available. In contrast, existing firm plants tend to locate closer to the center of existing agglomerations where the pool of potential suppliers is greater. Given the locations of new firm plants, the results also indicate that plant growth (in employment terms) is faster and that the risk of closure is greater at the geographic periphery of industry concentrations. This implies that entrepreneurs attempt to ease the competition for land and workers.

The Geography of Post-Startup Performance

The empirical findings on new venture performance in clusters present a paradox (cf. McCann & Folta, 2008). On the one hand, the geographic concentration of business activity is purported to generate many economic and competitive advantages for co-located firms (Cooper & Folta, 2000; Folta et al., 2006; Gilbert et al., 2008; Parr, 2002). This is especially true of new firms given the argument that they depend more on external economies than do their established counterparts (Cooper & Folta, 2000). Findings suggest that new ventures clustered with other firms are more innovative (Baptista & Swann, 1998; Beaudry & Breschi, 2003), are more productive (Henderson, 2003), grow faster with less volatility (McCann & Folta, 2008), enjoy higher valuations (DeCarolis & Deeds, 1999), and are—ultimately—more competitive (Porter, 2000). For instance Visser (1999) shows that small, clustered firms had higher sales than small, isolated firms in the Peru garment industry. Further, Beaudry and Swann (2009) find that firm growth was positively related to total same-sector employment within the cluster.

On the other hand, agglomeration also has its performance disadvantages. New firms in especially concentrated areas face higher operational costs driven higher by the effects of congestion (Sedgley & Elmslie, 2001, 2004) and by wage, input price, and rent inflation (Hoover & Giarratani, 1999). Glaeser and Maré (2001), for example, find that the wages paid to workers in urban areas include an average 33% premium. Similarly, Holmes (1998) finds that those firms in the pantyhose industry concentrated in North Carolina had 12% higher “purchased input intensities” (i.e., the dollar value of purchased inputs divided by sales) than did other firms in the industry nationwide. Even patent licensing fees have been shown to be higher in more densely concentrated areas (Katz & Shapiro, 1986; Poddar & Sinha, 2004).

Such agglomeration diseconomies may make a new firm less productive or less profitable (Folta et al., 2006).

This paradox is perhaps most apparent in the evidence that new firms perform better when clustered but face a higher risk of failure (McCann & Folta, 2008). Regions with higher birth rates, for example, also experience higher failure rates (Baum & Mezias, 1992; Folta et al., 2006; Hannan & Carroll, 1992; Hannan & Freeman, 1977; Sorenson & Audia, 2000); “precisely the opposite of what one would expect in a world of rational entrepreneurs” (Sørensen & Sorenson, 2003, 77). However, Pe'er and Vertinsky (2009) find that the smallness of new firms is less of a liability in clusters than it is in more isolated areas, while the survival value of growth in clusters is lower than that in isolation. In other words, it would seem that clustered new firms face less pressure to grow rapidly.

One explanation for Pe'er and Vertinsky's (2009) findings is that the liabilities of smallness and newness are less in clusters by facilitating the development of market recognition and legitimacy; creating opportunities for differentiation, specialization, and customization; forging partnerships with purchasers; and improving customer and market knowledge. In particular, proximity to thick product markets presents a new venture with opportunities to specialize and serve narrow market niches in which it can be noticed despite its small size. Correspondingly, proximity to thick input markets tends to reduce input prices, increase opportunities for outsourcing and strategic alliances, and permit tighter quality and supply-chain controls. The combination of these factors places less pressure on clustered new firms to expand their internal production capacities, thus reducing the survival value of growth.

The Entrepreneur in Spatial Economics

The discussion in the previous section gives the impression that scholarly interest in the connection between the spatial economy and the entrepreneur is a recent development. As mentioned in the introduction, however, this is not the case. The location choices and preferences of entrepreneurs has long been a focus of spatial economics, which, like the field of entrepreneurship, represents an eclectic cross-section of theoretical perspectives and ideologies. Indeed, the spatial economics literature fans out in multiple branches variously labeled economic geography, geographical economics, regional science, urban economics, regional economics, and location theory. Newer branches of the field include new economic geography, new industrial districts, and regional development. While the breadth of the field is somewhat overwhelming, there are several excellent reviews and primers for further reading, including those by Kilkenny and Thisse (1999), Ottaviano and Thisse (2004), Duranton and Puga (2004), Jovanovic (2001), and Hoover and Giartanni (1999).⁴

⁴Another tremendous introductory resource is the voluminous website of Günter Krümme, Professor (emeritus) of Geography, at the University of Washington.

As a whole, spatial economics builds on “three facts of economic life” (Hoover & Giarratani, 1999): the natural characteristics and advantages of particular locations, the “externalities” in the form of the benefits and costs due to the geographic distribution of economic activity, and the role of transport and communication costs in daily life. In more technical terms, these “facts” reflect the imperfect mobility of productive factors, the imperfect divisibility of production and business activity, and the imperfect mobility of goods and services (Hoover & Giarratani, 1999). As such, spatial economics lends itself to any level of analysis, including global and national economies, industries, firms, and plants; individual buildings; the location of specific departments or operations within firms; and even the placement of desks, wastebaskets, and work areas.

Given the emphasis on imperfectly mobile resources, spatial economic theory suggests that location choice can be driven by “first nature” features, such as the geologic landscape, climate, positions of physical and labor resources, and even access to transportation hubs and regional business infrastructures (Ottaviano & Thisse, 2004). Naturally, the premise of first nature emphasizes the entrepreneur’s location choice as driven by *exogenous* spatial characteristics. In this context, the locations of the Boeing Company, which started as a lumberyard on the Duwamish River outside of Seattle, and the Hershey Company, were arguably determined by the availability of timber and milk, respectively (Hoover & Giarratani, 1999; Serling, 1992).⁵

First nature features help explain broad spatial patterns of economic activity. In the United States, for example, much of Interstate I-95, a major north–south US highway, traces a geologic “fall line” from North Carolina to Rhode Island almost exactly. The fall line marks an important geologic boundary where continental bedrock on the west side meets the sandy coastal plain on the east side of the thoroughfare (Murphey, 1982). Consequently, like a string of pearls, this interstate highway links several major US cities, which, as the geology allowed, were each born out of the entrepreneurial process as centers of water-powered industry and/or inland trading posts at the head of waters that lead to the sea. Not surprisingly, then, these first nature features provide a good explanation for the location of some economic activities, such as heavy manufacturing or wholesale trade.

First nature features, however, do not explain the location of economic activities that are less dependent on natural or exogenous features as adequately, especially knowledge-intensive activities. As a result, many argue that the true aim of spatial economics is to understand the role of *endogenous* “second nature” features—those that emerge from human economic activity after controlling for first nature—that shape the spatial distribution of economic activity (Ottaviano & Thisse, 2004). At the core of these second nature features is the balance of the centripetal forces of “agglomeration economies,” which reward the concentration of economic activity, against the centrifugal forces of “agglomeration diseconomies,” which reward its dispersion (Fujita et al., 1999; Hoover & Giarratani, 1999; Krugman, 1995).

⁵The case of Hershey is quite interesting. After being unsuccessful at making candy in Philadelphia, Chicago, Denver, New York, and Lancaster, Milton Hershey ultimately decided to locate his company’s operations in rural Hershey, Pennsylvania, as much out of frustration as the location’s proximity to dairy farms and consumer markets.

Overlaying these forces are emergent business norms and practices, especially those that engender mutual cooperation and openness (Saxenian, 1994), and local institutional arrangements (Casson, 2003b; North, 1990).

First Nature: Location Theory

Much of modern spatial economics owes its existence to the German tradition of location theory (Scott, 2000). As it is, location theory is not a single body of work or a unified perspective but rather consists of several interrelated branches of thought that include von Thünen's land-use theory, Weber's theory of industrial location, Christaller's and Lösch's central place theory, and—although not part of the German legacy—Hotelling's spatial competition (Jovanovic, 2001). Common to all of these perspectives is a (neo)classical, deductive reasoning based on varyingly rigid assumptions. As a result, location theory models typically emphasize the role of first nature features and are often static and normative in the sense that optimal spatial patterns are prescribed based on the modeled assumptions and conditions (Krugman, 1995).

To many, the father of spatial economics is Johan-Heinrich von Thünen, the originator of *land-use theory*. His seminal work, *The Isolated State* (1966), combines the suppositions that crops differ in their yield per acre and are costly to transport to city markets. Through his analysis, von Thünen concludes that a “land rent gradient” leads to a series of rings around the city in which different crops are cultivated or different farming methods are used depending on the distance to the city market. Von Thünen's ideas are updated and modernized in William Alonso's (1964) theory of the “monocentric city,” which substitutes commuters and homeowners for von Thünen's farmers and landowners and a central business district (CBD) for the city center. As with von Thünen's theory, Alonso predicts that the interplay of land prices and transportation costs leads entrepreneurs to locate office-based businesses in the CBD (i.e., the city center) ringed sequentially by manufacturing firms, residential housing, and, finally, farming and resource extracting operations. Not surprisingly, Alonso's theory remains the basis for the extensive empirical and theoretical urban economics, zoning and planning, and land use literature (Fujita et al., 1999).

Whereas von Thünen's work centered on which crop to produce at a given location, in *The Theory of the Location of Industries* (1929), Alfred Weber concerned himself with the optimal location for industrial plants so as to maximize firms' profits by minimizing production and transportation costs. Indeed, given the realities of the relationship between the characteristics of a good produced (i.e., its weight and the location of raw materials), the costs of production, and the costs of delivery (i.e., the location of markets), *industrial location theory* concludes that there can be only one location for the production of certain goods (Jovanovic, 2001). As a result, entrepreneurs—the rational and perfectly informed owners of firms—will cluster their enterprises to produce such products at the optimal locations. In turn, such clustering enables “joint action spaces” in which the firms enjoy cost savings due to the spatial

concentration. Weber's acknowledgement of such cost reductions gives him credit as one of the first scholars to identify economies of agglomeration (Bergman & Feser, 1999).

There are two notable extensions of Weber's theory of industrial location. First, although as vague as Weber when defining agglomeration economies, Edgar Hoover (1937) introduced the now-accepted distinction between localization economies enabled by the co-location of firms from the same industry and urbanization economies made possible by the co-location of firms from diverse industries. Second, Leon Moses' (1958) integration of Weber's theory with more general theories of production makes it possible to treat production inputs as substitutes for geographic location. In many respects, Moses' insight anticipates the revolutionary improvements in transportation and communications technologies in the late twentieth century that enabled entrepreneurs to overcome, to some extent, the liabilities of unfavorable locations.

In contrast to the theories of von Thünen and Weber—both of which take the spatial structure of the economy as a given when predicting entrepreneurs' location choices—Walter Christaller (1966) and August Lösch (1954) each contributed to *central place theory* in which location choice is taken as the given. Assuming a uniform distribution of resources and consumer preference for buying from the nearest seller within a maximum range, the trade-off between internal economies of scale and transportation costs leads to a "lattice" of central places, each serving a surrounding market (Fujita et al., 1999). Moreover, because the production of some goods can only be sustained by a market with a larger number of buyers, a hierarchy of lower-order and higher-order central places emerges. In other words, whereas the provision of some goods is well served in small towns or villages, an array of larger-scale activities are better sustained by large cities (Christaller, 1966). Thus, like Weber's theory (1929), central place theory predicts that some economic activities can only be performed in specific locations.

The premise of central place theory is quite intuitive and fits well with the observation that cities of similar size are generally equidistant; however, some criticize central place theory as an overly clever application of mathematical geometry to economic analysis (Fujita et al., 1999). In addition, because central place theory takes the motives and decisions of the actors in the model as givens, the theory is probably the least accommodating of the entrepreneur's role in the spatial economy. Instead, the major strength of this perspective is its utility as a classification scheme for identifying and categorizing the many factors that define the location of economic activities (Fujita et al., 1999; Jovanovic, 2001). In addition, some of the core concepts of central place theory, such as market size (i.e., threshold) and market range, are found in the spatial competition literature.

The origins of *spatial competition theory*—although not part of the Germanic tradition—is credited to Harold Hotelling (1929). Instead of focusing on the location of production per se, Hotelling's perspective emphasizes the rivalry between entrepreneurs in their jockeying for locations that allow better access to customers and markets. Like his location theory counterparts, Hotelling grounds his argument on several stylized assumptions—zero production costs, homogenous products, and

consumer preference to purchase from the nearest seller—that make location choice the entrepreneur's the central focus of the entrepreneur (Hoover & Giarratani, 1999; Schoenberger, 2000). In a general sense, Hotelling's model makes the entrepreneur's profits an exclusive function of the enterprise's location and its geographic market size.

There are two dimensions of the Hotelling (1929) model that are particularly insightful and relevant to entrepreneurship. First, by establishing imperfect competition as a function of geography, Hotelling opened the door to most to incorporating location into models of monopolistic competition, in particular, and theories of the competitive process, in general (Schoenberger, 2000). Second, Hotelling's model demonstrates that the competition for location—especially when viewed as an iteration of competitive actions and reactions—explains the spatial distribution of economic activity as being the result of non-cooperative behaviors. Indeed, depending on certain conditions, spatial competition can be a dispersive force, causing entrepreneurs to locate their enterprises in isolation, or it can be a cohesive force, encouraging entrepreneurs to locate their enterprises close together (Hoover & Giarratani, 1999). Whether such competition leads firms to scatter or cluster appears to be chiefly a function of the pricing strategies of the firms involved (Eaton & Lipsey, 1977).

Second Nature: The Forces of Agglomeration

The emphasis on second nature features in the spatial economy is one of the many legacies of Alfred Marshall. In his *Principles of Economics* (1920) first published in 1890, Marshall suggested that “industrial districts,” and the “external economies” they generate, explain why a firm would find it advantageous to produce its goods in close proximity to other firms. Perhaps the oldest debate in spatial economics is whether the external or agglomeration economies that most impact a firm's performance originate from within or between industries (Hoover, 1948). This debate is sometimes framed as pitting Marshall's (1920) emphasis on “localization economies” that arise from the clustering of firms within industries against Jane Jacobs' (1969, 1984) arguments for “urbanization economies” that arise from the agglomeration of firms across a diversity of industries. Framing the debate this way, although helpful conceptually, is not entirely accurate since Marshall recognized the influence of both types of external economies.

For Marshall—as well as for many modern spatial economists—there are three *sources of agglomeration economies* that emerge principally on the production-side of economic activity (Fujita et al., 1999; Marshall, 1920). First, the geographic concentration of firms in an industrial center allows for the local pooling of workers with specialized skills and abilities. Second, as with a pooled labor market, agglomeration supports the provision of specialized (i.e., industry-specific) non-labor inputs and business services in greater variety and at a lower cost that would be possible otherwise. Finally, the close proximity of firms enables the flow and spillover of knowledge between firms.

This perspective has its roots in the following, oft-cited passage:

The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously. Good work is rightly appreciated, inventions and improvements in machinery, in processes and the general organization of the business have their merits promptly discussed: if one man starts a new idea, it is taken up by others and combined with suggestions of their own; and thus it becomes the source of further new ideas. And presently subsidiary trades grow up in the neighbourhood, supplying it with implements and materials, organizing its traffic, and in many ways conducting to the economy of its material. (Marshall, 1920, IV.X.7)⁶

Although production-side economies are most often emphasized, agglomeration economies also arise on the consumption-side. Consumption effects, which are the core of retail and “shopping mall” models of concentration, include economies in the supply of household goods (e.g., food, clothing, and shelter), public goods (e.g., transportation), and other “consumption amenities” (e.g., theaters, restaurants, etc.) (Krugman, 1995, 1998; Rosenthal & Strange, 2004). By definition, these consumption-side agglomeration economies reduce consumer costs or satisfy consumers’ preference for variety (Krugman, 1998). Moreover, in concert with production-side agglomeration economies, these consumption externalities contribute to a “home market effect,” which entails internal economies within firms interacting with the external economies of agglomeration to trigger a self-reinforcing process by which more firms and more workers (i.e., consumers) concentrate in a particular location (Rosenthal & Strange, 2004).

Of course, the forces of agglomeration are not always positive. Agglomeration diseconomies, which serve to reduce productivity and/or increase the cost of production or consumption, tend to manifest in two broad forms: congestion and, as discussed earlier, spatial competition. Congestion, in particular, is seen as the central countering force to agglomeration economies (Duranton & Puga, 2004; Ottaviano & Thisse, 2004; Rosenthal & Strange, 2004) and usually emerges as spikes in commuting costs/time, increased pollution, higher crime rates, diminished education quality, and other socially and economically eroding effects (Moretti, 2004; Rosenthal & Strange, 2004). In addition, urban congestion may also impede the flow and diffusion of knowledge spillovers within cities (Sedgley & Elmslie, 2001). Moreover, spatial competition suggests that entrepreneurs seek to locate their operations in isolated areas (Eaton & Lipsey, 1977; Kilkeny & Thisse, 1999).

One problem with second nature features is that it is nearly impossible to isolate a single source of agglomeration externalities empirically. As a result, most studies—even those that explore a specific source—focus on what Rosenthal and Strange (2004) refer to as the *scope of agglomeration externalities*. As Rosenthal

⁶ The reference to Marshall’s *Principles* is made to the 8th edition, published in 1920, which is available online at the Library of Economics and Liberty (www.econlib.org). The numbering scheme (e.g., IV.X.7) refers to the cited paragraph with the roman numerals referring first to the book number (IV) and then to the chapter number (IX) and the Arabic numeral referring finally to the paragraph number (25).

and Strange (2004) summarize, the total effect of agglomeration externalities is contingent on geographic, industrial, temporal, and organizational “distances” between neighboring firms. Thus, the geographic scope concerns the physical distance between firms; industrial scope refers to the degree of market overlap between firms; and temporal scope concerns the onset, duration, and timing of spatial interactions between firms. Organizational scope, in turn, refers to the similarity in the internal characteristics (e.g., size) of neighboring firms.

The Spatial Economy in Entrepreneurship

If the review of the empirical literature implies a recent interest in the geography of entrepreneurship, it also gives an impression that geography is simply a theoretical lens for viewing what is essentially a non-spatial process of entrepreneurship. The discussion of spatial economics in the previous section challenges both impressions, given the historical roots of location and agglomeration theories that clearly invoke the role of the entrepreneur as a central economic actor. The problem, however, is that the conception of the entrepreneur in spatial economics seems too stylized, reactive, and rationally “mechanical” (Jovanovic, 2001; Scotchmer & Thisse, 1992) to provide a framework that is satisfying to entrepreneurship scholars. In particular, the more robust view found in the entrepreneurship literature is absent from the spatial economics literature, largely because spatial economic theories—like their neoclassical counterparts—often build on assumptions that minimize or assume away the more nuanced and complex decision-making functions of the entrepreneur.

Fortunately, the role of geography is as much evident in the entrepreneurship literature as it is in spatial economics. Indeed, the review of the empirical literature reveals the many influences of geography on the central features of the entrepreneurship process, including on the individual, profitable opportunities, new firms, and even regions and localized industries. More precisely, it is clear that the role of geography is a central feature of many theories of entrepreneurship (cf. Casson, 2003a). Five of these theories in particular—the individual–opportunity nexus, Kirzner’s Austrian view, Schumpeter’s creative destruction and new combinations, institutional theory, and organizational ecology—clearly invoke the role of geography and are discussed here with the aim of highlighting the theoretical role of the spatial economy in the entrepreneurship process. Collectively, these five frameworks conceptualize geography as the source of opportunities, the potential of new markets, the emergence of business practices and norms, and the dynamics of entrepreneurial regions.

The Spatial Nature of the Individual–Opportunity Nexus

Shane and Venkataraman (2000, 218) define entrepreneurship as the study “of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited” (p. 218). Given this definition, they contend that entrepreneurship encompasses three targets of attention: (1) the

sources of entrepreneurial opportunities, (2) the processes by which these opportunities are discovered, evaluated, and exploited, and (3) the individuals who pursue these opportunities and the actions they take to do so. According to Shane (2003), this framework incorporates and extends received theories of entrepreneurship, including those of both Kirzner (1997) and Schumpeter (1934), by focusing on the interface between economic opportunity and the alert, enterprising individual.

As such, Shane and Venkataraman (2000) describe entrepreneurship as “a mechanism by which temporal and *spatial inefficiencies* in an economy are discovered and mitigated” (p. 219, emphasis added). In fact, an entrepreneurial discovery occurs when an alert individual notices and comes to believe that the output or value of a given resource could be higher if sold at another time, in another form, or *in another location*. This implies opportunities in markets for both products and inputs. Not surprisingly, then, the role of geography in the individual–opportunity nexus framework appears repeatedly. For example, Shane (2003), citing evidence that higher urban densities enable the transfer of information and knowledge, increase the number of entrepreneurial role models, and facilitate the vicarious learning of individuals by observing the entrepreneurial actions of others, acknowledges that the “evidence supports the argument that urbanization is a source of entrepreneurial opportunity” (p. 29).

In terms of the process of discovery and exploitation, Venkataraman (2004) explicitly acknowledges that neither the alert individuals nor the entrepreneurial opportunities at the heart of the individual–opportunity nexus are uniformly distributed geographically and that efforts to promote entrepreneurial activity in a given region must include steps to attract and retain both. He argues that some municipalities’ attempts to mimic the entrepreneurial success of Silicon Valley and Boston’s Route 128 by transforming a region’s “tangibles” (e.g., changing tax laws, improving capital markets and financial systems, and investing in physical infrastructures) often fail because the intangible qualities that attract and retain entrepreneurial talent are often ignored. Without talented people and good ideas, most investments flow directly to low-quality ventures and magnify a vicious cycle that further suppresses the emergence of the truly “transformative” entrepreneurial activity desired.

The Spatial Nature of the Austrian Entrepreneur

The premise that “spatial inefficiencies” are a source of entrepreneurial opportunity derives from Israel Kirzner’s Austrian view of entrepreneurship (Herbert & Link, 2006). Austrian theory emphasizes the alertness of individuals to new profit opportunities in the market and the actions they take following the discovery of a profitable opportunity, which often encompasses a broad type of arbitrage. Kirzner (1973) emphasizes “entrepreneurship as a responding agency” (p. 74), in which individuals alert to and pursuing opportunities already in existence drive the economy into equilibrium. As such, it is the entrepreneur who possesses “a rarified, abstract type of knowledge—the knowledge of where to obtain information (or other resources) and how to deploy it” (Kirzner, 1979, 8).

The spatial nature of the Austrian view is strongly implied in multiple facets of the entrepreneurship process and, especially, in the rhetorical devices used to describe them (cf. Casson, 2003a). Kirzner's (1979) clever use of the Robinson Crusoe story as a device to illustrate his ideas on the relationship between spontaneous learning and profit, which depends greatly on the character's isolation on an uninhabited island, necessarily implies the spatial nature of entrepreneurship. Likewise, Roger Koppl and Maria Minniti's (2003) use of a tongue-in-cheek vignette of a professor discovering that an alternate route for walking to class allows him to avoid his (apparently annoying) dean to explain the discovery of new means-ends relationships also has a strong spatial flavor. Casson (2003a) too notes the "spatial analogy" of Körner's Austrian theory of the entrepreneur, which "supposes the entrepreneur to have built a watchtower which enables him to recognize a much wider market than anyone else" (p. 65).

Perhaps nowhere is the spatial analogy of the Austrian entrepreneur more strongly implied than in the "bill on the sidewalk" principle. Holcombe (2003), working to extend Kirzner's theory by focusing on the origins of opportunity, compares the discovery of an entrepreneurial opportunity to finding money on the sidewalk. While some people walk right past the money without seeing it, another individual alert to the bill on the sidewalk picks up the money and profits from it. Indeed, as Holcombe (2003) explains, "because the ability to recognize an opportunity will often come only from some specific knowledge of time and space" (p. 28), an opportunity is typically acted upon "by those in the proximity of the opportunity" (p. 35). Thus, for Holcombe, the necessary proximity of alert individuals to opportunities, coupled with the premise that entrepreneurship is itself an important source of entrepreneurial activity, helps explain why entrepreneurial activity tends to cluster in places like Silicon Valley.

Following similar clues about the spatial nature of the Austrian entrepreneur, David Andersson (2005) offers a more direct link between Kirzner's theory and spatial economics. In particular, he shows how the Austrian view of entrepreneurship informs spatial economic theory and vice-versa. Andersson (2005) contends that there is an "unavoidable 'spatial positioning' of entrepreneurs that may in itself be the result of entrepreneurial alertness to profit opportunities" (p. 21). This spatial positioning of entrepreneurs, he argues, arises in part from their discovery of superior locations that magnify their alertness (and proximity) to future opportunities. In this case, "the appearance of the location as an object of choice is itself an instance of unplanned discovery, which is the result of (correctly or erroneously perceived) profit opportunities that the entrepreneur has discovered" (Andersson, 2005, 25). Moreover, in a spatial context, there are two dimensions to such entrepreneurial discovery: (1) the perception of favorable future streams of revenue at a given location and (2) the opportunity for profit in revenue–cost margins *across* locations.⁷ Thus,

⁷ Andersson (2005) suggests that this second dimension of entrepreneurial discovery is most fitting with Kirzner's theory of entrepreneurial discovery. In the spatial context, the entrepreneur may exploit discrepancies in output revenues and input costs, where costs include the price of land and "space-bridging" expenses.

by fully developing the link between entrepreneurship and the spatial distribution of economic activity, more robust theories of entrepreneurship will emerge.

The Spatial Nature of the Schumpeterian Entrepreneur

The view of entrepreneurship as a spatial phenomenon also fits with Schumpeter's perspective. In particular, as the empirical literature implies, there has been a shift from an economy in which the innovative activities of large established firms are the prime cause of economic development (Schumpeter, 1942) to an economy in which entrepreneurs play a key role in economic growth and renewal (Audretsch & Thurik, 2001). The research on the spatial distribution of entrepreneurial opportunities, as discussed earlier, suggests that the entrepreneurial economy is driven by local innovation processes through which entrepreneurs entering the market constantly seek to fulfill unmet market demands in ways that are more effective and efficient.

Schumpeter (1942) suggested that through their innovations, entrepreneurs that enter the market render their rivals obsolete, destroy their profits, and lead them to exit. Schumpeter posited that this process of creative destruction, facilitated by episodic switches in technological regimes and markets throughout the economy, is the key endogenous driver of economic growth in capitalistic systems. Recent studies, linking measures of regional entrepreneurial activity to regional economic growth (Acs & Plummer, 2005; Acs et al., 2009; Audretsch & Fritsch, 2002, 2003) suggest the possibility that in addition to the global Schumpeterian process of creative destruction, there are processes of industrial renewal and destruction operating at a local level.

Along these lines, Pe'er and Vertinsky (2008) argue for a process in which exits of older firms release resources that stimulate local entry. While the Schumpeterian process of creative destruction explains the consequences of radical technological shifts in which new entrants introduce superior new technologies or products, thereby making incumbents' technologies and products obsolete and forcing them to exit (or innovate), the local creative destruction process explains the course through which technologies change incrementally. Through this process, new technologies are built on know-how and inputs embodied in existing technologies. Unlike the standard Schumpeterian process in which the act of creation destroys incumbents, local creative destruction is an endogenous evolutionary process of renewal in which value is created in a location through a recombination of existing resources. This recombination of resources (including intangible resources, such as knowledge) can improve the way products and services are offered, modify existing products and services to reflect local tastes more fully, and/or introduce products and services that are new to the location. Unlike the standard Schumpeterian creative destruction process, the local process of creative destruction is triggered by the local availability of released resources and leads to increases in productivity.

Of course, the premise of new combinations is central to Schumpeter's framework and includes the creation of new markets. Following this line of thinking, Davidsson (2004) explicitly includes the selling of existing products in new

geographic markets in his definition of entrepreneurship. Specifically, Davidsson follows Herbert Simon's (in Sarasvathy, 2000) perspective and defines entrepreneurship as the introduction of new economic activity that leads to change in the marketplace. In that sense, either an entirely new market emerges or the activity is new to an existing market. As such, he argues that entrepreneurship scholars should not dismiss geographic market expansion as "the 'simple' repetition of successful recipes in new contexts" because the outcome "may well be as revolutionary for the consumers and competitors in that market as it was for consumers and competitors in the markets where the businesses originated" (Davidsson, 2004, 10).

The Spatial Nature of the Institutional Entrepreneur

The geographic expansion of markets as part of the entrepreneurship process also tends to force the evolution of the institutions or institutional environments conducive to entrepreneurial activity. Although there is tremendous variation in the literature's definitions, institutions generally refer to the conventions or "rules of the game" that govern human, social, and economic interactions (Scott, 2001). While economists like Douglass North (1990) describe institutions as the "human devised rules that shape human interaction" (p. 3), sociologists like Meyer and Rowan (1991) emphasize conventions (i.e., social processes, obligations, and actualities) "that take a rule-like status in social thought and action" (p. 42). Within this view, it seems clear that the conditions conducive to entrepreneurial activity differ from place to place both within and across national boundaries, if for no other reason than the differences in local, national, and international laws and regulations (Scott, 2001).

The effect of the institutional environment on the entrepreneurial process is not trivial and goes beyond shaping the abilities, motivations, and actions of would-be entrepreneurs. Meyer and Rowan (1991), for example, argue that institutions lead to the emergence of "rationalized professions," like law or accounting, each replete with unique social rules, licensing requirements, certification systems, and schools. From these rationalized professions, "formalized organizational programs" that define the functions of business (e.g., sales, marketing, accounting, and research and development) emerge as highly institutionalized "prefabricated formulas" or "business recipes" that legitimize the organizations that incorporate them (Meyer & Rowan, 1991). Within given regions, these institutional "programs" become "littered around the societal landscape" making it easier for organizations to emerge because "it takes *little* entrepreneurial energy to assemble them into a structure" (p. 44, emphasis added). In other words, where rationalized institutions arise, the levels of entrepreneurial activity are higher.

Of course, this begs the question of how these rationalized institutional rules emerge and differ from place to place. Douglass North (1990) answers this question by contending that the emergence and evolution of the "rules of the game" are a direct result of entrepreneurs "tinkering at the fringes of the economy." As an example, North notes that, historically, many of the world's economic regions initially

emerged as “geographically specialized” centers of production. As entrepreneurs established interregional trade as well as the informal rules for governing such exchange, formal institutions—such as systems of weights and measures and currency exchange—became necessary, especially when the centers of trade did not share the same informal institutions (e.g., social and cultural economic norms). This implies (1) that institutions diffuse spatially as trade routes and communication channels allow and (2) that where formal institutions are weak, informal institutions dominate as the rules of exchange.⁸

The Spatial Nature of the Entrepreneur in Organizational Ecology

The emergence of institutions as population-level rules of exchange obviously overlaps with similar perspectives in the organizational ecology literature. However, where institutional theory emphasizes the rules of the game that emerge from the entrepreneurial process, the rich literature in organizational ecology contributes significantly to our understanding of organizational founding in geographical spaces, especially with respect to the role population densities play in determining founding rates. Indeed, organizational ecology emphasizes the populations of organizations sharing a common form and the argument that founding processes are attributes of populations but not of individual organizations because no organization can exist prior to it being founded (Baum, 1996, 79). As a result, most ecological theories predict that the rate at which organizations will appear at a given location depends on specified conditions and contextual environmental causes that vary across locations (Carroll & Khessina, 2005).

Hannan (1986), for example, in his path-breaking paper, argued that population density drives two countervailing processes or forces: legitimacy and competition. On the one hand, increases in the local population density in areas with low initial density levels enhance the legitimacy or social acceptance of entrants, making it easy for them to assemble the resources they need to prosper in a given location. On the other hand, as population density grows, so does competition, thereby making new entry more difficult. Thus, changes in population density and the balance of these two forces manifest as an inverted U-shaped relationship between entry and population density (Hannan & Carroll, 1992). In particular, as population density grows from zero, the effects of legitimacy encourage higher rates of entry, but as the number of players approaches the limit that can be supported in an area, the effects of competition lead to lower rates of entry.

Although founding is an important theme in ecological research, new firms or organizations that emerge have typically been treated as identical additions to homogenous populations (Baum & Shipilov, 2006). However, “the problem of

⁸Hernando de Soto (1989) finds this to be the case in Peru, where large informal housing, trade, and transportation markets account for a surprisingly large portion of domestic economic activity. For example, the investment in the informal transportation sector alone is estimated at over \$1 billion (\$620 million for the transportation fleet and \$400 million in related infrastructure).

studying founding as occurring in an homogeneous population context is that not all potential founders are equally at risk of starting organizations or equally able to take advantage of local opportunities to mobilize resources because exposure to information and availability of opportunities vary significantly across space and time” (Lomi, 1995, 116). Similarly, competitive dynamics may be significantly different in heterogeneous populations (e.g., populations with some large firms and many small ones) as compared to homogeneous populations (e.g., populations with similar size firms) (Baum & Haveman, 1997; Hannan & Freeman, 1977). Thus, selecting the population as the unit of analysis creates some difficulties in dealing with the heterogeneity of the entrant population.

One approach used by ecologists to deal with heterogeneity in the population is to account for unobservable factors related to cross-sectional structures of organizational populations in their model estimations (Lomi, 1995). While these statistical procedures correct for the overestimation of density effects, they do not provide insight into the roles different kinds of heterogeneity play in determining the appearance of entrants in a specific location. An alternative approach is to specify the fine-grained population substructures in which organizations are founded (cf. Baum & Haveman, 1997). However, the absence of theories that specify the appropriate population substructures a priori when dealing with the impact of competition on founding leads ecologists to implicitly (and at times explicitly) invoke strategic (economic) reasoning attributed to nascent organizations (cf. Greve, 2002).

Indeed, density dependence theory in its basic form makes implicit assumptions about reasoned choice. Firms are assumed to locate in dispersed places to avoid the intense competition characteristic of dense areas. The reliance on assumptions of rationality and accurate market information are even higher when niche space is explicitly operationalized and entities are assumed to locate to differentiate and reduce competition (Carroll & Khessina, 2005). For example, differentiation (in terms of service locations, product attributes, and prices) must reflect rather complex strategic choices, as Baum and Mezias (1992) and Baum and Haveman (1997) found in hotel foundings in Manhattan.

The spatial dimension of the organizational ecology perspective is especially evident in a study of the American brewing industry (Carroll & Wade, 1991), which argues that competition operates at a different geographic level for foundings than it does for failures. Similarly, in their paper on the European automobile industry, Hannan, Dundon, Carroll, and Torres (1995) found that legitimation tends to flow across countries, while competition occurs locally— i.e., density-dependent processes operate at different levels of spatial analysis. Based on his study of Italian rural banks, Lomi (1995) suggests that no real “difference in legitimation was found across models based on local and non-local specification of density, competition is seven times stronger at the regional than at the national level” (p. 137). Similarly, the spatial reach of density for the Tokyo banking industry was found to be limited (Greve, 2000). Organizations compete more intensely with similarly sized organizations. Consequently, competition among large or small organizations is more intense than competition between large and small organizations. Indeed size-localized competition has received empirical support across several sectors (Baum & Mezias,

1992; Ranger-Moore et al., 1995). Especially relevant, Baum and Haveman (1997) showed that localized competitive processes shape key entrepreneurial decisions, such as location in product and geographic spaces at founding.

Toward Entrepreneurship as a Spatial Process

The discussion in the three preceding sections suggests a deep, interwoven connection between entrepreneurship and spatial economics well beyond the shared focus on Silicon Valley and comparable spaces of dynamic economic activity. First, the empirical literature reviewed in section two indicates a clear and significant relationship between the spatial economy and the entrepreneurship process. Second, the spatial economics literature discussed in section three has historically acknowledged and incorporated the role of the entrepreneur in explanations of the spatial economy. Third, as summarized in the previous section, multiple theories of entrepreneurship explicitly acknowledge the influence of the spatial economy on the role and function of the entrepreneur. Much of these discussions, however, captures the majority view of geography as a proxy or surrogate for the influence of local context or conditions on the process of entrepreneurship. Less evident in these discussions is the need for a more complete integration of entrepreneurship and spatial economic frameworks to resolve the superficial treatment of the entrepreneur in spatial economics and of geography in entrepreneurship (cf. Andersson, 2005; Casson, 2003a).

Entrepreneurship scholars, for example, are likely to find the treatment of the entrepreneur in the spatial economic literature less than satisfactory. As with mainstream economics, it seems that much of spatial economics assumes away actual human behaviors by viewing spatial economic outcomes as the automatic result of rational, perfectly informed actors optimizing the locations of their enterprises given the features of the spatial economy. Thus, at best, the entrepreneur serves a highly stylized and one-dimensional function more akin to the Walrasian auctioneer calling out trial prices than to the more complete decision-making actor portrayed in the entrepreneurship literature. At worst, the function of the entrepreneur is nonexistent (or taken as a given), as it is in central place theory. This aside, the strength of spatial economics theory is evident in its ability to frame entrepreneurship as a spatial process in which the features of the spatial economy are both cause and outcome of the discovery and exploitation of profitable opportunities.

In contrast, spatial economists are likely to find the theoretical treatment of geography in the entrepreneurship literature just as unsatisfactory as the treatment of the entrepreneur in spatial economics. The references to the spatial attributes of the economy in entrepreneurship theories are vague and incomplete. Shane and Venkataraman's (2000) suggestion, almost in passing, that entrepreneurship resolves "spatial inefficiencies" in the economy is a case in point; although geographic space and location are invoked explicitly, the concepts are never defined. This is also the case with references to "populations" and "institutional environments" in the organizational ecology and institutional theory literatures since it is not clear at what

scale the effects of location and geography operate. Again, such issues aside, the strength of the entrepreneurship literature, of course, lies in its description of the entrepreneur, which is by definition far more robust and complete than in the spatial economics literature.

It seems, then, that the time is right to merge entrepreneurship and spatial economic theories into an integrated view of entrepreneurship as a spatial process. Such integration certainly seems feasible, especially since both literatures share intellectual genealogy. For example, the three theoretical traditions of Frank Knight, Joseph Schumpeter, and Ludwig von Mises, which are the cornerstones of modern entrepreneurship theory, flow directly from the work of Richard Cantillon, a scholar also credited as a “father” of spatial economics (Herbert & Link, 2006).⁹ Likewise, Marshall (1920) and von Thünen (1966) had as much to say about the role of the entrepreneur in the economy as they did about the location and spatial distribution of economic activity. In fact, although von Thünen is best known for his theory of land use—which to this day is a mainstay of urban economics—he was also among the first scholars to distinguish the role and residual claims of the entrepreneur from those of the capitalist (Herbert & Link, 2006).

The crucial question is whether integrating entrepreneurship and spatial economic theories into a coherent whole would necessarily enhance or improve the descriptive and predictive power of the frameworks in either field. There is little question that a framework of entrepreneurship as a spatial process would offer a more realistic view of the entrepreneur and the modern economy, but more realism alone does not necessarily translate into better theory in general or superior predictive qualities in particular (Fujita et al., 1999; Scotchmer & Thisse, 1992). Instead, it follows that the effort to integrate entrepreneurship and spatial theoretical frameworks should focus on resolving the limitations of one theoretical framework by invoking or integrating the perspectives offered by another relevant theory. As it turns out, it appears that there are several opportunities to do this in the context of the geography of entrepreneurship.

As such, this section gives a sense of how the integration of entrepreneurship and spatial economic theories might proceed. In particular, the focus of the remainder of this section is on the opportunities for and challenges of developing a theory of entrepreneurship as a spatial process. The discussion specifically emphasizes the theoretical opportunities and challenges, including (1) the relationship between market imperfections and profitable opportunities, (2) the use of entrepreneurship theory

⁹Being distant intellectual cousins may explain the omission of both the entrepreneur and geography in more mainstream frameworks, especially in economics. Indeed, for much of the twentieth century, both the role of location and the function of the entrepreneur were largely ignored in mainstream economic theory because of the great difficulty of incorporating either in formal mathematical economic models. Thus, just as the entrepreneur was “expunged” from neoclassical economics (Baumol, 1968), so too were location and space because of their modeling complexity. Not surprisingly, those decrying the omission of either the entrepreneur or space from mainstream economic theory share many common objections to the rigid and stylized assumptions of neoclassical economic theory. As an example, readers are encouraged to compare the critiques of mainstream economic theory in Casson (2003a) and Scotchmer and Thisse (1992).

to resolve the potential tautology of agglomeration economies, and (3) the need to move beyond the conventional notion of clusters that tends to assume away key aspects of geography. There is, of course, an array of methodological challenges to be resolved and addressed if a theory of entrepreneurship as a spatial process is to be built and validated, but these matters are dealt with quite effectively elsewhere.¹⁰

Market Imperfections and Entrepreneurial Opportunities

One particularly provocative connection between entrepreneurship and spatial economics is their common emphasis on competition. At their cores, both entrepreneurship and spatial economic theories deal fundamentally with market competition, usually within the paradigm of market equilibrium, with the former emphasizing the actions of perceptive individuals given uncertainty and the latter by highlighting the interplay of imperfect mobility and market prices. The clearest way to appreciate this connection is to recognize that “space inevitably *leads* to imperfections in competition” (Scotchmer & Thisse, 1992, 270, emphasis added), while the actions of entrepreneurs to create pure profit *resolve* such imperfections (Kirzner, 1997). As a result, a spatial theory of entrepreneurship might explain the sources and mitigations of market imperfections in the spatial economy. For entrepreneurship scholars especially, such a theory would speak to the origins of entrepreneurial opportunity, a subject that has been relatively unexplored (Holcombe, 2003; McMullen et al., 2007; Plummer, Haynie, & Godesiabois, 2007).

Moreover, a spatial theory of entrepreneurship may help resolve a central dilemma in many spatial economic frameworks known as the “spatial impossibility theorem.” Specifically, since the introduction of geographic space into neoclassical economic models emphasizes the interactions of proximate economic agents, market competition is necessarily limited to a few firms and is thus unavoidably oligopolistic; in other words, the introduction of geography (in the form of transportation costs) renders any notion of a perfectly competitive equilibrium untenable (Scotchmer & Thisse, 1992). The “nonexistence” of a competitive equilibrium—especially in interregional trade models—means the price mechanism so central to neoclassical economics breaks down in spatial economic models. The nonexistence of price equilibrium is profound and implies any number of possibilities,

¹⁰ The relevant methodological issues are addressed by several scholars (e.g., Davidsson, 2004; Davidsson & Wiklund, 2000; McCann & Folta, 2008; Parker, 2004, 2008; Pe'er & Vertinsky, 2009). On the entrepreneurship side, Davidsson (2004), for example, includes an extensive discussion of sampling data by spatial units in his book on researching entrepreneurship. In addition, the forthcoming special issue on entrepreneurship research methods includes a primer on the application of estimation methods robust to spatial dependence (Plummer, 2010). On the spatial economics side, researchers should consult several reviews and critiques of the literature (Martin, 1999; Martin & Sunley, 2003; Rosenthal & Strange, 2004) and one study by Henderson (2003), which Rosenthal and Strange (2004) hold in highest regard. The extensive spatial econometrics literature is equally germane (Anselin, 1988, 2001; LeSage, 1999; Sarafoglou & Paelinck, 2008).

including a fundamental need to rethink most textbook views of market competition (Scotchmer & Thisse, 1992).

One solution to the nonexistence problem is revising the view of human behavior in a way that eschews the actions and preferences of rational, perfectly informed actors. As Scotchmer and Thisse (1992) put it, the “extreme predictability of consumers seems unwarranted and we would therefore [plead] for a richer model of individual behavior founded on the work of psychologists” (p. 279). By modeling heterogeneity in consumer preferences (whether static or stochastic), for example, it follows that firms (i.e., entrepreneurs) are imperfectly informed about their customers and thus uncertain about how to satisfy consumer needs best. As the influence of factors other than proximity (e.g., uncertainty or product heterogeneity) on consumer choice is introduced theoretically, a “perfect” equilibrium is once again possible in any configuration of locations in the spatial economy. More importantly, this logic opens the door for entrepreneurship scholars to propose solutions to the nonexistence problem faced by spatial economists. After all, the development of psychology-based frameworks of entrepreneurial behavior, cognition, and heuristics in the context of uncertainty is a specialty of entrepreneurship scholars (cf. Alvarez & Busenitz, 2001).

Entrepreneurial cognition frameworks aside, a broader solution to the nonexistence problem may be found by integrating the price-equilibrating process found in entrepreneurship theory (especially the Austrian view) into spatial economic theory (cf. Andersson, 2005). To illustrate this point, consider the work of Hotelling (1929), who concluded that his spatial competition model predicts that firms selling undifferentiated products will cluster in response to competition as part of a “principle of minimum differentiation.” Scotchmer and Thisse (1992), however, summarize several spatial economic studies that contradict Hotelling’s thesis and suggest instead a “principle of differentiation” whereby firms disperse geographically in response to competition. Scotchmer and Thisse (1992) suggest that the source of the contradiction is a fundamental flaw in Hotelling’s original formulation. Specifically, where the entrepreneurs in Hotelling’s original model only choose locations, the entrepreneurs in modern extensions of Hotelling’s model choose locations *and* set prices at the same time (see, e.g. Beckman, 1998; d’Aspremont, Gabszewicz, & Thisse, 1979; Eaton & Lipsey, 1977, 1979; Greenhut & Ohta, 1979). This small and subtle difference yields the direct opposite of Hotelling’s conclusion, but more importantly, it implies that one shortcoming of Hotelling’s theory is the incomplete view of the entrepreneur’s decision-making function.

The Tautology of Agglomeration Economies

One of the thorniest challenges to overcome is the difficulty of integrating the role of the entrepreneur into spatial economic theories of second nature features, especially agglomeration economies. For example, in a general equilibrium framework, arguing that entrepreneurs pick locations to leverage the effects of agglomeration invites the criticism of tautology, “like the jibe of the physicist who

said, “So economists believe that companies agglomerate because of agglomeration economies” (Krugman, 2000, 50). In particular, since agglomeration economies do not emerge until *after* firms cluster, agglomeration economies cannot be the (initial) cause for the clustering of firms. Krugman’s new economic geography model (Krugman, 1998, 2000) avoids the potential tautology by arguing that firms agglomerate when transportation costs are reduced; however, this theory builds on so many rigid and stylized assumptions that the model is nearly impossible to explore empirically (Neary, 2001).

An alternative, although speculative, solution to the perceived tautology is to consider the role of the entrepreneur in making judgmental decisions about future values or prices in the context of uncertainty (Casson, 2003a). In this view, entrepreneurs may choose—after careful consideration of both first- and second-nature features—to co-locate their enterprises in *anticipation* that agglomeration economies will emerge from industry clustering. After all, this is arguably what occurs with the development of new shopping malls and industrial parks, since mall developers anticipate consumption-side agglomeration economies that reduce consumers’ transport costs and satisfy their preference for variety (cf. Eaton & Lipsey, 1979), while industrial park developers anticipate production-side agglomeration economies (cf. Cooper, 1984). This premise is already supported by evidence that entrepreneurs actively seek the benefits of knowledge spillovers when selecting the location of their enterprises (Aharonson et al., 2007).

The Logical Limits of “Clusters”

Partial-equilibrium frameworks also avoid the perceived tautology of agglomeration economies by assuming the existence of clusters and agglomeration economies, which then weigh on the location decisions and actions of entrepreneurs (Kilkenny & Thisse, 1999). Unfortunately, taking the existence of clusters or agglomeration economies as given has the troubling consequence of assuming away the features of geography that are the focus of interest. For example, Porter’s (1998) notion of an industry cluster—vaguely defined as “a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities” (p. 199)—is especially problematic since it is not clear how and at what physical distance firms are interconnected (Martin & Sunley, 2003). Porter (1998) even admits that defining the boundaries of industry clusters “is often a matter of degree, and involves a creative process” (p. 202).

As such, many entrepreneurship scholars exploring partial-equilibrium frameworks like Porter’s clusters often focus their analyses on firms within a given industry (e.g., biotechnology or software) or by category (e.g., high-tech) located within “representative” agglomerations (e.g., counties or metropolitan areas). The problem is that there is nothing inherent in the concept of clusters or agglomerations to indicate how, and at what geographic scale, the effects of any externalities operate (Martin & Sunley, 2003; Rosenthal & Strange, 2004). Indeed, especially

in Porter's loose construction of the concept, there is neither reason to expect that firms within the same industry are necessarily "interconnected" nor any reason to think that metropolitan statistical areas are representative of a cluster. Thus, most notions of agglomerations, regions, districts, etc., make it quite difficult to explore and validate the geographic scale and structure by which the effects of interest operate.

Moreover, this tendency to focus on the clustering of same-sector enterprises also makes it difficult to explore the different types of externalities produced by firm concentrations (Parr, 2002; Pe'er & Vertinsky, 2009). In particular, a firm's spatial proximity to other same-sector enterprises, to suppliers, and to customers, respectively, generates different types of externalities and thus different strategic options for the entrepreneur to pursue. A firm's proximity to purchasers, for example, creates options for market niche specialization and differentiation through better customer relations. Similarly, proximity to suppliers creates opportunities for outsourcing, while proximity to same-sector enterprise concentrations allows for better access to managerial resources and know-how, spillovers, and resource sharing. Overlooking the types of cluster externalities restricts the usefulness of the cluster conceptualization, especially when studying the efforts of entrepreneurs to adapt their enterprises strategically to fit local conditions (Pe'er & Vertinsky, 2009).¹¹

All of this seems to suggest that a satisfying spatial theory of entrepreneurship should make it possible to reverse the "clusters logic" of defining geographic space first and then analyzing the economic and entrepreneurial activity within given spatial units. That is, instead of "nesting" populations of entrepreneurs and new ventures within given spatial units of analysis (e.g., counties or cities), the theory would build up from the micro-level of the entrepreneur (cf. Andersson, 2005). In effect, this would be quite similar to Nelson and Winter (1982) building their evolutionary theory of firms and economic change based off of the concept of "organizational routines." However, perhaps controversially, this would mean the abandonment of population-level frameworks (like Porter's clusters), portions of organizational ecology, and even the new economic geography model in favor of more micro-level frameworks like Hotelling's model of spatial competition and its modern variants.

¹¹In fact, Pe'er and Vertinsky (2009) develop a more nuanced theoretical approach to explore the relationships between growth strategies available for new entrants and agglomeration externalities, analyzing the distinct characteristic of externalities that are produced by each population and focusing on the micro-foundations of these externalities in moderating the positive and negative impacts of growth on survival. They argue that even when functionally similar strategic options are created by different cluster types—e.g., generating opportunities for outsourcing by proximate suppliers or production sharing with same-sector firms (potential competitors)—the risks associated with these options vary considerably and, thus, require different types of interactions to exercise those options.

Unanswered Questions and Future Directions

Building a theory of entrepreneurship as a spatial process has already begun (e.g., Andersson, 2005), but a number of important questions remain unanswered. Spatial economists, for example, are focused on answering questions on the physical, temporal, and technological “distances” at which agglomeration externalities operate (Rosenthal & Strange, 2004). As Martin and Sunley (2003) see it, the question of physical distance or range limits aside, the list of key unanswered questions includes (p. 10) “At what level of industrial aggregation should a cluster be defined, and what range of related or associated industries and activities should be included? How strong do the linkages between firms have to be? How economically specialized does a local concentration of firms have to be to constitute a cluster?” The most common approach to capturing industry relatedness, for example, is indexing firms by standard industrial classification (SIC) or by North American industrial classification system (NAICS) codes (Martin & Sunley, 2003; Rosenthal & Strange, 2004), but it is not clear from extant theory if this is the best method (Martin & Sunley, 2003; Rosenthal & Strange, 2004).

Correspondingly, management scholars like McCann and Folta (2008) offer a set of unanswered questions for future research quite similar to those proposed by spatial economists. Their questions encompass a broad range of unresolved issues, such as reconciling the evidence of agglomeration benefits with lower survival rates, exploring differences in supply-side and demand-side effects of agglomeration, and analyzing the potential for adverse selection within agglomerations. One way McCann and Folta (2008) diverge from spatial economists is in their call for the exploration of agglomeration’s impact on governance forms and organizational structures. As mentioned, Rosenthal and Strange (2004) include organizational “distances” as a focus of the spatial economics literature, but it would seem that a full and nuanced exploration of the organizational scope of agglomeration externalities is an area very well suited for management scholars.

Most importantly, spatial economists and management scholars agree on two sets of unanswered questions that may be addressed by a spatial theory of entrepreneurship. The first set of questions address the geographic distance at which agglomeration benefits accrue. A common premise regarding agglomeration externalities is that the magnitude of any effect diminishes with distance, a notion that reflects the First Law of Geography, which states that “everything is related to everything else, but near things are more related than distant things” (Tobler, 1970, 236). Henderson (2003), for example, finds that the effect of agglomeration externalities is evident within, but not between, counties, while Rosenthal and Strange (2003) find that the effects of agglomeration externalities are strongest within one mile and attenuate quickly out to a distance of 15 miles. Finally, using a sample of European firms, Duranton and Overman (2005) provide indirect evidence that the geographic scale at which the effects of agglomeration externalities are strongest is within 50 kilometers.

Although there is a tendency to treat the matter of geographic distance strictly as an empirical question (McCann & Folta, 2008), the spatially constrained actions of

the entrepreneur may form the basis of a theoretical answer to this question. Acs, Audretsch, Braunerhjelm, and Carlsson (2009), in their “knowledge spillover theory of entrepreneurship,” argue that the entrepreneur is the mechanism by which new knowledge is converted into economically useful knowledge. As such, the average limits of the entrepreneur’s commute and travel-for-work distances help explain the clear empirical evidence of spatially bounded knowledge spillovers (e.g., Varga, 1998). In other words, a principal contribution of a spatial theory of entrepreneurship may be to help define a priori terms like “local,” “proximate,” “nearby,” and “neighboring.” Indeed, it follows that a crucial attribute of such a theory is the ability to explain the emergence and nature of entrepreneurial activity at geographically isolated locations.

The second set of questions addresses the temporal dynamics of agglomeration. For example, Martin and Sunley (2003) argue that a key objective of agglomeration research should be to specify a priori how and under what conditions agglomeration externalities emerge and develop over time. After all, there seems to be little reason to expect that the onset of any agglomeration externalities following *changes* in the geographic concentration of economic activity is instantaneous (Anselin, 2001; Fothergrill, Gudgin, Kitson, & Monk, 1985; Martin & Sunley, 2003). This would seem especially true of knowledge spillovers if knowledge search, face-to-face networking, and organizational learning take time. Nevertheless, most studies treat agglomeration externalities as instantaneous by studying contemporaneous effects (Rosenthal & Strange, 2004).

In one of the few longitudinal studies, Henderson (2003) finds that the impact of same-industry economies on plant productivity carries forward for as many as 5 years, while some between-industry economies seem to carry forward for 20 years. Such evidence raises interesting questions regarding the timing and duration of agglomeration externalities including the possibility that the long-term effect of industry clustering may function as an accumulation of multiple effects having shorter durations (Rosenthal & Strange, 2004). Moreover, exploring agglomeration externalities as a dynamic process opens interesting avenues for research (Dumais et al., 2002), including the possibility that agglomeration externalities flow between firms in one period to firms yet to be born. One immediately wonders, then, whether the timing of geographic effects is explained by the entrepreneurial process of opportunity discovery, evaluation, and exploitation, especially if the process is decidedly “local.”¹²

Ultimately, the research discussed in this chapter suggests that the effects of location and geography are not overly deterministic factors in the entrepreneurship process in the sense that the actions of the entrepreneurs are not the automatic, rational responses to local environments. In other words, scholars must recognize that while entrepreneurship is an inherently spatial process, “geography is not destiny” (Henderson, 1999, 233). Instead, entrepreneurs can and do take actions to seek

¹² This also suggests that a spatial theory of entrepreneurship should encompass extant research on nascent entrepreneurship (e.g., Lichtenstein et al., 2007; Reynolds et al., 2004).

out, avoid, mitigate, and/or magnify the effects of location and geography as they pursue perceived opportunity. With that said, it is also obvious from this discussion that more work remains and that there is ample opportunity for those new to the study of entrepreneurship to contribute to an important and fascinating scholarly conversation.

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Chapter 20

The Impact of Entrepreneurship on Economic Growth

Martin A. Carree and A. Roy Thurik

Introduction

Since the late 1980s, we have witnessed many studies examining the consequences of entrepreneurship in terms of economic performance. This literature is generally restricted to two units of observation – that of the firm (or establishment) and that of the region. It is clear that an increased economic performance by firms and regions will positively affect aggregated economic growth at the country level. A sizeable body of literature analyzing the impact of entrepreneurship on economic performance at the level of the firm (or establishment) emerged. These studies typically measure economic performance in terms of firm growth and survival (Audretsch, 1995; Caves, 1998; Davidsson et al., 2006; Sutton, 1997). The compelling stylized fact emerging from this literature is that entrepreneurial activity, measured in terms of firm size and age, is positively related to growth.¹ New and (very) small firms grow, on average, systematically larger than large and established incumbents. These findings hold across Western economies and across time periods. The link between entrepreneurship and performance is also extended beyond the firm as unit of observation to focus on geographic regions. A small body of literature developed linking measures of entrepreneurial activity for regions to the economic performance of those regions (Acs & Armington, 2004; Audretsch & Fritsch, 2002).

Studies considering the impact of entrepreneurship on performance where the country is the unit of observation are notably scarce, despite the efforts of the Global Entrepreneurship Monitor (GEM) research program (Reynolds et al., 2005). The

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¹See Audretsch et al. (2004) and Santarelli et al. (2006) for a survey of studies dealing with (violations of) Gibrat's Law.

purpose of this chapter is to provide a survey of what is known about the links between entrepreneurial activity and (macro)economic growth. Notwithstanding the numerous claims made linking entrepreneurship to subsequent economic growth, the relative void here may be attributable to a paucity of theoretical frameworks linking entrepreneurship to growth as well as severe constraints in measuring entrepreneurship in a cross-national context. The reversed causality of economic development as it influences entrepreneurial activities is a further challenge. In this chapter, we provide overviews of the relevant literature and complement them with some new material.² We concentrate on economically developed economies (OECD countries) and do not discuss the (sizeable presence of) self-employment in the agricultural sector.

Explanations for economic growth have generally been restricted to the realm of macro-economics (Krugman, 1991; Lucas, 1988; Romer, 1990). However, a different scholarly tradition linking growth to industrial organization dates back at least to Schumpeter (1934). According to this tradition, performance, measured in terms of economic growth, is shaped by whether or not the industry structure utilizes scarce resources as efficiently as possible. This (most efficient) industrial structure does not alter if its underlying determinants are stable. However, as Chandler (1990), Scherer and Ross (1990) and Dosi (1988) emphasize, a change in the underlying determinants would be expected to result in a change in the industry structure most conducive to growth. Certainly, Chandler (1990) and Scherer and Ross (1990) identified a shift in industry structure toward increased centralization and concentration throughout the first two thirds of the previous century as a result of changes in the underlying technology, along with other factors.

More recently, it appears that technological change, globalization, deregulation, shifts in the labor supply, variety in demand, and resulting higher levels of uncertainty have shifted industry structure away from greater concentration and centralization and toward lesser concentration and decentralization (Thurik, 2009). A series of empirical studies find two systematic responses in the industry structure to the changes in the underlying determinants. The *first* is that the industry structure is generally shifting toward an increased role for small firms. The *second* is that the extent and timing of this shift varies across countries. Apparently, institutions and policies in select countries facilitate a greater and more rapid response to technological change and globalization, along with the other underlying factors, by shifting to a less centralized and more dispersed industry structure than is present in other

²Other recent overviews of the literature include Audretsch et al. (2006) and Braunerhjelm (2008), focusing on the key role of entrepreneurs (who benefit from knowledge spillovers) in achieving growth. Parker (2009) devotes part of Chapter 11 to a literature survey of entrepreneurship and aggregate growth. In their literature survey of the relative contributions of entrepreneurs, Praag and Versloot (2007) distinguish four measures: employment, innovation, productivity, and individual utility levels. Carree and Thurik (2006) present a collection of seminal articles.

countries. The question of whether countries that have shifted toward a greater role for entrepreneurship enjoy stronger growth is of great importance to policymakers (Audretsch et al., 2007).

Entrepreneurship is “at the heart of national advantage” (Porter, 1990, 125). Concerning the role of entrepreneurship in stimulating economic growth, many links have been discussed. It is of the utmost importance in carrying out innovations and enhancing rivalry. This directs our attention to two related phenomena of the 1980s and 1990s: the resurgence of small businesses and the revival of entrepreneurship. There is ample evidence that economic activity moved away from large firms to small firms in the 1970s and the 1980s. The most impressive and also the most cited development was the employment share of the 500 largest American firms, the so-called Fortune 500. Collectively, these firms accounted for 20% of employment in the United States in 1970; by 1996 this share had dropped to 8.5% (Carlsson, 1992, 1999).

Both Acs and Audretsch (1993) and Carlsson (1992) provide evidence concerning manufacturing industries in countries in varying stages of economic development. Carlsson advances two explanations for the shift toward smallness. The *first* deals with fundamental changes in the world economy from the 1970s onward. These changes relate to the intensification of global competition, the increase in the degree of uncertainty and the growth of market fragmentation. The *second* deals with changes in the character of technological progress. He shows that flexible automation has various effects, resulting in a shift from large to smaller firms. Also, Piore and Sable (1984) argue that the instability of markets in the 1970s resulted in the demise of mass production and promoted flexible specialization. This fundamental change in the path of technological development led to the occurrence of vast diseconomies of scale.

Brock and Evans (1989) argue that the shift away from large firms is not confined to manufacturing industries. They provide four more reasons why this shift has occurred: (1) the increase in labor supply, leading to lower real wages and coinciding with an increasing level of education; (2) changes in consumer tastes; (3) relaxation of (entry) regulations; and (4) the fact that we are in a period of creative destruction. Loveman and Sengenberger (1991) stress the influence of two trends of industrial restructuring: the formation of new business communities as well as decentralization and vertical disintegration. These intermediate forms of market coordination flourish as a result of declining transaction costs. Furthermore, they emphasize the role of public and private policies in the promotion of the small business sector. Audretsch and Thurik (2000) point to the necessary shift toward knowledge-based economies as the driving force behind the move from large to small businesses. In their view, globalization and technological advancements are the major determinants of this challenge of the Western countries. In Freytag and Thurik (2010) a range of cultural aspects is covered. See also Davidsson (1995).

The causes of this shift are one aspect. Its consequences cover a different area of research. Acs (1992) is among the first to discuss them. He distinguishes four consequences of the increased importance of small firms: entrepreneurship, routes

of innovation, industry dynamics, and job generation. He makes two claims. First, small firms play an important role in the economy by serving as agents of change because of their entrepreneurial activity. Second, small firms are the source of considerable innovative activity, stimulating industry evolution, and creating an important share of new jobs. Acs and Audretsch (1990) and Audretsch (1995) are key references because of their consideration of the role of smallness in the process of innovative activity. See also Cohen and Klepper (1992), who discuss the role of firm size and diversity in technological progress. The role of small firms in the job creation process remains controversial.³

The reevaluation of the role of small firms is related to a renewed attention being paid to the role of entrepreneurship in firms. If the size class distribution has an influence on growth, it must be differences in organization that matter. The major difference between the organization of a large firm and that of a small one is the role of ownership and management. In a small firm, usually there is one person (or a very small group of people) in control who shapes the firm and its future. The role of such a person is often described using the term “entrepreneurship.” Furthermore, many stress the role of the entrepreneur in implementing innovations.⁴ Attention is also given to the more aggregated role of entrepreneurship in economic development, i.e., in the functioning of markets. Many economists and politicians now note the positive impact of entrepreneurship on the growth of GDP and employment. This renewed interest of politicians and economists coincides with a revival of business ownership rates in most Western economies.

The remainder of this chapter is as follows. In Section 2, we will deal with the influence of economic development on entrepreneurship. In Section 3, types of entrepreneurship and their relation to economic growth are discussed. The effect of the choice between entrepreneurship and employment is covered in Section 4. Section 5 considers with entrepreneurship in endogenous growth models. Section 6 discusses empirical evidence. The topic of Section 7 is the time lag between entrepreneurial activity and economic performance. This is an important topic, since the impact of entrepreneurship on economic growth is unlikely to be instantaneous. Section 8 concludes. The general emphasis will be on the role of entrepreneurship for economic development at the macro-economic level. Readers not interested in the sometimes rigorous approach of the economic sciences can skip the mathematical expositions of sections 3, 4, and 5.

³See Carree and Klomp (1996) and Davis et al. (1996) for further discussion.

⁴This has led to the knowledge spillover theory approaches (Audretsch, 2007; Audretsch & Keilbach, 2008; Audretsch et al., 2006) which are dealt with elsewhere in this *Handbook of Entrepreneurship Research*. Entrepreneurship can contribute to growth by serving as a mechanism to help knowledge spilling over or to permeate the filter which impedes this spillover. The knowledge spillover theory attributes importance not just to the role of persons but also to that of regional agglomerations of knowledge activities (entrepreneurship capital) which then become the breeding ground of growth.

The Influence of Economic Development on Entrepreneurship

In this section, we discuss how business ownership rates are influenced by economic development.⁵ We pay attention to the role that the “Schumpeterian regime switch” played in this relationship. We discuss the pre-1970s era of declining business ownership rates and the period thereafter, in which the rates rose in most Western economies. The emphasis of the succeeding sections will be on how the business ownership rate at the economy-wide level influences the extent of structural transformation and subsequent economic growth.

Joseph Schumpeter’s contribution to our understanding of the mechanisms of technological progress and economic development is widely recognized. In *The Theory of Economic Development* (1934), he emphasizes the role of the entrepreneur as prime cause of economic development. He describes how the innovating entrepreneur challenges incumbent firms by introducing new inventions that make current technologies and products obsolete. This process of creative destruction is the main characteristic of what has been called the Schumpeter Mark I regime. In *Capitalism, Socialism and Democracy* (1950), Schumpeter focuses on innovative activities of large and established firms. He describes how large firms outperform their smaller counterparts in the innovation and appropriation process through a strong positive feedback loop from innovation to increased R&D activities. This process of creative accumulation is the main characteristic of the Schumpeter Mark II regime.

The extent that either of the Schumpeterian technological regimes prevails in any given time period and industry varies. It may depend upon the nature of knowledge required to innovate, opportunities for appropriability, the degree of scale (dis)economies, the institutional environment, the importance of absorptive capacity, demand variety, etc. Industries experiencing a Schumpeter Mark II regime are likely to develop a concentrated market structure, in contrast to industries in a Schumpeter Mark I regime, where small firms proliferate.

Decline of Business Ownership

The first three quarters of the twentieth century can be described as a period of accumulation. From the Second Industrial Revolution through the 1970s, the large firm share rose in most industries and in the economy as a whole. This was the period of “scale and scope” (Chandler, 1990). It was the era of the hierarchical industrial firm that grew progressively larger by exploiting economies of scale and scope in areas such as production, distribution, marketing, and R&D. The conglomerate merger wave of the late 1960s seemed to further the trend. The period

⁵A full account of the relation between entrepreneurship and economic development and whether and why it would be U-shaped is given in Wennekers et al. (2010).

has the characteristics of a Schumpeter Mark II regime, with a declining small firm presence in most industries. The policies of (European) governments also contributed to this decline by promoting large business. The self-employed proportion of the labor force decreased in most Western countries until the mid-1970s. Several authors (Blau, 1987; Kuznets, 1971; Schultz, 1990; Yamada, 1996) report a negative relationship between economic development and the business ownership (self-employment) rate.⁶ After the mid-1970s, this decline ended and even reversed in many Western countries and industries. Many old and large firms lost ground to their small, new, and more entrepreneurial counterparts. This is seen as a regime switch (reversal of the trend) from Schumpeter Mark II to Schumpeter Mark I. Audretsch and Thurik (2001) label this as a regime switch from a managed to an entrepreneurial economy.

Reversal of the Trend

After the mid-1970s, the self-employment rate started to rise in most modern economies. Blau (1987) observes that, while the proportion of self-employed in the nonagricultural US labor force declined during most of the twentieth century, this decline bottomed out in the early 1970s and then rose until at least 1982.⁷ Elsewhere business ownership increased in several other countries as well.⁸ Audretsch and Thurik (2001) show that the business ownership growth rate was higher in the period 1998–1986 than in the period 1986–1974 for 16 out of 23 OECD countries. Other authors provide evidence of a reversal of the trend toward less self-employment. Acs et al. (1994) report that of 23 OECD countries, 15 experienced an increase in the self-employment rate during the 1970s and the 1980s. They show that the weighted average of the self-employment rate in OECD countries rose slightly, from 8.4% in 1978 to 8.9% in 1987. Audretsch and Thurik (2001) show that this growth accelerates in the 1990s. During this era, large firms started downsizing and restructuring in order to concentrate on “core business.” In the meantime, the

⁶Some theoretical models propose to explain the decline of self-employment and of small business presence in general. Lucas (1978) shows how rising real wages may raise the opportunity cost of self-employment relative to the return. Given an underlying “managerial” talent distribution this induces marginal entrepreneurs (in this context, Lucas refers to managers) to become employees. This pushes up the average firm size. Iyigun and Owen (1998) develop a model implying that economic development is associated with a decline in the number of entrepreneurs relative to the total number of employees. They argue that fewer individuals are willing to run the risk associated with becoming an entrepreneur as “safe” professional earnings rise with economic development. See also Schaffner (1993).

⁷Other sources showing that the increase in the importance of large businesses has come to a halt in Western countries are Carlsson (1989), Loveman and Sengenberger (1991), Acs and Audretsch (1993), Acs (1996) and Thurik (1999).

⁸The US (non-agricultural) self-employment rate was stable at around 10% for many years. However, in the 2003–2007 period the rate went up in countries like France, Germany, the Netherlands and Sweden. See, e.g., the Compendia data in Carree et al. (2007).

entrepreneur rose from the dead. Innovative high-technology small firms came to the forefront of technological development in many (new) industries.

There are several well-documented reasons for the revival of small business and self-employment in Western economies.⁹ *First*, the last quarter of the twentieth century may be seen as a period of creative destruction. Piore and Sabel (1984) use the term “Industrial Divide,” Jensen (1993) prefers the term “Third Industrial Revolution,” and Freeman and Perez (1988) interpret the period as the transition from the fourth to the fifth Kondratiev wave. The most obvious evidence is the emergence of new industries like software and biotechnology. Small firms play an important role in these new industries. Acs and Audretsch (1987) provide empirical evidence that small firms have a relative innovative advantage over their larger counterparts in such highly innovative industries. Evidence for the comparative advantage of small firms in inventing radical new products is also given in Prusa and Schmitz (1991) and Rothwell (1983, 1984).

Second, new technologies reduced the importance of scale economies in many sectors. Small technology-based firms started to challenge large companies that still had confidence in mass production techniques (Carlsson, 1989; Meredith, 1987). Fiegenbaum and Karnani (1991) show how small firms can benefit from being more “flexible.” Jensen argues that “It is far less valuable for people to be in the same geographical location to work together effectively, and this is encouraging smaller, more efficient, entrepreneurial organizing units that cooperate through technology” (Jensen, 1993, 842). This idea is supported by Jovanovic’s claim that “recent advances in information technology have made market-based coordination cheaper relative to internal coordination and have partially caused the recent decline in firm size and diversification” (Jovanovic, 1993, 221).

Third, deregulation and privatization movements swept the world. In many Western countries, there are strong tendencies to deregulate and privatize (OECD, 1995, 39–49). Phillips (1985) reports that small firms dominated the creation of new businesses and new jobs in deregulated industry sectors in the United States during the early 1980s.¹⁰ In addition, governments acknowledge and promote the role of small (startup) firms in establishing economic growth and development (OECD, 1998).

Fourth, there is a tendency of large firms to concentrate on their “core competences” (Carlsson, 1989). Jovanovic (1993) reports that, consequently, the 1980s were characterized by corporate spin-offs and divestment. Aiginger and Tichy (1991) blame the opportunistic conglomerate merger wave of the late 1960s for much of the “back-to-basics” and downsizing (or rightsizing) tendencies.

Fifth, increasing incomes and wealth led to an increase in the demand for variety (Jackson, 1984). Cross-cultural influences also increase the demand for variety. Small firms are often the most obvious suppliers of new and specialized products.

⁹Brock and Evans (1986) were the first to provide a detailed overview.

¹⁰See Berkowitz and Holland (2001) for the effects of privatization on small enterprise formation in Russia.

The decrease in diversification as reported by Jovanovic (1993) suggests that large firms have not been capable of entering into such market niches.

Sixth, self-employment is more highly valued as an occupational choice than it was previously. Roughly one out of four young US workers pursues self-employment, according to Schiller and Crewson (1997). Kirchoff (1996) argues that self-employment is no longer perceived as under-employment or as a relic of mom-and-pop establishments but is instead seen as a way to achieve a variety of personal goals.

Finally, the increase in the employment share of the services sector with per capita income is well documented (Inman, 1985). Given the relatively small average size of most services (except for airlines, shipping, and some business and financial services), this creates increased opportunities for business ownership.

Obviously, some of these factors may have only a temporary effect. For example, it is not unlikely that the outsourcing and deregulation waves will dry up. In addition, many of the startups in the newly emerged industries fail to survive (for instance, Internet-based startups from the late 1990s). On the other hand, there are more permanent effects, like the impact of new technologies. We refer again to Freeman and Perez (1988), who claim that in the new techno-economic paradigm (fifth Kondratiev wave), firms will be organized into “networks” of large and small ones. Dushnitsky and Lenox (2005), for example, analyze the role of corporate venture capital programs, where incumbent firms invest in entrepreneurial ventures. Moreover, the introduction of these new technologies is also related to the stage of economic development because the technologies cannot be made effective without the necessary skills and other investments. This structural influence of economic development is reinforced by the increasing variety of demand for specialized goods and services and the enhanced valuation of self-realization, both of which are dependent on the level of prosperity.

Types of Entrepreneurship and Their Relation to Economic Growth

Throughout intellectual history, the entrepreneur has worn many faces and fulfilled many roles (Hébert & Link, 1989). Entrepreneurship has to do with the activities of individual persons. The concept of economic growth is relevant at the levels of firms, regions, industries, and nations. Hence, linking entrepreneurship to economic growth implies linkage between the individual level and the aggregate level. To consider this link, we first consider one definition of “entrepreneurship.” Inspired by Hébert and Link (1989), Bull and Willard (1993) and Lumpkin and Dess (1996), the following definition of entrepreneurship can be proposed: Entrepreneurship is the manifest ability and willingness of individuals, on their own, in teams, within and outside existing organizations to perceive and create new economic opportunities (new products, new production methods, new organizational schemes, and new product–market combinations), and to introduce their ideas to the market in

the face of uncertainty and other obstacles by making decisions on location, form and the use of resources and institutions (Wennekers & Thurik, 1999). Essentially, entrepreneurship is a behavioral characteristic of individuals. It should be noted that entrepreneurship is not an occupation and that entrepreneurs are not a well-defined occupational class of persons. Even obvious entrepreneurs may exhibit their entrepreneurship only during a certain phase of their career and/or with reference to a certain part of their activities.¹¹

Entrepreneurship is not synonymous with small business. Certainly, small firms are an outstanding vehicle for individuals to channel their entrepreneurial ambitions. The small firm is an extension of the individual in charge (Lumpkin & Dess, 1996, 138). However, entrepreneurship is not restricted to people starting or operating (innovative) small firms. Enterprising individuals in large firms, the so-called “intrapreneurs” or “corporate entrepreneurs,” behave entrepreneurially as well. In these environments, there is a tendency to “mimic smallness,” for instance, using business units, subsidiaries, or joint ventures.

Because in colloquial speech many terms like “entrepreneur,” “self-employed” and “businessmen” are used indiscriminately, their operationalization and measurement are far from obvious. However, one can make some pragmatic distinctions: *first*, between the concepts *entrepreneurial* and *managerial* in the sense of organizing and coordinating; and *second*, between business owners and the *self-employed* (including owner-managers of incorporated firms)¹² and *employees*. Based on this double dichotomy of self-employed versus employee and entrepreneurial versus managerial, three types of entrepreneurs may be distinguished. These three types are the Schumpeterian entrepreneurs, the intrapreneurs and the managerial business owners, those who are entrepreneurs in a formal sense only. This is illustrated in Table 20.1 where executive managers are incorporated as the decisively non-entrepreneurial category.

Table 20.1 Three types of entrepreneurs

	Self-employed	Employees
Entrepreneurial	<i>Schumpeterian entrepreneurs</i>	<i>Intrapreneurs</i>
Managerial	<i>Managerial business owners</i>	Executive managers

Source: Wennekers and Thurik (1999).

¹¹ See also Gartner (1989, 64) who asserts that “The entrepreneur is not a fixed state of existence, rather entrepreneurship is a role that individuals undertake to create organizations” and Schumpeter (1934, 78) who states that “Because being an entrepreneur is not a profession and as a rule not a lasting condition, entrepreneurs do not form a social class in the technical sense as, for example, landowners or capitalists or workmen do.”

¹² The terms “self-employed” and “business owners” will be used interchangeably throughout this chapter.

Schumpeterian entrepreneurs are found mostly in small firms. They own and direct independent firms that are innovative and creatively destroy existing market structures. After realizing their goals, Schumpeterians often develop into managerial business owners, but some may again start new ventures. The latter “serial entrepreneurs” might outperform other entrepreneurs because of their increased human capital, which itself is due to their entrepreneurial experience.¹³ Intrapreneurs, the so-called entrepreneurial managers, also belong to the core of entrepreneurship. By taking on commercial initiatives on behalf of their employers, and by risking their time, reputation and sometimes their jobs in doing so, they become the embodiment of leadership, resulting in entrepreneurial ventures in larger firms. Sometimes these entrepreneurial employees, either in teams or on their own, spin-off, start new enterprises ultimately becoming Schumpeterian entrepreneurs. Managerial business owners (entrepreneurs in a formal sense) are to be found in a large majority of small firms. They include many franchisees, shopkeepers, and people in professional occupations. They belong to what Kirzhoff (1994) calls “the economic core” and are the foundation of some of the entrepreneurial ventures.

We focus on three entrepreneurial roles, emphasized by Schumpeter, Kirzner, and Knight, respectively. The *first* is the role of innovator. Schumpeter is the economist who drew the most attention to the “innovating entrepreneur.” Such an entrepreneur carries out “new combinations we call enterprise; the individuals whose function it is to carry them out we call entrepreneurs” (Schumpeter, 1934, 74).¹⁴ The *second* is the role of the individual who perceives profit opportunities. We label this role Kirznerian (or neo-Austrian) entrepreneurship (see, for instance, Kirzner, 1997). A *third* is the role of the person who assumes the risk associated with uncertainty. We label this role Knightian entrepreneurship.¹⁵ When an individual introduces a new product or starts a new firm, this can be interpreted as an entrepreneurial act in terms of each of the three types of entrepreneurship. The individual is an innovator, s/he (assumes that s/he) has perceived a hitherto unnoticed profit opportunity and s/he assumes the risk that the product or venture may turn out to be a failure.

There are many definitions of an entrepreneur and of what an entrepreneur does. Based on their study of the history of economic thought about entrepreneurship, Hébert and Link (1989, 47) propose the following: “The entrepreneur is someone who specializes in taking responsibility for and making judgmental decisions that affect the location, form, and the use of goods, resources, or institutions.” When one is searching for links between entrepreneurship and growth, this definition is not sufficient. The dynamics of perceiving and creating new economic opportunities and

¹³Metzger (2006) notes that not every experience can be regarded as an indicator of enhanced human capital. The experience of failure can also be an indicator of entrepreneurial incompetence.

¹⁴Schumpeter’s *Theory of Economic Development* was published in German in 1911 and in English in 1934.

¹⁵The Knightian entrepreneur has also been interpreted as the “neo-classical entrepreneur” (see, for instance, Shane, 2000). In the neo-classical (equilibrium) framework, entrepreneurship is explained by fundamental attributes of people (like the “taste” for uncertainty).

the competitive dimensions of entrepreneurship need more attention. The key contribution of entrepreneurship to economic growth might be singled out as “newness.” This includes the startup of new firms but also the transformation of “inventions and ideas into economically viable entities, whether or not, in the course of doing so, they create or operate a firm” (Baumol, 1993, 198).

The management literature has a broad view of entry. In surveying this literature, Lumpkin and Dess (1996) integrate the renewal-oriented aspects of entrepreneurship. “New entry can be accomplished by entering new or established markets with new or existing goods or services. New entry is the act of launching a new venture, either by a start-up firm, through an existing firm or via internal corporate venturing” (Lumpkin & Dess, 1996, 136). In their view, the essential act of entrepreneurship is more than new entry as we see it. Entrepreneurial activity, so-called “new entry” in existing, large firms, often mimics smallness. Newness achieved through the creation of startups and through innovations, as well as through competition, is the most relevant factor linking entrepreneurship to economic growth. While managerial business owners fulfill many useful functions in the economy, such as the organization and coordination of production and distribution, they cannot be viewed as the engine of innovation and creative destruction. This is the major function of Schumpeterian entrepreneurs and intrapreneurs.

In the following model, we give an example of the economic impact of (the lack) of Kirznerian (neo-Austrian) and Knightian entrepreneurship (for the latter, see also Kihlstrom & Laffont, 1979) using the example of the retail sector. A more Schumpeterian approach is presented in Section 5. The model is a simplified version of the carrying capacity model by Carree and Thurik (1999b). The model is used to indicate how a lack of entrepreneurship can affect economic performance. The non-mathematically oriented reader may want to proceed to the last paragraph of this section.

A Model of the Impact of Two Different Types of Entrepreneurship

Assume that there are two local markets, labeled i and j , in which retailers sell a homogeneous good. Retailers can only be in one of the two markets. The total demand by consumers in the two local markets is assumed to have price elasticity equal to unity:

$$Q_x = a_x/p_x \quad x \in \{i, j\}. \quad (20.1)$$

Each retailer k in market x maximizes profit $\pi_k = (p_x - \beta)q_k - \alpha$ where α are fixed costs and β are variable costs, both of which are identical across firms. Assume that the retailers form a Cournot oligopoly, hence not taking into account reactions by competitors when changing the level of output q_k . Because the cost function of each retailer is assumed to be identical, also the output levels are identical to $q_k = Q_x/N_x$. If there are N_x firms in market x , the equilibrium market price and total output is easily derived as

$$p_x = \beta \frac{N_x}{N_x - 1} \quad \text{and} \quad Q_x = \frac{a_x N_x - 1}{\beta N_x} \quad x \in \{i, j\}. \quad (20.2)$$

By inserting this equation into the profit function, we derive that in equilibrium,

$$\pi_k = \frac{\beta Q_x}{N_x(N_x - 1)} - \alpha = \frac{a_x}{N_x^2} - \alpha. \quad (20.3)$$

There is an equilibrium across regions if entrepreneurs in one region earn as much as entrepreneurs in the other region. This implies that

$$\frac{N_i}{N_j} = \sqrt{\frac{a_i}{a_j}}. \quad (20.4)$$

This equilibrium condition assures maximum total output for the two markets combined, given a certain fixed number of entrepreneurs, N . To derive this, note that $N_j = N - N_i$ and that therefore, the sum of outputs is

$$Q_i + Q_j = \left(a_i \frac{N_i - 1}{N_i} + a_j \frac{N - N_i - 1}{N - N_i} \right) / \beta. \quad (20.5)$$

Maximizing Eq. (20.5) with respect to N_i gives us the exact same outcome as given in Eq. (20.4). Now we come to the final issue of how many entrepreneurs there will be. Following Carree and Thurik (1999b), we assume that there exists a critical profit level π^* that entrepreneurs seek to achieve as compensation for their efforts. If profits fall short of the critical level, entrepreneurs will exit until the profit level increases to the critical level. If profits exceed the critical level (new) entrepreneurs will enter until the profit level decreases to the critical level. An important determinant of the critical profit level is the extent to which entrepreneurs want to be compensated for the risk they face.

We give a numerical example to indicate the impact of a lack of either Kirznerian or Knightian entrepreneurship. Assume that the two markets are identical in size, $a_i = a_j = 50$, and that the fixed costs parameter α and critical profit level π^* both equal one. The variable costs parameter β is assumed to be 0.1. The total number of retailers in each of the two markets is then derived from $a_x/N_x^2 - \alpha = \pi^*$ and is found to equal 5 after inserting the numerical values. The total output of the two markets is derived from Eq. (20.2) and is equal to 800.

Now assume that instead of both markets having five firms, that there is one market with six and one market with four firms. Total output then equals 792 instead of the maximum output of 800. Hence, the consequence if at least one of the six retailers is not alert to the prevailing disequilibrium will be an output loss of 1%. The lack of Kirznerian entrepreneurship that would otherwise have alerted one retailer to the

need to change location (market) leads to lower output.¹⁶ Alternatively, assume that entrepreneurs want to achieve (10%) higher compensation for the uncertainty they are confronted with and that the critical profit level π^* equals 1.1 instead of 1. The number of firms in each market then decreases to 4.88, and total output drops to 795. Hence, the consequence of entrepreneurs' being more averse to risk also is a drop in total output. A decrease in the number of individuals prepared to take risks in the marketplace (Knightian entrepreneurs) leads to an output loss.¹⁷ The next section elaborates on this issue: choosing between entrepreneurship and employment.

The Effects of the Choice Between Entrepreneurship and Employment

In this section, we present a simple model of occupational choice in which the impact of entrepreneurial activities is analyzed by considering the consequence of not allowing firms to enter (or exit) or that of not allowing firms to expand (or limit) their activities. We distinguish between three possible economic "systems" labeled "market economy," "semi-planned economy," and "planned economy." Before presenting the details of the occupational choice model, we first discuss important papers that consider the intertemporal relation between occupational choice and economic development.

We briefly discuss the contributions made by three articles: Banerjee and Newman (1993), Iyigun and Owen (1999), and Lloyd-Ellis and Bernhardt (2000). The papers deal with the complicated issue of the two-way interaction between occupational choice and economic development. On the one hand, both the number of individuals choosing to become self-employed and their entrepreneurial skills affect economic development. On the other hand, the process of development affects returns to occupations. It transforms the nature of risks and the opportunities for innovation.

Banerjee and Newman (1993) develop a model in which the distribution of wealth plays a central role. They argue that occupational decisions are dependent upon the distribution of wealth because of capital market imperfections. The latter imply that poor agents can only choose to work for a wage, while wealthy agents become entrepreneurs. The initial distribution of wealth determines whether in the

¹⁶Yu (1998) provides an interesting analysis of the importance of Kirznerian (adaptive) entrepreneurship in explaining Hong Kong's economic development. He finds that small Hong Kong firms are usually the first groups to get out of a declining sector and move onto new markets. He claims that the diversification of Hong Kong's economy into the service sector "can be explained consistently by the dynamic operations of adaptive entrepreneurship" (pp. 902–903).

¹⁷Ilmakunnas and Kannianen (2001) find empirical evidence from OECD countries to support the Knightian view that economic risks shape equilibrium entrepreneurship in an occupational choice model. They find evidence that both "national economic risk" (changes in GDP) and social insurance for labor risks (unemployment compensation), assumed not to be available to the self-employed, negatively impact the self-employment rate.

long run an economy develops to feature only self-employment in small-scale production (“stagnation”) or to include an active labor market where both large- and small-scale production prevail (“prosperity”). Banerjee and Newman stress that the model implies the initial existence of a population of dispossessed individuals whose best choice is to work for a wage as the condition needed for an economy to achieve the stage of prosperous capitalism.

While Banerjee and Newman focus on financial requirements as the defining characteristic of entrepreneurship, Iyigun and Owen (1999) focus on the element of risk. They distinguish between two types of human capital: entrepreneurial and professional. Entrepreneurial activities are assumed to be more risky than professional activities.¹⁸ Entrepreneurs in the model accumulate human capital through a work-experience intensive process, whereas professionals’ human capital accumulation is education-intensive. The models predict that as technology improves, individuals devote less time to the accumulation of human capital through work-experience and more to the accumulation of human capital through professional training. The allocation of an increasing share of time to formal education continues until a steady state is reached (see Iyigun & Owen, 1999, 224). Hence, entrepreneurs should play a relatively more important role in intermediate-income countries and professionals should be relatively more abundant in rich countries. However, both entrepreneurship and professional activities are important, and those countries that initially have too little of either entrepreneurial or professional human capital may end up in a development trap. Iyigun and Owen point to former communist countries as an example of economies that have a highly educated labor force but that still have not achieved the high-income steady state because of a shortage of entrepreneurs (p. 225).

Lloyd-Ellis and Bernhardt (2000) also derive the scarcity or abundance of entrepreneurial skills as the defining variable behind the equilibrium development process. In their model, individuals may choose between working as entrepreneurs, as wage laborers in industry or in subsistence agriculture. Just as in the Banerjee and Newman model, entrepreneurs are faced with a limited capital market and (inherited) wealth is needed to permit entrepreneurial activity to expand. The economy in the model goes through four separate stages. An interesting outcome of the model is that the average firm size increases quickly in the first stages of the development process but then decreases in the later stages of the development process. The number of entrepreneurs (outside agriculture) as a fraction of the population may rise in each of the stages (Lloyd-Ellis & Bernhardt, 157).

We present a simple model of occupational choice in which the impact of entrepreneurial activities is analyzed by considering the consequence of not allowing firms to enter (or exit) or of not allowing firms to expand (or limit) their activities. We distinguish between three possible economic “systems.” In the *first*

¹⁸The uncertainty in the return to entrepreneurial ventures is that with probability q an individual achieves an income of λ_e , the endogenously determined technology level, times his entrepreneurial capital and with probability $1-q$ he receives no income. There is no uncertainty assumed in the return to education, being λ_p times their professional capital (see Iyigun & Owen, 1999, 220).

system, labeled “market economy,” there is complete freedom of entry and exit, and firms may adjust their inputs to maximize profits. In this system, there is complete entrepreneurial and managerial freedom. In the *second* system, called the “semi-planned economy,” there is no freedom of entry or exit. However, firms are free to adjust their input quantities so as to achieve maximum profits. In such an economic system, the large incumbent firms are considered the engines of economic progress. Starting new enterprises is hampered by regulations and by a relatively low level of esteem for business ownership. The *third* economic system, labeled the “planned economy,” also does not include the managerial freedom to adjust inputs to maximize profits. Firms are assigned to produce outputs using a certain fixed amount of labor, even though this may lead some firms to become unprofitable.

Clearly, the three economic “systems” are extremes. However, comparing the economic performance of such virtual systems may enhance our understanding of the total contribution of entrepreneurial activity to economic performance in the long and short run. In addition, the conditions in the three systems may approximate actual conditions in existing economic systems. For example, the market economy of the United States grants (potential) entrepreneurs considerable freedom with little government intervention. In contrast, the economies of the nations of Continental Europe, like France, Germany, and the Scandinavian countries, entail a much larger role for government. In these countries, governments have actively intervened to support large enterprises in the recent past. The Soviet Union is the prime example of the planned economy. The model described below is used to compare the relative performance of the three “systems.”¹⁹ The non-mathematically interested reader may want to proceed to the last paragraph of this section, in which we discuss the main results.

A Model of Entrepreneurship in Economic “Systems”

Consider a population of N individuals that can choose between being employees and being managers (business owners). Each person i is assigned a certain managerial ability e_{it} in period t . This ability can be used in combination with an input of L_{it} employees earning an equal wage w_t to produce a total output of some (homogeneous) good $Q_{it} = e_{it}L_{it}^\beta$ with β in between 0 and 1. Assuming the price of the good to be unity total profit for manager i in period t will be $\pi_{it} = e_{it}L_{it}^\beta - w_tL_{it}$. From the first-order condition ($\partial\pi_{it}/\partial L_{it} = 0$), we find the optimal levels of labor input and profit:

$$L_{it}^* = (\beta e_{it}/w)^{\frac{1}{1-\beta}} \text{ and} \quad (20.6)$$

$$\pi_{it}^* = (1 - \beta)e_{it} (\beta e_{it}/w)^{\frac{\beta}{1-\beta}}. \quad (20.7)$$

¹⁹The model is only concerned with occupational choice, not with the (dis)incentives present in economic “systems” to pursue product or process innovation.

From Eq. (20.7) it is clear that individuals with higher levels of managerial ability will enjoy higher profits ($\partial\pi_{it}^*/\partial e_{it} > 0$). If individuals are free to enter and/or exit, we should see incumbents exiting the market (and becoming employees) if the optimal level of profits is less than the wage level, while employees should start enterprises if the optimal level of profit exceeds the wage level. In conformity with Lucas (1978), equilibrium is reached where individuals become managers if and only if

$$e_{it} \geq \frac{w_t}{\beta^\beta(1-\beta)^{1-\beta}}. \quad (20.8)$$

In each of the three economic systems, it is assumed that the wage level is determined by the equilibrium condition that the demand and supply of labor be identical. If we denote the number of managers/entrepreneurs by M_t and their set by Θ_t , then this condition reads

$$N - M_t = \sum_{i \in \Theta_t} L_{it}^* \Leftrightarrow w_t = \beta \left(\sum_{i \in \Theta_t} e_{it}^{\frac{1}{1-\beta}} / (N - M_t) \right)^{1-\beta}. \quad (20.9)$$

From Eqs. (20.8) and (20.9), the equilibrium structure, given free entry and exit, can be determined. Given the distribution of the abilities e_{it} , the equilibrium occupational choice and (maximum) total output can be derived. If changes occur in the ability distribution, the manner in which equilibrium in the labor market is restored differs across the economic systems. In the case of a “market economy” system, managers with increased abilities will enter and those with decreased abilities will exit, along with changes in firm size and wage level. In the “semi-planned economy” system, there will be changes in the size of incumbents firms and in the wage level. The one variable that restores equilibrium in the “planned economy” system is the wage level; this is because of the absence of managerial discretion to adapt labor demand. It is obvious that due to the larger “degrees of freedom,” the total output after changes in the ability distribution will be highest for the “market economy” and smallest for the “planned economy.” The more that the ability distribution changes over time, the larger the differences in performance will be. Hence, in periods of important changes in technological regimes and in the longer term, the differences are likely to be largest. This finding is related to that presented by Eliasson (1995), expressing that lack of new entry of firms will adversely impact economic performance more in the long term than in the short term.

Entrepreneurship in Endogenous Growth Models

One reason that entrepreneurship disappeared from economic theory is that it played no role in the neoclassical growth model developed by Solow (1970). An important characteristic of this growth model is that technological improvements are

exogenous and therefore independent of economic incentives. Economic growth in the traditional growth models is achieved by capital accumulation and exogenous technological progress, both of which leave little room for any entrepreneurial role whatsoever (see also Baumol, 1968). The more recently developed endogenous growth models also support the idea that improvements in technology have been the key force behind perpetually rising standards of living. However, this long-term growth process is assumed in many endogenous growth models to be determined by purposive, profit-seeking investment in knowledge (Grossman & Helpman, 1994, 24). The act of seeking profits by shifting resources to achieve improvements in technology can be seen as entrepreneurial because the outcome of the investments is uncertain. However, it is uncommon for endogenous growth models to explicitly address the issue of entrepreneurship as a driving force of technological and economic development. We will discuss four exceptions in this section.²⁰ The *first* exception is the Aghion and Howitt's (1992) model of creative destruction (see also Aghion & Howitt, 1997; Howitt & Aghion, 1998). The *second* exception is constituted by the endogenous market structure models by Peretto (1998, 1999a, 1999b), and the *third* is the scientific knowledge creation paper by Sanders (2007). The *fourth* exception is the imitation model developed by Schmitz (1989). Of these four exceptions, the model by Aghion and Howitt has been the most influential, and we will discuss it in some detail.

Aghion and Howitt introduce the notion of Schumpeterian "creative destruction" into a growth model by having firms invest resources in research to achieve a new product that renders the previous product obsolete.²¹ Capital is excluded from the basic model while economic growth results from technological progress, being a result of competition among firms that generate innovations. Firms are motivated by the prospect of (temporary) monopoly rents after a successful innovation is patented. Another innovation will again destroy these rents, as the Schumpeterian entrepreneur is making the existing good obsolete. We will discuss a simple version of the basic model as presented by Aghion and Howitt in their Section 2. The non-mathematically oriented reader may want to proceed to the section below Eq. (20.15).

The Aghion and Howitt (1992) Model

Assume that there are four different kinds of units: a final consumption good y , an intermediate good x , unskilled labor used to produce the final good and skilled labor that can be used to produce the intermediate good or that can be used in research.

²⁰See also Braunerhjelm (2008), who discusses how knowledge creation and diffusion can be integrated into existing growth models.

²¹It may be argued that Schumpeterian entrepreneurship cannot be modeled using standard assumptions of the neo-classical model such as profit maximization. It is evident that the Aghion and Howitt models fail to do complete justice to Schumpeter's discussions of the motivations that underlie entrepreneurial behavior.

The total amount of unskilled labor is fixed at M . The total amount of skilled labor is fixed at N , and the amount used to do research is denoted by n , leaving $N-n$ units for production of the intermediate good. The final good is assumed to be produced using a Cobb-Douglas type of production function (with input factors of unskilled labor and intermediate goods), and since M is fixed, it can be written as

$$y_t = A_t x_t^\alpha \quad 0 < \alpha < 1 \quad (20.10)$$

where t is the index of the period. The parameter A_t denotes the productivity of the intermediate input in period t . The intermediate good is produced using skilled labor not used for research and linear technology:

$$x_t = N - n_t. \quad (20.11)$$

Innovations arrive in a random sequence, with the Poisson arrival rate for innovations in the economy equal to λn_t (see also Howitt & Aghion, 1998, Eq. (6)). The arrival rate depends only upon the current flow of inputs to the research. Hence, there is no memory in the technology of research. The index t of the period increases by one each time a new innovation arrives; hence, it is not a time index. The length of the time interval from t to $t+1$ is random and has an exponential distribution with parameter λn_t . During this time interval, prices, and quantities are assumed to be constant. Each innovation (the invention of a new intermediate good) makes the previous intermediate good obsolete because it allows the production of the final good y_t to become more efficient. The increase in efficiency is determined by the factor :

$$A_t = A_0 \gamma^t \quad \gamma > 1. \quad (20.12)$$

The model is a “winner takes it all”-model in the sense that a successful innovator is assumed to receive a patent that is used to monopolize the intermediate sector. The patent lifespan is assumed to be infinite but the monopoly lasts only till the next innovation when the intermediate good is replaced by the next vintage. Each market is assumed to be perfectly competitive with the exception of the monopolized intermediate sector.

The successful innovator has a temporary monopoly and seeks to maximize the profit during this interval. The final good sector will choose the amount of intermediate goods, x_t , so as to maximize $y_t - p_t x_t$ with the price of the final good as the “numéraire” and p_t as the price charged by the monopolist. The first-order condition is

$$p_t = \alpha A_t x_t^{\alpha-1}. \quad (20.13)$$

The monopolist takes this condition into account and maximizes its profit $(\alpha A_t x_t^{\alpha-1} - w_t) x_t$ with w_t as the wage level of the skilled laborer. Optimization gives us outcomes for profit, price, and output of the intermediate good:

$$\pi_t = \left(\frac{1 - \alpha}{\alpha} \right) w_t x_t, \quad p_t = w_t / \alpha \quad \text{and} \quad x_t = \left(\frac{w_t}{\alpha^2 A_t} \right)^{1/(\alpha-1)}. \quad (20.14)$$

The above notation gives the key parameters for the stationary equilibrium value for the amount of resources devoted to research (where $n_t = n_{t+1} = \hat{n}$). Aghion and Howitt derive this to be:

$$\hat{n} = \frac{\gamma(1 - \alpha)/\alpha}{1 + \gamma(1 - \alpha)/\alpha} N - \frac{r}{\lambda(1 + \gamma(1 - \alpha)/\alpha)} \quad (20.15)$$

with r being the constant rate of time preference. Equation (20.15) shows a direct connection between research in stationary equilibrium \hat{n} and the degree of market power. The higher the value of α , the lower the degree of market power. Specifically, $1 - \alpha$ is the Lerner index (price minus marginal costs divided by price). Hence, some extent of market power used to achieve rents is needed for Schumpeterian entrepreneurs to engage into research. Aghion and Howitt (1992, 336) derive the average growth rate of real output as $\lambda \hat{n} \ln(\gamma)$. The effect of market power attracting entrepreneurial energy shows the importance of imperfect competition to the growth process.

Competition and growth are inversely related in this Schumpeterian model, something that is usually not supported by empirical evidence (for instance, see Nickell, 1996). Aghion and Howitt (1997), therefore, extend their model to show that a more competitive market structure may contribute to economic growth. In Howitt and Aghion (1998), the authors add capital to their model of creative destruction. They show that capital accumulation and innovation are complementary processes and equal partners in the growth process. Aghion and Howitt have contributed to the endogenous growth literature by connecting purposive, profit-seeking investment in knowledge to the persons performing this task: entrepreneurs.

Other Endogenous Growth Models Including Entrepreneurship

In a series of papers, Peretto introduces a different kind of endogenous growth model in which an endogenous market structure is incorporated. His model includes a key role for the number of firms, again in the intermediate sector, determining the returns to investment and R&D. An important difference between his model and the model by Aghion and Howitt is the assumption that monopolistic firms in the intermediate sector set up in-house R&D facilities to produce a continuous flow of cost-reducing innovations. This sets it apart from the model of independent research firms in Aghion and Howitt (1992). The relation between the number of firms and returns to investment and R&D in the Peretto (1999b) model is determined by a trade-off between external and internal economies of scale. External economies of scale are a result of complementarities across firms because aggregate output is increasing in the number of intermediate goods. Having a large number of firms

in the model therefore leads to high specialization, large investment and R&D programs, and fast growth. On the other hand, the fragmentation of the market due to the large number of firms leads to lesser investment and fewer R&D programs, as well as to slow growth. An increase in the number of firms increases the market size through the specialization effect, whereas each firm's market share is reduced through the fragmentation effect. As a consequence, there is a hump-shaped relation between the number of firms and economic growth.

In Peretto (1998), entrepreneurs play a more visible role. His model seeks to explain a shift in the locus of innovation from R&D undertaken by inventor-entrepreneurs ("competitive capitalism") to R&D undertaken within established firms in close proximity to the production line ("trustified capitalism"). In the model, the economy converges to a stable industrial structure where entrepreneurial R&D and the formation of new firms peter out while corporate R&D undertaken by established oligopolists drives growth.²² While it is true that from about 1870 to roughly 1970, the corporate laboratories affiliated with large manufacturing firms were increasingly responsible for commercial R&D, the disappearance of entrepreneurial energy as an important determinant of economic growth is an unrealistic feature of the model. In Peretto's setup, entrepreneurs must develop new differentiated products, since entering an existing product line in Bertrand competition with the incumbent is bound to lead to losses because of sunk entry costs. Entrants are net creators of knowledge, as "they create a new product and the knowledge necessary to run manufacturing operations." (p. 58). Although in its more developed stages the economy in Peretto's model experiences a transition from entrepreneurial to corporate R&D, entrepreneurship plays a vital role in economic development: only when a critical number of firms have entered the market do established firms begin investing in R&D. A key result of Peretto's models is that "there is an inverted-U relationship between the number of firms and steady-state growth" (Peretto, 1999a, 1762).

Sanders (2007) extends the normal endogenous growth model by including a separate "basic science" sector dedicated to producing new fundamental knowledge. He argues that scientific knowledge creation follows a reputation-driven, paradigm-shifting dynamic as described by Kuhn. This knowledge creation leads to entrepreneurial opportunities as an unintended side-product. The entrepreneurs then commercialize the opportunities that new knowledge creation presents, enjoying the profits as their reward. These innovative activities drive economic growth. Sanders therefore argues that "a self-governing community of scientists that generates a flow of fundamental knowledge in the pursuit of reputation" (p. 344) is the basis of economic development. Hence, he sees "scientific institutions and entrepreneurial activity as prerequisites for economic growth" (p. 339). This is because innovation opportunities are not exhausted only if scientists increase the

²²This is an *escalation effect*: the decrease in the number of firms is due to technological opportunities leading firms to invest in R&D, which is characterized by sunk costs that make entry and incumbency more costly and labor more scarce for production.

stock of “potential opportunities” from time to time. The endogenous growth model by Sanders contributes to the literature by modeling where the possibilities for new innovations come from in the first place.

Schmitz (1989) was the first to present an endogenous growth model relating entrepreneurial activity and economic growth. However, his entrepreneurs are more “passive” than in the other models because their role is restricted to that of “imitation.” This may have contributed to the Schmitz model’s being less influential than the Aghion and Howitt model. His model implies that the equilibrium fraction of entrepreneurs in an economy is lower than the social optimal level, providing a rationale for policies stimulating entrepreneurial activity. We end this section by stressing that one may also set up endogenous growth models in which (a specific notion of) entrepreneurship may not be beneficial to growth. Peng (2000) constructs such a model in which entrepreneurs do not carry out research but, rather, choose between research projects. He finds a negative relationship because of the rent-seeking element in the exercise of entrepreneurship.²³

Strands of Empirical Evidence

There are various strands in the empirical literature showing the effect of entrepreneurship on economic growth. We concentrate on three strands of empirical research: the regional, industry, and national levels. The *first* strand concentrates on the effect of (changes in) the size distribution in *regions* on subsequent economic growth. If a region has a larger share of new or small firms as compared to another region, this could indicate a higher level of entrepreneurial activity. The empirical “knowledge filter” literature is an important recent development in regional research stressing that new venture creation is an essential mechanism for converting new knowledge into economic knowledge. The *second* strand investigates the effect of the number of market participants in an *industry* on economic growth. An increase in the number of competitors or more turbulence (entry and exit) is usually related to more intensive entrepreneurial activity. The *third* strand of empirical literature concentrates on the effect of the number of self-employed individuals (business owners) or people with entrepreneurial intentions on subsequent growth. In economically developed *nations*, the rate of self-employment will be related to the extent of entrepreneurial activity. New firms usually begin with a phase of solo self-employment, *viz.*, with no paid employees. The Global Entrepreneurship Monitor research program is a promising contributor to this strand of the literature. A fourth source of evidence on the relation between self-employment and progress is the economic history of the formerly centralized planned economies. A characteristic of these economies was the almost complete absence of small firms (and private

²³The idea that entrepreneurial energy as such may not suffice for economic progress is also expressed by Baumol (1990), who stresses the importance of entrepreneurship being led into productive channels.

ownership of the means of production), and this extreme monopolization constituted one of the major factors leading to the collapse of state socialism (Acs, 1996). The development of small enterprises is considered a vital part of the current transition process in Eastern Europe. This last source of evidence is not discussed in the present chapter.²⁴

Regional Evidence

We now proceed to concentrate upon empirical contributions that detail the impact of entrepreneurship on subsequent economic performance at the regional level. The unit of observation for these studies is spatial: either a city, a region or a state. The most common measure of performance is economic growth, typically measured in terms of employment growth. These studies try to link various measures of entrepreneurial activity, most typically startup rates, to subsequent performance.

Reynolds (1999) finds some evidence that turbulence is related to economic growth using American Labor Market Area data for 1980–1992. Labor Market Areas generally include a metropolitan area and the surrounding rural area from which it draws both employees and consumers. Acs and Armington (2004) link a measure of entrepreneurship to growth at the Labor Market Area level. Their measure of entrepreneurial activity is the new-firm birth rate in each of these local economies. They test the hypothesis that increased entrepreneurial activity leads to higher growth rates for local economies. They find that higher levels of entrepreneurial activity are strongly positively associated with higher growth rates, even after controlling for establishment size, and agglomeration effects.

Audretsch and Fritsch (1996) analyze a database identifying new business startups and exits based on the social insurance statistics in Germany to examine whether a greater degree of turbulence leads to greater economic growth. Each record in the database identifies the establishment at which an individual is employed. The startup of a new firm is recorded when a new establishment's identification appears in the database, which generally indicates the birth of a new enterprise. While there is some evidence that in the United States, a greater degree of turbulence at the regional level is linked to higher rates of growth for regions (Reynolds, 1999), Audretsch and Fritsch (1996) find that the opposite was true for West Germany during the 1980s. In both the manufacturing and the service sector, a high rate of turbulence in a region tended to lead to a lower and not a higher rate of growth. They attribute this negative relationship to the fact that the underlying components – the startup and death rates – are both negatively related to subsequent

²⁴Other examples of the role of entrepreneurship in economic history are given in Wennekers et al. (2002, 2010).

economic growth. Similar evidence for West Germany is found by Fritsch (1997).

Divergent findings from the 1980s about the relationship between the degree of entrepreneurial activity and economic growth in the United States and West Germany posed something of a puzzle. On the one hand, these diverging results suggest that the relationship between entrepreneurship and growth lacks a general pattern across developed countries. On the other hand, the results also provide evidence for the existence of distinct and different national systems capable of supporting economic growth. However, in a more recent study, Audretsch and Fritsch (2002) find different results for the 1990s. Those regions with a higher startup rate are found to exhibit higher growth rates in this more recent time period. This would suggest that, in fact, Germany is changing over time, as its engine of growth is shifting to rely on entrepreneurship. Based on the empirical evidence that the source of growth in Germany shifted away from the established incumbent firms during the 1980s to entrepreneurial firms in the 1990s, it would appear that, despite persisting institutional differences, the relationship between entrepreneurship and growth in the two countries tends to converge.

The positive relationship between entrepreneurship and growth at the regional level is not limited to Germany in the 1990s. For example, Foelster (2000) examines not just the employment impact within new and small firms but also the overall link between increases in self-employment and total employment in Sweden between 1976 and 1995. He provides a link between micro behavior and macro-economic performance, showing that increases in self-employment rates have a positive impact on regional employment rates in Sweden. Hart and Hanvey (1995) link measures of new and small firms to employment generation in the late 1980s for three regions in the United Kingdom. While they find that employment creation came largely from SMEs, they also identify that most job losses also came from SMEs. Robbins et al. (2000) perform an analysis for 48 US states for 1986 through 1995 and find that states with a higher proportion of (very) small business employment experience higher levels of productivity growth and Gross State Product growth. Callejon and Segarra (1999) use a dataset of Spanish manufacturing industries between 1980 and 1992 to link new-firm birth rates and death rates (which, taken together, constitute a measure of turbulence) to total factor productivity growth in industries and regions. They adopt a model based on a vintage capital framework in which new entrants embody the available edge technologies and exiting businesses represent marginal obsolete plants. Using a Hall type of production function, which controls for imperfect competition and the extent of scale economies, they find that both new-firm startup rates and exit rates contribute positively to the growth of total factor productivity in regions as well as industries. Berkowitz and DeJong (2005) find for post-Soviet Russian regions that regional entrepreneurial activity, in terms of number of enterprises per population, has led to subsequent growth. The data are for 70 regions over the period 1993–2000. The private enterprises in the regions can be seen as having consisted of either small-scale startups or private spin-offs from previously state-run enterprises.

Recent literature emphasizes the role of entrepreneurship in translating knowledge investments into economic progress (see Audretsch et al., 2006). This literature argues that new knowledge does not automatically generate anticipated levels of economic growth. Audretsch (2007) and Audretsch and Keilbach (2008) use the term “European Paradox”: a combination of high investments in knowledge and low growth performance. The “knowledge spillover” theory argues that this is caused by a lack of entrepreneurial initiatives able to penetrate the so-called knowledge filter. Acs and Plummer (2005) use Colorado data to provide empirical evidence that new venture creation is a better mechanism than the absorptive capacity of incumbent firms for converting new knowledge into economic knowledge. Audretsch and Keilbach (2008) and Mueller (2006), both using German data, find that entrepreneurship and R&D intensity promote regional economic growth.²⁵ Mueller, in addition, claims that university–industry relations also contribute to regional economic performance. In a related paper, Mueller (2007) stresses the importance of startup activity in technology- and knowledge-intensive industries rather than just that of increases in general entrepreneurship. The obvious policy implication derived is the facilitation of the spillover and commercialization of knowledge through the encouragement of entrepreneurship.

Industry Evidence

Nickell (1996), Nickell et al. (1997) and Lever and Nieuwenhuijsen (1999) present evidence that competition, as measured by the increased number of competitors within an industry, has a positive effect on the rate of total factor productivity growth. This positive effect is consistent with Geroski’s (1989) findings regarding the increase in overall productivity growth in 79 UK manufacturing industries along with a lagged rate of gross entry of new firms. One reason for these findings is that an increased number of market participants and increased entrepreneurial activity often go hand in hand. There have been some studies on the impact of the number of market participants on regional industrial growth as well. Glaeser et al. (1992) examine three determinants of regional sectoral growth: specialization, diversity, and competition. They find that local competition, measured as the relative number of businesses per worker, encourages employment growth in industries. Caves (1998, 1973) concludes that in the short run, turnover from entry and exit appears to make only a very small contribution to an industry’s productivity growth. However, he adds that in the long run, entry–exit turnover makes a more important contribution.

²⁵Jaffe et al. (2007), in an editorial to a special issue of *Journal of Economic Behavior and Organization* on academic entrepreneurship, conclude that the “dual engines of growth” being the process of scientific discovery and industrial innovation, appear to reinforce each other in the contribution of research to the process of economic growth.

The empirical evidence of the effect of (changes in) the size distribution of firms on subsequent growth performance appears clear-cut, at least for data from the late 1980s and early 1990s. Carree and Thurik (1998, 1999a) show that the share of small firms in manufacturing industries in European countries in 1990 has had a positive effect on industry output growth in the subsequent 4 years. Audretsch et al. (2002) find evidence for 17 European countries that the consequences for economic growth of not shifting the industry structure away from large businesses and toward small businesses have been rather large. Likewise, Carree (2002) shows evidence for the five largest economies (France, Germany, Japan, the UK, and the United States) that manufacturing industries that underwent little downsizing in the 1977–1990 period also experienced less subsequent growth than was typical internationally.²⁶

Country Evidence

A third strand of literature focuses on the effect of self-employment and entrepreneurship on growth at the country level. Using a panel of OECD countries, Blanchflower (2000, 497) finds no evidence that increases in the self-employment rate result in increasing economic growth. However, he uses uncorrected OECD Labor Force Statistics data, which suffers from a lack in comparability across countries and, in some cases, lacks comparability over time due to changes in counting procedures. Carree et al. (2002, 2007) investigate whether countries that deviate from an “equilibrium” business ownership rate for comparable levels of economic development suffer in terms of economic growth. In their view, discrepancies between the actual and the “equilibrium” rate of business ownership will diminish the growth potential of an economy in the medium term. A shortage of business owners will likely diminish competition, with detrimental effects for the static efficiency and competitiveness of the national economy. It will also diminish variety, learning, and selection and thereby harm dynamic efficiency (innovation). On the other hand, a glut of self-employment causes the average scale of operations to remain below optimum level. It will result in large numbers of marginal businesses, absorbing capital and human energy that could have been allocated more productively elsewhere. Carree, van Stel, Thurik, and Wennekers develop an error-correction model to determine the “equilibrium” rate of business ownership as a function of GDP per capita.²⁷ Their estimated “equilibrium” relationship, using corrected OECD Labor Force Statistics data, is presented in Fig. 20.1 together with the actual (corrected) data of the G7 countries. Their estimation results show that a

²⁶Engelbrecht (1997) also shows that inefficient corporate bureaucracies have had a negative impact on US export competitiveness. Denis and Shome (2005), among others, show that downsizing has had a positive effect on firm financial performance.

²⁷Carree et al. (2002, 2007) hypothesize a “U-shaped” equilibrium relationship between the rate of business ownership and per capita income but, in fact, find it to be impossible to statistically discriminate between U-shaped “equilibrium” functions and L-shaped functions.

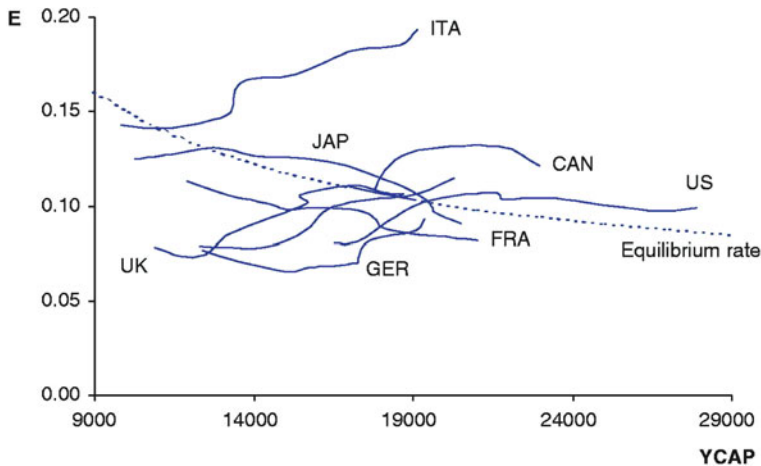


Fig. 20.1 The actual and equilibrium rate of business ownership for G7 countries, 1972–2004
 Note: E stands for the ratio of self-employed over labor force. YCAP stands for GDP per capita in US dollars (of 1990)

Source: Carree et al. (2007).

deviation of the actual number of business owners from the “equilibrium” rate has a significantly negative impact on economic growth.

Figure 20.1 shows that several European countries had too few self-employed individuals relative to the equilibrium value. An obvious exception is Italy. Data indicate that the high level of self-employment in Italy is not efficient and it has a relatively large negative impact on economic growth.²⁸ Countries with low business ownership rates compared to the equilibrium include the Scandinavian countries. Each of these economies is characterized by a large public sector, relatively low entry and exit rates and high taxes. Eliasson (1995) and Braunerhjelm and Carlsson (1999) blame part of Sweden’s relatively bad economic performance in the 1980s on limited private initiative and a lack of structural adjustment. Another country with a relatively low level of business ownership rate is Germany. Figure 20.1 also shows that, at least until recently, Germany has failed to restructure where, for example, the United Kingdom has. Klodt (1990) blames (West) German industrial policy for repressing structural change in supporting large-scale industries with subsidies. An important reason for the lack of a vibrant sector of new firms and industries in Germany until the mid-1990s were the high barriers to innovative activity (Audretsch, 2000). Thurik (1996) reports, related to this, that the excess growth

²⁸In Italy, research and development expenditures are by far the lowest among the largest OECD countries as a percentage of gross national product. This is in line with the idea that when there are too many business owners, the scale advantages in research and development are not utilized. See Cohen and Klepper (1996).

of small firms²⁹ had a positive influence on percentage change in gross national product for a sample of 16 European countries in the period 1988 through 1993.

It should be stressed that the number of self-employed individuals is a possible yardstick for entrepreneurship, as statistical information is often available along the ownership dimension. However, this yardstick can be misleading. For instance, it is unknown whether the relatively high number of self-employed in Italy as compared to Germany indicates a high level of Schumpeterian entrepreneurship or merely a time lag in economic development, influencing the number of marginal establishments or merely differences in sectoral composition. Other approximations are brought to the fore in other empirical studies. Audretsch (1995) uses the employment share of surviving young firms as a proxy for entrepreneurial activity in manufacturing industries. This variable may well express the comparative entrepreneurial positions of these industries. Outside the manufacturing sector, this variable may be biased due to the occurrence of franchising firms and marginal or part-time startups. Moreover, the rate of intrapreneurship in both new and incumbent firms is missing.

The Global Entrepreneurship Monitor (GEM) research program (Reynolds et al., 2005) is yet another approach. It seeks to assess the level of national entrepreneurial activity and to relate this to the rate of economic growth. Entrepreneurial activity is measured through questionnaires in 43 countries (2008). It started with 10 countries in the first year of assessment, 1999; it included 21 countries in 2000; and 29 countries in 2001. The research program shows some preliminary evidence that the level of entrepreneurial activity is related to economic growth. Van Stel et al. (2005) argue that this effect is dependent upon the level of economic development. Increased entrepreneurial activity is especially beneficial to well-developed economies. Less well-developed economies appeared to benefit less from additional new entries of entrepreneurial initiatives that are often very small. An important reason is the abundance of necessity entrepreneurship in these countries. Acs (2006) shows that the opportunity–necessity entrepreneurship ratio is low for countries like Brazil and Uganda. It is likely that entrepreneurial activity that grows out of opportunity will, on average, lead to more subsequent economic growth than necessity entrepreneurship.

A final example of the influence of entrepreneurship on growth at the country level is in Erken et al. (2009), where total factor productivity (TFP) is used as an indicator. A panel of averaged annual data is used from 20 OECD countries spanning 1971–2002. TFP is computed as the ratio between the real gross domestic product and a weighted sum of hours of labor and capital of firms. Entrepreneurship is computed as the ratio between the actual business ownership rate (number of business owners per workforce) and the “equilibrium” business ownership rate. This ratio corrects for the influence of per capita income as found in Carree et al. (2002, 2007).

²⁹ The excess growth of small firms in that study is defined as the percentage change in the value-of-shipments accounted for by small firms minus that accounted for by large firms.

The outcomes of five different literatures explaining TFP are reproduced where variables such as private and public R&D capital, foreign R&D capital, human capital, catching up with the technological leader, labor participation, and hours worked play important roles. Finally, entrepreneurship is taken into account and the results show it to be a driver of productivity. It has a small but stable and significant impact on the development of productivity levels.

The Time Lag Structure

There may be important lags between changes in the composition of the (small) business sector and changes in economic performance because of the time-consuming nature of the processes of selection and learning about what consumers prefer, what is technologically viable and how to obtain the necessary resources. Fritsch and Mueller (2004) made an important contribution, showing that there may be both positive and negative effects of new firm formation on regional employment change that occurs with different time lags. Fritsch and Mueller propose a lag structure with three stages. These are shown in Fig.20.2.

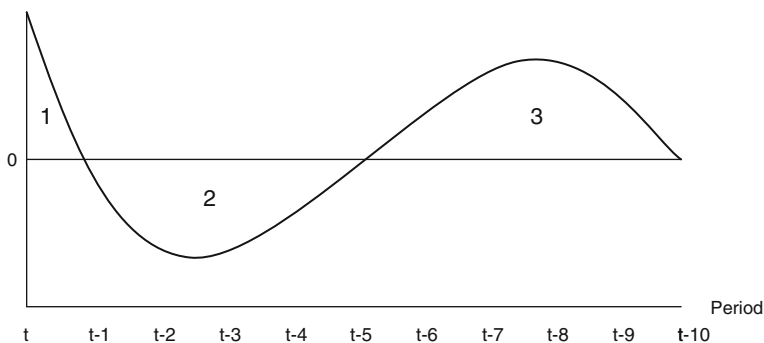


Fig. 20.2 Lag structure of the impact of new business formation on employment change

The first stage is one of the easily identifiable direct positive employment effects of new capacities. The impact occurs when startups in the current year create additional jobs at the time of inception. The second stage is one of exiting capacities based on the infant mortality of startups and the crowding-out of incumbents. The displacement of inefficient incumbents may lead to a negative impact on employment growth. The last stage is the stage in which the startups again contribute to employment via direct or indirect supply-side effects. In the longer term, the successful new firms promote increased efficiency due to intensified competition and process innovation and enhance market demand due to product innovation, leading to a greater variety of products and hence to a better correspondence to the diversity of consumer preferences. After the third period, the new firms can be considered to have become incumbents themselves, and the effects phase out.

Fritsch and Mueller find that the peak of the negative impact and that of the positive impact occur at about 3–4 years and 6–7 years after startup, respectively. However, Fritsch (2008), in the introduction to a special issue of *Small Business Economics*, argues that the timing of peaks may be region- and sector-dependent. Fritsch and Mueller (2008) find that regions with less labor productivity benefit less from new firms. Mueller et al. (2008) find that regions that are less entrepreneurial also tend to be characterized by a “wrong type” of entrepreneurship when new firms enter. As Fritsch and Mueller (2004) claim, the effect of new entrants is three-fold: the first effect is to increase employment, the second is to lower employment, and the third is to again increase employment. The total effect upon employment can therefore be either positive or negative depending upon the magnitude of the three elements. Carree and Thurik (2008) examine the lag structure of the impact of changes in the number of business owners on three measures of economic performance: employment growth, GDP growth, and labor productivity growth. Their results confirm earlier evidence of three stages in the impact of entry on economic performance using country-level data: the initial direct positive effect, followed by a negative effect due to exiting capacities and, finally, a stage of positive supply-side effects. The net effect is found to be positive for employment and GDP growth. Changes in the number of business owners have no effect on labor productivity. Thurik et al. (2008) show that the lags between growth in business ownership rates at the country level and subsequent decrease in unemployment rates can take up to 8 years.

Conclusion

We expect a framework relating entrepreneurial activity to economic growth to hinge on at least four elements. *First*, it should identify the micro-economic foundations of growth, emphasizing the role of knowledge externalities in the growth process (Romer, 1986, 1994). The model by Sanders (2007) is an example. *Second*, it should identify intermediate linkages from entrepreneurial activity to economic progress. The “knowledge spillover theory” literature appears to contribute substantially to that. *Third*, it should deal with dual causality in the relation between entrepreneurial activity and growth. A contribution in this regard is Thurik et al. (2008). And *finally*, it should take into account the multidisciplinary character while linking together different levels of analysis.³⁰ Before discussing some policy issues, we will first present such a framework derived from Wennekers and Thurik (1999).

³⁰See Audretsch et al. (2002) for such a framework concerning the determinants of entrepreneurship. See also Wennekers et al. (2002) for more detailed frameworks.

A Framework for Future Analysis

Figure 20.3 presents a framework inspired by the insights reaped from the various strands of the literature. Three levels of analysis can be distinguished, since linking entrepreneurship to economic growth also means linking the individual level to the firm and the macro levels.

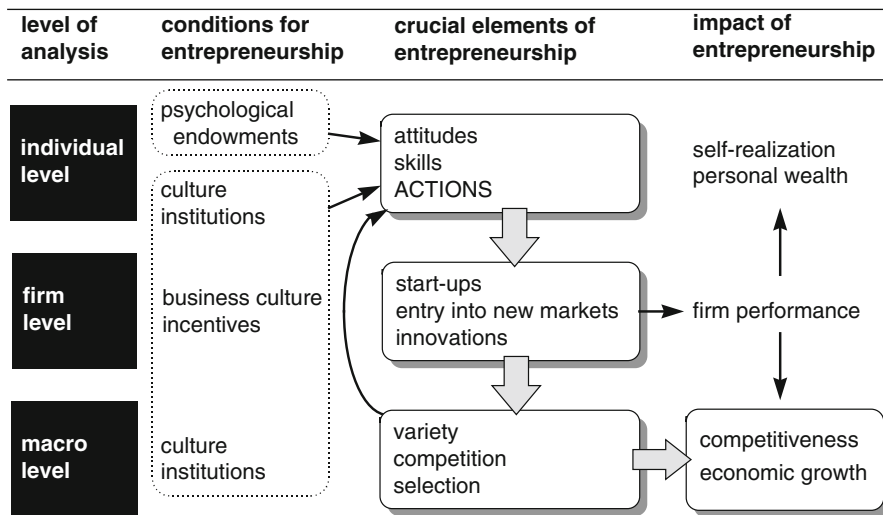


Fig. 20.3 Framework for linking entrepreneurship to economic growth
 Source: Wennekers and Thurik (1999).

Entrepreneurial action happens at the firm level. Entrepreneurs need a vehicle for transforming their personal qualities and ambitions into actions. Small firms where the entrepreneur has a controlling stake provide such a vehicle. Larger firms often mimic smallness (using organizational forms like business units, subsidiaries, and joint ventures) to introduce corporate entrepreneurship or intrapreneurship. The outcomes of these entrepreneurial manifestations at the firm level generally have to do with “newness.” This can be newness through product, process, and organizational innovation, through entry into new markets, or through innovative business startups. Incumbents can sometimes successfully invest in and harvest innovations from entrepreneurial ventures (Dushnitsky & Lenox, 2005).

At the aggregate level of industries, regions, and national economies, the many individual entrepreneurial actions compose a mosaic of new experiments. In evolutionary terms this can be considered variety. A process of competition between these various new ideas and initiatives takes place, continuously leading to the selection of the most viable firms and industries. Variety, competition, selection, and imitation expand and transform the productive potential of a regional or national economy via

the replacement or displacement of obsolete firms, via higher productivity and via the expansion of new niches and industries.

Schumpeterian entrepreneurs, intrapreneurs, and managerial business owners all play their part in this process (see Table 20.1). Next to the linkages from the individual level to the aggregate level, there are also important feedback mechanisms. Competition and selection amidst variety undoubtedly enable individuals (and firms) to learn from both their own and others' successes and failures. These learning processes enable individuals to increase their skills and adapt their attitudes. The outcome of these so-called spillovers will be new entrepreneurial actions, creating a recurrent chain of linkages.

Clearly, the outcome of these dynamic processes depends on a set of conditions like the ones referred to in Fig. 20.3. *First*, these conditions refer to the national (or regional) cultural environment, and to the internal culture of corporations. The linkages between culture and entrepreneurship are neither simple nor straightforward, and much is still unknown about these processes. The history of the rise and fall of nations has shown that cultural vitality, thriving sciences and a high tide of entrepreneurship often coincide (Wennekers & Thurik, 1999). *Second*, the institutional framework, both on the national level and within firms, defines the incentives for individuals to turn their ambitions into actions and determines to what extent unnecessary barriers hamper them. The importance of institutions to the development of entrepreneurship is paramount and deserves further study.

Some Policy Issues

One of the central goals of public policy that is common among all modern economies is the generation of growth and the creation of employment opportunities. Much of the policy debate on generating growth and jobs has relied on a macro-economic framework and focused on traditional macro-economic policy instruments. The survey of the present chapter suggests that a different, less traditional instrument for generating growth and employment plays an important role—policies that generate and promote entrepreneurship (OECD, 1998).³¹ Starting in the mid-1990s, a broad spectrum of enabling policy initiatives that fall outside of the jurisdiction of the traditional regulatory agencies emerged.³² Empirical evidence surveyed in this chapter suggests that those countries that experienced an increase in entrepreneurial activity also enjoyed higher rates of growth. However, the actual mechanisms, i.e., the intermediate linkages, of how entrepreneurship

³¹ Sternberg (1996) documents how the success of a number of different high-technology clusters spanning a number of developed countries is the direct result of enabling policies, such as the provision of venture capital or research support.

³² An example is the French government's "auto-entrepreneur" stimulus plan that started in January 2009 and has led to tens of thousands of new business startups. See also Audretsch et al. (2007) and European Commission (2000).

generates growth are less obvious. The present chapter relies on a rich body of literature, both theoretical and empirical, taking into account some micro foundations of entrepreneurship. Entrepreneurship generates growth because it serves as a vehicle for innovation and change, and therefore as a conduit for knowledge spillovers. This is the case in particular in a regime of increased globalization, where the comparative advantage of modern economies is shifting toward knowledge-based economic activity. This led Yu to argue that “any policy recommendation on economic development should be based on an analysis that incorporates entrepreneurship, the engine of economic growth” (Yu, 1998, 906). Similarly, Holcombe claims that “the incorporation of entrepreneurship into the framework of economic growth not only fills in the institutional details to help make the growth process more understandable, but also points toward more promising economic policy recommendations for fostering economic growth” (Holcombe, 1998, 60).

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Chapter 21

Entrepreneurship and Public Policy

Magnus Henrekson and Mikael Stenkula

Introduction

After having been absent from mainstream policy discussion since the Great Depression, entrepreneurship was revived in the 1980s in research and policy circles alike. Spurred by David Birch's influential 1979 study, research documenting the important role of new and small firms for job generation and innovative activity began appearing. Policymaking in wealthy countries soon followed in its wake. People still believed that small and new firms needed policy protection and support relative to large firms due to size-inherent cost disadvantages. Moreover, it was also thought that market failure emanating from three types of positive externalities – namely, network, knowledge, and learning externalities¹ – necessitated corrective policy measures.

As a result, policy discussions and policymaking became focused on small firms and the incentive to become self-employed.² Small business policy or SME policy became selective, typically driven by government agencies with a mandate to assist specific types of firms, industries, or groups of people (unemployed, women, certain ethnic groups). Policy's role was to “ensure that small firms can compete in the marketplace and that they are not prejudiced because of their small size, relative to large firms.”³ Given this role, policy was evaluated using quantitative measures

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¹Audretsch et al. (2007).

²See, e.g., Storey (2003) and Cumming and MacIntosh (2006).

³Lundström and Stevenson (2005, 37).

such as changes in the rate of self-employment, the number of start-ups, and other similar indicators.

Yet new evidence indicates that a small share of all firms, sometimes called gazelles, generate most of new net jobs.⁴ Acs (2009) shows that since the mid-1990s, these so-called high-impact firms have represented a tiny share of US companies (2–4%).

These developments have in turn influenced policy discussions. Rather than targeting small firms to compensate for their inherent disadvantages, policy has begun to shift its focus toward providing a framework for fostering a dynamic economy. What bundle of policies ensures that people can start new ventures, develop these ventures into high-impact firms, and expand existing ventures to their full potential?⁵

This chapter identifies the most important policy areas and measures likely to create a favorable environment for entrepreneurship, notably high-impact firms. As entrepreneurship policies do not target existing firms, our discussion will keep a systemic focus. Rather than discussing *why* entrepreneurship is important, we will address *how* public policy can stimulate entrepreneurial activity, with emphasis on productive entrepreneurship in high-impact firms.

The chapter is organized as follows. Sections “Self-Employment versus Entrepreneurship” and “Entrepreneurship Policy versus Small Business Policy” give a background to the following sections and discuss the differences between self-employment and entrepreneurship, and the differences between SME policy and entrepreneurship policy. Section “Entrepreneurship Policy” constitutes the bulk of the chapter, and discusses how an entrepreneurial economy can be promoted. It contains four subsections classified according to Baumol et al.’s (2007) four key tenets for the support of an entrepreneurial economy: Ease of starting and expanding a business, rewards for productive entrepreneurship, disincentives for unproductive entrepreneurship, and incentives to keep the winners on their toes. Section “Summary and Conclusions” concludes.

Self-Employment versus Entrepreneurship

The meaning of entrepreneurship requires clarification, as does the distinction between self-employment (or small- and medium-sized enterprises, SMEs) and entrepreneurship. The terms entrepreneur and entrepreneurship lack an accepted definition, and are commonly used vaguely and inappropriately. For instance, the

⁴See Henrekson and Johansson (2010) for a survey of the evidence.

⁵Hoffmann (2007, 140). This does not preclude that an entrepreneurial venture is sold to an incumbent fairly quickly. The full potential of a business idea will more likely be realized if it is sold to an established business with the requisite know-how and financial strength (Norbäck & Persson 2009).

terms self-employment and entrepreneurship are often used interchangeably in empirical work.

Two aspects of entrepreneurship deserve special attention. First, entrepreneurship stems from individuals and organizations—be they new, old, large, or small—that actively renew and reshape the economy. Second, entrepreneurship is a *function*, pursued by specific individuals who decide whether and to what extent they supply this function.

The above distinctions underlie why self-employment or SMEs cannot be equated with entrepreneurship, and why they constitute a poor proxy in empirical work. First, in many cases, becoming self-employed is a second-best response to unfavorable institutions, and has thus nothing to do with entrepreneurial activity. Second, employees without an ownership stake can be entrepreneurial within an existing (large) company, although this seldom occurs unless compensation contracts provide the right incentives. Hence, self-employment is neither a necessary nor a sufficient condition to be regarded as an entrepreneur.⁶

The literature often distinguishes opportunity entrepreneurship – starting a business to take advantage of an entrepreneurial opportunity – from necessity entrepreneurship – starting a business because other employment options are either absent or unsatisfactory.⁷ Regarding necessity entrepreneurship as entrepreneurship is questionable indeed, although it may become (opportunity) entrepreneurship at a later stage.

Another distinction involves innovative and imitative entrepreneurship; innovative entrepreneurs introduce innovations in the economy (such as new products, new techniques, and new organizational forms) whereas imitative entrepreneurs diffuse these innovations throughout the economy.⁸ Even if imitative entrepreneurship should not be regarded as entrepreneurship by definition, purely imitative entrepreneurs seldom exist in reality as they often modify or improve the innovation (e.g., adjust the innovation to a new market or a new customer group).

Productive, unproductive, and destructive entrepreneurship are also distinctive. The self-serving entrepreneur will pursue those entrepreneurial activities expected to generate the largest private return.⁹ A highly profitable venture for the individual entrepreneur may, however, have a zero or negative social rate of return. Depending

⁶See Iversen et al. (2008) and Henrekson (2007) for a further discussion.

⁷Reynolds et al. (2002). Sometimes the terms “pull” and “push” effects are used instead to distinguish whether individuals start ventures due to their lack of better alternatives or to exploit entrepreneurial opportunities.

⁸See, e.g., Baumol et al. (2007).

⁹This maximization behavior does not necessarily imply narrow selfishness. The entrepreneur could care about the welfare of kin and friends, or even about the welfare of the general public. It suffices that the business decisions are decoupled from such considerations. The entrepreneur maximizes profits selfishly, but no constraint is put on the use of these profits. These may or may not be spent with altruistic considerations in mind.

on the social outcome, an entrepreneurial activity can be classified as productive (social gains), unproductive (zero social gains), or destructive (social losses).¹⁰

Finally, it is crucial to stress the importance of so-called high-impact entrepreneurship (HIE). High-impact entrepreneurial activities commercialize key innovations or create disruptive breakthroughs, extract substantial entrepreneurial rents, spur growth (in both the firm and the economy) and employment, and shift the production possibility frontier outwards. In short, HIE significantly influences the economy. HIE activity occurs within so-called high-impact firms. Entrepreneurial firms with an exceptional growth trajectory are sometimes termed high-growth firms (HGFs) or “gazelles.” Yet a typical start-up is not characterized by HIE; and high-impact entrepreneurship is not necessarily performed within new (or small) companies.¹¹

Entrepreneurship Policy versus Small Business Policy

Stimulating entrepreneurship and small business activity sits high on the agenda of developed and developing countries alike. This is striking given that large companies commanded attention during much of the post-war period. Recently, however, globalization has spurred focus on entrepreneurship. Increased product and market integration have thwarted efforts to protect incumbents, allowing successful entrepreneurs to extract higher profits. This in turn increases the lobbying power of potential entrepreneurs relative to incumbent firms.¹² Public discourse often regards entrepreneurship and small businesses as an economic panacea. While this view is exaggerated, it is fair to claim that productive entrepreneurship plays a key role in economic development.

The government can wield public policy – namely, the use of tools by policymakers to influence society in a politically desired manner¹³ – to stimulate the economy. Entrepreneurship can be encouraged by efforts ranging from specific targeted support, such as technology assistance to small firms, to general macro policies to maintain a stable economic environment.

It should be noted, however, that SME policy does not parallel entrepreneurship policy.¹⁴ SME policy involves policies directed specifically at supporting SMEs (including self-employment), and can be justified on several grounds. It can be used to spur perceived positive macroeconomic side-effects—such as increased employment, growth, or innovation output—or to compensate for perceived negative

¹⁰Baumol (1990) and Murphy et al. (1991).

¹¹See Acs (2008) for an in-depth discussion of HIE. Acs claims that HIE should be an activity focused on (homogeneous) mass production within the product market sector. However, we find it unnecessary to restrict the concept of HIE to specific business activities and/or strategies.

¹²See Douhan et al. (2009).

¹³Hart (2003).

¹⁴Lundström and Stevenson (2002).

microeconomic side-effects—such as scale-economies or other cost and information disadvantages—associated with the SME sector.¹⁵ This policy approach commonly involves the creation of specific government agencies that support SMEs in a range of small-firm support programs and subsidies.

Entrepreneurship policy is a much broader concept. Its aim is not to stimulate firms but to support an economic system that encourages socially productive entrepreneurial activity by individuals acting independent of business form. SME policy influences *quantitative* aspects, such as the number of self-employed and small or new firms, and the size distribution of firms. This rests on the premise that more SMEs and self-employment is always better, since it increases entrepreneurship in the economy. Yet most definitions of entrepreneurship find no truth in this assertion. Pervasive small-scale businesses or self-employment would not benefit a country's economy.¹⁶ Moreover, searching for an “optimal” level of self-employment and trying to steer the economy toward this level would be foolish as well. Such a level cannot be determined; even if it did exist, it would fluctuate over time and differ across regions and industries. It is not feasible to fine-tune a modern market economy in this manner.

As it is difficult, if not impossible, for policymakers to a priori determine who will be an entrepreneur, measures directed at a specific group or a specific form of business are largely misdirected.¹⁷

Public policy should not try to influence the “natural” evolution of firm size, growth, or form through targeted subsidies or tax breaks. Market forces and profit motive alone should govern the evolution of firms.¹⁸ Unless a substantial market failure that can be rectified through public policy exists, targeted programs should be looked upon with skepticism. A system replete with special treats and regulations for select categories results in a complex system with detailed rules, exceptions, and exceptions to the exceptions, which in the end impairs all activity due to increased administration and information costs. These costs are almost always more burdensome for SMEs because of the existence of a sizable fixed cost component.¹⁹ Moreover, complex systems provide opportunities for unproductive and destructive entrepreneurship.

Normally, welfare increases if the economy allows and rewards productive entrepreneurial initiatives across the board, independent of firm, and individual characteristics. A well-designed entrepreneurship policy facilitates productive

¹⁵See, e.g., Storey (2003) or van Stel (2007). Audretsch et al. (2007) mention network, knowledge, and learning externalities as three examples of market failures that work against SMEs in the economy. Rodrik (2007) points to information and coordination externalities as one basis for government intervention.

¹⁶Audretsch et al. (2002, 45).

¹⁷Cf. Holtz-Eakin (2000), who claims that it is virtually impossible to clearly identify entrepreneurs.

¹⁸Cf. Holtz-Eakin (2000).

¹⁹EU (2007, 2008).

entrepreneurial activities and enables the creation and commercialization of valuable knowledge.²⁰ Whether this implies a high or low rate of self-employment or SMEs is largely irrelevant. Instead of focusing on quantitative aspects of entrepreneurship, entrepreneurship policy should focus more on the *qualitative* aspects. Empirical evidence suggests that an economy that fosters (a few) high-impact entrepreneurial firms and high-growth firms is superior to an economy that tries to maximize the number of SMEs or the rate of self-employment.²¹

In many countries, public policy is currently shifting emphasis from SME policy toward entrepreneurship policy. Figure 21.1 depicts major distinctions between these two concepts.

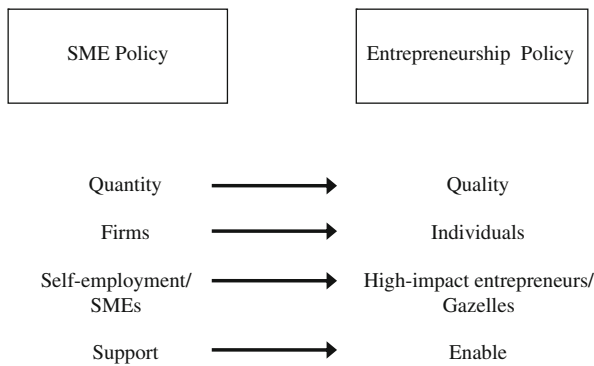


Fig. 21.1 SME policy versus entrepreneurship policy

Nonetheless, the entrepreneur is not the only agent important for economic progress. Successful entrepreneurs who identify and exploit new ideas – thereby creating and expanding businesses – depend on a number of complementary agents, such as skilled labor, industrialists, venture capitalists, and secondary markets. It is important to keep in mind that successful entrepreneurs cannot succeed without these complementary competencies and inputs.²² Focusing on just the entrepreneur distracts from important factors necessary for an economy to prosper. Still, entrepreneurship is crucial; a lack of productive entrepreneurs cannot be fully offset by an ample supply of skilled labor or an extensive capital market.

Quantitative policy goals have the advantage of being easier to evaluate. Many studies that evaluate support programs use a quantitative measure. They may, for instance, assess whether a certain policy has boosted the number of small firms.

²⁰ Acs and Szerb (2007, 112).

²¹ See, e.g., Shane (2008, 162), who states that: “[N]ew company formation per se isn’t what matters; rather it’s the creation of a small number of super-high-potential new companies, which among them generate almost all the economic growth and job and wealth creation that comes from having an entrepreneurial economy [. . .] A strategy that revolves around increasing the number of new business created every year is flawed.”

²² Johansson (2010).

Academics prefer quantitative variables, as they facilitate both empirical and econometric analysis. Illusive qualitative concepts like entrepreneurship, however, are more difficult to handle.

Evaluating and analyzing entrepreneurship policy is less straightforward. Be that as it may, entrepreneurship policy exists to stimulate job creation, innovation, social welfare, and economic growth: lackluster performance in these dimensions indicates a need of policy reform.

Entrepreneurship Policy

The research literature identifies at least 25 factors ranging from labor market regulations to public sector size that influence the rate of entrepreneurial activity.²³ Compiled systematically, public policy influences entrepreneurial activity in five different areas:

- the demand side of entrepreneurship;
- the supply side of entrepreneurship;
- the availability of resources, skills, and knowledge;
- preferences for entrepreneurship; and
- the decision-making process of potential entrepreneurs.²⁴

Irrespective of classification, it is tricky to evaluate the effectiveness of different policy options. As discussed earlier, measurement poses the first problem. Second, different policy measures will likely interact, with ambiguous effects – policies can be complementary, but they may also counteract each other.²⁵ Third, policies geared toward other goals may also influence entrepreneurial activity.²⁶ As the effect of a policy tool depends on the whole policy mix in the economy, it is virtually impossible to fully identify the factors affecting entrepreneurial activity; to quantify their respective effect is, of course, even more difficult.

In short, context matters.²⁷ Political, economic, and cultural systems differ across countries, each of which has characteristics that cannot be replicated or imitated by public policies. Although using both cross-national benchmarking and best practice comparisons is worthwhile when evaluating different policy tools, doing so largely ignore the importance of context. Countries may have different binding constraints,

²³Lundström and Stevenson (2002).

²⁴Audretsch et al. (2002).

²⁵Orszag and Snower's (1998) study of the complementarity of different policies in the area of unemployment provides an interesting parallel. They show how the effectiveness of one policy depends on the implementation of other policies.

²⁶OECD (2007).

²⁷Cf. Boettke and Coyne (2009, 144).

and the importance of a particular factor may be greater in one country than in others. Therefore, ranking different policies as “best practice” may at best give rough policy guidance and at worst be quite misleading.²⁸

No time-invariant and universal general policy prescriptions exist that can and should be used to stimulate entrepreneurial activity. As entrepreneurship research is multidisciplinary and diverse, no generally accepted theory exists. Patterns can be traced between countries using suitable empirical and econometric techniques, but one must avoid drawing strong general conclusions based on this research. Even if several studies find one aspect to be (the most) important, this factor may not be similarly relevant in other economies not covered by the study.

Time span poses an additional problem. Several studies have shown that public policy rarely influences entrepreneurial activity in the short run.²⁹ This can stem from cultural inertia but also transaction/switching costs, which make public policy toward entrepreneurship ineffective. Depending on the political time horizon, different policies may prove optimal from different points of view.³⁰

Even if a country’s culture can impede progress in the short run, cultural patterns are not immutable. Public policy can alter attitudes in a society over time. To the extent that norms and attitudes are culturally codified products of the reward structures in society, institutional changes are likely to affect norms and attitudes.³¹ Furthermore, the importance of culture may not only induce inertia but also produce a positive reinforcing feedback cycle. A more entrepreneurial culture generates a larger “demonstration effect,” a process in which people are exposed to (successful) entrepreneurs and are in turn stimulated to engage in entrepreneurial activities; soon more people are being stimulated, which strengthens the entrepreneurial culture even further.³² Yet causality may run in the opposite direction. A vivid entrepreneurial culture is not a cause but rather a by-product of institutions that foster entrepreneurship.³³ Culture is a proximate rather than an ultimate cause; focusing on its role in spurring entrepreneurial activity is misleading indeed.

These insights provide the backdrop for the remainder of this chapter. As context matters, we eschew a general ranking of best practice policies. Instead, we discuss a smorgasbord of factors that research has shown to be of importance.

Many perspectives can color a discussion of entrepreneurship policy; as our starting point, we take Baumol et al.’s (2007) four primary tenets underpinning an entrepreneurial economy:

²⁸Cf. Rodrik (2007), Boettke and Coyne (2009), and Lundström and Stevenson (2002).

²⁹Acs and Szerb (2007).

³⁰Acs and Szerb (2007) state that information, opportunity recognition, and skill development are the most important factors influencing entrepreneurial activity in the short run.

³¹Bowles (1998), Baumol et al. (2007, 203ff), and Smith (2003).

³²Audretsch et al. (2002).

³³See Boettke and Coyne (2003, 2009) for a further discussion.

- ease of starting and growing a business;
- generous rewards for productive entrepreneurial activity;
- disincentives for unproductive activity, and
- incentives to keep the winners on their toes.

All four tenets and their relevant policy tools will be discussed below. All in all, 11 public policy areas are analyzed in this chapter. Of course, the separate policy areas may influence several tenets at once; we have thus listed the policy area under the most relevant tenet in the text below. Table 21.1 presents a general overview of the policy areas and policy tools to be discussed.

Table 21.1 Summary of policies and how they relate to Baumol et al.,’s four tenets

	Ease of starting and expanding a business	Rewards for productive entrepreneurial activity	Disincentives for unproductive activity	Incentives to keep winners on their toes
Policy				
Regulatory entry and growth barriers	x		(x)	(x)
Liquidity and capital constraints	x			
Labor market	x			
Social security	x	(x)		
R&D, commercialization and knowledge spillover	x	(x)		(x)
Targeted support	x			(x)
Property rights	(x)	x		
Taxation	(x)	x	(x)	
Bankruptcy laws	(x)		x	
Intellectual property rights		(x)		x
Trade and regulation	(x)			x

Note: All public policies can be relevant for more than one of Baumol et al.,’s four tenets. In that case the tenet which is deemed to be the most important is marked with an X, while other tenet/tenets of lesser relevance are marked with an (X). The respective policies will be discussed in the section seen as the most relevant.

A final word of caution regarding the outcome of entrepreneurship policy is justified. Public policy has to strike a balance between different goals and different interest groups – trade-offs are inevitable and must be dealt with. This is also true for entrepreneurship policy.

Ease of Starting and Expanding a Business

Being able to start and expand a business with ease is vital in stimulating entrepreneurship. Public policy directly influences firm formation and expansion through laws and regulations—including direct prohibition—but also does so indirectly through the social security system and labor market regulation. Public policy also stimulates entrepreneurship indirectly through measures that alleviate natural constraints, such as capital requirements.

Regulatory Entry and Growth Barriers

Although natural entry barriers such as scale economies and capital requirements exist, government regulations can also impede new venture formation and expansion. Indeed, governments forge both direct and indirect entry barriers. Direct entry barriers refer to the act of restricting and even prohibiting entry into certain sectors of the economy (such as health care), while indirect barriers involve administrative costs and regulatory burdens imposed on new (and/or existing) firms. Expressed in another way, public policy can directly stimulate entrepreneurship by deregulating the economy, thereby increasing the opportunities for competition; alternatively, the government can indirectly stimulate entrepreneurship by easing administrative and legislative burdens, thereby allowing entrepreneurs to devote more of their time, money, and effort to productive activities.³⁴

Direct Barriers

Direct entry barriers can be justified as consumer protection against fraudulent or incompetent business owners. Few would support a system in which anybody could work as a doctor, surgeon, or psychologist; strong arguments can be made for direct entry barriers for persons lacking requisite skills or know-how.³⁵ However, overly extensive regulations hamper productive entrepreneurship. Research indicates that occupational licensing, for example, may have gone too far, resulting in unjustified profit opportunities for license holders rather than consumer protection. Consequently, licensing may curb the rate of innovation.³⁶

In recent decades, the governments of developed countries have deregulated product markets with the aim of increasing market contestability and providing more opportunities for private entrepreneurship within telecommunications, transportation, and financial services, for example. The scope for new high-impact entrepreneurs has thus increased dramatically.

Yet one segment of most advanced economies remains heavily regulated and even monopolized by the public sector: the provision of social services such as

³⁴Storey (1994).

³⁵OECD (2007).

³⁶Kleiner (2006). For an early critique of occupational licensing, see Friedman (1962, Chapter 9).

health care, child and elder care, and education. This is so despite that these services are primarily private goods. As demand for these services increases as a result of aging and wealthier populations, the social benefits arising from productive entrepreneurship in these areas would be substantial.³⁷ Indeed, these industries already constitute 30% of GDP in the Scandinavian welfare states, and about 20% in the OECD.³⁸ While several of these markets have been partially opened to private competition in recent years, many impediments still loom – private firms only produce a fraction of total output.

Government monopolization of production frustrates organizational development and productivity. Typically, local or regional governments control production and are prohibited from expanding outside their own region. As a result, efficient organizations cannot expand geographically. Consumers (e.g., patients) in the region may also be restricted to using the local provider. Such policy generates small regional production monopolies controlled by the government. Efficient producers cannot expand outside their local domain and inefficient public organizations continue to operate under little pressure to improve. Furthermore, government ownership decreases management interest in innovation, as they cannot reap the same benefits from these activities as private owners could (the producer is not the residual claimant).³⁹

Hence, the public sector's de facto monopolization of many income-elastic services has excluded vast areas of the economy from entrepreneurial exploitation. Part of this problem can be rectified by substituting private commercial firm production for public sector production, even if the service is provided free (or almost free) of charge to customers.⁴⁰ In addition, service producers can be permitted to offer additional services beyond what is granted through a tax-financed voucher system. This, too, would provide stronger incentives for entrepreneurs. Such a scheme would likely spur the emergence of new high-impact entrepreneurs in the health care sector.

Near-exclusive reliance on taxation for the financing of health care, child and elder care, and education becomes more problematic as real income grows, since these highly income-elastic services suffer from Baumol's Disease, i.e., their relative price tends to increase over time because they largely consist of labor intensive services with low or zero productivity growth.⁴¹ Technological breakthroughs also increase the supply of services in the health sector. When private purchasing power is restricted from these sectors, they become tax-financed "cost problems" rather than potential growth industries attracting talented entrepreneurs and other key agents and competencies.

³⁷The income elasticity of these services has been estimated to be as high as 1.6 (Fogel 1999).

³⁸Adema (2001), Adema and Ladaique (2005), and Andersen (2008).

³⁹See, e.g., Shleifer (1998).

⁴⁰See, e.g., Jensen and Stonecash (2005) for an overview of public sector outsourcing. Even if only part of public production is privatized, the non-privatized part may improve. Bergström and Sandström (2005) have found that school results in Swedish public schools improved due to competition from independent schools under a voucher system covering all children.

⁴¹Baumol (1993) and Jansson (2006).

Even if private high-impact firms are not permitted entry into areas like health care, the private sector may still be affected by activity in these sectors. The public sector buys services and products for billions of euros each year; monopolized public sector segments are and can be a major market for many private firms and entrepreneurial initiatives. SME production commonly holds just a small share in these segments, which SME policy aims at increasing. Even if SMEs do not have an inherent advantage, public procurement policies should at least be as neutral as possible in regard to large firms and SMEs.⁴²

Indirect Barriers

That extensive entry barriers deter business entry is corroborated throughout the empirical literature.⁴³ Entrepreneurship is facilitated if it is easy and inexpensive to form (or expand) a business. Hence, administrative, legislative, and regulatory burdens should be as low as possible to stimulate entrepreneurship, save for regulation necessary to ascertain product safety and assuage distributional concerns.

It is useful to distinguish between different entry barriers. The World Bank has constructed an index measuring the ease of doing business in different countries (the WBDB indicator). They use four variables: length of time, complexity of the procedures, direct cost, and minimum capital necessary to start a business.⁴⁴ Research based on this dataset shows that entry barriers discourage start-ups.⁴⁵ Despite that research shows that entry barriers matter, researchers disagree on which entry barriers are most important.⁴⁶

Entry barriers raise both direct and indirect costs of starting a business and therefore constrain possibilities to exploit new opportunities. An entrepreneur will only found or expand a business if expected profits compensate for the costs and uncertainty associated with the project. Hence, increased regulatory and procedural costs raise the required rate of return necessary for an entrepreneurial opportunity to be exploited.⁴⁷ High costs deter potential entrepreneurs.⁴⁸

Regulatory burdens do not only impede firm start-ups, but also the expansion of existing small firms.⁴⁹ Entrepreneurial firms are often smaller than mature, non-entrepreneurial firms. Several studies have found that many SMEs struggle

⁴²See, e.g., OECD (2007) and EU (2008) for a further discussion.

⁴³Ho and Wong (2007). In a highly influential paper, Djankov et al. (2002) discuss and analyze entry costs across 85 countries.

⁴⁴See, e.g., World Bank (2005a, 2005b). The methodology is based on Djankov et al. (2002), which is greatly inspired by de Soto (1989).

⁴⁵See, e.g., Desai et al. (2003) and Klapper et al. (2004).

⁴⁶Ho and Wong (2007).

⁴⁷Dean and Meyer (1996).

⁴⁸OECD (1998).

⁴⁹Nijssen (2000).

heavily with administrative regulations.⁵⁰ Hence, a high regulatory burden penalizes entrepreneurial expansion.

More than just the level of the administrative burden matters, however; ambiguous and opaque legislation – including vaguely formulated rules, frequent changes, and exemption clauses – also hampers entrepreneurial initiatives.⁵¹ Many entrepreneurs lack the resources to devote their own time or pay an employee to cope with bureaucratic red tape and unpredictable changes and delays in relevant legislation.⁵²

A high regulatory burden influences necessity entrepreneurship and opportunity entrepreneurship differently. Potential necessity entrepreneurs usually possess less wealth, but regulatory costs can upset their financial status and deter them from entrepreneurship.⁵³ On the other hand, potential opportunity entrepreneurs normally possess more wealth; they have more options (notably, to continue being a wage earner), which in turn makes them sensitive to start-up costs.⁵⁴ In contrast, potential high-impact entrepreneurs who expect large gains are less likely to be deterred by a regulatory burden, granted that the expected gain is high enough.⁵⁵

However, costly regulation not only affects the level (and form) of entrepreneurship, but also its distribution between the formal and informal sector. Excessive regulation tends to push entrepreneurial activity into the informal sector, breeding corruption and stimulating unproductive entrepreneurship.⁵⁶ Lowering administration costs thus shifts business activities from the informal to the formal sector.⁵⁷ Given that entrepreneurship in the formal sector is preferred and more productive, lowering entry barriers and administrative costs stimulates productive entrepreneurship.

In response, many countries have attempted to ease the regulatory environment to stimulate entrepreneurship by reducing the number of permits required to start a business, for example, or cutting the minimum time needed to obtain such permits. This has stimulated business creation in many countries.⁵⁸

However, lower levels of regulatory barriers may also have counterintuitive effects. Rodrik (2007) has pointed out that the easier it is to start a new business,

⁵⁰EU (2008). Crain and Hopkins (2001) found that the total cost of federal regulation in the United States is about 45% greater per employee in small firms (< 20) relative to large firms (> 500).

⁵¹Audretsch et al. (2002).

⁵²Kauffman Foundation (2008).

⁵³van Stel et al. (2007, 173). Ho and Wong (2007) claim, however, that necessity entrepreneurship should not be hampered by regulatory costs, as they are driven by lack of alternative employment and not by exploiting new profitable opportunities.

⁵⁴Ho and Wong (2007).

⁵⁵Ho and Wong (2007).

⁵⁶de Soto (1989) and Henrekson and Sanandaji (2010).

⁵⁷Cf. Baumol (1990). Capelleras et al. (2008) find support for this idea. They show that there is lower business activity in Spain's highly regulated formal sector than in the less-regulated UK. This difference disappears, however, if the informal sector is included in the analysis.

⁵⁸OECD (2005) and Haggarty et al. (2006).

the easier it is to imitate the initial innovator and capture a share of his profits. If entry barriers are too low, the incentive to introduce innovations is too low as well. Research has shown that the number of new products being exported is *positively* related to the height of entry barriers.⁵⁹

Entry barriers can also influence the quality of entrepreneurs and their ventures. More stringent entry requirements may increase the average quality of new ventures and their survival rate.⁶⁰ The more difficult it is to enter the market, the higher the chance of surviving and succeeding once a firm has entered. When entry is easy ventures with a lower likelihood of success are worth attempting. Hence, lowering entry barriers may increase the quantity of entrepreneurs but decrease their quality. In theory low entry barriers could therefore have a detrimental effect on the aggregate economy. However, we deem that this is unlikely to be the case in practice. It is also easy to find research which shows that the quality does not deteriorate when entry requirements are relaxed.⁶¹

Liquidity and Capital Constraints

Entrepreneurial activity hinges on accessing and raising capital of the right kind. Numerous studies show that access to capital is the most significant obstacle for many business launches.⁶² Yet many start-ups do not require much capital; financial constraints do not pose a problem for many new businesses.⁶³ Advances in ICT have also reduced minimum capital requirements in many markets.⁶⁴ As it stands, capital tends to constrain high-growth firms more⁶⁵ because they often require sizable infusions of funds to sustain growth. Liquidity constraints also become more binding as companies get smaller.⁶⁶

In the EU, entrepreneurs and SMEs rank financing as their second most important concern after administrative burden.⁶⁷ The United States' highly developed financial system has indeed been cited as responsible for the emergence of its successful entrepreneurial economy.⁶⁸

⁵⁹Klinger and Lederman (2006).

⁶⁰Audretsch et al. (2002).

⁶¹See, e.g., Audretsch et al. (2002).

⁶²See, e.g., Parker (2004, Section II) and van Auken (1999).

⁶³Hurst and Lusardi (2004) and Shane (2008, 79).

⁶⁴Baumol et al. (2007, 236).

⁶⁵Baumol et al. (2007, 205).

⁶⁶Fazzari et al. (1988).

⁶⁷EU (2008).

⁶⁸Kauffman Foundation (2007, 34).

The General Problem

Banks normally demand collateral-based lending. This requires that the potential entrepreneur has enough resources of his own to invest in the project or to use as collateral. A mixture of information asymmetries and the inherent risk of entrepreneurial projects lies at the heart of the problem. A potential entrepreneur understands more about his own ability and his entrepreneurial investment project than his prospective lender. Reducing the obstacle of asymmetric information by screening (by the potential lender) and signaling (by the potential entrepreneur) can be problematic because of the entrepreneur's lack of a track record or the difficulty of evaluating his project.

Entrepreneurs can circumvent the asymmetric information problem by investing personal resources in the project, as this signals that the entrepreneur believes that the project has a high likelihood of success. Banks do normally also demand collateral-based lending. This obviously requires that the potential entrepreneur has enough resources of his own to invest in the project or to use as collateral. Hence, own financing or collateral lending may signal both high confidence in the project and access to wealth. However, potential entrepreneurs without enough wealth cannot signal confidence in this way (even if they have high faith in their project).

From a first-best perspective, the desirable outcome is obvious: good projects should be funded, bad ones should not. Good projects should be pursued even if the entrepreneur lacks requisite funds. (And bad projects should not be pursued even if the entrepreneur has the necessary resources.) Not all projects should be financed. A failure to raise funds is by no means an example of market failure or capital market malfunction. The credit market functions as an initial filter, screening out the most unrealistic and overly optimistic projects. A bank or a venture capitalist, with many years of experience financing entrepreneurial ventures, may make better judgments than a first-time entrepreneur.⁶⁹ Moreover, many entrepreneurs are grossly overoptimistic about the future success of their projects.⁷⁰

Research has found that the probability of becoming an entrepreneur increases with wealth – financial constraints curtail entrepreneurial activity. However, causality may run in the other direction; wealthier persons may be more likely to be better entrepreneurs on average.⁷¹ Other studies have also shown that receiving an inheri-

⁶⁹See de Meza (2002) and de Meza and Southey (1996) for an in-depth discussion. de Meza actually claims that too many low-quality projects are being funded due to asymmetric information. The problem is then that too many projects are financed. In accordance, he argues that public policy should be used to reduce lending to entrepreneurs.

⁷⁰See, e.g., Hayward et al. (2006) who discuss the Hubris theory of entrepreneurship; many potential entrepreneurs have overconfidence in their knowledge, predictions, and personal ability.

⁷¹See Shane (2008, Chapter 5) for an interesting discussion.

tance does not increase one's likelihood of starting a business, which casts doubt on the importance of financial constraints.⁷²

Although these objections must be considered, it would be too harsh to conclude that financial constraints never pose a problem. Even if an appropriate amount of projects are funded, their quality could still leave much to be desired. After all, the problem could be qualitative rather than quantitative. Plenty of other research indicates that capital resources increase the ability to survive and expand.⁷³

This first-best perfect information approach, which underlies some of the arguments above, may also be misleading. It is impossible to know *ex ante* whether a project will be successful. Testing new ideas in the marketplace is the entrepreneur's fundamental task – in practice, all failed projects do not represent a waste of resources or a market failure. However, every opportunity to use scarce resources more efficiently thwarted by financial constraints gives rise to a welfare loss. Being an agent of change who combines production factors in novel ways, the entrepreneur holds center stage in the market's selection process.

Financing Entrepreneurship in Practice

A start-up's success relies on the availability of equity financing. In general, reliance on equity rather than debt financing increases with risk. The smaller and newer the firm is, the more difficult it is for outside financiers to assess the viability and profitability of the venture. Thus, *ceteris paribus*, small and newly established firms are more dependent on equity financing than large, well-established firms.

Entrepreneurial start-ups struggle to raise funds from large financial institutions and thus often rely on insider and internal funding in the enterprise's nascency. Internal financing can be increased in this phase by pursuing economic policies that promote private wealth accumulation in forms that do not preclude the assets from being used as equity in entrepreneurial ventures.⁷⁴

Research strongly suggests that incentives for individual wealth accumulation would likely increase entrepreneurial activity.⁷⁵ Low private savings exacerbate the inherent problem caused by asymmetric information, as discussed above. Wealth-constrained would-be entrepreneurs are unable to forcibly signal their project's worth to outside investors by means of making sizeable equity infusions of their own or, if needed, to fully finance the firm until organic growth based on retained earnings is possible.

⁷²Hurst and Lusardi (2004). Nykvist (2008) examines this relationship using similar methods with Swedish data, but the result that wealth is not important for new entrepreneurs could not be replicated.

⁷³Kauernman et al. (2005) and Bamford et al. (2004).

⁷⁴Pelikan (1988) provides forceful arguments supporting this view. Data from the United States show that businesses below 2 years of age are equity financed to 48%, in which the bulk comes from internal sources. Consequently, debt financing constituted 52%, but only 28% of the debt consisted of funding from financial institutions (Berger and Udell 1988).

⁷⁵See Parker (2004) and Nykvist (2008).

Informal investors, mainly so-called business angels, fill this gap between internal funding and formal venture capital financing. New research has shown that the availability of these informal investors is crucial in overcoming liquidity constraints.⁷⁶ The United Kingdom has in particular used tax reliefs and generous deductions to encourage business angel investments.⁷⁷

Venture capital firms play a pivotal role in the development of small entrepreneurial ventures by converting high-risk opportunities to a more acceptable risk level through portfolio diversification and adding key competencies that the firm may be lacking. Although the importance of the formal venture capital industry has increased over time, its extent is still rather modest.⁷⁸ As already noted, many entrepreneurial firms are too small for venture capital funding. Yet venture capital retains importance for high-performing and high-growth entrepreneurial firms.⁷⁹ Venture capital is often superior to bank finance since it also provides key expertise and access to networks important for entrepreneurial high-risk firms.⁸⁰

The venture capital industry is less developed in Europe than in the United States.⁸¹ This may occur because European business owners are less prone to accept loss of control, a normal implication of venture capital support.⁸² US firms also grow faster than their European counterparts, which tend to remain small.⁸³

The government can support the venture capital industry both directly and indirectly.⁸⁴ The government can use tax revenues to directly provide venture capital to the market, either through state-controlled organizations or together with private actors. The government could in particular support the supply of early stage (seed) capital – which the formal venture capital industry typically does not provide – through public interventions.

However, there is reason to be skeptical of this kind of direct support. Any support system must contain elements of rationing and selection in order to avoid moral hazard problems of unmanageable proportions. No recipe dictates how to “pick the winners” and support the right investments. On the contrary, the process of evaluation in the private venture capital industry is both highly complex and sophisticated, and often includes tacit judgments. The industry is at best moderately successful

⁷⁶Ho and Wong (2007).

⁷⁷An example is the Enterprise Initiative Scheme, introduced in 1994, which under certain conditions gives business angel investors tax relief from capital gains and the possibility to write off the amount invested (up to a cap) against income tax. See, e.g., Boyns et al. (2003) and Mason (2006).

⁷⁸See, e.g., Reynolds et al. (2002) and Bygrave and Hunt (2004).

⁷⁹OECD (1998).

⁸⁰Ho and Wong (2007) and Keuschnigg and Nielsen (2004a).

⁸¹See, e.g., Bottazzi and Da Rin (2002) and Da Rin et al. (2006)

⁸²OECD (1998).

⁸³Scarpetta et al. (2002).

⁸⁴Borger et al. (2000).

in picking the winners among high-risk projects, despite their specialization in this area.⁸⁵

Neither theory nor practice indicates that politically controlled organizations are better able than the private venture capital industry (or business angels) to assess the likelihood of business success. On the contrary, politically controlled organizations might – directly or indirectly, openly or furtively, partly or completely – base their decisions on political rather than commercial criteria and therefore underperform.⁸⁶ Examples of politically controlled organizations that have outperformed private organizations in this area are hard to find.⁸⁷ To counter this objection, state-governed venture capital could be compelled to only fund firms that also receive private funding in order to copy and reinforce the emerging funding structure on the market.⁸⁸

The government can also support the venture capital industry indirectly. It could, for example, stimulate the private venture capital industry through tax policy. The 1980s witnessed the rapid growth of the US venture capital industry in just this fashion, spurred by large cuts in capital gains taxes.⁸⁹ Around 1980, the US legal framework began encouraging the development of a sophisticated venture capital industry. The industry itself then designed a number of efficient incentive schemes to overcome inherent conflicts of interest between innovators, entrepreneurs, fund managers, and investors.⁹⁰

New research based on European data cast doubt on the idea that channeling more funds into venture capital markets automatically stimulates a successful venture capital industry. A successful VC industry is more likely to be stimulated if

⁸⁵See, e.g., Gompers and Lerner (2004) or Gompers et al. (2009). Cf. Birch (2006), who claims that it is impossible to “pick winners.” Svensson (2008) has also shown that soft public financing in the early stage (seed) phase often leads to inferior firm performance and that public loans always should be granted on commercial terms. See also Bergström (2000).

⁸⁶However, openly and politically influenced decisions are at times deliberate support of, e.g., impoverished regions. Supporting specific minority groups, like immigrants or women, may also be a way to compensate for possible (credit market) discrimination in the economy.

⁸⁷Baumol et al. (2007, 220).

⁸⁸Cf. Shane (2008) who claims that politicians should think like venture capitalists and copy their strategies instead of supporting the “typical” venture with a supposedly low impact on the economy. Politicians cannot “pick winners” but they can try to avoid “picking losers”. Baumol et al. (2007) asserts that the Advanced Technology Program (ATP), administered by the Commerce Department in the US, only supported ventures which also attracted private money and there is some support that this has been successful. The largest program in the United States is the Small Business Innovation Research (SBIR) program. Program evaluation can be very complex, but Siegel et al. (2003) concludes that both ATP and SBIR have been successful.

⁸⁹Gompers and Lerner (1999) find that a crucial factor behind the growth of the United States venture capital industry was that the decrease of capital gains tax rates boosted demand for venture capital as more workers got an incentive to become entrepreneurs. Keuschnigg and Nielsen (2004b) have shown theoretically that inefficiently low entrepreneurial effort and venture capital support may arise in the economy and that capital gains taxation may be particularly harmful. See also Keuschnigg and Nielsen (2004a) for an additional discussion.

⁹⁰Henrekson and Rosenberg (2001).

the expected return of innovative projects were higher due to, e.g., decreased corporate or capital gains taxation. The existence of exit opportunities also spurs the venture capital industry.⁹¹ Although the problem of information asymmetries cannot be solved by means of tax policy, an appropriate tax policy can trigger informal and formal venture capital to alleviate these problems.

Focus should not, however, remain fixed on the venture capital industry. A well-developed financial sector offers a spectrum of other financial sources, ranging from readily available, highly liquid savings to long-term institutionalized pension saving schemes that severely restrict the owner's control of the assets. In many countries, long-term pension savings constitute the bulk of personal savings. In addition, pension savings are often tax favored. Peter Drucker warned against these tendencies more than 30 years ago, claiming that the sharp increase of corporate pension plans posed a dire threat to the entrepreneurial society – it concentrated too much power in too few hands.⁹²

Hence, the composition of savings – not just the volume – sways potential entrepreneurship activity in the economy. For this reason, any arrangement that channels savings and asset control to large institutional investors will likely limit the supply of financial capital to potential entrepreneurs. In 1978, the United States began allowing pension funds to invest a portion of their assets in high-risk projects. This contributed to a significant expansion of the VC industry that, in the end, boosted entrepreneurial activity.⁹³

The Labor Market

Labor market and wage-setting regulation can influence incentives for entrepreneurship since it restricts the freedom of contracting and therefore curtails possible combinations of factors of production. Labor security regulations fall more heavily on younger, smaller, and less capital-intensive employers. As entrepreneurial firms are overrepresented in these categories, labor security regulation disproportionately burdens entrepreneurial firms.

As a highly regulated economy is too rigid to adapt well to changes, employment flexibility may be important for entrepreneurial activities. Strong regulation of the employment and dismissal of employees keeps entrepreneurs from adjusting their workforce in correspondence with market fluctuations, thereby increasing the risk of their projects even further.⁹⁴ As an employer determines a worker's abilities over time, and as those abilities evolve with the accumulation of experience, his optimal work assignment will also likely change. In a flexible labor market, this often entails

⁹¹Da Rin et al. (2006). They conclude: "[T]he European experience suggests that the creation of active venture capital markets might depend on providing investors and entrepreneurs with the possibility to reap the benefits of their efforts rather than providing them with more funds."

⁹²Drucker (1976).

⁹³Hart (2003, 10).

⁹⁴Audretsch et al. (2002, 47).

worker mobility between firms; such mobility is more likely to occur when the initial employment relationship was forged in a small, often young, business.

Labor market regulation can directly influence entrepreneurial activity through two channels. First, a low level of labor market regulations increases the flexibility of high-risk entrepreneurial companies, making it more attractive to be an entrepreneur. Second, the relative advantage of being an employee decreases with weak employment protection laws, making it more favorable to undertake entrepreneurial projects as self-employed.⁹⁵ Generous, far-reaching labor protection laws increases an employee's opportunity cost of changing employers or leaving a secure salaried job to become self-employed.

The extent of labor market regulations differs greatly across countries. OECD has compared the extent of government regulations on labor standards by measuring five different aspects.⁹⁶ Of the 18 countries included in the survey, Greece and Sweden exhibited the highest index value (8 and 7 points). The average for all European countries was 4.9. The United States scored a zero and Canada 2.⁹⁷ New research has found that the differences in labor market regulations shape the level of nascent entrepreneurship more than entry regulations. Entrepreneurship tends to be higher in countries where it is relatively easy to hire and dismiss employees.⁹⁸

Labor market deregulation can and has stimulated entrepreneurial activities in many OECD countries.⁹⁹ Small firms in the Netherlands, for example, hire fewer employees than needed due to the perceived cost of formal rules and regulation.¹⁰⁰ New firms in the United States on the other hand, expand their employee base more rapidly than firms in Europe.¹⁰¹ Europe's stricter employment protection laws probably induce the relative lack of new, rapidly growing firms in Europe.¹⁰²

Labor market regulations thus deter and impede business activities. If regular employment is highly regulated, however, a strong incentive to circumvent these regulations may develop. Potential entrepreneurs can do so by pursuing entrepreneurial projects as self-employed, using only self-employed labor instead of hiring employees if labor is needed. Compensation and working hours are totally unregulated and no labor security is mandated for the self-employed. This may boost the level of self-employment, but it should not be interpreted as a sign of exuberant entrepreneurial activity. Instead, it is a costly, albeit necessary, measure

⁹⁵ van Stel et al. (2007).

⁹⁶ OECD (1994).

⁹⁷ OECD provided an update of the 1994 study in 2009. See Shedinger (2010) for details.

⁹⁸ van Stel et al. (2007).

⁹⁹ OECD (1998, 2000).

¹⁰⁰ Niehof (1999).

¹⁰¹ OECD (2003).

¹⁰² Baumol et al. (2007, 210, 222).

to evade the effects of stringent labor market regulation. Part of the increase in self-employment in recent years in many highly regulated economies is likely driven by such considerations.

Given the large intra-firm differences in productivity and productivity growth, wages set in negotiations away from the workplace that do not take idiosyncratic factors into account will impair entrepreneurial activities. Intra-firm differences are especially large in young and rapidly expanding industries and firms.¹⁰³ In developed countries, employees' general income level is also relatively high, which in turn makes the opportunity cost of leaving salaried employment to start or work in a new venture high as well.¹⁰⁴

Very small firms can avoid unionization and collective agreements, and therefore benefit from greater freedom of contract. This room for maneuvering would likely disappear once the firm size exceeds a certain threshold, thus increasing the cost of expansion. This is yet another factor likely to hamper the entrepreneurial spirit and willingness to grow among new and small enterprises. As a result, a tightly regulated labor market may create a system in which a large share of economic activity occurs in small firms lacking the ability or the ambition to grow. Onerous regulation makes it difficult and risky to build large companies. Italy is a good case in point, where firms tend to remain small and resort to cooperating with other small firms in clusters.¹⁰⁵ By contrast, new firms in the United States tend to expand their businesses more rapidly than the European counterparts.

The Social Security System

The social security system is closely linked to the labor market regulation discussed above. The establishment of public income insurance systems in combination with stringent labor security legislation tends to penalize individuals who assume entrepreneurial risk.¹⁰⁶

That social security schemes in modern welfare states tend to deter entrepreneurial activity stems from the relative advantage of being an employee. Many social security benefits, such as disability, sickness, and unemployment benefits, are explicitly linked to formal employment. The opportunity cost of leaving a tenured position as an employee is high, strengthening preferences for regular employment and reducing the incentives for entrepreneurship.¹⁰⁷ Generous pension benefits paid by employers have a similar effect.

However, even if it were possible to generalize the social security system, the self-employed and owners/managers of small entrepreneurial firms would not be

¹⁰³See Caballero (2007).

¹⁰⁴Ho and Wong (2007).

¹⁰⁵Lazerson and Lorenzoni (1999) and Pyke et al. (1990).

¹⁰⁶See, e.g., Ilmakunnas and Kannianen (2001) for an econometric analysis of the effects of risk insurance in the welfare state.

¹⁰⁷See, e.g., Audretsch et al. (2002).

able to use sick or parental leave benefits, for example, in practice. Their increased exposure to risk and lower social security protection is a natural part of being an entrepreneur. Many are therefore unwilling to forgo a large part of their social security protection in exchange for uncertain entrepreneurial incomes. Making part of social insurance benefits “portable” between jobs and between regular employment and self-employment would reduce this effect.

Beside the differences in social security protection between employees and many entrepreneurs, the level of benefits may matter as well. Generous unemployment benefits discourage the unemployed from becoming self-employed (as a form of necessity entrepreneurship) and reduce the number of individuals willing to enter into entrepreneurial ventures as employees. In countries where the unemployed receive a high proportion of their former wage, the rate of new firm formation is lower.¹⁰⁸ In a study of people among Swedish business start-ups with at least 3 years of university education in science, technology, or medicine, employees and students often preferred unemployment and further education to starting a business of their own when faced with unemployment.¹⁰⁹

The health care insurance system poses additional problems. In many countries, notably the United States, health insurance is tied to employment. Many workers and potential entrepreneurs get “trapped” in large companies that provide generous health insurance for the employee and his/her family. Decoupling health insurance from employment would increase labor flexibility and reduce fears of losing adequate health insurance.

R&D, Commercialization, and Knowledge Spillover

The successful exploitation of research and inventions combined with the transfer and spillover of this knowledge stimulates growth and prosperity in a modern economy.¹¹⁰ The entrepreneur plays an important role in this respect. Entrepreneurs—in both new and established ventures—are responsible for recognizing unexploited opportunities in the market and spreading innovations by imitation and incremental improvements of existing technologies.¹¹¹ An important objective of entrepreneurship policy is to promote this process of production and commercialization of knowledge. Entrepreneurship policy is often justified by noting the key importance of knowledge spillovers.¹¹²

At present, politicians of all persuasions stress “the knowledge economy” and virtually all of them seem to have a similar policy prescription to promote this kind of economy: more R&D spending.¹¹³ This idea is, however, based on an

¹⁰⁸Nickell (1997) and Koellinger and Minniti (2009).

¹⁰⁹Delmar et al. (2005).

¹¹⁰See, e.g., Acs et al. (2009).

¹¹¹Baumol (2002).

¹¹²See, e.g., Acs (2008).

¹¹³See, e.g., EU (2002).

overly mechanical view of the economic system. Higher spending on R&D does not automatically produce more innovations or more entrepreneurs who start new or expand existing ventures. Without a well-functioning entrepreneurial economy, the full potential from increased R&D cannot be reaped. New ideas and inventions are only the first step in an innovation and commercialization process. For increased R&D to translate into economic growth, entrepreneurs must exploit the inventions by introducing new products on the market or introducing new methods of production.¹¹⁴

In the worst case, quantitative goals can be a waste of money as focus and resources are directed toward factors which may not be exploited at all or be exploited elsewhere.¹¹⁵ R&D spending is a factor input, not an output, and should not be subject to quantitative political goals. It has no such intrinsic value from an economic point of view. Although high R&D spending can be a necessary part of a successful economy of today, it is far from sufficient.¹¹⁶

The so-called knowledge spillover theory of entrepreneurship offers an alternative perspective.¹¹⁷ This theory relaxes two implicit or explicit assumptions of earlier theories. First, it distinguishes between knowledge and “economic knowledge”, namely, knowledge that is economically exploitable – more knowledge does not automatically translate into more economic knowledge. Second, it rejects the assumption that (economic) knowledge automatically spills over and induces growth. The entrepreneur enlivens these roles instead. They are the actors who commercialize inventions and thereby transform knowledge into economic knowledge, and they are the origin of knowledge spillover throughout the economy.

Knowledge is often tacit, sticky, and uncertain, making it both costly and difficult to transmit and evaluate. As it is uncertain, the expected value and variance of an innovation will differ between individuals. This lays bare high profit opportunities for new entrepreneurial firms which incumbent firms either do not recognize or do not realize. Spin-offs also become possible. If incumbents fail to see high enough profit opportunities in ideas launched by their employees, the employees can instead exit the companies and start new entrepreneurial firms.

¹¹⁴Bhidé (2008).

¹¹⁵The amount of R&D may not only be large but also exploited inefficiently. Da Rin et al. (2006) examined 14 European countries in a panel between 1988 and 2001 and did not find any positive relationship between public R&D spending and the rate of innovation, defined as the share of high-tech and early stage venture capital investments.

¹¹⁶To make the point crystal clear: it was neither Bill Gates nor Henry Ford who invented the technologies they used in their ventures. They were entrepreneurs who successfully exploited new or existing technologies. These entrepreneurs were needed to successfully exploit the inventions. Only focusing on inventions and R&D misses at least half of the story. Increased R&D will not automatically bring forth entrepreneurs undertaking entrepreneurial activity based on new R&D. Perhaps it is even the other way around, i.e., in an economic system encouraging productive entrepreneurship a great deal of R&D is undertaken because the results from R&D are *demanded* (Holcombe, 2007).

¹¹⁷See, e.g., Acs (2008) and Acs et al. (2009) for a further discussion.

Geographic proximity also facilitates knowledge spillover and knowledge transfer. If public policy promotes networks through which knowledge can easily be transferred between businesses and organizations, entrepreneurship is facilitated as a result.¹¹⁸ Clusters and science parks supported by public policies make sense from this perspective. A Swedish study comparing new technology-based firms found a slight overperformance for firms situated in science parks.¹¹⁹ Today's most dynamic clusters, however, cannot be traced to a certain policy measure; cluster formation is a long-term process which cannot be accelerated by means of a quick policy fix.

An element of serendipity characterizes all cluster formations. Consequently, public policy plays a greater role in the later phases of cluster formation. Successful clusters normally emerge in response to opportunities – a successful cluster cannot be created by public policy. At the end of the day, the competence of creative, persistent entrepreneurs seems to outweigh geography in the formation of successful clusters.¹²⁰ However, this form of support should not be directed to specific firms. Firms must be self-selected and not “picked” (see Section “Targeted Support” for further discussion).

Public policy can instead sustain business infrastructure with different facilities. Google and Netscape provide two interesting examples of innovations originating from university campuses. Stimulating academic entrepreneurship and accelerating the commercialization of university-developed innovations can be one way to foster innovation in the economy.¹²¹ For this to be successful, university faculty must encourage and stimulate entrepreneurial initiatives at the same time as incentives for university spin-offs remain strong. Some universities have a Technology Transfer Office, or TTO, an in-house organization specializing in assisting academic entrepreneurs in commercializing their inventions. But a TTO could also hinder the commercialization of useful technologies by making the process too bureaucratic and seeing to its own narrowly defined proprietary interests.¹²²

Targeted Support

The policies discussed so far have all been general in nature. However, more specific public policies can target firms (SMEs), occupations (self-employed), regions

¹¹⁸Audretsch et al. (2002).

¹¹⁹Lindelöf and Löfsten (2003).

¹²⁰Carlsson (2009).

¹²¹Kauffman Foundation (2007).

¹²²Kauffman Foundation (2008) and Baumol et al. (2007). See also Henrekson and Rosenberg (2001). There are innumerable examples of programs supporting science parks, clusters, and spin-offs, especially within the academic sector. Even if many studies find a positive effect from these programs, fair evaluations are difficult due to endogeneity problems and a lack of a counterfactual benchmark (how institutional arrangements would have spontaneously evolved had there been no public support). There are, however, also examples of failed policy programs such as the UK support program for young people (Meager et al., 2003). See OECD (2007) for a further discussion of evaluations of entrepreneurship policies and programs.

(underdeveloped, rural), sectors (ICT, biotech), or individual groups (women, blacks, immigrants, and unemployed). These groups could be perceived to be more important for entrepreneurship (e.g., SMEs or the ICT-sector), or found to be lacking in entrepreneurial activity (e.g., young people, women).

As discussed in the opening sections, entrepreneurship policy takes a more general stance and tries to stimulate productive entrepreneurial initiatives independent of firm and individual characteristics. One should be wary of using targeted policies because of their negative side-effects. For instance, subsidizing small firms increases small firms' cost of growth (beyond a certain threshold). If policy aims to encourage a robust and dynamic business sector, such a program is largely misdirected.¹²³ Supporting the unemployed also tends to have undesirable side-effects. The unemployed are more likely to start new ventures than their employed counterparts – even without government support – and their ventures are more likely to fail. Pushing more unemployed into self-employment is unlikely to increase the success rate in this category and should be treated with skepticism.¹²⁴

Rewards for Productive Entrepreneurship

Entrepreneurs generally strive for a combination of wealth, power, and prestige.¹²⁵ Low costs to start and expand a business alone will not entice an entrepreneur to exploit an opportunity; the expected reward must be large enough to compensate for the opportunity costs and uncertainty incurred.¹²⁶ This section discusses how public policy can stimulate entrepreneurship by rewarding productive entrepreneurship. Tax policy plays a major role in this respect, and its effects constitute a substantial part of this section as a result.

Property Rights

Private property rights—the existence of legal titles to hold property and the protection thereof—is arguably our most fundamental economic institution.¹²⁷ The establishment of secure and stable property rights steered the long-term development of Western countries.¹²⁸ Secure property rights ensure that physical objects

¹²³Holtz-Eakin (2000, 288).

¹²⁴Audretsch et al. (2002, 55). Research based on UK data also shows that targeted regional start-up subsidies to under-performing regions tends to encourage individuals with limited human capital to start firms. This group seldom develops high-impact firms and often leaves the market after some time. See van Stel and Storey (2004).

¹²⁵Baumol et al. (2007, 234).

¹²⁶Cf. Ho and Wong (2007).

¹²⁷See, e.g., Libecap (1993), Baumol (2002), Rodrik et al. (2004), and Acemoglu and Johnson (2005).

¹²⁸Rodrik (2007) and North and Weingast (1989).

can be turned into capital, a transformation that requires judgment, imagination, and innovation.¹²⁹ Without control over assets and their returns, a potential entrepreneur will lack the incentive to innovate.¹³⁰ In countries with weak property rights, entrepreneurs are discouraged from reinvesting retained earnings in their ventures.¹³¹ The division and specialization of labor are also hampered, which narrows the range of potential entrepreneurial discoveries.

Moreover, weak property rights (and the protection thereof) stimulate unproductive and destructive entrepreneurship. If the protection of property rights is sufficiently weak, destructive entrepreneurship, such as extortion and corruption, will be promoted. Hence, in light of insufficient and inadequate laws to protect and ascertain private property rights, unproductive and destructive entrepreneurship is strengthened relative to productive entrepreneurship. Organized crime syndicates and the mafia, for example, are often innovative in their response to shortcomings in the legal enforcement framework, and pursue entrepreneurship as a substitute for absent or maladaptive public institutions. The Sicilian mafia and criminal organizations in Japan illustrate that these activities are not necessarily negative for the economy, given the context within which they are carried out.¹³²

Intellectual property rights and patent legislation are important questions in this area. We will discuss this issue in Section “Intellectual Property Rights”.

Taxation

The tax system represents a key public policy tool in setting the level of rewards of entrepreneurship. The extent and design of the tax system affects the net return to entrepreneurship both directly and indirectly. It determines a potential entrepreneur’s risk-reward profile and consequently his incentives for undertaking entrepreneurial activities as well. Even if non-pecuniary rewards unaffected by taxes (such as autonomy and individual flexibility) also matter, the financial effects from taxation cannot be neglected. Extensive research has analyzed theoretical and empirical effects of the tax system; its effects are, however, often complex and sometimes counter-intuitive.

From a theoretical point of view, the tax system affects entrepreneurial activity through a variety of mechanisms. The theoretical literature identifies four main channels: (1) an *absolute effect* affecting the supply and effort of potential entrepreneurs in the economy; (2) a *relative effect* affecting an individual’s choice

¹²⁹de Soto (2000).

¹³⁰Rodrik (2007, 156). Rodrik stresses the importance of *control*. Formal property rights which in practice do not render control rights are useless. In the same way, even if formal property rights are absent, sufficiently strong control rights may be enough to provide sufficient incentives for potential entrepreneurs.

¹³¹See Johnson et al. (2002) who investigates new firms in the post-communist countries.

¹³²Bandiera (2003), and Milhaupt and West (2000). See Douhan and Henrekson (2010) for a further discussion.

of occupation and organizational form; (3) an *evasion effect* affecting the willingness to become an entrepreneur to take advantage of opportunities to decrease the tax burden; and (4) an *insurance effect* affecting the amount of risk people are willing to assume and hence the likelihood of undertaking entrepreneurial activities.¹³³ We will discuss each of these effects below.

The absolute effect of a tax makes it more expensive to start or expand a business; an absolute increase of taxation of entrepreneurs lowers the (expected) after tax reward. It also makes expansion financed by retained earnings more difficult and negatively affects the liquidity position of an entrepreneur. A lower after tax return or higher expansion costs discourages entrepreneurial activities and impedes new start-ups and the expansion of firms.¹³⁴

Taxation may also alter the relative return of different activities if it favors one form of employment over another. As a result, a higher tax rate may encourage income shifting and thus positively influence (some form of) entrepreneurship in the economy.

The evasion effect arises if evading taxes on entrepreneurial income either illegally or legally is simpler than paying them. This often proves true for entrepreneurs working as self-employed.¹³⁵ It may be easier for self-employed to underreport income by avoiding registration of cash sales or to overstate costs by recording private expenses as business costs, or to frequently use more informal agreements that are hard for the tax authority to verify or disclose. A Swedish study estimates that the self-employed underreport their income by 30%.¹³⁶ Higher taxes may, as a result, encourage entrepreneurship (i.e., self-employment). When a business expands above a certain level, it becomes more difficult to exploit such tax avoidance opportunities.¹³⁷

Lastly, the insurance effect claims that taxation (with full loss offset) functions as insurance that stimulates risk-taking.¹³⁸ When applied to entrepreneurship, an increased tax on the net return together with full loss offset will reduce the after tax variance of profits and hence the risk associated with the business. If potential entrepreneurs are risk averse, this risk reduction may stimulate entrepreneurship.¹³⁹

However, the rate of tax *progression* may also matter. The insurance effect assumes a proportional tax rate with full loss offset. Given that entrepreneurial incomes are more variable than salaried income, the average tax will be higher

¹³³These effects can, e.g., be compared to Slemrod (1986) who only distinguishes between two effects to tax changes: real responses and avoidance responses.

¹³⁴See, e.g., the discussion in OECD (1998).

¹³⁵See, e.g., Long (1982), Watson (1985), Kesselman (1989), Pestieau and Possen (1991) for a discussion of tax evasion and choice of occupation. Robson and Wren (1999) conclude that it is mainly the average tax rate that affects evasion behavior.

¹³⁶Engström and Holmlund (2009).

¹³⁷Henrekson and Johansson (2009).

¹³⁸This argument was first put forward by Domar and Musgrave (1944).

¹³⁹A recent discussion of this effect is Cullen and Gordon (2007). It is noteworthy that in practice no tax system has full loss offset.

for entrepreneurs in a progressive tax system. A highly progressive tax system with imperfect loss offset therefore deters entrepreneurial business entry.¹⁴⁰ High marginal tax on entrepreneurial income (for high incomes) penalizes gazelles, or high-growth entrepreneurial ventures.¹⁴¹

In sum, theory argues for both a positive and a negative relationship between taxation and entrepreneurship. Bearing in mind the difference between unproductive and productive entrepreneurship, the positive effects seem mainly to encourage unproductive (or destructive) entrepreneurship and non-entrepreneurial self-employment. Productive entrepreneurship has little to do with people who start their own ventures to avoid paying higher taxes. Rather, this effect likely reduces opportunities for legitimate and productive entrepreneurship.¹⁴²

As the theoretical models give ambiguous results, we must look to empirical research to determine which is the dominant effect. However, empirical findings are still ambiguous in this respect. A great deal of empirical research analyzes taxation and entrepreneurship, but much lacks a satisfactory measure of entrepreneurship. Nearly all studies within the literature of empirical entrepreneurship struggle to define and quantify entrepreneurship. Self-employment levels are often used as a proxy because they are readily available and of relatively good quality over time and across countries, but this is a crude measure of entrepreneurship (as discussed in Section “Self-employment versus Entrepreneurship”). As a consequence, empirical results must be interpreted with caution. Taxation’s positive or negative effect on self-employment levels does not indicate the same effect on truly entrepreneurial activity in general or productive entrepreneurial activity in particular.

The empirical results conflict at first glance, as both negative, positive and no effects are found.¹⁴³ Parker (1996) and Schuetze (2000) find a positive effect (i.e., higher tax rate increases entrepreneurial activity), for example, whereas Moore (2004) observes a negative effect. Many studies also find no or only negligible effects from taxation (e.g., Stenkula, 2009). OECD (2007) concludes that no simple relationship between low tax rates and the level of entrepreneurship can be established. Given the complexity of the tax code in a typical OECD country, the incentive effects of the tax code on entrepreneurial behavior are highly complex. A more detailed examination of the research illustrates that the average tax rate likely has a positive effect whereas the marginal tax rate likely has a negative effect.¹⁴⁴ As stated earlier, a higher tax progression may also deter entrepreneurial activities.¹⁴⁵

Many studies within this field often analyze the effect of one specific tax, like the tax on earned income, or use an overall aggregate tax measure, like taxes as a share

¹⁴⁰Gentry and Hubbard (2000).

¹⁴¹Audrestch et al. (2002, 46).

¹⁴²Audrestch et al. (2002, 46).

¹⁴³For a general overview of the research until 2003, see Schuetze and Bruce (2004).

¹⁴⁴See, e.g., Robson and Wren (1999).

¹⁴⁵Gentry and Hubbard (2000).

of GDP. But what one should really analyze is taxes on entrepreneurial income. In practice, no specific tax on income from entrepreneurial effort exists. From a tax perspective, entrepreneurial income can be taxed in many different forms, including labor income, business income, current capital income (dividends and interest), or capital gains. These taxes may affect entrepreneurial activities in different ways. A thorough analysis of the effects of taxation on entrepreneurship must disentangle these effects.

To begin with, entrepreneurs can often choose their business form and its associated taxation. Income from labor and unincorporated businesses (business income) are often taxed in the same way – the sum of labor income and business income is normally called earned income. As long as tax rates from earned income are higher than corporate tax rates (as is typically the case) and new ventures experience tax-deductible losses in the beginning (as tends to be the case), entrepreneurs will generally choose to start a new business as an unincorporated business. When the company is profitable at a later stage, the entrepreneur may want to incorporate the business. As a result of these differences, an increase of the earned income tax rate relative to the corporate income tax rate may actually encourage new ventures.¹⁴⁶ A high tax on earned income makes the initial loss of a new venture less burdensome. (As discussed above, it may also be easier to avoid taxes as an entrepreneur in small or new businesses.)

However, income from entrepreneurial effort may be taxed as earned income to a larger extent than described above. First, the tax code may restrict the extent income accrued from closely held incorporated companies may be taxed as first corporate and then capital income at the personal level.¹⁴⁷ Second, a great deal of the entrepreneurial function is carried out by employees without an ownership stake in the firm, for whom the earned income tax schedule is always applicable. For these categories, a high tax on earned income may have negative incentive effects.

High labor tax rates may also impede the emergence of a large, efficient service sector. Many activities within the household service sector are labor intensive tasks that can also be performed by unpaid household members themselves. High labor tax rates make it difficult to compete successfully with unpaid household production; consequently, commercial exploitation and entrepreneurial business development occur less often.¹⁴⁸

Payroll taxes are normally included in discussions of labor taxation. High payroll taxes deter entrepreneurs from hiring employees if wage costs are too high (if the incidence of the payroll tax is on the employer/entrepreneur) or the net wage too low (if the incidence of the payroll tax is on the employee), or a combination of these two effects (if part of the incidence is on the employer and part on the employee).

¹⁴⁶Kauffman Foundation (2007) and Cullen and Gordon (2007).

¹⁴⁷This is true for Sweden, where the so-called 3:12 rules restrict how much of profits from closely held firms that can be taxed as dividends and not as earned income by the owners. See Agell et al. (1998) and Davis and Henrekson (2010).

¹⁴⁸Henrekson and Johansson (2009).

High payroll taxes could also discourage development within the service sector in the same way as the regular labor income tax.

Turning to capital and corporate taxation, a high tax rate on business profits discourages equity financing and spurs debt financing. To the extent that debt financing is less costly and more available for larger firms, high corporate tax rates coupled with tax-deductible interest payments disadvantage smaller firms and potential entrepreneurs.¹⁴⁹ Taxing corporate profits also reduces the amount of retained earnings that can be used to expand the existing venture. Research has shown that taxing profits in small firms often lead to lower growth rates.¹⁵⁰ A higher tax rate on dividends encourages the reliance on retained earnings for financing expansion. This punishes new ventures, locks in retained earnings, and traps capital in incumbent firms. This could reduce the flow of capital into the most promising projects, as it favors projects in incumbent ventures.¹⁵¹

Most of the economic return from successful high-impact entrepreneurial firms comes as steeply increased stock market value rather than as dividends or large interest payments to the owners. As a result, the taxation of capital gains on stock holdings greatly affects the incentives for potential high-impact entrepreneurs.¹⁵² Successful entrepreneurs are also highly sensitive to wealth, property, and inheritance taxes.¹⁵³ Certain assets are exempted from taxation in many countries, such as corporate wealth or pension savings, and the imputed value used as the basis for assessments is often based on arbitrary calculation rules. These rules may spur (like corporate wealth exemption) or discourage (like pension savings exemption) investments in entrepreneurial activities.

Stock options can be used to encourage and reward individuals who supply key competencies to a firm. In ideal circumstances, this would provide incentives that closely mimic direct ownership. This is most important for entrepreneurs in certain industries in which options are an effective response to agency problems.

The efficiency of stock options greatly depends on the tax code. If gains on stock options are taxed as wage income, some of the incentive effect is lost. This becomes particularly true if the gains are subject to (uncapped) social security contributions and if the marginal tax rate on wage income is high.

The situation changes dramatically if an employee with stock options can defer the tax liability to when the stocks are eventually sold. The effectiveness is reinforced further if the employee suffers no tax consequences upon the granting or the exercise of the option and if the employee is taxed at a low capital gains rate when

¹⁴⁹Henrekson (2007).

¹⁵⁰Michaelas et al. (1999).

¹⁵¹Cf. Audretsch et al. (2002, 46).

¹⁵²Henrekson and Johansson (2009). High corporate and capital gains taxation may also discourage the venture capital industry (Da Rin et al., 2006). See, however, Holtz-Eakin (2000, 288) for a critical discussion and calculation of the importance of capital gains taxation.

¹⁵³See Rosen (2005) for an overview.

the acquired stock is sold. The United States changed the tax code in the early 1980s along these lines, paving the way for a wave of entrepreneurial ventures in Silicon Valley and elsewhere.¹⁵⁴

In order to calculate the total effect of taxation, one must consider corporate taxation's specific rules for depreciation and valuation and the taxation of interest income, dividends, capital gains, and wealth. The effective total tax rates also depend on ownership category.¹⁵⁵ In many developed countries, business ownership positions held directly by individuals and families have been taxed much more heavily than other ownership categories. The wave of tax reforms that swept the OECD in the 1980s smoothed over many of these differences.¹⁵⁶ Those that still persist, however, spur an endogenous response in the ownership structure of the business sector toward the tax-favored owner categories.¹⁵⁷ If individual stock holdings are disfavored relative to institutional holdings and institutions are less willing to invest in small and new entrepreneurial projects, entrepreneurial activity could be hampered.¹⁵⁸

Finally, we must stress the importance of looking at the whole picture. Taxing citizens in an economy has several purposes, like financing public and merit goods, redistributing incomes, or controlling aggregate demand. A tax system should be efficient, transparent, and equitable. Policymakers should take all these aspects into consideration when designing the tax system – entrepreneurial effects are just one of many relevant aspects.¹⁵⁹ Nevertheless, it is important to understand and consider the effect of taxes on entrepreneurial activity when designing and reforming a tax system. The design of a tax system may otherwise dampen entrepreneurial activity in the economy.

Disincentives for Unproductive Entrepreneurship

If institutions are such that it is beneficial for individuals to spend entrepreneurial effort on circumventing them, individuals will do so rather than benefiting from given institutions to reduce uncertainty and enhance contracts and product quality. In this case, corruption and predatory activities prevail over socially productive entrepreneurship. As discussed in Section “Rewards for Productive Entrepreneurship”, the institutional framework must offer rewards to productive entrepreneurship. Moreover, the institutional framework should also weaken or ideally eliminate incentives for unproductive or destructive entrepreneurial activities.

¹⁵⁴Misher (1984) and Gompers and Lerner (2001).

¹⁵⁵These kinds of highly complicated estimates have been made for a number of countries using the methodology developed by King and Fullerton (1984).

¹⁵⁶Jorgenson and Landau (1993).

¹⁵⁷Rydqvist et al. (2009).

¹⁵⁸Henrekson and Johansson (2009).

¹⁵⁹Cf. Acs and Szerb (2007).

A complex and ill-conceived tax system forces entrepreneurs to waste time and effort on tax issues, while a tax system with high tax rates increases the incentive to evade taxes. Entry barriers and high regulatory burdens can have the same negative effect.

Bankruptcy Law

If the economy is to evolve and develop, unsuccessful and unproductive entrepreneurial ventures must close down so that their resources can be redirected to more productive uses. The institutional framework must hence make it easy to close down or reconstruct ventures.¹⁶⁰

However, all failed projects should not be considered a waste of resources, as discussed earlier. Bankruptcies themselves are not unproductive (or destructive) entrepreneurship. Failed firms can create value for the economy as their very failure gives information to other agents; moreover, the knowledge generated/created by these firms can often be used by other firms. Restructuring a failed venture with new management may also result in improvements, for example. Knowledge from failed projects and ideas often can underlie the success of other ventures.¹⁶¹ The restriction or delay of this process by stringent bankruptcy regulation harms knowledge generation and development.

From an individual point of view, stringent bankruptcy laws discourage potential entrepreneurs because they increase the perceived cost of starting a business. A new business can always fail. As business formation, selection, and destruction often include a positive information and knowledge externality that the potential entrepreneur does not consider when starting a business, relatively generous bankruptcy laws seem reasonable. Examples include discharge clauses, postponement of debts, and the possibility of restructuring. Discharge clauses allow the debtor to cancel some debt, although its use varies from country to country. On the other hand, overly generous bankruptcy laws encourage exploitation and destructive entrepreneurship and may directly damage creditors while indirectly harming the rest of the community.¹⁶²

Non-financial effects cause additional concerns. Psychological costs often accompany bankruptcies, and many countries exhibit negative public attitudes toward business failures.¹⁶³ This stigma may discourage people from

¹⁶⁰ Audretsch et al. (2002) and OECD (1998).

¹⁶¹ Gilbert et al. (2004) and Holbrook et al. (2000). Armour and Cummings (2005) show that the harshness of the bankruptcy law has a statistically and economically significant negative effect on self-employment levels.

¹⁶² Audretsch et al. (2002) and OECD (1998).

¹⁶³ EU (2008) and OECD (1998). A survey has, e.g., shown that 47% of the Europeans would be reluctant to order from a business owned by somebody who has previously filed for bankruptcy. This will hardly facilitate entrepreneurial activities for re-starters. The average time to complete a bankruptcy varies also considerable within EU, from 4 months to 9 years (EU, 2008).

entrepreneurial activities despite good chances to succeed and prosper economically. Some countries like the United States, however, look more favorably upon failed business projects.¹⁶⁴

Business culture must also give failed entrepreneurs a “second chance” and allow them to start anew. These entrepreneurs have often accumulated valuable experience and business networks that increase their probability of success in the future. Empirical research also shows that so-called habitual or serial entrepreneurs are more successful.¹⁶⁵ Great business potential stems thus from re-starters, but cultural differences and institutions influence failed entrepreneurs’ willingness to try new projects.

Incentives to Keep the Winners on Their Toes

The formation of successful ventures is necessary for economic progress – yet it is far from sufficient. Initial success can become stagnation in later stages. There is no guarantee that entrepreneurial ventures will continue to innovate and successfully evolve. Many large companies use their power and financial strength to protect themselves from competitors, thereby thwarting the entrepreneurial spirit found both within the firm and among potential competitors. The institutional framework should therefore foster an entrepreneurial economy that compels the old “winners” to continue to perform.¹⁶⁶

To this end, public policy has traditionally constrained “big business” in order to ensure that large companies do not abuse their market power. This is often an ill-conceived approach, frequently involving lengthy legal processes with unpredictable outcomes. Alternatively, the government could attack the problem from the other direction: stimulate new and small businesses (or foreign firms), instead of trying to punish and restrain large companies.¹⁶⁷

Intellectual Property Rights

The intellectual property rights system is an interesting example of how a second-best solution bears far-reaching consequences for entrepreneurial activities. In principle, property rights should encourage innovation and entrepreneurs. Yet a difficult trade-off in the legal system must be made, and finding the right balance can be problematic. On the one hand, it is important to protect entrepreneurial ideas and ensure that entrepreneurs have the opportunity to reap the benefits of

¹⁶⁴Audretsch et al. (2002).

¹⁶⁵See Ucbasaran et al. (2008) for an overview of habitual entrepreneurs.

¹⁶⁶See Baumol et al. (2007) for a further and more detailed discussion.

¹⁶⁷Gilbert et al. (2004).

their own entrepreneurial activities and projects. On the other hand, such exclusive monopoly privileges render protectionist entrepreneurial initiatives and impede healthy competition.

If protection is overly strong – if its time frame is too long or is too easy to obtain (including inventions which are not truly novel) – the initial entrepreneur will be able to extract excessive monopoly rents. This will definitely not keep winners “on their toes”; the economy could become less competitive and less innovative in response. Yet, if protection is too weak, or if it can be circumvented too easily (through unproductive or destructive entrepreneurship), there is no incentive to introduce innovations in the first place.¹⁶⁸

In recent years, the protection of intellectual property has been strengthened in ways that increase both the cost and risk associated with innovative activity. Numerous studies claim that intellectual property rights protection laws have become too protective, notably in the United States.¹⁶⁹ This excessive protection could impede productive entrepreneurship, but it also spur evasive and unproductive entrepreneurship to circumvent and to exploit the excessive protection of intellectual property. The system then functions as a tax on innovation, in that both the risk and the expected expense associated with innovative activity rises sharply.

Trade and Regulation

Policies that inhibit new entry and subsidize specific companies or industries clearly cause stagnation. Willingness to engage in risky entrepreneurial projects declines sharply in an economy lacking the threat of new competitors. Sheltering domestic firms from foreign competition dampens innovative activity in already developed economies.

However, a dominant, formerly successful firm in a market will not necessarily stop innovating. In a contestable market with no (or low) entry and exit costs, the incentive to innovate may still be present.¹⁷⁰ Low entry barriers, as discussed in Section “Regulatory Entry and Growth Barriers”, then become crucial.

Even with low entry barriers, the number of firms in the market may be limited by the extent of the domestic market; in combination with economies of scale (and scope) and high sunk entry costs, the interplay pressures incumbents too little. In this case, international trade can stimulate the competition and contestability of the market as incumbent firms are exposed to international competitors. The market expands at the same time as foreign firms may already have incurred the necessary

¹⁶⁸Baumol et al. (2007), Kauffman Foundation (2007), and Acs and Szerb (2007). See Merrill et al. (2004) for an in-depth discussion.

¹⁶⁹Jaffee and Lerner (2004). In the United States, the United States Patent and Trademark Office (USPTO) is overburdened as it is too easy to get a patent; the special court in the United States that deals with these issues (CAFC) has over time given greater protection to patent claimants (Kauffman Foundation 2007, 24).

¹⁷⁰Cf. Baumol et al. (1982).

sunk costs. As a result, international competition can spur the domestic innovation process as long as the domestic economy is not sheltered from competition from foreign firms.

Summary and Conclusions

The successful commercialization of an innovation requires a chain of agents that work together in order to develop a high-impact firm. Entrepreneurship is arguably the most important. In this chapter, we have examined policy areas and policy measures that foster a favorable environment for high-impact entrepreneurship.

Our analysis emphasizes the complementary character of institutions. If policy-makers would like to improve conditions for high-impact entrepreneurship, a wide array of complementary institutional reforms should be adopted.

We have identified and categorized institutions important for productive entrepreneurship in general and high-impact entrepreneurship in particular, based on Baumol et al.'s (2007) four tenets of an entrepreneurial economy. According to Baumol et al. (2007), a successful entrepreneurial economy is characterized by (1) ease of starting and expanding a business; (2) rewards for productive entrepreneurial activity; (3) disincentives for unproductive activity; and (4) incentives to keep the winners on their toes.

Based on the above classification, we have discussed 11 public policy areas, including seemingly disparate areas such as the design of the social security system and the extent of intellectual property rights. We identify a number of distortions within these policy areas that could disfavor productive and high-impact entrepreneurship. In particular, we have analyzed the importance of regulatory entry and growth barriers, labor market regulation, liquidity constraints, and tax policy in depth.

This chapter discusses entrepreneurship policy rather than SME policy. Entrepreneurship policy aims to support socially productive entrepreneurial activity, independent of business form. SME policy is a much narrower concept and includes specific support to encourage distinct groups or firms, such as SMEs and the self-employed. It often involves the creation of specific government agencies as well as targeted subsidies. Part of industrial policy in developed countries can certainly be characterized as SME policy during the 1980s and the 1990s.

Table 21.2 summarizes the issues discussed in this chapter and their ensuing policy conclusions. Under each policy area, we list public policies that contribute to an “entrepreneurial economy” and a “managed economy.” It should be stressed that many institutions and policy measures reinforce the effects pushing the system in either the managed or entrepreneurial direction.

Finally, we must keep in mind that each country has its own unique characteristics that cannot be easily replicated or imitated by public policies. Therefore, we abstain from ranking policies or identifying the “best” policy combination. Such identification would require in-depth country analyses far beyond the scope and purpose of this book chapter.

Table 21.2 Public policy supporting an entrepreneurial economy versus a managed economy

Public policy	Managed economy	Entrepreneurial economy
Regulatory entry and growth barriers:		
– Entry barriers	High	Low
– Production of welfare services/merit goods	Government production	Sizeable private production, contestability
– Financing of welfare services/merit goods	Tax financing only	Government ensures basic high-quality supply, then private financing
– Profit-driven organizations	Partly de facto prohibited in key areas facing income-elastic demand	Fully allowed
Liquidity and capital constraints:		
– Wealth formation	High levels of income redistribution and wealth tax	Support private wealth formation
– Venture capital	Direct support	Indirect support
Labor market:		
– Labor security mandates	Tied to years of tenure	Portability of tenure rights
– Wage-setting arrangements	Centralized and closely tied to formal criteria	Decentralized and individualized
Social security:		
– Design	Tied to employment	Portability of tenure rights
R&D, commercialization and knowledge spillover:		
– Focus	Quantitative goals of input (spending on R&D)	No quantitative goals, indirect support, enabling and general
Targeted support	Yes	No
Property rights	Weak	Stable and secure
Taxation:		
– Earned income tax rate	High and progressive	Low or moderate
– Capital income tax rate	High	Low
– Capital gains tax rate	High	Low
– Tax on stock options	High	Low
– Degree of tax neutrality across owner categories	Favor institutional owners over individuals	Neutrality
– Degree of neutrality across sources of finance	Favor debt over equity	Neutrality
– Personal taxation of asset holdings	Yes, in particular on equity	No, or exemption for equity holdings
– Corporate tax rate	High statutory rate, low effective rate	Low or moderate statutory rate, effective rate equal to statutory rate, and neutral across types of firms and industries

Table 21.2 (continued)

Public policy	Managed economy	Entrepreneurial economy
Bankruptcy laws	Onerous and lengthy	Generous, allow for a “second chance”
Intellectual property rights	Very strong, easily obtained	Balance inventors’ interests against need for knowledge dissemination
Trade and regulation	Protect national and incumbent firms	Openness

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Chapter 22

Connecting the Study of Entrepreneurship and Theories of Capitalist Progress: An Epilog

Rita Gunther McGrath and Sameeksha Desai

Introduction

In the beginning was the corporation. Or so it seems, as it is pointed out in the first chapter of this handbook. However, the “modern industrial corporation” is a relatively recent invention in historical terms. Chandler (1990) dates its emergence to the last-half of the nineteenth century, when advances in transportation and communications both enabled and demanded the formation of large corporations managed by professionals. Such corporations came to represent the engines of national economic growth and of individual wealth creation in countries whose very membership in the group of industrialized nations speaks to the success of this organizational form (Acs, Introduction, this volume; Baumol, 2002).

Prior to the rise of the large multi-national corporation (MNC), owner-managed firms were taken utterly for granted as the *primary* vehicle through which business was conducted. Founders started companies. If things went well, these firms grew, under the direct management of owner-entrepreneurs. The number of professional managers was extremely small. It is a testament to the success of the large industrial firm and the institutions that developed that business founding came to be seen as exceptional rather than the norm by the latter half of the twentieth century, at least in developed economies. Interestingly, we seem to have now come full circle, with new firms as a major research focus and an interest in innovation more broadly attracting both scholarly and practitioner attention.

As this handbook comes to a close, it is worthwhile to reflect on the core contributions entrepreneurship research can make. Researchers and practitioners seem to take for granted that entrepreneurial firms play a starring role in the process of economic growth and technological change. Research suggests that the key drivers are

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in fact larger collectivities – collections of firms in regions, for instance, or global oligopolies (Baumol, 2002; Schoonhoven & Romanelli, 2001). New firms certainly have a role to play, but when one thinks about it, it is the larger firm or industry collective that facilitates a new firm's impact. Most founders of new firms come from older ones. Most customers of new firms are established consumers. Most technologies used by new firms are derived from knowledge created by established ones. Even Microsoft would not have succeeded in establishing so dominant a position in personal computer operating systems had the company not built on IBM's credibility. This leads to the question of what we can expect from entrepreneurship research and its key evolving questions, as a distinct point of departure for future scholarship.

This epilog does not purport to synthesize all the fascinating future research opportunities that all the chapters in the handbook raise. Rather, we would like to use this opportunity to focus readers' attention on a role for entrepreneurship research not reflected in the other chapters. We believe that entrepreneurship scholars are well-positioned to consider big questions with respect to the future of capitalist economies, even though these may lie outside its normal "small young firm" focus. For example, entrepreneurship and a competitive private sector are strongly connected to well-performing modern economies. This provides opportunities to understand its dynamics and answer important questions across levels of analysis and academic disciplines. It is worthwhile to raise our sights and take advantage of the creative possibilities of a nascent "field" without a particular doctrine to our advantage.

Large organizations almost certainly will continue to represent a disproportionately influential source of economic growth (Baumol, 2002; Harrison, 1994a; Harrison, 1994b). They also almost certainly will be subject to frequent, unpredictable, challenges. A possible advantage scholars studying entrepreneurial phenomena have is that they have traditionally been more interested in change, disruption, and novelty than in the status quo. A second possible advantage such scholars have is that the research methodologies and points of reference among those working in the area are diverse (although some might say diverse to the point of incoherence). In this diversity lies opportunity. As the chapters in this book make clear, entrepreneurship scholars grapple with issues of researching outliers rather than central tendencies, of problems arising when the phenomenon of interest is the exception rather than the rule and of studying phenomena that defy aggregation (MacMillan & Katz, 1992).

Building on this might allow the entrepreneurship community to make a contribution to a dialog on the nature of capitalist systems that is gaining in urgency. At the center of this dialog is a paradox. First, the innovative investments of large organizations are recognized as critical to economic growth and development, yet, the disruptive effects of innovative investments are a de-stabilizing force. Thus, on the one hand, large firms and the institutions surrounding them are the main drivers of capitalist economic development, while, on the other hand, they are its most visible victims. Second, many of these large organizations often begin with a single entrepreneur who starts a venture or commercializes an innovation. The ability of these entrepreneurs to exploit opportunities is a critical element in the capitalist system – yet, as they become successful, their firms grow and expand into large

firms. Thus, on the one hand, small firms are necessary to maintain innovativeness and competition in the economy, while, on the other hand, growth is a necessary next step to maintain success. An important – and as yet unanswered – question in the research on entrepreneurship and its broader environment is *how* and *why* the capitalist system has been able to maintain balance between small and large firms. In particular, given the natural tendency of small successful firms to seek growth, how have opportunities for small firms remained available (and some would argue, robust)?

Entrepreneurship as an Engine of Change in Capitalist Economies

Without taking sides in the vibrant “what is entrepreneurship” debate, we believe that the study of entrepreneurship is interesting to a broad scholarly community because it has fundamentally to do with the study of mechanisms of economic change. Entrepreneurship scholars are always concerned with how old ways of doing things disappear and new ways come into being, and with the actors, technologies, and organizations influencing and influenced by these changes (Schoonhoven & Romanelli, 2001; Shane & Venkataraman, 2000; Venkataraman, 1997). In capitalist systems to study entrepreneurship is to study its fundamental workings, a point emphasized by Schumpeter (1942) many years ago. The study of entrepreneurship is fundamentally about the process of economic change – it’s inevitability and the positive and negative effects accompanying it.

Entrepreneurship and capitalism cannot be separated and are mutually reinforcing. As economies embrace competition, firms must become more competitive and opportunities for entrepreneurs begin to open up. The wave of growth in the reforming rapidly developing economies in the early 2000s – China, India, Brazil, and South Africa – was matched by significant entrepreneurial activity. It is impossible to determine if capitalism is the driver of entrepreneurship or vice versa, but it is necessary to consider their symbiotic relationship as we move forward.

In this essay, we suggest four issues illustrative of topics that constitute substantive research opportunities for those interested in change in capitalist economies. The first concerns investment incentives for innovation. The second concerns the “destruction” aspects of Schumpeter’s “creative destruction” formulation. The related third issue involves the legitimacy of capitalist competition and the dark sides of entrepreneurial progress. The fourth issue involves the mechanisms through which entrepreneurship contributes to the sustainability of the capitalist system, by making noneconomic investments that contribute to opportunity expansion.

Incentives to Invest in Innovation

An assumption taken for granted in entrepreneurship literature is that the structure of payoffs (to use Baumol’s, 1993 term) for innovative activities influences both its prevalence and direction. Business founders are guided by the profit motive, because

they have the chance to take advantage of an opportunity not obvious to others. Others who invest in businesses, similarly, are guided by the profit motive, and will tend to invest where they anticipate earning the greatest returns. Risk, in the sense of variability of returns, influences the return on investment that would be considered adequate. Understanding how investors perceive the attractiveness of investments in innovation is critical for the effective functioning of capitalist economies, because if investors perceive no returns for investing in innovation, presumably they will not bother to fund it.

However, the formulas most frequently used in finance to allocate capital take little account of innovation, entrepreneurship, or idiosyncratic firm behavior (Bettis, 1983). Instead, standard formulations in finance suggest that capital should be allocated on the basis of systemic, not un-systemic (firm-specific) risk profiles. The resulting paradox is this: although many (Baumol, 2002; Foster, 1986) argue that large corporations compete on the basis of their ability to innovate, entrepreneurial activities are not central to standard methods for calculating investment attractiveness. Indeed, conventional tools have been linked with under-investment in innovation (Kester, 1981). The pressing question is thus how should the incentive to innovate be reflected in the tools used to allocate capital? The opportunity seems ripe to consider this question.

Risk and Option Value: Investing in “Long Shots”

In the field of strategy, Chatterjee et al. (1999) propose a “post-CAPM” world, in which unsystematic (or firm-specific) risk is taken into account in capital asset allocation. They argue that many attributes of a firm have an option-like component to them which would yield a better understanding of a firm’s true risk profile than a conventional assessment, and which would re-introduce a role for strategy and management into the calculation of financial incentives. For new firms, the proportion of its value that is amenable to present value analysis is relatively small, relative to the proportion represented by its option potential.

Treating organizational assets as options has come to be called “real options reasoning” (Bowman & Hurry, 1993; Dixit & Pindyck, 1994). Real options represent a preferential right to select action at some point in the future, ideally when more information is available. This right comes from choices made in current investments. Investments in R&D, for instance, are often characterized as real options because they convey the right, not the obligation, for a firm to commercialize a resulting discovery (Dixit & Pindyck, 1994; McGrath, 1997).

The value of a real option depends on an asymmetry between potential gains and losses: The larger the upside opportunity and the more any downside losses can be contained, the more valuable a real option becomes. One interesting implication is that investors in real options should be more concerned with the magnitude of possible losses than with their frequency. Ventures, it has been argued, can thus be considered real options, providing that exit is a possibility. It is more promising to the extent that its a downside exposure is contained, and the upside opportunity is substantial (McGrath, 1996).

Options logic does appear to fit observed investment behavior in new ventures. Failure rates in ventures are high, and the potential for success (on average) is small. The President's Report on the State of Small Business (1997) indicates that 600,000 businesses are started annually in the United States. Of these, few grow substantially. Aldrich (1999: 108–109), for example, notes that throughout the 1980s, only 3,186 firms went public in the United States. Of this high-potential population, only 58% were still listed on any exchange at the end of 1989 (see Welbourne & Andrews, 1996). Yet, there seem to be large numbers of investors willing to take a chance on such a “long shot.” For example, the venture capital industry raised \$130 billion between the third-quarter of 1999 and the end of 2000 (Norton, 2001, citing data provided by Venture Economics and the National Venture Capital Association).

Implicit in the investment logic for new ventures is a contrarian perspective on mean-enhancing versus variance-enhancing activities. The options-oriented investor is most interested in those factors that extend the right-hand tail of the potential performance distribution. They might well prefer an investment in a high-variance (risky) venture, other things being equal, because it has the potential to dominate low-variance ventures (a point made by March, 1991; see also Morris et al., 1991). Further, an options perspective is consistent with the boom-and-bust cycle of Internet investment, suggesting that many investors took out options on the potential for growth of Internet firms, but allowed these options to expire when the potential appeared to be less than anticipated.

One implication of using an options lens to inform valuation is that the whole concept of success and failure in venturing may need to be re-visited. As argued elsewhere (McGrath, 1999), research tends to have a pro-success preoccupation with the result that insight into failure's influences on economic value is lost. If failures can be discarded at low cost, the net effect may be to increase value because greater variety can be created for the same level of investment than if every new initiative had to be followed through to completion. From a broad economic perspective, the actual number of firm failures may matter less than the magnitude and resources attached to these firms. Similarly, low-cost failures facilitate discovery processes by highlighting dead ends and closing off unpromising alternatives.

What Can Entrepreneurship Offer to a Better Theory of the Structure of Incentives for Investment in Innovation?

This discussion centers on a paradox: Although investments in innovation are seen as crucial to both firm-level success and the growth of the economy overall, innovation considerations are not central to the most widely used capital allocation methods. Instead, investors seem to use a logic that more closely resembles investment in options, where the primary incentive is a substantial upside. What contribution can an entrepreneurial perspective make to this issue? Three are suggested.

The first involves the perception of incentives. If the allocation of entrepreneurial talent in a society reflects the structure of payoffs, how are the incentives perceived? The opportunity for entrepreneurship scholars is to use their insight into individual and collective cognitive processes to ascertain how these payoff structures are actually perceived and to what extent these perceptions translate into individual and collective behaviors. For instance, Pindyck (1982) identifies several ways in which managerial behavior departs from the expectations of conventional theory, suggesting that managers intuit the value due to options and behave accordingly. Understanding how payoff structures are cognitively represented might even lead to better financial theory. Indeed, there is considerable excitement in the fields of finance and economics today as scholars in a new behavioral finance stream of work begin to explore the implications of human psychology for how economic systems work in practice (see Thaler, 1992 for one of the seminal initial pieces in this research tradition). Interest in applying experimental methods to the study of entrepreneurial decision-making (e.g., Schade & Burmeister-Lamp, 2009) is one way to generate insights on incentives that would otherwise be difficult or impossible to study through other methods. Experiments can provide researchers greater control in the study of incentives, which by nature are intangible. The study of incentives is a promising possible point of intersection with entrepreneurship research.

Ideally, research would inform investment theory as well as those aspects of the payoff structure that are amenable to policy influence. A nice exemplar of the kinds of insight entrepreneurship research can provide is Busenitz and Barney's (1997) study of differences in risk perception between company founders and managerial employees, in which they learned that the two groups have systematically different heuristics for considering risky situations. At a more macro-level, Kortum and Lerner's (1999) study suggests how a policy-level shift (a change in regulations allowing pension funds to invest in venture firms) translated into increases in funds available for investment and productive patenting, thus changing the structure of payoffs to investors in pension funds and thereby changing their behavior. The policy relevance of these questions can lead to insights across multiple levels of analysis.

A second opportunity for entrepreneurship scholars is to develop a construct that anticipates the value created by investments in innovation. A point of departure might be Rumelt's concept of "entrepreneurial rents." Rumelt (1987) distinguishes among the classic concept of rents, representing a firm's ability to take advantage of a scarce resource it possesses (such as proprietary access to raw materials), and entrepreneurial rents, which result from the discovery of new combinations of resources that are to some extent proprietary to their discoverers. He defines entrepreneurial rent as follows

... the difference between a venture's *ex post* value (or payment stream) and the *ex ante* cost (or value) of the resources combined to form the venture. If we posit expectational equilibrium (*ex ante* cost equals expected *ex post* value) then expected entrepreneurial rents are zero. The basic thrust of this definition is to identify those elements of profit that are the result of *ex ante* uncertainty. (p. 143)

One of the most useful aspects of Rumelt's argument is that he goes on to specify a parsimonious set of three necessary preconditions for the presence of entrepreneurial rents. The first is that an innovation must be a "socially efficient" replacement for an existing combination of resources. The second is that the innovator must be able to avoid having its rents appropriated (for instance, by powerful suppliers). The third is that the innovation must be able to take advantage of isolating mechanisms, which deter rapid competitive imitation or matching. Rumelt's formulation is admirable for its parsimony and thus lends itself to operationalization. Parallel to the question of entrepreneurial rents is the question of how entrepreneurs are able (both in terms of opportunity recognition and ability to exploit) to capitalize on these rents.

A third investment-relevant topic for entrepreneurship scholars concerns spillovers. Spillovers, broadly defined, consist of benefits to third parties from a firm's investments in innovation that are not realized by the party making the investment. Because the originating firm is not compensated, the conventional argument is that firms should seek to avoid spillovers, and that policies (such as patenting and trademark legislation) should be put in place to guarantee property rights for the outcome of investments in innovation. This conventional view is being challenged.

For one thing, in increasingly information-intensive environments, preventing spillovers is extremely difficult (Boisot, 1995). For another, there are many occasions when spillovers are beneficial to firms (Baumol, 2002; McGrath & McGrath, 2001; Saxenian, 1994). The difficulty is that conventional theory still makes a valid point: absent a clear mechanism to capture a portion of the benefit from investments in innovation, entrepreneurs and firms are unlikely to invest in it.

The question comes down to better understanding when one should hoard information and when one should share it. Understanding the *origins* of opportunity can make a key contribution not only in the entrepreneurship literature, but also to our understanding of modern capitalist systems more generally. Entrepreneurship scholars have a good opportunity to define such improved boundary conditions for the theory of spillovers by pursuing a traditional strength of scholars working in the area – namely an individual and firm-level focus on activities over time and in context (for instance, Gatewood et al., 1995). Two areas in which the spillover issue is central are in the literature on regional development (see Acs et al., 2002; Schoonhoven & Romanelli, 2001) and a small, but growing literature on the nature of Schumpeterian change (for instance, Tripsas, 1997). An important question in the growing research on spillovers addresses if and how spillovers create new opportunities for entrepreneurs, and what incentives and institutional conditions allow them to harness these opportunities.

A fourth opportunity for entrepreneurship scholars comes from the importance and influence of government, society, and business sectors *relative* to one another. This relationship is constantly evolving. For example, financial crises can lead to increased regulation and stronger oversight of business by government, whereas long periods of growth and prosperity can lead to arguments against regulation and formal or informal weakening of oversight. The influence of government on entrepreneurs comes in many forms – each a question in itself – including taxes,

financial regulation such as investor rights protection and bankruptcy regulation, intellectual property regimes, legal systems, etc. For example, the Bayh-Dole Act governs technology transfer and intellectual property of research conducted in universities, affecting incentives related to selection and pursuit of cutting-edge research by faculty. An important question for entrepreneurship scholars concerns the effects of stronger or weaker government on the private sector. This question centers on the quality and strength of key institutions related to entrepreneurship. Although much insight is provided on differences in institutions across countries (Klapper et al., 2006), the effect of cycles of government in a given country is unclear. Such research would benefit from a historic perspective.

Whatever Happened to the Destruction in “Creative Destruction?”

Schumpeter’s famous phrase “gales of creative destruction” certainly captures the imagination (Schumpeter, 1942). The scholarly community, however, has been so fascinated with the “creative” part of the Schumpeterian formulation that we give relatively little emphasis to the “destruction” part. This is a huge oversight. Until we understand how old combinations of factors of production are dis-assembled we cannot understand the process of creating and implementing new combinations of factors of production.

Baumol (2002) proposes that innovation has become a life-or-death matter for established corporations in free-market economies. Other scholars have observed that when a firm’s assets consist not of physical things but of information and individual skills and knowledge, swift change in their constitution is not only possible, but also far more likely (Boisot, 1995). The result would seem to be short organizational life cycles and a greater prevalence of discontinuation, or at least of volatility in performance for large organizations. The destruction aspect of Schumpeter’s concept is thus increasingly with us.

The normative literature seems to offer corroborating evidence. In the first few years of the 2000s, bear market conditions revealed immense vulnerability for even well-established organizations. Charan and Useem (2002) report that 257 public companies with \$258 billion in assets declared bankruptcy in 2001 alone, while 26 of America’s largest corporations lost over two-thirds of their market value, including such premier names as Hewlett-Packard and Charles Schwab. A similar pattern could be seen in Europe, in which well-regarded leading firms such as Ericsson, Nokia, and ABB wrestled with collapsing share prices. Even in Japan, large firm bankruptcies were becoming more common (Porter et al., 2001).

Firms seem caught between increasingly difficult competitive circumstances and increasingly elevated shareholder expectations. Hamel (2000) reports that in 1999 31% of S&P 500 outperformed the average, while 58% did so in 1992. Repercussions include increased churn among executive ranks. A recent study concluded that nearly half of the CEO’s of the worlds’ very largest companies have

been in office 3 years or less (Drake et al., 2001). Another, which examined CEO turnover from 1995 to 2001, reported that turnover of CEO's increased by 53%, while average tenure declined from 9.5 to 7.3 years (Lucier et al., 2002).

Thus, despite evidence that the period of time during which a corporation can enjoy a period of dominance is shrinking, the premise that a large corporation will be relatively enduring persists in our theorizing (see Foster & Kaplan, 2001). Arguments premised on historical scale and scope advantages for diversified firms have persisted (Goold et al., 1994; Prahalad & Hamel, 1990). It seems clear, however, that the "good corporation" of Whitman's 1950s style benchmark is less and less the norm (Whitman, 1999).

Schumpeter, of course, posited such destruction as essential to capitalist progress. Because of this, he anticipated capitalist organizational structures to be inherently fragile and self-obsolete. Witness the following passage from his *Capitalism, Socialism, and Democracy* (1942)

Since capitalist enterprise, by its very achievements, tends to automatize progress, we conclude that it tends to make itself superfluous – to break to pieces under the pressure of its own success. The perfectly bureaucratized giant industrial unit not only ousts the small or medium-sized firm and "expropriates" its owners, but in the end it also ousts the entrepreneurs and expropriates the bourgeoisie as a class which in the process stands to lose not only its income but also what is infinitely more important, its function.

To adopt Schumpeter's view of capitalist progress implies that we need to take into account the essential fragility of an organization in a capitalist system. Yet, entrepreneurship literature by and large ignores half of this process. Instead, it focuses primarily on how new combinations come into being, rather than taking a more balanced look at how old ones vanish. In addition, the entrepreneurship literature tends to assume that new firms come into being as a result of some kind of opportunity. It has ignored the question of where opportunities come from, an important environmental and economic question, and only recently started to examine how they are identified and evaluated, which constitute important perspectives in cognitive psychology.

This leads to gaps in understanding. One regional example: much of the technology that eventually created enormous wealth in Silicon Valley was invented and commercialized in the northeastern United States, in states such as New Jersey. Why, then, did the digital revolution create such growth in California and not on the East Coast? The taken for granted explanation is that enlightened individuals such as Stanford's Frederick Terman sparked a wave of innovation by transferring university technology to small firms, which were able to create a self-renewing network-based ecosystem (Saxenian, 1994). Silicon Valley's success has sparked a virtual cottage industry seeking to transfer university technology to startup firms (Miner et al., 2001). Results are decidedly mixed. In fact, Terman was unsuccessful in two subsequent attempts he personally undertook to re-create Silicon Valley (Leslie & Kargon, 1996).

Accepted explanations for the success of Silicon Valley thus do little to help us understand why the revolution occurred there and not elsewhere (Acs, 2000). If we look at what would have to be destroyed elsewhere for something like Silicon

Valley to emerge, a much richer picture of the process can be developed. Consider the constraining effects of resource dependence in more developed communities at the time Silicon Valley was formed (Pfeffer & Salancik, 1978). In the case of New Jersey, for instance, people and corporations were dependent on resources generated by an existing technological and economic regime. They had great jobs with bright futures, their corporations (such as AT&T and RCA) were stable and secure, and the existing economic pattern seemed powerful enough to deliver results for a long time to come.

Jim Carnes, former CEO of the Sarnoff Center (a subsidiary of SRI International which originated as the research arm of RCA, the Radio Corporation of America) captures this sense

We were the first high-tech state. We've had Edison, RCA Labs, Bell Labs. In the 1930s, RCA was the Microsoft of the United States. It was in Camden, Harrison, later in Princeton. It was a New Jersey company. . . . Let's face it. The Silicon Valley, starting in the second half of the 1970s, 1980s and 1990s took over that cachet [of being a high tech region] based initially on the semiconductor business. . . . General Electric, RCA – the large companies – had a vested interest in earlier technologies. RCA, for example, made tremendous money with vacuum tubes. RCA failed to make the appropriate kind of investments because they were protecting their previous investments. . . . The guys in California didn't have any previous interest, and they took over. (interview in Business News, New Jersey, 2001)

It is of course a purely hypothetical question to ask whether New Jersey could have become Silicon Valley were its inhabitants prepared to destroy what they had to take a chance on a new technological regime. Our point is merely to suggest that the entrepreneurship field has an opportunity to address an important, and neglected aspect of the process of change by incorporating both creation and destruction as twin parts of the entrepreneurship phenomenon.

What Can Entrepreneurship Offer for a Better Understanding of the Nature of Creative Destruction?

Entrepreneurship scholars are well-placed to contribute to an understanding of the nature of creative destruction. There are two promising paths forward.

First, in studying startups and growing businesses, entrepreneurship scholars have the opportunity to look, in parallel, at the businesses and activities these displace. This suggests a slight shift in emphasis: rather than only focusing on the entrepreneurial venture, scholars would need to understand its activities in context. Exemplary work along these lines is Henderson and Clark's (1990) investigation of architectural innovation and its effects on a population of firms. Absent a careful look at the firms that were not successful, in addition to those that were, the underlying pattern of change would have been impossible to detect. In addition, learning more about the conditions affecting firm-level failure or survival may provide lesson for both management and policy. At a minimum, entrepreneurship scholars should wean themselves from the temptation to select their samples on the basis of a dependent variable, such as some aspect of success, and to ignore attempts that failed in

developing theories of entrepreneurial success. Although the economic concern is the existence of a high enough level of turnover and competition in the economy, there are important management questions more directly related to failure and the activities selected by firms.

Related to this first opportunity is a second one, namely, to re-examine the work that has been done on organizational discontinuance, with the objective of better understanding the causes for growth and decline. Consider, for instance, the considerable work that has been done on organizational mortality in the population ecology tradition (see Baum, 1996 for an overview). This literature is admirable for its theoretical coherence and the consistency with which data are gathered on the changes in composition of organizational populations. It is typically silent, however, on the activities of different population members, on the interactions between differing populations, and on the welfare outcomes for the economic areas in which population change occurs. Moreover, the way in which data are gathered for most of these studies does not allow a particularly nuanced view of organizational mortality, as they are typically captured through the presence or absence of a firm in an archival record.

An outstanding example of research that re-visited taken for granted assumptions with respect to organizational mortality is Gimeno et al.'s (1997) study of the selection process in a sample of small businesses. In contrast to the presumption in the ecological literature that selection acts through resource deprivation to cause firms to fail, Gimeno et al. observed a different and far subtler process. The business owners in their sample established highly individual thresholds for acceptable performance of their ventures. Performance below the threshold, even if acceptable from a purely economic point of view, triggered closure. Interestingly, performance above the threshold, even if unacceptable from a purely economic point of view, did not. Their work suggests a much larger role for entrepreneurial choice and the weighing of alternatives than is commonly depicted in the ecological literature.

The Institutional Legitimacy of Capitalism and the Dark Sides of Entrepreneurship

If one accepts that the idea that entrepreneurship is interesting because it has to do with change in capitalist economies, then it stands to reason that some changes will be for the better (for some) while other changes will be for the worse (for some). Scholars have disproportionately focused on creation of the new, presumably superior, markets and technologies rather than seeking to understand their negative consequences. Economic decline, social adjustment costs, huge income disparities, business closures, loss of community, and the funneling of vast resources to people who are sometimes simply lucky can result from the entrepreneurial process. As the capitalist system needs expansion and growth to sustain, the development or entrenchment of rich and poor regions points to some of its negative effects. Implicit in the ability of actors to expand is the assumption of the existence, recognition, and

successful exploitation of opportunity. However, the nature of the system also means that opportunities are expended as they are realized, thereby limiting future growth without means through which to create opportunity. This begs the fundamental question of where opportunities originate, a question, which has not been clearly linked to the spirit of creative destruction, but is at the heart of the entrepreneurial system. This also leads to a question of numbers and redistribution: Are opportunities finite? Can they be created or can they only be observed? If they can be created, who creates them? If they can only be observed, can we better hone observation skills?

Aghion and Howitt (1998) observe that capitalist progress does not take into account the losses from creative destruction in allocating its rewards. Innovations that make older resource combinations obsolete may well pay off for their champions. At a societal level, however, the benefit may be harder to ascertain. Baumol (2002: 23) illustrates the problem: "An innovation with an expected market value of \$10 million will be an attractive proposition to the innovator if its expected private cost is \$7 million. But it will be a net loss to society if the process also makes \$8 million in older assets obsolete." A disconnect occurs between those who reap the rewards from innovation and those who pay its price: they are typically not the same people. Taking place across nations and industries, the process can generate extremes in income and appear unfair to those on the losing end.

As Stinchcombe (1997) points out, it is remarkable that the potential for massive redistribution of benefits is considered legitimate, given that much of human history has been devoted to humans seeking to thwart or avoid competition. Absent the legitimacy of competition and appropriate supporting institutional norms, market capitalism cannot work effectively. An increasingly important question is whether processes that make some firms and populations of firms obsolete will continue to be legitimate. If so, will institutional actors be able to effectively cope with the negative consequences?

We are already witnessing a backlash against the institutional rules for cross-border economic activity, and increasing concern for issues such as preservation of heterogeneous lifestyles amidst pressures for global homogenization and sensible treatment of environmental risks. If we continue to give short shrift to the dark sides of entrepreneurship, the legitimacy that makes free-market contracting work can easily be compromised.

Let us consider some of the underpinnings of a working free-market economy. Stinchcombe (1997) building on the work of Commons (1950) makes the point that market contracting can only exist when parties agree on future performances. Institutions are essential to the existence of markets because they represent the working rules that define how power may be used in making and enforcing such contracts. Absent an agreed-upon system of rules, parties to transactions are unlikely to make commitments for the future, and as Commons puts it there can be "little or no present value, present enterprise, present transactions or present employment" (p. 104) absent such rules (see also Van de Ven, 1993). The legitimacy of the working rules and of the parties subject to them is thus an essential pre-requisite to the functioning of a free-market economy.

Stinchcombe further argues that markets cannot exist unless parties predict both that transaction partners are likely to be competent to act as they say they will and are morally committed to act as they say they will. In the entrepreneurship literature, this consideration has been well-represented in Stinchcombe's (1965) concept of the "liability of smallness and newness" that causes parties to future transactions to question a new firm's competence and commitment to future actions.

A basic assumption about governance is also descended from Commons' concept of the working rules of capitalist organizing (Commons, 1974 [1924]). The premise of these working rules is that only the Board of Directors of a corporation can allocate the property of that corporation. In other words, although shareholders have a property interest in the corporation, they cannot simply march in and take the office copier to satisfy this interest. Enforcing such working rules in the case of a corporation with primarily physical assets is a far more straightforward affair than enforcing them when the assets are intangible. This creates a real question with respect to the legitimacy of taken for granted ways of governing corporations.

As increasing proportions of the assets of large organizations are intangible, controlling its use becomes extraordinarily problematic. Further, knowledge about its true worth is unlikely to be available to those who are at the "top" of the organization in a hierarchical sense. Most theories of corporate governance presume that the best information about what is going on in a corporation can be found at the hierarchically highest levels. In an intangible-based business, this assumption may not hold (Child & McGrath, 2001). If governance is challenged, the question of who can legitimately contract on the part of a firm becomes a crucial issue. When parties to future transactions feel that their contracting partners cannot actually control the competencies forming the basis for an agreement, agreements are unlikely. When contracting is widely seen to be illegitimate, it is apt to be slow and incomplete.

Capitalist systems are unusual in their acceptance of the dark sides of entrepreneurship. In other forms of economic organization, preventing such dark sides is deemed more worthwhile than pursuing its upsides. Citing Finley (1965) Baumol reproduces the following story (1993: 31)

There is a story, repeated by a number of Roman writers, that a man – characteristically unnamed – invented unbreakable glass and demonstrated it to Tiberius in anticipation of a great reward. The emperor asked the inventor whether anyone shared his secret and was assured that there was no one else; whereupon his head was promptly removed, lest, said Tiberius, gold be reduced to the value of mud.

Without rules to drive productive entrepreneurship, an entire society can forfeit the benefits to public good and productivity creation stemming from innovative behavior. Witness Japan's long struggle throughout the 1990s – a struggle often attributed to the lack of legitimacy and incentives for entrepreneurial activity (Porter et al., 2001). In countries with weaker rule of law, the social effects of neglecting the formation of rules to support productive entrepreneurship can lead to additional consequences, including undermining of the overall stability of political, economic, and social systems.

The challenge is clear: We need to develop a better sense of how capitalist gains and losses are distributed and what kinds of institutions are necessary to mediate this process.

What Can Entrepreneurship Offer to a Better Understanding of the Dark Sides of the Entrepreneurial Process and its Continued Legitimacy?

Entrepreneurship scholars are well-placed to offer a point of view on what the institutions of capitalism should be. Doing so, however, requires that scholars temper the tendency for unabashed enthusiasm over the entrepreneurial process. We already have some good examples for how a richer perspective might be developed.

At the individual level, Kets de Vries (Kets de Vries, 1985; Kets de Vries & Miller, 1984) has suggested that we pay too little attention to the pathological aspects of entrepreneurial personalities. Egotistical, neglectful, and dangerous to themselves and others, people who start businesses can use their talents for socially negative ends. At the worst, greed and ruthlessness can come to take over entirely. The corporate scandals of the 2001–2002 period, which saw revelations of malfeasance on a grand scale in seemingly reputable organizations, serve to reinforce the point that absent institutional controls, greedy individuals can get away with self-serving rent-seeking.

Further consistent with a more balanced view of the entrepreneur, Baumol (1993) articulated the idea that the process can be productive, unproductive, or destructive. If interpreted simply as a phenomenon driven by the desire for private gain such as wealth, power, or prestige entrepreneurship can have many effects other than commonly assumed positive externalities. Entrepreneurial talent is not automatically dedicated to socially desirable ends and can result in activities “which need not have the highest social returns” (Murphy et al., 1991, 506). It requires institutions to accomplish this. Baumol reminds us that entrepreneurship, as we know it, cannot exist without institutional legitimacy, and that the form entrepreneurial activities take is fundamentally shaped by institutional rules.

Resolving these contrasting perspectives on the determinants of the allocation of entrepreneurs – pathological elements versus institutionally driven allocation – is an area of inquiry for future research in the field.

Institutional development is increasingly important not only at the level of public policy, but also within firms. If information about what is really going on is located at the line level, away from the “top” of a corporate hierarchy, then governance processes need to be developed to extend to that line level. Institutional rules that can usefully cope with decentralized market contracting need to be developed. Entrepreneurship, with its work on how young and new businesses overcome problems of moral hazard and information asymmetry, might have some interesting models to offer (Cable & Shane, 1997). Entrepreneurship scholars have also spent considerable time understanding how liabilities stemming from a lack of legitimacy

can be counter-acted (for instance, Venkataraman & Van de Ven, 1998; see also Aldrich, 1999) and what kind of strategic activities may be undertaken in this regard (Zimmerman & Zeitz, 2002).

The field of entrepreneurship would do well to pay attention to research done in other fields that looks at institutional rules that can mitigate some of these dark or not immediately positive sides. Of particular interest is work on emerging institutions in post-communist countries (for instance, Spicer et al., 2000). This research suggests that it takes time for appropriate institutions to support and control the entrepreneurial process to emerge, and that prior to the creation of an appropriate institutional environment a society is highly vulnerable to thuggery on the part of its entrepreneurs. More generally across countries, issues of formality versus informality are examined as the result of incentives from political economy institutions (see, for example, Acs et al., 2008; Klapper et al., 2006), with important implications for the potential tax base and public sector capabilities.

Entrepreneurial activity across countries exhibits more nuances relationships between institutions, suggesting the existence of lag time after policy intervention and even tradeoffs between key institutions. For example, higher concentration of family ownership may be used to counter weak protection of investor rights (La Porta et al., 1998). Higher family ownership can lead to inefficient allocation of capital, thereby making it more difficult for entrepreneurs in some contexts to access necessary financing. The entrepreneurship literature would be well-served by bringing in and testing dominant hypotheses from the law and economics perspectives, such as the role of investor protections.

The message very clearly is that if we are to grapple with issues of the institutional context for entrepreneurship, we ignore the dark sides at our peril (see Aldrich and Martinez, this volume).

How Does Entrepreneurship Sustain the Capitalist System?

Ironically, the entrepreneurial-capitalist system that breeds innovation also becomes the system that embeds socially undesirable activities. As noted earlier, capitalist systems are unusual in their acceptance of the dark sides of entrepreneurship. That is not to say that such dark sides go unchecked. In fact, unique innovations within systems have evolved in order to address and even correct for such problem.

These innovations concern *giving* and can occur in both the actual process through which it takes places and through its organizational forms. Two such innovations are of particular relevance for entrepreneurship scholars – philanthropy and social entrepreneurship. The evolution of the philanthropy represents a uniquely capitalist response to its own problems. Social entrepreneurship has become mainstreamed around the world, with social enterprises continuing to grow, particularly where the public sector is weak or ineffective.

Acs and Phillips (2002) present a philanthropic approach to modern capitalism, arguing that successful entrepreneurs build (correct) social institutions by

creating foundations. Schramm (2007) notes that the foundation is the ultimate socially innovative institution. In both perspectives, successful entrepreneurs engage in social development by building up institutions, first, through foundations and second, through the activities of these foundations. Desai and Acs (2008) present the entrepreneurship–philanthropy–opportunity cycle, arguing that the creation of opportunity is the ultimate and most lasting effect of philanthropy. They argue that successful entrepreneurs “give back” by creating or supporting a foundation that creates opportunities for the next generation of entrepreneurs.

Philanthropy builds up social institutions such as schools, hospitals, community distribution centers, etc. As more people can access education and technology, for example, through the creation of universities, opportunities grow in number and in scope. This allows more people to be entrepreneurial, generating at least a handful of extremely successful entrepreneurs. At a later time, they may give back through philanthropy. In this perspective, philanthropy is a self-sustaining investment in the long-term inputs for economic growth.

Indeed, philanthropic efforts may be the mechanism through which capitalism sustains itself. Although Schumpeter (1934) predicted a capitalist system that would weaken as it began to undermine its own self, the institutional innovation of philanthropy did not exist at the time of his writing. In their book *Philanthrocapitalism* (2008), Bishop and Green suggest how private money and major philanthropic efforts can change the world. Their comparisons between philanthropy and private business open many avenues for scholarly research, including important questions related to strategic management and business ethics.

An interesting question for the field of entrepreneurship is to understand the drivers of philanthropy and to disentangle specific roles and dynamics of the entrepreneurship–philanthropy–opportunity cycle. The research on philanthropy and entrepreneurship focuses overwhelmingly on the origins of philanthropy in the United States, where it originated. However, most other societies have some form of mechanism through which capitalism-driven inequalities are addressed. Most such structures take the form of charity and cannot be immediately self-sustaining. Therefore, an important question is how opportunity creation occurs in other societies, and if the “philanthropy trend” works across environments.

In addition to philanthropy, the study of social entrepreneurship presents many opportunities to better understand what has become a mainstream phenomenon. While this was once solidly in the realm of nonprofit streams, social entrepreneurship has become mainstreamed.

There are several important streams in the study of social entrepreneurship. First, who is the social entrepreneur, and why is social entrepreneurship selected? The work of Zahra et al. (2009) presents a typology of social entrepreneurs and insights into ethics of decision-making. Entrepreneurship scholars can provide a great deal of insight into why individuals become social entrepreneurs. As the study of key characteristics, such as risk preferences, has yielded useful information about traditional entrepreneurs, scholars have yet to understand such characteristics about social entrepreneurs.

A second stream asks what the social enterprise actually does. Social entrepreneurs seek innovative, often grassroots, ways to solve problems. As philanthropists give money to pay for hospitals, social entrepreneurs build and operate them and deliver services. If mobile clinics present the most effective means of delivering treatment, the social entrepreneurs will recognize and mobilize resources to open these clinics. An unanswered and related question is how opportunities are recognized and evaluated. Another question asks how social entrepreneurship works. Specifically, what are the firm-level dynamics of action, decision-making, scaling up, evaluation, etc.? This addresses the development of hybrid forms of social enterprises, earned income strategies and new mechanisms for generating funds through payment for services.

There is no better case for social entrepreneurship as an area of study and practice than the 2006 Nobel Peace Prize award to Mohammad Yunus for his work on microfinance. The award itself presents a question – one that entrepreneurship scholars may be in a unique position to answer. Why did Mohammad Yunus receive the prize for peace and not for economics? While microfinance certainly has shown itself as a practical and workable tool for economic development, its specific relationship with *growth* remains an open question. As a means through which development can occur, microfinance is an alternative to traditional aid-driven, welfare-inducing models of economic development. It offers the means for the “everyman” to become an entrepreneur and has supported the formation of a new paradigm for the role of business and the private sector in economic development (Hubbard & Duggan, 2009; Moyo, 2009). The growth of the microfinance model presents opportunities to study social entrepreneurship in a true Schumpeterian sense – newness in product offerings, service delivery, and expansion of markets by population, geography, and size.

The realm of “giving” more generally is an emerging area for scholarly research related to entrepreneurship. By studying philanthropy, entrepreneurship scholars can generate systematic insight into the *origins* of opportunity. By studying social entrepreneurship, entrepreneurship scholars can understand how human capital is leveraged and enabled to take advantages of opportunity. An interesting question is how different mechanisms for giving can be disentangled – e.g., personal giving such as philanthropy, social entrepreneurship (other means, including charity) versus corporate giving in the form of corporate social responsibility (CSR), social investments, etc. For example, Baron (2007) presents a theory of CSR, showing it can be costly when it is not a perfect substitute for personal giving. A related question is why people choose to give – and if they give, the reasons and effects of the particular mechanism selected. For example, do entrepreneurs engage in philanthropy because of altruism or self-interest, and does this actually affect the quality and the effects of giving? Finally, if a socially beneficial innovation is developed and successfully applied in one place, how can it be scaled up to spread the innovation (Dees et al., 2004)?

The importance of giving is key to economic progress and is increasingly embraced as a social movement at multiple levels (see Clinton, 2007).

Understanding the connection between entrepreneurs and their mechanisms of giving can make a key contribution to our understanding of modern capitalist systems more generally.

New Theories and Capitalist Progress: A Role for Entrepreneurship?

In organizational scholarship, what Stinchcombe (1997: 6) calls “narrow” conceptions that are mathematically tractable seem to be valued more highly than what he calls detail about the “guts of the causal process.” Challenges to prevalent assumptions, however, call such narrow research into question and create interesting opportunities for scholars who study entrepreneurship. In this essay, we identify four themes that represent opportunities for entrepreneurship scholars to weigh in with new, even provocative ideas: the nature of incentives to innovation; the process of destruction as well as creation; the challenges to institutional legitimacy created by the dark sides of the entrepreneurial process; and noneconomic investment mechanisms that contribute to capitalism’s sustainability. Our hope is that these questions are sufficiently intriguing to broaden the kinds of phenomena that entrepreneurship researchers examine, while sustaining its core focus on change in capitalist economies.

Those of us working in entrepreneurship today have an advantage over the field’s pioneers. We have the benefit of several decades of entrepreneurship research, from the annual compilations published by Babson College to the years of focused journals such as the *Journal of Business Venturing* to several good handbooks and guides.¹ In this essay, we have tried to suggest that the field of entrepreneurship may offer a useful vantage point from which to tackle some of the more pressing issues of today’s business organizations and the institutions in which they exist. The insight gained by entrepreneurship scholars through their study of often small, fragile, new entities can, we believe, be powerfully leveraged to improve our understanding of the workings of the capitalist system. Large established firms that were presumed to be far less vulnerable to challenge can be seen to struggle with the very kinds of issue that entrepreneurship scholars have thought about for a long time.

If entrepreneurship scholars are to make such a contribution, we believe we also need to be asking different questions as part of our future research agenda. We need to frame our questions in terms of what is known and not known about processes of change, rather than trying to validate previously held assumptions. We

¹For those just getting started, let us draw attention to several solid texts that build on this body of literature to create a context for learning what territory has already been covered and where new thinking might be welcome. In addition to this excellent volume, we would also direct readers’ attention to Schoonhoven and Romanelli (2001), Bhide (2000) and for those interested in corporate entrepreneurship Hitt et al. (2002).

should be looking for anomalies and weak signals that may suggest when a new set of boundary conditions or relationships is present (Christensen et al., 2002). Throughout, building bridges with scholars looking at similar problems in other disciplines will continue to be important. Entrepreneurship, as it begins to leave its adolescence behind, has a compelling opportunity to start to make a difference in the way scholars think about economic organization.

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