International Studies in Entrepreneurship

João Leitão
Rui Baptista
Editors

Public Policies for Fostering Entrepreneurship

A European Perspective

Springer

INTERNATIONAL STUDIES IN ENTREPRENEURSHIP

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A European Perspective

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Editors
João Leitão
Technical University of Lisbon
Portugal
joao.correia.leitao@ist.utl.pt

Rui Baptista
Technical University of Lisbon
Portugal
rui.baptista@ist.utl.pt

ISBN: 978-1-4419-0248-1 e-ISBN: 978-1-4419-0249-8
DOI: 10.1007/978-1-4419-0249-8
Springer Dordrecht Heidelberg London New York

Library of Congress Control Number: 2009926042

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

One of the main challenges facing the member states of the European Union (EU) is the fundamental need to accept the strategic importance of entrepreneurship as a force for regional development and economic growth. Definition of this urgent objective is set in the context of the European Council in Lisbon in March 2000, where there was focus on other operational goals directed to improving performance in European regions in terms of different variables indicating the level of economic activity, particularly employment, real convergence, economic reform, and social cohesion.

In 2003, the European Commission (EC) initiated the public debate around the need to strengthen entrepreneurship in the European Union, through publication of the "Green Paper on Entrepreneurship" in Europe which raised two fundamental questions for reflection by policymakers, entrepreneurs, and individuals: (a) why do so few Europeans set up their own business? and (b) why are so few European businesses growing?

Later, in the context of the 2004 Spring European Council, the European Commission launched the "Entrepreneurship Action Plan" which aimed fundamentally to: (1) change the way society views entrepreneurs, (2) create conditions to encourage more individuals to become entrepreneurs, (3) allow SMEs and entrepreneurs to be more competitive and assume a more important role in determining growth, (4) improve conditions for access to finance by SMEs and entrepreneurs, and (5) create an administrative and regulatory framework for SMEs.

Since the 1990s, academic investigations developed according to an eclectic paradigm consider entrepreneurship as having important effects in both the economic and social domains. Entrepreneurship is also considered a powerful driver to combat social exclusion, and can promote integration of ethnic and immigrant communities with high potential in terms of entrepreneurial ability and innovation. This combination of cultures facilitates the emergence of truly innovative proposals able to penetrate and be accepted in international markets characterized by an increasing mix of coexisting cultures, making it viable to take advantage of truly global niches in the market.

Following a Neo-Schumpeterian approach, entrepreneurship can also be a generating force for creative destruction not only in terms of promoting employment but also in processes of change. The Schumpeterian view of the entrepreneur places as a central agent of change the individual who, despite facing various types of

adversity and resistance to change, is able to apply a filter of knowledge that allows successful commercialization of a creative idea.

It is precisely the lack of comprehension of the importance of the entrepreneur as a determining agent of the process of creative destruction that has reduced the competitive capacity of countries based on growth dynamics led by multilevel approaches that contemplate the individual, region, and country.

Individuals considered as the contributing basis for strengthening countries' competitive capacity interact in the field of dense institutional networks that, although operating in completely global networks, have to face barriers to the development of individual entrepreneurial capacity and competitive conditions which imply different levels of change, namely institutional, organizational, and, above all, cultural.

Concerning institutional change, it becomes necessary to provide the leadership of public institutions with young and independent human capital, directed toward contemplating simultaneously entrepreneurship and innovation. In addition, the networking of public and private institutions should be promoted as an interface that allows joint management and the introduction of both disruptive and incremental innovations according to the function assumed by each participating partner in the institutional networks that should preferably be directed toward increased economic growth and productivity.

Organizational change based on withdrawing false social protection is a priority. Certainly, conditions should be created for maximum general welfare, but without forgetting identification of mechanisms of (im)balance between producer surplus and consumer surplus, as a way of creating a sufficiently solid and appealing economic incentive for individuals to consider the option of being entrepreneurs, as one of the possible occupational choices they could make at any time in the course of their personal and professional development.

As for cultural change, a risk-loving type of culture should be encouraged, as a function of profound changes taking place through public policies that promote behavior comprising high risk, but calculated according to the necessary constant and vigilant upgrading of competences, activities and technical qualifications required to face new knowledge-intensive ventures successfully.

Concentrating on a positive change-oriented culture, at the three levels referred to, as well as identification of the best entrepreneurial and innovative individuals available, should begin with identification of our comparative advantages in regional terms. It is in the regions that we find a country's force of development, and although change is sometimes desired, it is not yet fully "understood" by decision-making agents in general in the public and private spheres.

Taking qualified entrepreneurship based on technology, and not that of survival so characteristic of developing economies, as the lever for regional development and growth means concentrating on a technological driving force that will create instability in terms of employment but which by qualifying and retaining qualified independent human capital can produce effects over time able to promote sustainability which is under threat in underdeveloped and depressed regions, through the dynamics of high-tech activities in harmony with traditional product specialization.

Use of incentives focused exclusively on foreign multinational firms is not an efficient way to increase general welfare, inasmuch as the potential benefits arising from spillover effects only arise if entrepreneurs are motivated to learning and subsequent incorporation in local production processes and organization of foreign technology, differentiating competences, and a culture directed toward designing innovative, efficient, and sustainable organizations.

So it is time to take a new look at the priorities of public development policies, particularly those marked recently by reduced investment in the education sector, because without education there is no entrepreneurship or even regulation that translates into greater stocks of knowledge (or creative ideas) associated with highly qualified human capital, or through acceleration leading to higher levels of economic growth with an endogenous basis.

In this context, there is a need to define public policies for fostering entrepreneurship based on disruptive innovation, aiming to generate mixed combinations of risk and performance that guarantee prolonging and sustaining business opportunities which represent forms of highly qualified technological entrepreneurship that can generate added value easily transferable to the necessary restoration of real convergence, in terms of economic growth.

The entry of companies into higher education institutions: universities and polytechnics, and especially businesses that carry out activities in emerging and traditional sectors, with intense use of knowledge and technology, should also be encouraged through public policies oriented toward technological entrepreneurship and the education of human capital. These policies must overcome the traditional practice of protectionism and concentrate above all on creating an entrepreneurial and winning culture that through an integrative business approach allows financial gains for both companies and higher education institutions and their respective research units. In this way, there can be viable network functioning and endogenous growth of areas influenced by regional higher education institutions, without the occurrence of situations of monodependence on European and national funding of a structuring nature.

In this way, new mechanisms for technological regionalization can emerge from the potential of endogenous growth in each region, formed by what each one really knows how to do, in a differentiated way, instead of being simply an administrative task of formal organization and political administration of the country.

Regions should be reconsidered in terms of the specialization of traditional and emerging activities, with a starting point being the mapping of clusters and insights from the pioneering studies carried out by Giacomo Becattini and Michael Porter, on groups of innovation associated with activities geographically concentrated around a central driving force of innovation and regional development. Those crucial activities form the core of an international network of real competences that can serve as a driving force for development and endogenous growth. In addition, they should be the foundation for redesigning regional systems of innovation based on technological regionalization with extended institutional relationships and international cooperation, going beyond the physical limits of the local concentration of economic activities.

Following this line of thought, the contribution of this book is to join in the same volume a set of theoretical visions and empirical assessments by leading scholars about public policies toward entrepreneurship. The focus is on rethinking European public policies for entrepreneurship and various levels based on analyses of different cases of implementation of entrepreneurial and innovating policies in Europe. The book is divided in two parts: Part I – Entrepreneurship Policies: A European Framework and Part II – Entrepreneurship Policy in Countries and Regions. In Part I, various theoretical approaches are presented by prominent scholars. They point to the need for the European economy to be the subject of regional reorganization, based on concentrations of production activities with a strong component of knowledge and technology.

There follows a summarized review of the contributions brought together in the two main parts of the book. In Chap. 1, David Audretsch, Iris Beckmann, and Werner Bönte discuss how policy programs promoting knowledge-based start-ups may potentially foster the commercialization of knowledge and spur economic growth. However, the authors question whether such government programs are really needed or whether markets are likely to achieve an efficient outcome without government intervention. Moreover, the way of implementing these entrepreneurship policies and the success obtained are analyzed as well.

In Chap. 2, Martin Carree, Roberta Piergiovanni, Enrico Santarelli, and Ingrid Verheul analyze regional policies supporting new firm formation in Italy between 1997 and 2005, testing for the impact of policies implemented between 1997 and 2003 on gross entry, exit, and net entry in Italian provinces. This analysis is conducted for six different sectors: Manufacturing, Construction, Commerce, Hotels and Restaurants, Transport, and Financial Services. The effect of unemployment rates on firm demographics is evaluated, controlling for economic growth, level of development, presence of industrial districts or major cities, and the wage level. The results point out that the effects of direct subsidies and fiscal incentives on both gross and net entry are not (or hardly) significant. Hence, the authors state that regional policies implemented to induce entry in fact appear to have no important effect on firm dynamics at the local and industry level.

In Chap. 3, Giambatttista Dagnino, Arabella Li Destri, and Daniela Baglieri explore the relationships between firm strategies, the design of institutional contexts on behalf of public agents, and the stimulation of diffused entrepreneurship within the economic system. In particular, they analyze the way in which firm patent portfolio management strategies may systematically hinder the emergence of entrepreneurial endeavors within the economic system. The authors argue that although patents are institutional mechanisms typically designed with the intention of motivating economic agents to create value for the society they belong to by adopting entrepreneurial behaviors (and as such receive favorable treatment in public policies), they may also be strategically used by large firms as an offensive barrier to entry or to imitation by potential competitors.

In Chap. 4, Niels Bosma, Veronique Schutjens, and Erik Stam review several streams of literature stressing the importance of regions when it comes to investigating both causes and consequences of entrepreneurship. The authors examine the

"determinants side," through the analysis of the impact of regional conditions on entrepreneurial activity. For this purpose, a multilevel approach is used, in order to assess the way regional conditions impact on individual entrepreneurial behavior. This makes sense in the light of entrepreneurship policy, in the sense that regional and national entrepreneurship policies are designed to impact individuals' entrepreneurial behavior. A dataset encompassing individual behavior of over 3,50,000 individuals is used, for 131 regions across 16 countries in Europe. The main findings were (1) Network effects in the region appear to be of importance. Regions where many individuals personally know someone who recently started a business show more innovation-oriented entrepreneurs; (2) At the national level, a profound negative effect of the degree of employment protection on involvement in both growth and innovation-oriented entrepreneurship is found; and (3) A positive effect of immigration on early-stage entrepreneurship with innovation ambitions is found. Nevertheless, its effect on employment growth ambitions is negative.

In Chap. 5, Erik Stam, Kashifa Suddle, Jolanda Hessels, and André van Stel investigate whether the presence of ambitious entrepreneurs is a more important determinant of national economic growth than entrepreneurial activity in general, in the light of the ongoing debate about public policies designed to stimulate high-growth start-ups. The authors use data from the Global Entrepreneurship Monitor (GEM) to test the extent to which high-growth ambitions of entrepreneurs affect GDP growth for a sample of 36 countries. The main findings suggest that ambitious entrepreneurship contributes more strongly to macroeconomic growth than entrepreneurial activity in general. Furthermore, a particularly strong effect of high-expectation entrepreneurship is revealed, for transition countries.

In Chap. 6, Charlie Karlsson and Martin Andersson address several fundamental questions pertaining to entrepreneurship policies, namely determination of the optimal rate of entrepreneurship, identification of fundamental market failures, and identification of the risks associated with policy failures and how can they be avoided. The authors also state that entrepreneurial activities in different locations offer very different conditions for entrepreneurship, and the factors stimulating entrepreneurship tend to differ between different locations. In their view, this implies that there is a need for different entrepreneurship policies in different types of locations that should be based on appropriate analyses, which must consider the general conditions for entrepreneurship in terms of institutions, the role of the public sector, and the influence of market failures. If the general conditions are wrong it can be meaningless as well as a waste of time and resources to develop sophisticated policies targeting entrepreneurs.

In Chap. 7, Mário Raposo provides an overview of the theoretical background and goes on to examine entrepreneurship policy in Portugal. The author states that entrepreneurship policy influences the environment in favor of entrepreneurship, by introducing measures that will enable people to move through the entrepreneurial process. In this line of reasoning, entrepreneurship policies encompass multiple organizational units, ranging from individuals to enterprises, as well as clusters, or networks, which might involve sector and/or spatial dimensions, a city, a region, or even a country.

In Part II, specific entrepreneurship policies in Europe are analyzed and assessed. In Chap. 8, Maria José Silva and João Leitão analyze whether the entrepreneurial innovation capacity of firms is stimulated by their external partners. The Portuguese situation is used for testing if entrepreneurial innovation capacity is stimulated by external partners, controlling for size, research and development (R&D) intensity, export intensity, and industry sector. The theoretical approach developed supports the basic idea that innovation is an evolutionary, nonlinear, and interactive process between the firm and its partners, where external contacts that relate to innovation influence the firm's innovation capacity. The findings point out that product innovation benefits from partnering with universities. The findings suggest the importance of public policies oriented toward cooperation in open innovation with external partners.

In Chap. 9, Zélia Serrasqueiro and Paulo Nunes analyze the determinant factors of the growth of Portuguese Knowledge Intensive Business Services (KIBS). From the study carried out, the authors claim that (1) smaller, younger companies grow more quickly than larger, older companies; (2) internal financing, long-term debt, and R&D are determinant factors for company growth; and (3) total debt and short-term debt, public grants, and intangible assets appear to be irrelevant as determinant factors for growth. On the basis of the study, four types of public policies for entrepreneurship are proposed: (1) direct public support for the rapid and sustained growth of Portuguese KIBS, (2) more efficient use of public grants, (3) creation of special channels for long-term debt to promote R&D activities, and (4) effective public programs for the creation of new companies whose activities are concentrated on high intensity of R&D.

In Chap. 10, Friederike Welter reviews the German support system for fostering entrepreneurship and SMEs, focusing on the specific institutional structure, and also the main policy areas and trends in support emerging over the last decades. On the basis of her participation and acquired experience in distinct projects, the author assesses the German system, looking at the rationales for supporting new and small firms, and demonstrating some strengths and shortcomings. Several potential lessons are presented that can be considered in making the support system more suitable for fostering entrepreneurship as well as identifying overall barriers to implementing an entrepreneurial culture in distinct locations.

In Chap. 11, Pia Arenius reviews the Finnish entrepreneurship policy. Focusing on entrepreneurship, the author states that the emphasis of the Finnish policy shifted from SME policy toward a more holistic entrepreneurship policy in the late 1990s. Currently, Finnish policy shows some signs of shifting back toward an SME emphasis again, with a focus on the growth and internationalization of firms. Nevertheless, the promotion of entrepreneurship education and the creation of new structures, products, and services for new start-ups and underrepresented target groups will continue. The author states that the abundance and variety of initiatives appears to be a significant weakness of entrepreneurship policy in Finland (GEM studies 1999–2007). Therefore, an external evaluation of entrepreneurship policy and specific interventions is proposed, in order to identify focus areas.

In Chap. 12, Marc Cowling, Gordon Murray, and Pete Bates analyze the experience of the UK government's strategy in the area of Venture Capital (VC), through evaluation of the activities of informal investors and the nature of their intervention, according to two schemes: the Enterprise Investment Scheme (EIS) and Venture Capital Trusts (VCTs). Through a panel data analyses, the authors find that the majority of EIS- and VCT-supported companies were incorporated within the last decade. For both schemes, a clear majority of companies were founded either in the year of their first scheme investment or less than 12 months before the scheme investment. Furthermore, the authors point out that the proportion of brand new companies receiving EIS investments is fairly stable over time, while the period post-2001 has been characterized by an increase in the share of new companies using VCT investment. Historically, around one quarter of all EIS and VCT recipient companies are no longer actively trading and (as would be expected) the cessation rate increases the more time that has elapsed since the initial investment.

In Chap. 13, David Urbano and Nuria Toledano examine the importance of new firms in the generation of wealth, employment, and social welfare. For this purpose, the Spanish situation is used for testing the effects associated with the implementation of entrepreneurship policies. The authors analyze the support programs that stimulate the creation of new firms and the institutional context that affects them. These issues are addressed from the institutional perspective using a case-study approach. The main results emphasize the importance of some environmental factors, especially assistance measures and the entrepreneurial culture in new firm creation.

Finally, in Chap. 14, Christian Serarols, Yancy Vaillant, and David Urbano reveal the importance of entrepreneurship as an important component of economic, employment, and innovation policy. The need to promote technology-based firms, even in rural areas, is stressed. On the basis of Catalonian experiences, the authors analyze the variables that influence the choice of location made by rural technology-based manufacturing firms, taking as reference three of the most common theoretical frameworks used to analyze location decision making: neoclassical, institutional, and behavioral. The results of the qualitative approach suggest important policy recommendations as well as practical insights for entrepreneurs.

This book appears at a particularly unfavorable time, in economic and social terms, when entrepreneurship and innovation assume particular strategic importance, inasmuch as endogenous growth should be considered by policymakers and also by business-people and citizens as one of the driving forces that can catalyze regional economies. In doing so, it inverts growing economic and regional inequalities that increasingly separate a diversified geographical area that should be innovative, entrepreneurial, and competitive. This is the main motivation for analysis in Part II of the Entrepreneurship Policy through presentation of the European experience, according to different contributions applied to European countries and regions.

The European experience is therefore presented as a genuine living laboratory where we find diverse examples of initiatives of public policies directed toward entrepreneurship and innovation. However, the future spread over the whole of Europe of less bureaucratic public policies with great impact on economic and social activities will be welcome. This is the preferred path suggested in this work

to follow up the Schumpeterian and reformative philosophy of the Lisbon Strategy (March 2000), over the whole of Europe with its endogenous capital which is human, organizational, relational, historical, and cultural. This is its great advantage for accelerating the process of real convergence and endogenous growth with a regional basis.

Lisbon, Portugal — João Leitão
Lisbon, Portugal — Rui Baptista

Contents

Part II Entrepreneurship Policy in Countries and Regions

Contributors

Martin Andersson Department of Economics, Internationella Handelshögskolan, Jönköping International Business School, P.O. Box 1026, SE-551 11 Jönköping, Sweden
martin.andersson@ihh.hj.se

Pia Arenius Turku School of Economics, Turku, Finland
Pia.Arenius@tse.fi

David B. Audretsch Max Planck Institute of Economics, Entrepreneurship, Growth and Public Policy Group, Kahlaische Straße 10, 07745 Jena, Germany
audretsch@econ.mpg.de

Daniela Baglieri University of Messina, Via dei Verdi, 75, 98122 – Messina, Italy
dbaglieri@unime.it

Rui Baptista Instituto Superior Técnico, Technical University of Lisbon, IN+, Lisbon, Portugal, Max Planck Institute of Economics, Jena, Germany

Pete Bates Institute for Employment Studies, Mantell Building, University of Sussex Campus, Brighton BN1 9RF, UK
peter.bates@employment-studies.co.uk

Iris A.M. Beckmann Max Planck Institute of Economics, Entrepreneurship, Growth and Public Policy Group, Kahlaische Straße 10, 07745 Jena, Germany
beckmann@econ.mpg.de

Werner Bönte Max Planck Institute of Economics, Entrepreneurship, Growth and Public Policy Group, Kahlaische Straße 10, 07745 Jena, Germany
boente@econ.mpg.de
Bergische Universität Wuppertal, Fachbereich B – Wirtschaftswissenschaft, Schumpeter School of Business and Economics, Gaußstraße 20, 42097 Wuppertal, Germany
boente@wiwi.uni-wuppertal.de

Niels Bosma Urban and Regional Research Centre Utrecht (URU), Utrecht University, P.O. Box 80115, NL-3508 TC Utrecht, The Netherlands
n.bosma@geo.uu.nl

Martin Carree Faculty of Economics and Business Administration, Maastricht University, P.O. Box 616, 6200 MD Maastricht, The Netherlands
m.carree@os.unimaas.nl

Marc Cowling Institute for Employment Studies, Mantell Building, University of Sussex Campus, Brighton BN1 9RF, UK
marc.cowling@employment-studies.co.uk

Giovanni Battista Dagnino University of Catania, Corso Italia, 55, 95129 – Catania, Italy
dagnino@unict.it

Jolanda Hessels EIM Business and Policy Research, Zoetermeer, The Netherlands, Erasmus University Rotterdam, Rotterdam, The Netherlands
joh@eim.nl

Charlie Karlsson Department of Economics, Internationella Handelshögskolan, Jönköping International Business School, P.O. Box 1026, SE-551 11 Jönköping, Sweden
charlie.karlsson@jibs.hj.se

João Leitão Engineering and Management Department, IN+ Center for Innovation, Technology and Policy Research, Instituto Superior Técnico, Technical University of Lisbon, Lisbon, Portugal, joao.correia.leitao@ist.utl.pt
European Council for Small Business and Entrepreneurship, Turku, Finland

Arabella Mocciaro Li Destri University of Palermo, Viale delle Scienze, 90128 – Palermo, Italy
a.mocciaro@libero.it

Gordon Murray School of Business and Economics, University of Exeter, The Queen's Drive, Exeter, Devon EX4 4QJ, UK
G.Murray@exeter.ac.uk

Paulo Maçãs Nunes Department of Management and Economics at the University of the Beira Interior, Covilhã, Portugal
Member of the Centre for Studies and Advanced Training in Management and Economics (CEFAGE), University of Évora, Évora, Portugal
macas@ubi.pt

Roberta Piergiovanni Istat-Ufficio Regionale per l'Emilia-Romagna, Galleria Cavour, 9, I-40121 Bologna, Italy
piergiov@istat.it

Mário Raposo Department of Business and Economics, University of the Beira Interior, Núcleo de Estudos em Ciências Empresariais, Covilhã, Portugal
mraposo@ubi.pt

Enrico Santarelli Department of Economics, University of Bologna, Piazza Scaravilli, 2, I-40126 Bologna, Italy
enrico.santarelli@unibo.it

Veronique Schutjens Urban and Regional Research Centre Utrecht (URU), Utrecht University, P.O. Box 80115, NL-3508 TC Utrecht, The Netherlands
v.schutjens@geo.uu.nl

Christian Serarols Business Economics Department, Universitat Autònoma de Barcelona, Barcelona, Spain
christian.serarols@uab.es

Zélia Serrasqueiro Department of Management and Economics at the University of the Beira Interior, Covilhã, Portugal
Member of the Centre for Studies and Advanced Training in Management and Economics (CEFAGE), University of Évora, Évora, Portugal
zelia@ubi.pt

Maria José Silva Management and Economics Department, University of the Beira Interior, Covilhã, Portugal
msilva@ubi.pt

Erik Stam Utrecht School of Economics, Utrecht University, 12 Janskerkhof, NL-3512 BL Utrecht, The Netherlands
E.Stam@econ.uu.nl

Kashifa Suddle EIM Business and Policy Research, Zoetermeer, The Netherlands
ksu@eim.nl

Nuria Toledano Business Economics Department, Autonomous University of Barcelona, Barcelona, Spain
nuria.toledano@uab.cat

David Urbano Business Economics Department, Autonomous University of Barcelona, Barcelona, Spain
david.urbano@uab.es

Yancy Vaillant Business Economics Department, Universitat Autònoma de Barcelona, Barcelona, Spain
yancy.vaillant@uab.cat

André van Stel Department Economics, Faculty of Economics and Business, University of Amsterdam, Roetersstraat 11, 1018 WB Amsterdam, The Netherlands, A.vanStel@uva.nl
EIM Business and Policy Research, P.O. Box 7001, 2701 AA Zoetermeer, The Netherlands
ast@eim.nl

Ingrid Verheul Department of Applied Economics, Erasmus University of Rotterdam, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands
verheul@few.eur.nl

Friederike Welter Small Business Management and Entrepreneurship, University of Siegen, PRO KMU, FB 5, Hölderlinstr. 3, D-57068 Siegen, Germany
welter@uni-siegen.de

Part I
Entrepreneurship Policies - A European Framework

Chapter 1
Knowledge-Based Start-ups and Entrepreneurship Policy

David B. Audretsch, Iris A. M. Beckmann, and Werner Bönte

1.1 Introduction

In the past decade, entrepreneurship policies aimed at encouraging entrepreneurial activities in general and policies that aim at supporting the formation of knowledge-based start-ups in particular have been implemented in many industrial economies. The strong interest in knowledge-based start-ups might be explained by the fact that in a global economy, the comparative advantage of developed, high labor cost countries has continuously shifted toward knowledge-based activities and innovation being the key to economic growth and employment.

This development created a compelling argument in favor of policies in areas such as venture capital markets, knowledge commercialization, R&D skill-upgrading efforts, and clustering (Audretsch et al. 2007). Consequently, universities and research institutes gained attention from policymakers who developed policy instruments to invest in knowledge. In order to commercialize scientific knowledge, incumbent firms or knowledge-based start-ups must use that new knowledge and create new products, processes, or services.

However, the role of incumbent firms in the innovation process might differ from that of knowledge-based start-ups. Baumol (2004: 10) states that "The major breakthroughs have tended to come from small new enterprises, while the invaluable incremental contributions that multiply capacity and speed, and increase reliability and user-friendliness have been the domain of the larger firms." Well-known examples of knowledge-based start-ups introducing major breakthroughs are, for example, Microsoft, Apple, and Google. Especially in young industries, like the Biotech-industry, knowledge-based start-ups play an important role for the commercialization of scientific knowledge.

Hence, policy programs promoting knowledge-based start-ups may potentially foster the commercialization of knowledge and spur economic growth. However, one might ask whether such government programs are really needed or whether

D.B. Audretsch (✉), I.A.M. Beckmann, and W. Bönte
Max Planck Institute of Economics, Entrepreneurship, Growth and Public Policy Group, Kahlaische Straße 10, 07745 Jena, Germany

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*, International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_1,

markets are likely to achieve an efficient outcome without government intervention. Moreover, one might ask how entrepreneurship policies are implemented in practice and whether the policy programs are successful. This chapter discusses these issues. In the following section, we look at the specific role of knowledge-based start-ups in the economy and the need for public policies promoting such start-ups. Section 1.3 discusses entrepreneurship policies targeting knowledge-based entrepreneurial activity in detail taking Germany as an example. The question of entrepreneurship policies impact is addressed in Sect. 1.4. Section 1.5 is the concluding section.

1.2 Is There a Need for Public Policies Promoting Knowledge-Based Start-ups?

In many countries, the entrepreneurship policies that emerged in the 1990s were seen as a mechanism to stimulate economic growth, employment generation, and competitiveness in global markets (Lundström and Stevenson 2005). The first generation of new policy instruments corresponding to the knowledge-driven economy generally involved inducing investments not necessarily in physical capital, but rather in knowledge capital. However, these instruments were not very successful. Substantial investments in universities as well as research and development were undertaken but had a disappointing yield in terms of economic growth and employment creation. This phenomenon is widely known as the European Paradox (European Commission 1995). Perhaps it is at the country level where the failure of knowledge investments to generate economic growth was most striking. Consider Sweden: Since the end of World War II, Sweden has consistently ranked among the highest in the world in terms of investments in new knowledge. Whether measured in terms of private R&D, levels of education, university research, or public research, Sweden has exhibited a strong and sustained investment in new knowledge. In 2003, the country had the highest ratio of GDP invested in R&D. Yet, despite these investments in knowledge, the return in terms of employment creation and economic growth had been modest, at best, and disappointing to Swedish policymakers (Goldfarb and Henrekson 2003). Similar examples of large investments in new knowledge yielding a low performance in terms of economic growth can be found across Europe (Tijssen and Van Wilke 1999; Archibugi and Coco 2005), spanning Germany, and France.

The Knowledge Spillover Theory of Entrepreneurship (Audretsch et al. 2006) suggests that the missing link explaining the lack of economic growth despite high investments in knowledge is the lack of entrepreneurial activity. Investments in knowledge capital may be a necessary but insufficient condition to ensure that such investments are actually commercialized and generate economic growth. As knowledge has become more important as a factor of production, knowledge spillovers have also become more important as a source of economic growth (Romer 1986). However, a knowledge filter (Acs and Armington 2004; Audretsch et al. 2006) impedes the spillover and commercialization of investments in new knowledge.

This knowledge filter emerges as a consequence of the basic conditions inherent in new knowledge. Because differences exist in the valuation of new ideas across economic agents and the decision-making hierarchies of incumbent firms, entrepreneurial opportunities are not fully exploited by incumbents. As a consequence, entrepreneurial opportunities arise for individuals who might decide to commercialize new economic knowledge and start a new business. Starting a new venture is an important mechanism for getting returns from new economic knowledge created in existing companies or universities. In an economy where knowledge and innovations are key to economic success, entrepreneurship takes on decisive importance because it serves as a key mechanism by which knowledge created in one organization becomes commercialized in a new enterprise.

Research shows that there are considerable regional differences with regard to the regional ability to stimulate entrepreneurial activities (Audretsch and Stephan 1996) and that these differences impact economic performance (Audretsch and Feldman 1996, 1999, 2002). Audretsch et al. (2006) identify four types of externalities determining the environment for entrepreneurship in a region: network externalities, knowledge externalities, failure externalities, and demonstration externalities. These externalities are conducive to entrepreneurial activity within a region. Network externalities emerge from the geographic proximity of complementary firms and individuals. The existence of a pool of specialized workers or suppliers or the increased potential for informational, technological, and knowledge spillovers increase the value of an entrepreneurial firm. Furthermore, knowledge and new ideas created by an entrepreneurial firm have at least partially the nature of a public good. As a consequence, the nonappropriability of research outcomes qualified as new economic knowledge can lead to a suboptimal private provision that opens the case for policy intervention. Additionally, the existence of entrepreneurial activity in a region provides a kind of learning effect for third parties. Firms benefit from activities of other firms in a region, even if they fail.

These externalities are not market failures in the classical sense. However, those regions lacking the environment for these externalities have a disadvantage compared to regions with an environment conducive to entrepreneurial activity. Since knowledge spillovers and entrepreneurship do not happen automatically, Audretsch et al. (2006: 175) suggest:

> The role that entrepreneurship plays in permeating the knowledge filter and serving as a conduit of knowledge spillovers, combined with the strong propensity for those knowledge spillovers to remain localized, suggests a special focus for public policy on the impact of local institutions, universities, and policies on the individual cognitive process of changing career trajectories and deciding to become a high-technology entrepreneur.

Policymakers around the world have been trying to create entrepreneurial dynamics in their region or country using Silicon Valley's success as a role model. Economic policy shifted from regulating business toward stimulating entrepreneurial activity (Eisinger 1988; Audretsch and Thurik 2001; Audretsch 2003). With the shift from the managed to the entrepreneurial economy, the role of public policy also changed (Audretsch and Thurik 2001). Thus, the poor economic performance of specific regions and/or entire countries and the inability of the traditional policy approaches

to deliver a sustainable economic performance led to a refocusing of public policy toward entrepreneurship as the engine of economic growth and employment creation. These new policies neither are designed to support existing businesses like previous small business policies did nor can be regarded as classical research and development policies. New entrepreneurship policies promote earlier stages of the entrepreneurship process (Lundström and Stevenson 2005). Programs support potential entrepreneurs who are in the stage of developing a business idea even before a business is founded. The focus is clearly on facilitating knowledge commercialization and the creation of business ideas. The motivation behind these policies is to create an entrepreneurial climate that encourages business start-ups and leads to innovative ventures. Although knowledge-based start-ups do not instantly create as many jobs as foreign direct investment or the establishment of a plant, policymakers hope that internationally competitive start-ups will ultimately create high-quality jobs. The new instruments facilitate the institutionalization of regional cooperation and network building[1] in order to stimulate start-ups out of universities or research institutes. Bringing together different expertise is regarded as a mechanism to support the exchange of knowledge and ideas.

1.3 Entrepreneurship Policies Targeting Knowledge-Based Start-ups: Examples from Germany

In Germany, policies encouraging start-ups have been in place within the framework of small business policy for decades.[2] However, the 1990s saw the implementation of a new type of entrepreneurship policy that was considerably different from the previous start-up policies in terms of instrumentation, targets, and goals. Whereas classical innovation policies supported existing businesses, for example, with R&D subsidies, new entrepreneurship policies turned to promoting early-stage entrepreneurial activity and the process of turning new research results into innovations. Hence, policies promoting knowledge-based entrepreneurship target especially research institutes and universities and high-skilled individuals.

Acknowledging the regional dimension of knowledge spillovers and entrepreneurship, new entrepreneurship policies have been implemented mainly on a regional level. Since geographic proximity has been found to be an important precondition for innovations, policies build on existing regional capacities, for example a university or an industrial cluster. The following paragraphs describe the new entrepreneurship policies in more detail.

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[1] These policies have sometimes been referred to as new innovation policies (Eickelpasch and Fritsch 2005).

[2] Germany has a strong support infrastructure for small- and medium-sized enterprises. Within this framework, programs for start-ups supporting business start-ups have been available for decades. The focus of these programs has been on financial assistance and the provision of start-up specific information for the entrepreneur.

1.3.1 Exist Program

A range of new entrepreneurship programs are targeted toward the creation of regional networks for cooperation between regional key actors from industry, science, and government in order to facilitate knowledge spillovers and stimulate an entrepreneurial climate.[3] All have in common that they follow a similar procedure (Eickelpasch and Fritsch 2005). The program initiators at one of the federal ministries conduct contests and evaluate the concepts that have been handed in by applicant regions.[4] Only 10–20% of the proposals are funded, the rest are rejected.

The Exist program,[5] initiated by the Federal Ministry of Education and Research (BMBF), started in 1998 and is now in its third funding phase. The program's objective is to increase the number of university-based start-ups by graduates or scientists. Therefore, regional key actors, like banks and service agencies, are supposed to form a support network together with the university. The focus is on supporting the process from seed to start-up phase. Exist funds a university-based support infrastructure, the establishment of university education in entrepreneurship, as well as the stimulation of research commercialization. In the first phase (through 2002), five regions[6] were chosen. For the second wave (through 2005), ten additional regions[7] were added. Whereas in the beginning, Exist was organized as a contest, Exist III has been turned into a program where universities can apply for project funding. Projects are now spread at universities all over Germany and have been targeted toward entrepreneurship education, idea management and opportunity recognition, technical assistance for future entrepreneurs, motivation and awareness of entrepreneurship as a career option, commercialization of research, and the establishment of incubators.

In addition to programs with a systemic approach, another type of program targets individual entrepreneurs. Prior to these programs, financial assistance was only available when the business was about to be started or the process of turning the business idea into a start-up was well under way. The Exist-Gründerstipendium, the successor of Exist Seed, supports high-skilled nascent entrepreneurs in developing and realizing their business idea. The program complements the Exist initiative by the BMBF. It provides students, graduates, or researchers with a monthly income to develop their business idea into a viable business plan. Program participants

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[3] Eickelpasch and Fritsch (2005) have described these new policies and analyzed benefits and limitations.

[4] The Bio program was the first of its kind and started in 1995. The motivation was to create regions of excellence and promote the emergence of biotechnology clusters in selected regions.

[5] http://www.exist.de

[6] bizeps (Wuppertal-Hagen), dresdenexists (Dresden), GET UP (Ilmenau-Jena-Schmalkalden-Weimar), KEIM (Karlsruhe-Pforzheim), and PUSH (Stuttgart).

[7] BEGiN (Potsdam - Brandenburg), BRIDGE (Bremen), fit-exist (Trier), G-Dur (Dortmund), GROW (Ostbayern), Gründerflair MV (Mecklenburg-Vorpommern), KOGGE (Lübeck - Kiel), Route A 66 (Frankfurt - Wiesbaden - Offenbach), START (Kassel - Fulda - Marburg - Göttingen), and sowie SAXEED (Südwestsachsen).

have access to university infrastructure and usually get office space there. The university provides assistance and counseling, while a mentor guides the process. Similar programs were created at the federal and state level. With the Exist-Forschungstransfer, another instrument was implemented that supports the commercialization process of knowledge-intensive and risky research results. Funds include up to 50,000 euros development subsidies and personal costs of up to three scientists.

1.3.2 High-Tech Strategy

In August 2006, the German federal government started a new High-Tech Strategy, a joint initiative by all federal government departments, to increase innovation activities and support the process of commercializing new research into new products, processes, and services (Federal Ministry of Education and Research 2007). Until 2009, 15 billion euros will be issued. A major cornerstone of the High-Tech Strategy is the cluster policy that has been focused on the development of 17 so-called cutting-edge fields which have economic and scientific potential and where technological development is most important from a national perspective. Although this reminds a little of the classical industrial policy that supported particular industries, the focus of the High-Tech Strategy is on the commercialization of research in those fields.

In order to stimulate cooperation between research institutes and small- and medium-sized enterprises, a new instrument, the so-called Forschungsprämie, was put in place in the beginning of 2007. A research institute or university can apply for the Forschungsprämie if it has an R&D contract with an SME of a minimum of 10,000 euros. The award is 25% of the contract volume or a maximum of 100,000 euros. Further examples of comparable instruments are the competition program "Companies meet Science" available in the former East German states and the program FHprofUnd supporting cooperation between universities of applied studies and enterprises. The High-Tech Gründerfonds is a venture capital fund for young technology start-ups. The Federal Ministry of Economics and Technology implemented the fund in cooperation with partners in industry and the KfW banking group.

1.3.3 Unternehmen Region

Additional to the promotion of university-based start-ups, the creation of regional innovation systems has become an important policy objective. Under the roof of the initiative "Entrepreneurial Regions",[8] various programs, organized as contests, have been implemented to stimulate regional capacities for innovation. As the name of the

[8]http://www.unternehmen-region.de/en/index.php

program indicates regions are regarded as entrepreneurial enterprises. The goal is to facilitate the development of regional networks of excellence that have a unique economic and research profile. Regional actors apply for funding by handing in a concept for regional development and cooperation that must be compatible with the program's guidelines. Some regions might have more than one network of excellence. All of these programs are only available in the former East German states.

All instruments build on the idea that sustainable jobs are created when the commercialization of innovations is at the center of any effort and where research institutions network with firms and universities as well as with political decision makers. The establishment of publicly funded networks should facilitate knowledge exchange in order to stimulate innovation. Programs differ and are adapted in light of the preexisting regional cooperation levels. Support to establish regional cooperation is available, as well as financing for projects that build on existing networks. Research institutes and universities play a central role in the concept of "Entrepreneurial Regions." One program is specifically designed to develop an attractive research environment for young scientists. Although these programs are limited to the former East German states, similar programs exist for Western Germany as well. One example is the program "Kompetenznetze" that creates centers of excellence and serves as a marketing instrument for regions.

The so far discussed entrepreneurship policies were implemented by the federal government. Because research policy is responsibility of German states, entrepreneurship policies might differ considerably on this level. The BMBF points to the fact that so-called technology policy in the states supports to a great deal innovative SMEs.[9]

1.4 Entrepreneurship Policies: Program Design, Control of Success, and Scientific Evaluation

Even if entrepreneurship is conceivably linked to enhanced economic performance, there is not automatic justification for policy intervention (Audretsch et al. 2007). The main justification for the implementation of entrepreneurship policies is the existence of market failures. With regard to knowledge start-ups, various forms of market failures, like information asymmetries and externalities due to incomplete appropriability, have been identified. Hsu (2004: 1805), for instance, states that

> A central issue for early–stage high-tech entrepreneurs is obtaining external resources when the assets of their start-up are intangible and knowledge-based. Particularly for entrepreneurs without an established reputation, convincing external resource providers such as venture capitalists (VCs) to provide financial capital may be challenging.

However, even if market failures are present, it is by no means guaranteed that entrepreneurship policy leads to an increase in welfare. Entrepreneurship policy

[9] http://www.bmbf.de

programs may fail at improving social welfare because of lack of information about the kind and extent of market failures or as Auerswald puts it:

> Proponents of government support could claim that any investment in the support of technology development was justifiable because of 'increasing returns' to knowledge creation; skeptics would argue that such support was wasteful corporate welfare, and that decisions regarding the rate and direction of inventive activity were best left to better informed private actors. (Auerswald 2007: 29)

Consequently, the existence of market failures is not necessarily a mandate for policy intervention and the numerous policy programs promoting entrepreneurship call for a careful evaluation of their effects.

There are three important elements that have to be considered when entrepreneurship policy programs are issued: *program design*, *control of success*, and *scientific evaluation*. The *program design* concerns three questions: Who is supported by the program? How is the money distributed? What is the time horizon of a program? To be effective, programs should focus on the most promising start-ups and they should target those start-ups that have problems obtaining external resources. Otherwise government support could simply crowd out private investment, for example, financial capital by VCs. Moreover, programs should exhibit a fixed time horizon. As mentioned in Sect. 1.3, new policy programs in Germany are designed to fund projects for a few years and are organized as contests in order to select supported start-ups (regions). This means that the government does not pour in money but instead focuses on certain start-ups (regions). Hence, the program design of this new policy approach is promising and may be rather effective. However, the two other elements of policy programs, *control of success* and *scientific evaluation*, are also important.

In order to measure the effect of a particular entrepreneurship program, it is important to compare the supported start-ups to a control group of unsupported start-ups. By using unsupported start-ups as a control group, it is possible to analyze the counterfactual situation, that is, what would have happened to the supported start-ups if they had not been supported. Hence, control groups allow for measuring the impact (causal effect) of a government program on its participants which is often called the effect of *treatment on the treated* (Angrist and Krueger 1999). However, some of the entrepreneurship programs are designed to create positive external effects (spillovers) for other firms by supporting start-ups. Klette et al. (2000: 481) state that measurement of causal effects will be biased in the presence of spillovers, since the impact of a program will be *under*estimated if unsupported firms benefit from supported firms (e.g., knowledge spillovers or network externalities). Furthermore, the impact will be *over*estimated for unsupported firms (e.g., they lose relative competitiveness). Alternatively, one might compare regions instead of firms. If externalities are *intra*regional and government programs are focused on specific regions (like in some government programs in Germany, see Sect. 1.3), one might compare supported and unsupported regions in order to measure the impact of a program on the regional economic performance. However, the results of such an evaluation will also be biased if *inter*regional externalities exist. Moreover, it

may be difficult to identify a control group of regions, that is, a group of unsupported regions that are similar to the supported ones. In spite of all the measurement issues, it is important that the program targets are clearly defined and that state-of-the-art evaluation methods are used in order to scrutinize the success of a program.

Hence, an objective and credible control of success requires clear and quantifiable program targets as well as the implementation of a control group from the outset of the program. The *scientific evaluation* should be independent, transparent, and comprehensible. Moreover, the evaluation results should be published. In the end, spending tax payers' money for certain policy programs can only be justified if evaluations provide empirical evidence for the success of such programs.

However, most programs do not meet these demands. Greene and Storey (2007) refer to the contextual nature of evaluation pointing to the different interests regarding program evaluation. A major complaint is that program targets are often fairly opaque and difficult to translate into measures that can be evaluated. Sound evaluation of policy programs itself poses various difficulties. Econometric analyses, for instance, require large datasets and are expensive and "which may prove onerous for resource-constrained enterprise programs" (Greene and Storey 2007). Therefore, it is not surprising that a great number of programs are not evaluated at all or most other programs are evaluated ex post without the implementation of control groups.[10]

1.5 Conclusion

This chapter focuses on the entrepreneurship policies that emerged in the 1990s. In Germany, for instance, new types of entrepreneurship policy were implemented aiming at the promotion of early-stage entrepreneurial activity and the process of turning new research results into innovations by supporting spin-offs from research institutes and universities.

We argue that entrepreneurship policy may foster economic growth because investments in knowledge may be a necessary but insufficient condition to ensure that scientific knowledge is actually commercialized. In fact, the Knowledge Spillover Theory of Entrepreneurship suggests that knowledge-based start-ups are needed for the commercialization of scientific knowledge. The main justification for government support for knowledge-based start-ups is the existence of various market failures, like information asymmetries and externalities, that may inhibit the start-up activities.

A number of policy programs have been introduced to support knowledge based start-ups and the program design of many of the new policy approaches, like the

[10]The PROINNO program, for instance, was evaluated ex post. See Kulicke (2005) and Kulicke and Kraus (2005).

organization of contests to select supported start-ups, is promising. However, as yet it is unclear whether such programs were successful or not. A control of success is often not possible because clear and quantifiable policy targets as well as control groups do not exist. Simple descriptive ex post evaluations are not enough and cannot provide empirical evidence for the success of such programs. We therefore propose that at least major entrepreneurship policy programs should have clear and quantifiable program targets and should implement control groups from the outset of the program. Independent scientific evaluation of policy programs is not only essential as a control of success but is also likely to improve the design of future entrepreneurship policy programs.

References

Acs, Z. J. and C. Armington (2004). "Employment Growth and Entrepreneurial Activity in Cities." Regional Studies 38(8): 911–927.

Angrist, J. and A. Krueger (1999). Empirical Strategies in Labor Economics. The Handbook of Labor Economics. O. Ashenfelter and D. Card. Amsterdam, North-Holland. IIIA: 1277–1366.

Archibugi, D. and A. Coco (2005). "Is Europe Becoming the Most Dynamic Knowledge Economy in the World?" Journal of Common Market Studies 43(3): 433–459.

Audretsch, D. B. (2003). Entrepreneurship Policy and the Strategic Management of Places. The Emerge of Entrepreneurship Policy. D. M. Hart Cambridge University Press: 20–38.

Audretsch, D. B. and M. Feldman (1996). "R&D Spillovers and the Geography of Innovation and Production." American Economic Review 86(3): 630–640.

Audretsch, D. B. and M. Feldman (1999). "R&D Spillovers and the Geography of Innovation and Production." American Economic Review 86(3): 630–640.

Audretsch, D. B. and M. Fritsch (2002). "Growth Regimes over Time and Space." Regional Studies 36(2): 113–124.

Audretsch, D. B., I. Grilo and R. Thurik (2007). Explaining Entrepreneurship and the Role of Policy: A Framework. Handbook of Research on Entrepreneurship Policy. D. B. Audretsch, I. Grilo and R. Thurik. Cheltenham, UK, Edward Elgar Publishing, Inc.: 1–17.

Audretsch, D. B., M. C. Keilbach and E. E. Lehmann (2006). Entrepreneurship and Economic Growth. New York, Oxford University Press.

Audretsch, D. B. and P. E. Stephan (1996). "Company-Scientist Locational Links: The Case of Biotechnology." American Economic Review 86(3): 641–652.

Audretsch, D. B. and A. R. Thurik (2001). "What's New About the New Economy? Sources of Growth in the Managed and Entrepreneurial Economies." Industrial and Corporate Change 10(1): 267–315.

Auerswald, P. E. (2007). "The Simple Economics of Technology Entrepreneurship: Market Failure Reconsidered." Handbook of Research on Entrepreneurship.Policy D. B. Audretsch, I. Grilo and R. Thurik. Cheltenham, UK, Edward Elgar Publishing, Inc.: 18–35.

Baumol, W. (2004). "Entrepreneurial Enterprises, Large Established Firms and Other Components of the Free-Market Growth Machine." Small Business Economics 23(1): 9–21.

Eickelpasch, A. and M. Fritsch (2005). "Contest for Cooperation – A New Approach in German Innovation Policy." Research Policy 34: 1269–1282.

Eisinger, P. K. (1988). The Rise of the Entrepreneurial State – State and Local Economic Development Policy in the United States. Madison, Wisconsin, The University of Wisconsin Press.

European Commission (1995). Green Paper on Innovation, European Commission.

Federal Ministry of Education and Research Ministry of Education and Research (2007). The High-Tech Strategy for Germany. Bonn and Berlin.

Goldfarb, B. and M. Henrekson (2003). "Bottom-up Versus Top-down Policies Towards the Commercialization of University Intellectual Property." Research Policy 32(4): 639–658.

Greene, F. J. and D. J. Storey (2007). Issues in Evaluation: the Case of Shell Livewire. Handbook of Research on Entrepreneurship Policy. Audretsch D. B., Grilo I. and Thurik R Cheltenham, UK, Edward Elgar Publishing, Inc.: 213–233.

Hsu, D. (2004). "What Do Entrepreneurs Pay for Venture Capital Capital Affiliation." Journal of Finance 59(4): 1805–1844.

Klette, T. J., J. Moen and Z. Griliches (2000). "Do Subsidies to Commercial R&D Reduce Market Failures? Microeconometric Evaluation Studies." Research Policy 29: 471–495.

Kulicke, M. (2005). Untersuchung der Wirksamkeit von PRO INNO – Program INNOvationstionskompetenz mittelständischer Unternehmen. Modul 1: Einschätzung der Ergebnisse des Programms PRO INNO. Stuttgart, Fraunhofer IRB.

Kulicke, M. and M. Kraus (2005). EXIST-SEED – Ergebnisse und Erfahrungen aus einem Förderprogramm zur Vorbereitung von Ausgründungen aus Hochschulen, Fraunhofer Institut für Systemtechnik- und Innovationsforschung.

Lundström, A. and L. Stevenson (2005). Entrepreneurship Policy: Theory and Practice. New York, NY, Springer.

Romer, P. (1986). " Increasing Returns and Long-Run Growth." Journal of Political Economy 94: 1002–1037.

Tijssen, R. J. W. and E. Van Wilke (1999). "In Search of the European Paradox: An International Comparison of Europe's Scientific Performance and Knowledge Flows in Information and Communication Technologies Research." Research Policy 28(5): 519–543.

Chapter 2
Policies Fostering New Firm Formation and Self-Employment in Italy: An Empirical Exercise

Martin Carree, Roberta Piergiovanni, Enrico Santarelli, and Ingrid Verheul

2.1 Introduction

Do public policies support or inhibit entrepreneurship? This dilemma has faced policymakers and researchers since the 1820s. Some scholars (Djankov et al. 2002; Pages et al. 2003) argue that administrative obstacles (e.g., red tape) or a lack of public support lead to significantly higher entry rates, whereas others (Baumol 1990; Santarelli and Vivarelli 2002) claim no effect on firm entry. Advocates of entrepreneurship support policies (e.g., training) claim that these are particularly useful when entrepreneurs lack the relevant skills or knowledge. This suggests that regional policies supporting entrepreneurial activity in areas with high unemployment could be effective.

It is difficult to establish a relationship between unemployment and entrepreneurship. Evans and Leighton (1990) find that in the USA, the unemployed are twice as likely to start a company as wage-employed people. Several sectoral and regional analyses determined that this so-called "unemployment push" effect is not as robust as expected. For example, see studies on the USA (Carree 2002), Italy (Santarelli et al. 2009), Germany, and the UK (Reynolds et al. 1994). If the unemployed are less endowed with entrepreneurship capital than the wage-employed, subsidizing their start-ups is not efficient and is potentially harmful. Furthermore, if the opportunities for new firm creation differ across regions and industries (Acs 2006),[1] it is crucial to adopt strict criteria for assigning subsidies.

M. Carree(✉), R. Piergiovanni, E. Santarelli, and I. Verheul
Faculty of Economics and Business Administration, Maastricht University,
P.O. Box 616, 6200 MD, Maastricht, the Netherlands
e-mail: m.carree@os.unimaas.nl

[1] With industries dominated by SMEs and characterized by low entry barriers in which a positive impact of the unemployment rate on the rate of new firm formation should be detected (Audretsch and Fritsch 1999).

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_2, © Springer Science+Business Media, LLC 2009

Regional and sectoral differences are often structural, as is the case for unemployment differences. Still, central and local governments frequently cannot resist the temptation to intervene by alleviating the short-term effects of such differences instead of addressing the root causes. For example, policy incentives (e.g., subsidies, tax benefits) are often introduced to boost employment creation, even where there is a dynamic and blossoming self-employment process. A nonselective policy of providing subsidies to newborn firms may lead to an adverse selection process. Santarelli and Vivarelli (2007) find that public intervention in terms of subsidies is usually received by efficient firms that do not need it (deadweight effect) or inefficient firms that are not viable in the long run (substitution effect).

Keeping in mind the model of noisy selection (Jovanovic 1982), where viable start-ups expand and inefficient ones exit, the inappropriate use of policies supporting new firms may not just obstruct natural market selection (leading to excess entry, early exit of firms, and "entrepreneurial disillusion," cf. Dosi and Lovallo 1998), but may also interfere with the learning process by means of which new firms discover their efficiency parameters and decide whether to exit, continue, or grow (cf. Lotti et al. 2003; Santarelli and Vivarelli 2002, 2007).

In this study, we test for the effect of public policies supporting entry in Italian regions on actual rates of new firm formation. To assess the effectiveness of entrepreneurship policy, we investigate the dynamics in six different sectors at the local level: Manufacturing, Construction, Commerce, Hotels and Restaurants, Transportation, and Financial Services. In addition, we investigate whether structural unemployment has an independent effect on new firm formation. In our analysis, we take into account other local factors, including economic growth, per capita value added, presence of an industrial district or a large metropolitan area in the province, and wage level. Note that regional economic characteristics may not only explain firm entry but also firm exit, and therefore net entry. In case of adverse economic conditions, self-employed workers may decide to prolong their entrepreneurial experience and do not close their business, particularly if they have no other way of earning a living. Hence, unemployment may not only exert a positive effect on gross entry but also have a negative effect on the exit rate.

Findings indicate that entrepreneurship policy does not have an important impact on industrial dynamics, and that the positive effect of unemployment on net entry is mainly driven by a negative effect on firm exit. The latter result suggests a lack of dynamics in the Italian regional labor markets, where individuals are not able or willing to adjust their occupational preferences and switch between professions.

The remainder of this study is structured as follows. We start with a review of policies favoring new firm formation in the Italian regions in Sect. 2.2, and a presentation and discussion of differences in unemployment rates across provinces in Sects. 2.3 and 2.4. Subsequently, we present a model to determine the impact of entrepreneurship policies and unemployment, as well as other relevant regional factors, on gross entry, net entry, and net exit for the 103 Italian provinces. Finally, in Sect. 2.6, we discuss the empirical results for the period 1997–2003, and Sect. 2.7 is the conclusion.

2.2 Regional Entrepreneurship Policy in Italy

In this section, we give an overview of the main regional entrepreneurship support measures in Italian provinces to show the development of public support programs for entrepreneurship during the period of study. The review is based on data from the online databases of the "Camera dei Deputati" (camera.ancitel.it/lrec) and the "Normeinrete" (www.normeinrete.it) for the period between 1997 (the year in which the first regional law supporting firm entry was introduced) and 2005.[2] We focus on financial and fiscal grants for new and young firms. The emphasis on new start-up firms or young established firms is similar to the measure of early-stage entrepreneurial activity of the Global Entrepreneurship Monitor. We also consider the use of regional budgets as far as they were employed to support entrepreneurship.[3] Finally, we take into account the tax exemptions granted by local administrations to encourage new venture creation. Using these criteria, we identify 111 relevant laws, presented in Table 2.1 per region and per year.[4]

From the mid-1980s, national laws on new firm formation were introduced, starting with the State Law n. 44 targeting youth entrepreneurship (the so-called "De Vito Law"). However, some localities (e.g., Valle d'Aosta, Campania, Sardegna, the autonomous province of Trento) had already issued measures starting in the mid-1970s to protect particular sectors.[5] There were a number of interventions in 1993, when local administrations reacted to the economic downturn by implementing a series of laws enhancing employment and supporting specific disadvantaged groups.[6] The introduction of such measures, in Italy and globally, assumes that they are effective in generating employment rather as opposed to fostering structural change (which sees the new innovative firms as an "agent of change") or enhancing competition in sectors where a few firms exert a significant amount of market power. In fact, about half of the laws presented in Table 2.1 are aimed at increasing employment or stimulating youth and female entrepreneurship.

[2] The "Camera dei Deputati" is the Italian parliament. The "Normeinrete" web site is managed jointly by the Ministry of Justice and the CNIPA (the National Center for the Informatization of the Public Administration).

[3] In some instances, regional governments use the annual Budget Act for the regulation of a broad range of issues (Arabia and Desideri 2005). Generally, using the Budget Act for promoting entrepreneurship results in a less-frequent use of specific laws for new firm creation.

[4] See Appendix for a complete list. We refer to Piergiovanni et al. (2007) for a detailed description of the laws in Italian.

[5] L.R. n.41 of 6/6/1977 (region Valle d'Aosta) for Handicraft; L.R. n.34 of May 4, 1981 (Campania region) for Commerce; L.R. n.4 of April 3, 1981 (autonomous province of Trento) for Manufacturing; L.R. n.16 of August 11, 1983 (Sardegna region) for Social Cooperatives; L.R. n.26 of March 9, 1984 (Calabria region) for the development of tourism.

[6] Cf., for example, L.R. n.28 of August 31, 1993 (Campania region) or L.R. n.3 of January 22, 1993 (Liguria region).

Table 2.1 Number of laws fostering new firm formation by region, year, and field (1977–2005)[a]

Region	Number of laws	Year	Number of laws	Field	Number of laws
Piemonte	7	1977	1	Development and job creation	24
Valle d'Aosta	3	1981	2	Youth entrepreneurship	22
Lombardia	9	1983	1	Female entrepreneurship	14
Bolzano	2	1984	3	Innovation	12
Trento	4	1986	2	Handicraft	11
Veneto	8	1987	3	Social cooperatives	10
Friuli Venezia Giulia	4	1988	3	Industry, services, and handicraft	8
Liguria	5	1990	2	Tourism	8
Emilia Romagna	12	1991	3	Support to weak and disadvantaged components of the population	7
Toscana	7	1992	4	Small firms	5
Umbria	2	1993	10	Commerce	4
Marche	11	1994	4	Valuation of the territory	3
Lazio	6	1995	8	Ecocompatible activities	2
Abruzzo	8	1996	9	Industry	2
Molise	3	1997	8	Informatization	2
Campania	6	1998	10	Services to the family	2
Basilicata	2	1999	8	Agriculture	1
Calabria	6	2000	5	Agritourism	1
Sardegna	6	2001	5	Professional education	1
Total	111	2002	5	New economy	1
		2003	6	Fishing	1
		2004	6	Professional requalification	1
		2005	3	Cultural and entertainment services	1
		Total	111	Social, health-related, and education services	1
				Socially useful sectors	1
				Total[a]	145

[a]The total number of fields exceeds that of the laws since each intervention may include more than one field.

Regarding the sectoral coverage of laws, there are some important considerations. First, policies aimed at stimulating economic growth and productive activity, in particular targeting manufacturing and tourism, are part of 1992's Law n. 488 and EU Structural Funds (Arabia and Desideri 2005). These policies are not included in this chapter because they represent general interventions. Moreover, the jurisdiction of regional administrations is extended to include specific activities previously under national control (e.g., agriculture, handcraft,

industry, tourism, and technological innovation) as part of the administrative federalism reforms introduced by Law n. 59 of 1997 and the revision of Title V in the Italian Constitution in 2001. In terms of new administrative rule implementation, we identify two subperiods (1977–1996 and 1997–2005) and two categories of laws (the first comprising issues which are under regional jurisdiction – agriculture, handicraft, trade, industry, and tourism – and the second national laws). Whereas the regional laws increased in number between the two periods, the number of national laws remains constant.

The first column of Table 2.1 shows that, with the exception of Puglia and Sicilia, all Italian regions introduced some measures to support new firm formation between 1997 and 2005. Localities probably increased the number of policies due to the joint effect of well-established guidelines at the national level (cf., Santarelli and Vivarelli 1994) and the 1997 and 2001 reforms. Regions such as Veneto and Friuli Venezia Giulia that did not previously subsidize new firms implemented measures (8 and 4, respectively) to support and stimulate new firm formation.

2.3 Unemployment and New Firm Formation

The relationship between adverse labor market conditions and new firm formation is complex. It is generally difficult to identify, negative or positive, the effects of unemployment on self-employment and vice versa (Audretsch et al. 2005). First, the unemployed might be more likely to become self-employed than wage-employed people because the opportunity costs of self-employment are relatively low (unemployment push; cf., Evans and Leighton 1990). Second, high unemployment signals a depressed economy where aggregate demand is stagnating and there is a lack of profit opportunities for new and young firms. Third, a higher self-employment rate may lead to an decrease in unemployment as self-employed people not only employ themselves but also create employment for others, some new employees previously unemployed (Storey 1991). Finally, an increase in entrepreneurship may lead to an increase in unemployment when Schumpeter's creative destruction process that accompanies radical innovation destroys jobs as older exit (Aghion and Bolton 1997; Fritsch and Mueller 2004).

Generally, there are two approaches to investigating new firm formation. There is the ecological approach (birth rate calculated in relation to the stock of active firms) and the labor market approach (birth rate calculated in relation to labor force) (Armington and Acs 2002). Furthermore, entrepreneurial demographics can be measured in terms of gross and net entry (Carree and Thurik 1996). The empirical evidence regarding the relationship between unemployment and self-employment may be sensitive to the choice of measurement unit. In addition, Acs (2006) argues that high unemployment hinders new firm formation in some industries while favoring it in others, which makes the relationship between entrepreneurship and unemployment at the aggregate level even less straightforward.

Carree (2006) proposes two possible explanations for the lack of robust empirical evidence supporting the unemployment push hypothesis. According to the first explanation, it is difficult to capture the possible (negative) effect of a depressed economy by simply adding a variable representing the economic cycle to the model. The second explanation states that the unemployed can have lower endowments of human capital than the employed, which makes them less suited to start a new and viable business. Acs and Armington (2006) suggest that rates of new firm formation tend to be higher in regions with more adult workers who have attained higher education.

Keeping in mind the findings of previous studies, this study sheds light upon the complex relationship between unemployment and entrepreneurship by investigating not only the impact of unemployment on gross entry but also its impact on net entry and exit. We hypothesize that unemployment has a positive effect on entry and a negative effect on exit. The positive push effect on (net) entry is expected to be stronger in low-capital intensive industries, where it is usually easier to start a new firm given the relatively low entry barriers.

2.4 Entry, Exit, and Unemployment Rates in Italian Provinces

The data on unemployment, entry, and exit rates are taken from Unioncamere (the Italian Union of the Chambers of Commerce) and covers 103 provinces (administrative units in-between regions and municipalities). Table 2.2 presents unemployment rates (average values over the 1996–2002 period) as well as firm entry and exit rates (average values for the 1997–2002 period) for the ten provinces with the lowest and highest unemployment rates. Note that the provinces with the lowest levels of unemployment are in the north, while provinces with the highest unemployment levels tend to be in the south.

Although Italy appears clearly divided in terms of unemployment rates, there is more heterogeneity regarding entry and exit rates and it is difficult to identify a common pattern. Some provinces that are characterized by high entry rates are associated with a low value-added per capita (*vapc*) (e.g., Vibo Valentia and Lecce), whereas others combine low vapc with low firm entry rates (e.g., Enna and Messina). Moreover, provinces characterized by the presence of a large metropolitan area, like Roma and Milano, exhibit relatively low entry rates. With respect to exit rates, we observe low values in those provinces where per capita income is also relatively low. Again with the exception of Roma and Milano, most provinces with low exit rates are located in the areas of the country with the lowest population density (in particular, in the south). In many provinces – including Reggio Emilia, Prato, Rimini and Livorno – substantial entry and exit rates are found. Finally, the provinces of Roma, Milano and Bolzano exhibit simultaneously low entry and low exit rates.

Table 2.2 Provinces: unemployment, entry, and exit rates (average yearly rates)[a]

Province	Province	Province	Exit rate (average)
Lecco	Messina	Messina	4.10
Bolzano-Bozen	Biella	Palermo	4.37
Vicenza	Bolzano-Bozen	Reggio Calabria	4.39
Bergamo	Roma	Roma	4.46
Reggio Emilia	Lodi	Catania	4.74
Mantova	Sondrio	Nuoro	4.75
Treviso	Milano	Napoli	4.80
Modena	Enna	Bolzano-Bozen	5.01
Cremona	Belluno	Potenza	5.08
Belluno	Ascoli Piceno	Ragusa	5.12
Cagliari	Lecce	Bologna	6.94
Cosenza	Pescara	Reggio Emilia	6.95
Catania	Campobasso	La Spezia	6.96
Caserta	Rovigo	Torino	7.00
Messina	Prato	Ferrara	7.04
Catanzaro	Vibo Valentia	Livorno	7.07
Palermo	Caserta	Udine	7.08
Napoli	Rimini	Rimini	7.09
Reggio Calabria	Livorno	Savona	7.46
Enna	Reggio Emilia	Prato	7.96

[a]The upper frame of the table presents the ten provinces with the lowest unemployment rates, with the corresponding entry and exit rates. The lower frame presents the ten provinces with the highest unemployment rates. The average values are referred to the 1996–2002 period for unemployment and to the 1997–2003 period for entry and exit.

2.5 The Model

In this section, we introduce the model and discuss the descriptive statistics for the endogenous and exogenous variables. Index i denotes the province (i= 1, …, 103), whereas index t represents the year (t = 1997, …, 2003). The impact of entrepreneurship policies, P_{it}, on entry and exit is investigated by considering the impact of the sum of policies in the previous three years and the current year. Total labor force, that is the sum of employed and unemployed individuals, is represented by L_{it}, and the provincial number of unemployed people is denoted U_{it}. The unemployment rate u_{it} equals the ratio U_{it}/L_{it}. We use symbols E_{it} and X_{it} for number of entrants and exits, respectively. As discussed earlier, firm entry and exit rates can be measured in terms of labor, assuming that one firm represents one self-employed individual (labor market approach), or in terms of number of firms (ecological approach) (Armington and Acs 2002). In this chapter, entry and exit rates are taken relative to the total labor force. Entry and exit rates are presented as follows: $e_{it} = E_{it}/L_{i,t-1}$ and $x_{it} = X_{it}/L_{i,t-1}$.

We assume in our model that new firms are started, either with or without public subsidies, by employed or unemployed individuals from within the own province. The goal of our analysis is to determine whether the extensive use of subsidies in provinces with high unemployment rates facilitates a greater (net) entry combined with fewer exits than in other provinces. Formally, the baseline model can be represented as follows (with Z_{it} representing the other explanatory variables):

$$E_{it} = aP_{it} + b_t L_{i,t-1} + cU_{i,t-1} + dZ_{it} + \varepsilon_{it}^{E} \tag{2.1}$$

$$X_{it} = eP_{it} + f_t L_{i,t-1} + gU_{i,t-1} + hZ_{it} + \varepsilon_{it}^{X} \tag{2.2}$$

$$E_{it} - X_{it} = jP_{it} + k_t L_{i,t-1} + lU_{i,t-1} + mZ_{it} + \varepsilon_{it}^{N} \tag{2.3}$$

The first determinant in Eq. (2.1), P_{it}, represents the number of policies supporting entrepreneurship issued in the previous three years and in the year for which the analysis is carried out. The second determinant, $L_{i\,t-1}$, represents the labor force in the previous year. For each individual in the labor force, employed or unemployed, there is a probability b_t that (s)he starts an enterprise. This probability is time-dependent because Italy relaxed entry regulations during this period. Schivardi and Viviano (2007) discuss the 1998 Bersani Law that reformed the Italian retail trade sector.[7] The third determinant, $U_{i,t-1}$, represents the number of unemployed individuals. There is an additional probability c for the unemployed to start a firm. Unemployment has a positive (push) effect on entry when $c > 0$, which means that the unemployed are more likely to start new firms than employed individuals. Similar interpretations are valid for the exit Eq. (2.2) and net entry Eq. (2.3). The parameter g will be positive when unemployment serves as a proxy for lack of entrepreneurial opportunities for incumbent firms. It will be negative when unemployment results in a lack of job alternatives discouraging self-employed individuals to close down their business. The parameter l is the difference between c and g.

Equations (2.1)–(2.3) are expressed in absolute numbers. A disadvantage of using absolute numbers is that provinces with large populations (e.g., Roma and Milano) tend to dominate the analysis. This is why we estimate the equations in relative terms. In relative terms, all variables are divided by the labor force in the previous year ($L_{i,t-1}$). This leads to the following set of equations to be estimated:

$$e_{it} = a_t + bp_{it} + cu_{i,t-1} + \frac{dZ_{it}}{L_{i,t-1}} + \varepsilon_{it}^{E} \tag{2.1a}$$

$$x_{it} = e_t + fp_{it} + gu_{i,t-1} + \frac{hZ_{it}}{L_{i,t-1}} + \varepsilon_{it}^{X} \tag{2.2a}$$

[7] Prior to the Bersani Law, retail establishments were required to have a permit from the town council. The Bersani Law abolished this permit for smaller firms, which now must only give notice of their activity. See Carree and Nijkamp (2001) for the estimated effects of a similar deregulation on entry and exit rates in Dutch retailing.

$$e_{it} - x_{it} = j_t + kp_{it} + hu_{i,t-1} + \frac{lZ_{it}}{L_{i,t-1}} + \varepsilon_{it}^{N} \tag{2.3a}$$

The following control variables are included in the Z_{it} variable:

1. The variable *growth* is measured by the relative change in the provincial value added (valore aggiunto a prezzi base – al netto dei SIFIM, source: ISTAT) in the previous period. Most studies at the industry level find a positive effect of profitability and market growth on both gross and net entry (cf., Carree and Thurik 1996). We test whether the same effect arises at the provincial level. This variable should correct (together with *vapc*) for "pull" effects in the unemployment–entry relationship.
2. The variable *city* is a dummy variable with value 1 for the four largest cities in terms of population (Torino, Milano, Napoli, and Roma), and 0 otherwise. We control for the possibility that provinces with large Italian cities display relatively high entry rates.[8] This is in line with Reilly's Law (Reilly 1931) positing that the larger the city, the larger the trade area around it. Large metropolitan areas are likely to attract new firms to the surrounding area (Fotopoulos and Louri 2000). Other studies allude to the attractiveness of urban areas for new firm formation, including the "inner-city incubator" hypothesis by Vernon (1960) and the "filtering down" hypothesis by Thompson (1968). Reynolds et al. (1994) find that regional population density has a positive effect on the birth rate of firms (per population) in several countries, including Italy.
3. *vapc* is based on provincial value-added data. This variable controls for the fact that the north, south, and central parts of Italy differ in terms of level of development. Level of development may again be a proxy for a range of related factors and may, as such, be linked to new firm formation.
4. The presence of industrial districts is captured by the dummy *inddist* with value 1 for provinces with at least one industrial district (Source: Unioncamere) and 0 otherwise. There are 22 provinces with an *inddist*.[9] It is likely that in regions with industrial districts, entry rates are higher. An industrial district can be seen as a local production system stimulating new firm formation by an accelerated process of labor division and specialization (Becattini 1990; Brusco 1982). Industrial

[8] Studies by Garofoli (1994) and Santarelli and Piergiovanni (1995) found contrasting evidence.

[9] Provinces with at least one important "traditional" (according to the definition used by Unioncamere) industrial district are Ascoli Piceno (shoes), Arezzo (golden jewelry), Avellino (leather), Bari (footwear), Biella (textiles – wool), Brescia (metal household artifacts and machinery for textile industry), Como (silk), Ferrara (mechanical engineering), Macerata (leather products), Mantova (stockings), Modena (knitwear and biomedical industry and ceramics), Pisa (leather), Pordenone (cutlery), Prato (textiles), Parma (ham), Pesaro-Urbino (furniture), Pavia (machinery for the footwear industry), Siena (furniture), Treviso (sporting footwear), Vicenza (leather), Verona (furniture), and Viterbo (ceramics). Note that the definition of industrial district used here excludes local systems dominated by "focal" or leading firms occupying strategic and central positions due to their extensive network of customers and suppliers (for a further specification, cf. Lazerson and Lorenzoni 1999).

districts tend to be characterized by many small firms that in turn subcontract production to other small firms (European Commission 2002: 24; Santarelli 2006).

5. The variable *wage* represents the regional (manufacturing) wage level (source: ISTAT). This is the only variable not available at the provincial level; it is available at the level of the 20 Italian regions. High wage levels are expected to have a negative effect on firm entry and a positive effect on firm exit. High wages imply high opportunity costs for the self-employed and also high wage costs when employing workers. Indeed, Ashcroft et al. (1991) show that average annual wages per employee has a negative influence on new firm formation at the county level in Great Britain.

Table 2.3 presents summary statistics (i.e., mean and standard deviation) for all variables included in the empirical analysis for the sectors Manufacturing, Construction, Commerce, Hotels and Restaurants, Transportation, and Financial Services.[10] The Commerce sector includes retailing, wholesale, and repair. The Transportation sector includes transport, storage, and communication services. In Table 2.3, all variables are presented in terms of relative values: e, x, and $e - x$ denote entry, exit, and net entry, respectively [as defined in Eqs. (2.1a), (2.2a), and (2.3a)], at the aggregate level (total) and for each of the sectors taken into account. The statistics reported in the lower frame of Table 2.3 (policy, unemployment (U), *growth*, *city*, *vapc*, *inddist*, and *wage*) are the same for all sectors.

The values reported in Table 2.3 show that (net) entry and exit rates display some cross-industry variability. Entry is higher in Commerce, where entry barriers are low, but it is relatively high for Construction and Manufacturing. These sectors are also characterized by the highest exit rates, which indicate structural turbulence. Net entry is positive only for Construction and the Financial Services, while Commerce shows the highest exit rate.

2.6 Empirical Results

The empirical results from estimation of the models are reported in Tables 2.4–2.6, which refer to equations (2.1a), (2.2a), and (2.3a). We start with discussing the impact of policies on gross entry (e), exit (x), and net entry ($e - x$). We continue with the effect of unemployment and the other explanatory factors included in the analysis.

Entrepreneurship policies have a positive impact only in Construction and Transportation. We find no overall effect of entrepreneurship policies on total gross entry. The positive relationship between entrepreneurship policies and entry in the Construction sector is unsurprising because in the period under consideration this

[10] These are coded as sectors D, F, G, H, I, and J in the database Movimprese provided by Unioncamere.

Table 2.3 Descriptive statistics[a]

	Total	Manufacturing	Construction	Commerce	Hotels and restaurants	Transportation	Financial services
E	13.97 (3.91)	1.59 (0.80)	2.41 (0.90)	3.75 (1.23)	0.75 (0.43)	0.43 (0.21)	0.45 (0.19)
X	11.09 (3.28)	1.77 (0.94)	1.74 (0.58)	4.07 (1.19)	0.79 (0.46)	0.54 (0.21)	0.32 (0.14)
e−x	2.88 (2.67)	−0.18 (0.45)	0.67 (0.56)	−0.32 (0.88)	−0.04 (0.27)	−0.11 (0.16)	0.13 (0.16)
Policy	1.616 (1.496)						
U	0.10 (0.08)						
Growth	0.05 (0.02)						
City	0.04 (0.19)						
Vapc	16.86 (4.29)						
Inddist	0.21 (0.41)						
Wage	3586.54 (4445.71)						

[a]Average values are presented with the corresponding standard deviations in brackets. Average values are referred to 7-year periods.

Table 2.4 Results of the estimates for the entry model (1a)

	Total	Manufacturing	Construction	Commerce	Hotels and restaurants	Transportation	Financial services
D1997	18.16 (1.91)*	3.04 (0.40)*	2.30 (0.42)*	6.39 (0.62)*	0.95 (0.22)*	0.31 (3.30)*	0.48 (0.10)*
D1998	18.15 (1.94)*	3.17 (0.41)*	2.34 (0.42)*	6.29 (0.63)*	0.93 (0.26)*	0.27 (0.10)*	0.47 (0.10)*
D1999	21.32 (2.00)*	3.02 (0.42)*	2.38 (0.43)*	6.53 (0.65)*	0.80 (0.23)*	0.23 (0.10)*	0.52 (0.10)*
D2000	22.43 (2.04)*	2.93 (0.42)*	2.37 (0.44)*	7.13 (0.66)*	0.68 (0.24)*	0.23 (0.10)*	0.57 (0.10)*
D2001	22.76 (2.09)*	3.01 (0.44)*	2.42 (0.45)*	7.10 (0.68)*	0.67 (0.24)*	0.20 (0.10)*	0.53 (0.10)*
D2002	22.78 (2.13)*	2.96 (0.44)*	2.59 (0.46)*	7.16 (0.69)*	0.72 (0.25)*	0.16 (0.11)	0.40 (0.10)*
D2003	21.96 (2.17)*	2.85 (0.45)*	2.85 (0.45)*	7.04 (0.71)*	0.67 (0.25)*	0.12 (0.11)	0.30 (0.10)*
Policy	0.04 (0.36)	0.02 (0.02)	0.05 (0.02)*	−0.01 (0.03)	−0.01 (0.01)	0.01 (0.01)*	−0.01 (0.01)
U	−6.95 (3.53)*	−0.85 (0.74)	−3.29 (0.77)*	0.89 (1.15)	−0.90 (0.41)*	−0.15 (0.18)	−0.75 (0.16)*
Growth	3.90 (6.01)	0.92 (1.25)	−0.90 (1.31)	2.66 (1.95)	0.07 (0.70)	0.16 (0.30)	0.22 (0.28)
City	1.02 (0.74)	−0.19 (0.16)	−0.66 (0.16)*	0.62 (0.24)*	−0.29 (0.09)*	−0.01 (0.03)	−0.01 (0.03)
Inddist	0.45 (0.33)	0.52 (0.07)*	0.05 (0.07)	0.02 (0.11)	−0.14 (0.04)*	−0.03 (0.01)	0.02 (0.01)
Vapc	0.10 (0.07)	0.04 (0.01)*	0.05 (0.01)*	−0.07 (0.02)*	0.01 (0.01)	0.03 (0.01)*	0.01 (0.01)
Wage	−0.55 (0.11)*	−0.14 (0.02)*	−0.04 (002)*	−0.13 (0.04)*	−0.01 (0.01)	−0.01 (0.01)*	−0.01 (0.01)
R^2 adj.	0.216	0.195	0.310	0.179	0.132	0.331	0.293
Mean	13.97	1.59	2.41	3.75	0.75	0.43	0.45

Note: Standard error in brackets. Number of observations = 721
*Significant at 5% confidence level

Table 2.5 Results of the estimates for the exit model (2a)

	Total	Manufacturing	Construction	Commerce	Hotels and restaurants	Transportation	Financial services
D1997	16.38 (1.67)*	3.23 (0.46)*	1.94 (0.30)*	7.39 (0.65)*	0.80 (0.23)*	0.66 (0.11)*	0.330.06)*
D1998	15.00 (1.70)*	3.03 (0.47)*	1.64 (0.30)*	7.05 (0.66)*	0.70 (0.23)*	0.59 (0.11)*	0.31 (0.06)*
D1999	14.88 (1.75)*	2.93 (0.48)*	1.58 (0.31)*	7.20 (0.67)*	0.68 (0.24)*	0.55 (0.11)*	0.32 (0.07)*
D2000	14.96 (1.78)*	2.88 (0.49)*	1.61 (0.32)*	7.28 (0.69)*	0.65 (0.24)*	0.60 (0.12)*	0.33 (0.07)*
D2001	14.91 (1.83)*	2.86 (0.50)*	1.73 (0.33)*	7.18 (0.71)*	0.58 (0.25)*	0.54 (0.12)*	0.35 (0.07)*
D2002	15.71 (1.87)*	3.02 (0.51)*	1.80 (0.33)*	7.40 (0.72)*	0.59 (0.26)*	0.52 (0.12)*	0.40 (0.07)*
D2003	14.89 (1.90)*	2.94 (0.52)*	1.71 (0.34)*	7.17 (7.34)*	0.52 (0.26)*	0.48 (0.12)*	0.36 (0.07)*
Policy	0.01 (0.09)	0.02 (0.02)	0.01 (0.02)	−0.03 (0.03)	−0.01 (0.01)	0.01 (0.01)*	−0.01 (0.01)
U	−8.51 (3.10)*	−1.07 (0.85)	−1.70 (0.55)*	−2.56 (1.19)*	−1.27 (0.42)*	−0.04 (0.20)	−0.57 (0.12)*
Growth	−2.79 (5.26)	0.47 (1.44)	−1.19 (0.94)	−0.19 (2.03)	−0.41 (0.72)	0.27 (0.34)	−0.22 (0.20)
City	−0.07 (0.65)	−0.15 (0.18)	−0.37 (0.12)*	0.26 (0.25)	−0.39 (0.10)*	−0.02 (0.04)	−0.01 (0.02)
Vapc	0.19 (0.09)*	0.06 (0.02)*	0.02 (0.01)	−0.02 (0.02)	0.03 (0.01)*	0.02 (0.01)*	0.01 (0.01)*
Inddist	0.11 (0.29)	0.58 (0.08)*	−0.04 (0.05)	−0.16 (0.11)	−0.21 (0.04)*	−0.03 (0.01)	0.01 (0.01)
Wage	−0.41 (0.10)*	−0.15 (0.03)*	0.01 (0.01)	−0.16 (0.04)*	−0.01 (0.01)	−0.03 (0.01)*	−0.01 (0.01)
R^2 adj.	0.164	0.232	0.152	0.060	0.181	0.224	0.330
Mean	11.09	1.77	1.74	4.07	0.79	0.54	0.32

Note: Standard error in brackets. Number of observations = 721
*Significant at 5% confidence level

Table 2.6 Results of the estimates for model of net entry (3a)

	Total	Manufacturing	Construction	Commerce	Hotels and restaurants	Transportation	Financial services
D1997	1.79 (0.95)	−0.19 (0.23)	0.36 (0.25)	−1.00 (0.40)*	0.13 (0.14)	−0.35 (0.09)*	0.14 (0.07)*
D1998	3.15 (0.97)*	0.14 (0.23)	0.70 (0.26)*	−0.75 (0.41)	0.23 (0.14)	−0.33 (0.09)*	0.16 (0.07)*
D1999	6.44 (1.00)*	0.09 (0.24)	0.80 (0.27)*	−0.67 (0.42)	0.12 (0.14)	−0.32 (0.09)*	0.20 (0.07)*
D2000	7.47 (1.02)*	0.04 (0.24)	0.76 (0.27)*	−0.15 (0.43)	0.02 (0.15)	−0.37 (0.09)*	0.24 (0.07)*
D2001	7.86 (1.04)*	0.14 (0.25)	0.70 (0.28)*	−0.08 (0.44)	0.09 (0.15)	−0.33 (0.09)*	0.18 (0.07)*
D2002	7.07 (1.07)*	−0.06 (0.26)	0.79 (0.28)*	−0.24 (0.45)	0.12 (0.15)	−0.36 (0.10)*	−0.01 (0.07)
D2003	7.07 (1.08)*	−0.06 (0.26)	0.76 (0.29)*	−0.16 (0.46)	0.15 (0.16)	−0.36 (0.10)*	−0.07 (0.07)
Policy	0.02 (0.05)	0.01 (0.01)	0.04 (0.01)*	0.03 (0.02)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
U	1.56 (1.77)	0.23 (0.42)	−1.59 (0.47)*	3.45 (0.75)*	0.37 (0.26)	−0.12 (0.16)	−0.18 (0.12)
Growth	6.69 (3.00)*	0.45 (0.72)	0.29 (0.80)	2.85 (1.27)*	0.47 (0.43)	−0.16 (0.27)	0.43 (0.21)*
City	1.08 (0.37)*	−0.04 (0.09)	−0.30 (0.10)*	0.37 (0.16)*	0.10 (0.05)	0.02 (0.03)	−0.01 (0.02)
Inddist	0.34 (0.17)*	−0.06 (0.04)	0.09 (0.04)*	0.18 (0.07)*	0.02 (0.02)*	0.01 (0.01)	0.01 (0.01)
Vapc	−0.07 (0.03)*	−0.03 (0.01)*	0.04 (0.01)*	−0.05 (0.01)*	−0.02 (0.01)*	0.01 (0.01)	−0.01 (0.01)*
Wag	−0.14 (0.06)*	0.01 (0.01)	−0.04 (0.01)*	−0.05 (0.01)*	0.01 (0.01)	0.01 (0.01)*	0.01 (0.01)
R^2 adj.	0.588	0.150	0.343	0.314	0.16	0.06	0.450
Mean	2.88	−0.17	0.67	−0.32	−0.04	−0.11	0.13

Note: Standard error in brackets. Number of observations = 721
*Significant at 5% confidence level

sector was characterized by a high rate of new firm formation due to the introduction of tax benefits for renovations and, in particular, to the emergence of businesses previously active in the hidden economy. With respect to exit, the effect of entrepreneurship policies is not statistically significant, except for the Transportation sector where the effect is positive. Turning to net entry, the policy effect is significantly positive only for the Construction sector, confirming the importance of the "push" effect exerted by entrepreneurship policies on entry in this sector.

The effect of unemployment is negative and statistically significant for total gross entry and entry in Construction, Hotels and Restaurants, and Financial Services. We find no evidence for an unemployment push effect. The differences in unemployment across provinces as displayed in Table 2.2 are not accompanied by similar differences in entry rates. From Table 2.5, it appears that unemployment exerts a negative effect on exit in the majority of sectors, with the exception of Manufacturing and Transportation. Hence, the majority of the self-employed appear to be unwilling to exit in provinces where, given the high unemployment levels, there are lower chances of finding wage-employment. From Table 2.6, we see that unemployment has a significantly negative effect on net entry in Construction and a positive effect on net entry in the Commerce sector. The latter effect may be due to the large number of self-employed who, in the provinces with the highest unemployment rates, prefer *not* to close down their firms despite a depressed (local) economy. Hence, if there are no job alternatives available, marginal independent economic activity is preferred over receiving unemployment benefits.

The results for the parameters *a1997* to *g2003* clearly confirm the positive effect on entry of a relaxation of entry regulation in Commerce (i.e., the Bersani Law), with the estimated coefficients and their significance increasing between 1998 and 2002 in the (gross) entry equation (in Table 2.4). Since Commerce is the largest sector in terms of number of firms, the impact of deregulation on gross entry is also confirmed for total entry.

With respect to other explanatory variables, in Table 2.6, we see a positive effect of *Growth* on total net entry and entry in Commerce and Financial Services. In the four largest cities, net entry is higher in Commerce and lower in Construction. The result for the commercial sector confirms Reilly's Law of large cities being attractive for retail and wholesale firms. *vapc* has a positive effect on gross entry in Manufacturing, Construction, and Transportation, whereas in the equation for Commerce, the coefficient is negative, confirming the defensive nature of the process of new firm formation in this sector. For net entry, *vapc* has a positive effect only in Construction, with negative effects in Manufacturing, Commerce, Hotels and Restaurants, and Financial Services. Evidently, in most sectors, the resident population in the affluent provinces prefers wage-employment over self-employment. As expected, industrial districts is an important determinant of gross entry in Manufacturing. With respect to net entry, the presence of industrial districts has a positive impact for total entry and for the Construction, Commerce, and Hotels and Restaurants sector. Finally, as hypothesized, higher wages clearly deter (gross) entry in the majority of sectors.

2.7 Conclusion

This chapter presents an empirical test of the effect of regional policies supporting entrepreneurship in Italy on entry, exit, and net entry at the provincial level for six selected sectors. The results show that entrepreneurship policies do not have the desired effect on firm entry. We have also analyzed the relationship between unemployment and business demographics. The influence of unemployment on entry, exit, and net entry seems to depend upon specific characteristics of the sectors analyzed, even though a prevalent negative impact of unemployment on both entry and exit has been found. This suggests a lack of dynamics in the Italian labor market where individuals (in particular, the self-employed) are unable or unwilling to switch between occupations.

The study has some limitations. The level of aggregation (sectoral level) is still relatively high. In addition, possible effects of adjacent provinces are not taken into account. Nevertheless, Santarelli et al. (2009) suggest that effects of these adjacent provinces are limited. In sum, the results are quite clear-cut across sectors: regional policies targeting entrepreneurship do not exert an impact on firm and sector dynamics and unemployment does not disappear by the unemployed disproportionally starting up new firms.

Appendix: List of the Regional Laws Supporting New Firm Formation

N.	N. of the law	Region	Field
1.	N. 16 of 02/03/1984	Piemonte	Cultural and entertainment services
2.	N. 56 of 01/12/1986	Piemonte	Innovation
3.	N. 28 of 14/06/1993	Piemonte	Job creation – support to disadvantaged population groups
4.	N. 21 of 09/05/1997	Piemonte	Handicraft
5.	N. 18 of 08/07/1999	Piemonte	Tourism
6.	N. 28 of 12/11/1999	Piemonte	Commerce
7.	N. 23 of 13/10/2004	Piemonte	Social cooperatives
8.	N. 41 of 06/06/1977	Valle d'Aosta	Handicraft
9.	N. 15 of 04/05/1994	Valle d'Aosta	Social cooperatives
10.	N. 22 of 05/04/1998	Valle d'Aosta	Small firms
11.	N. 68 of 10/12/1986	Lombardia	Youth entrepreneurship
12.	N. 36 of 27/06/1988	Lombardia	Tourism
13.	N. 9 of 27/04/1991	Lombardia	Job creation
14.	N. 215 of 25/02/1992	Lombardia	Female entrepreneurship
15.	N. 34 of 16/12/1996	Lombardia	Handicraft
16.	N. 35 of 16/12/1996	Lombardia	Small firms
17.	N. 18 of 10/09/1998	Lombardia	Youth entrepreneurship
18.	N. 1 of 15/01/1999	Lombardia	Youth entrepreneurship – support to disadvantaged population groups

(continued)

Appendix (continued)

N.	N. of the law	Region	Field
19.	N. 21 of 18/11/2003	Lombardia	Social cooperatives
20.	N. 1 of 13/05/1993	Bolzano	Social cooperatives
21.	N. 4 of 13/02/1997	Bolzano	Female entrepreneurship
22.	N. 4 of 03/04/1981	Trento	Job creation – industry
23.	N. 13 of 03/08/1987	Trento	Handicraft
24.	N. 6 of 13/12/1999	Trento	Job creation
25.	N. 3 of 22/03/2001	Trento	Industry, services, and handicraft
26.	N. 1 of 18/10/1999	Veneto	Commerce – tourism – small firms
27.	N. 57 of 24/12/1999	Veneto	Youth entrepreneurship
28.	N. 1 of 20/01/2000	Veneto	Innovation – female entrepreneurship
29.	N. 5 of 09/02/2001	Veneto	Youth and female entrepreneurship – social cooperatives.
30.	N. 34 of 22/11/2002	Veneto	Youth and female entrepreneurship – social cooperatives
31.	N. 38 of 24/11/2003	Veneto	Youth and female entrepreneurship – social cooperatives
32.	N. 29 of 26/11/2004	Veneto	Youth and female entrepreneurship – social cooperatives
33.	N. 19 of 26/11/2005	Veneto	Youth and female entrepreneurship – social cooperatives
34.	N. 1 of 14/01/1998	Friuli Venezia Giulia	Professional education
35.	N. 12 of 22/04/2002	Friuli Venezia Giulia	Handicraft
36.	N. 20 of 11/12/2003	Friuli Venezia Giulia	Job creation
37.	N. 1 of 26/01/2004	Friuli Venezia Giulia	Handicraft
38.	N. 3 of 22/01/1993	Liguria	Job creation – support to disadvantaged population
39.	N. 28 of 14/06/1993	Liguria	Handicraft
40.	N. 29 of 20/04/1995	Liguria	Small firms
41.	N. 19 of 17/03/2000	Liguria	Tourism
42.	N. 3 of 02/01/2003	Liguria	Handicraft
43.	N. 29 of 10/09/1987	Emilia Romagna	Job creation – youth entrepreneurship
44.	N. 14 of 21/02/1990	Emilia Romagna	Support to disadvantaged population groups
45.	N. 6 of 05/02/1992	Emilia Romagna	Industry, services, and handicraft
46.	N. 9 of 15/02/1994	Emilia Romagna	Innovation
47.	N. 38 of 05/09/1994	Emilia Romagna	Innovation
48.	N. 7 of 03/02/1995	Emilia Romagna	Innovation
49.	N. 25 of 10/04/1995	Emilia Romagna	Innovation
50.	N. 9 of 22/04/1996	Emilia Romagna	Innovation
51.	N. 7 of 24/04/1997	Emilia Romagna	Innovation
52.	N. 22 of 19/07/1997	Emilia Romagna	Innovation
53.	N. 13 of 23/04/1998	Emilia Romagna	Innovation
54.	N. 2 of 20/01/2004	Emilia Romagna	Enhance regional value creation
55.	N. 83 of 14/11/1988	Toscana	Job creation
56.	N. 27 of 26/04/1993	Toscana	Youth entrepreneurship
57.	N. 89 of 03/12/1997	Toscana	Youth entrepreneurship

(continued)

Appendix (continued)

N.	N. of the law	Region	Field
58.	N. 23 of 22/04/1998	Toscana	Youth entrepreneurship – agriculture
59.	N. 35 of 20/03/2000	Toscana	Job creation
60.	N. 2 of 26/01/2001	Toscana	Industry, services, and handicraft
61.	N. 58 of 19/12/2003	Toscana	Youth entrepreneurship
62.	N. 24 of 19/07/1988	Umbria	Youth entrepreneurship
63.	N. 12 of 23/03/1995	Umbria	Youth entrepreneurship
64.	N. 35 of 07/10/1987	Marche	Youth and female entrepreneurship
65.	N. 33 of 28/10/1991	Marche	Tourism
66.	N. 22 of 02/06/1992	Marche	Female entrepreneurship – family support services
67.	N. 22 of 09/09/1993	Marche	Youth and female entrepreneurship
68.	N. 34 of 12/04/1995	Marche	Youth entrepreneurship
69.	N. 31 of 20/05/1997	Marche	Job creation
70.	N. 33 of 20/05/1997	Marche	Handicraft
71.	N. 21of 06/07/1998	Marche	Commerce – enhance regional value creation
72.	N. 32 of 30/11/1999	Marche	Job creation
73.	N. 35 of 19/12/2001	Marche	Industry, services, and handicraft
74.	N. 20 of 28/10/2003	Marche	Job creation
75.	N. 33 of 02/08/1991	Lazio	Innovation – ecocompatible activities
76.	N. 36 of 03/06/1992	Lazio	Job creation
77.	N. 29 of 25/07/1996	Lazio	Job creation
78.	N. 51 of 13/12/1996	Lazio	Female entrepreneurship
79.	N. 7 of 19/02/1998	Lazio	Handicraft
80.	N. 19 of 01/09/1999	Lazio	Industry, services, and handicraft
81.	N. 85 of 11/08/1994	Abruzzo	Job creation – social, health, and education services – support to disadvantaged population groups
82.	N. 95 of 02/05/1995	Abruzzo	Job creation – family support services
83.	N. 143 of 2/12/1995	Abruzzo	Innovation – female entrepreneurship
84.	N. 136 of 17/12/1996	Abruzzo	Youth entrepreneurship – ecocompatible activities
85.	N. 34 of 09/04/1997	Abruzzo	Training for reentry in the labor market
86.	N. 55 of 10/07/1998	Abruzzo	Job creation
87.	N. 77 of 28/04/2000	Abruzzo	Tourism
88.	N. 16 of 20/07/2002	Abruzzo	Job creation
89.	N. 24 of 08/05/1995	Molise	Job creation – small firms
90.	N. 45 of 24/12/2002	Molise	Industry, services, and handicraft
91.	N. 1 of 09/01/2004	Molise	Industry, services, and handicraft
92.	N. 34 of 4/5/1981	Campania	Commerce
93.	N. 40 of 28/08/1984	Campania	Tourism
94.	N. 28 of 31/08/1993	Campania	Job creation
95.	N. 9 of 29/04/1996	Campania	Job creation
96.	N. 15 of 26/07/2002	Campania	Job creation

(continued)

Appendix (continued)

N.	N. of the law	Region	Field
97.	N. 23 of 28/12/2005	Campania	Youth entrepreneurship – support to disadvantaged population groups
98.	N. 53 of 04/11/1996	Basilicata	Computerization
99.	N. 1 of 07/01/1998	Basilicata	Job creation – youth entrepreneurship
100.	N. 26 of 09/03/1984	Calabria	Tourism (hot springs)
101.	N. 17 of 09/04/1990	Calabria	Support to disadvantaged population groups
102.	N. 18 of 30/07/1996	Calabria	Job creation – socially useful jobs
103.	N. 8 of 03/03/2000	Calabria	Computerization
104.	N. 17 of 03/05/2001	Calabria	New economy
105.	N. 27 of 12/11/2004	Calabria	Fishing and enhance regional value creation
106.	N. 16 of 11/08/1983	Sardegna	Social cooperatives
107.	N. 17 of 20/04/1993	Sardegna	Industry, services, and handicraft
108.	N. 21 of 28/04/1993	Sardegna	Industry
109.	N. 51 of 19/10/1993	Sardegna	Handicraft
110.	N. 18 of 23/06/1998	Sardegna	Agritourism
111.	N. 7 of 21/4/2005	Sardegna	Female entrepreneurship

References

Acs, Z.J. (2006), "New Firm Formation and the Region: Empirical Results from the United States States", in: E. Santarelli (Ed.), *Entrepreneurship, Growth and Innovation: The Dynamics of Firms and Industries*, New York, Springer, 106–133.

Acs, Z.J. and C. Armington (2004), "The Impact of Geographic Differences in Human Capital on Service Firm Formation Rates", *Journal of Urban Economics*, 56, 244–278.

Arabia, A.G. and C. Desideri (2005), "La produzione legislativa nella settima legislatura regionale", in ISSiRFA-CNR, *Terzo Rapporto annuale sullo stato del regionalismo in Italia*, Milano, Giuffrè.

Armington, C. and Z.J. Acs (2002), "The Determinants of Regional Variation in New Firm Formation", *Regional Studies*, 36, 33–45.

Aghion, P.P. and Bolton (1997), "A Theory of Trickle-Down Growth and Development", *Review of Economic Studies*, 64, 151–172.

Audretsch, D.B. (1995), *Innovation and Industry Evolution*, Cambridge and London, MIT Press.

Audretsch, D.B. and M. Fritsch (1999), "The Industry Component of Regional New Firm Formation Processes", *Review of Industrial Organization*, 15, 239–252.

Baumol, W.J. (1990), "Entrepreneurship: Productive, Unproductive, and Destructive", *Journal of Political Economy*, 98, 893–921.

Becattini, G. (1990), "The Marshallian Industrial District as a Socio-Economic Notion", in F. Pyke, G. Becattini, and D. Sengenberger (eds.), *Industrial Districts and Inter-Firm Cooperation in Italy*, Geneva: ILO, 35–71.

Brusco, S. (1982), "The Emilian Model: Productive Decentralization and Social Integration, *Cambridge Journal of Economics*, 6, 167–184.

Carree, M.A. (2002), "Does Unemployment Affect the Number of Establishments? A Regional Analysis for US States", *Regional Studies*, 36, 389–398.

Carree, M.A. and A.R. Thurik (1996), "Entry and Exit in Retailing: Incentives, Barriers, Displacement and Replacement", *Review of Industrial Organization*, 11, 155–172.

Carree, M.A. and J. Nijkamp (2001), "Deregulation in Retailing: the Dutch Experience", *Journal of Economics and Business*, 53, 225–235.

Djankov, S., R. La Port, F. Lopez-de-Silanes and A. Schleifer (2002), "The Regulation of Entry", *Quarterly Journal of Economics*, 117, 1–37.

Dosi, G. and D. Lovallo (1998), "Rational Entrepreneurs or Optimistic Martyrs? Some Considerations on Technological Regimes, Corporate Entries, and the Evolutionary Role of Decision Biases", in: R. Garud, P. Nayyar, and Z. Shapiro (Eds.), *Foresights and Oversights in Technological Change*, Cambridge, Cambridge University Press, 41–68.

European Commission Commission (2002), *Regional Clusters in Europe*, Observatory of European SMEs, No. 3, Brussels: European Commission.

Evans, D.S. and L.S. Leighton (1990), "Small Business Formation by Unemployed and Employed Workers", *Small Business Economics*, 2, 319–330.

Fotopoulos, G. and H. Louri (2000), "Location and Survival of New Entry", *Small Business Economics*, 14, 311–321.

Fritsch, M. and P. Mueller (2004), "Effects of New Business Formation on Regional Development Over Time", *Regional Studies*, 38, 961–975.

Garofoli, G. (1994), "New Firm Formation and Regional Development: The Italian Case", *Regional Studies*, 28, 381–393.

Jovanovic, B. (1982), "Selection and Evolution of Industry", *Econometrica*, 50, 649–670.

Lotti, F, E. Santarelli and M. Vivarelli (2003), "Does Gibrat's Law Hold Among Young, Small Firms?", *Journal of Evolutionary Economics*, 13, 213–235.

Pages, E.R., D. Freedman and P. von Bargenvon Bargen (2003), "Entrepreneurship as a State and Local Development Strategy", in: D.M. Hart (Ed.), *The Emergence of Entrepreneurship Policy: Government, Start-ups, and Growth in the U.S. Knowledge Economy*, Cambridge, Cambridge University Press, 240–259.

Piergiovanni, R., Carree, M.A., Santarelli, E., and I. Verheul (2007), "Politiche per l'imprenditorialita e self-employment: un'analisi territoriale", *l'Industria*, 27 (2), 199–219.

Reilly, W.J. (1931), *The Law of Retail Gravitation*, New York: Knickerbocker Press.

Reynolds, P.D., D.J. Storey and P. Westhead (1994), "Cross-National Comparisons of the Variation in New Firm Formation Rates", *Regional Studies*, 28, 443–456.

Santarelli, E., 2006, "Entrepreneurship, Innovation, and the Evolution of Industrial Districts", in: E. Santarelli (ed.), *Entrepreneurship, Growth, and Innovation: The Dynamics of Firms and Industries*, New York: Springer, 165–182.

Santarelli, E. and M. Vivarelli (1994), "Non solo rose per l'imprenditore", *Il Sole 24 Ore*, 17 June.

Santarelli, E. and M. Vivarelli (2002), "Is Subsidizing Entry an Optimal Policy?", *Industrial and Corporate Change*, 11, 39–52.

Santarelli, E. and M. Vivarelli (2007), "Entrepreneurship and the Process of Firm's Entry, Survival and Growth", *Industrial and Corporate Change*, 16, 455–488.

Santarelli, E., Carree, M.A., and I. Verheul (2009), "Unemployment and Firm Entry and Exit: An Update on a Controversial Relationship", *Regional Studies*, forthcoming.

Storey, D.J. (1991), "The Birth of New Firms – Does Unemployment Matter? A Review of the Evidence", *Small Business Economics*, 3, 167–178.

Thompson, W. (1968), Internal and External Factors in the Development of Urban Economies, in: H.S. Perloff and L. Wingo (eds.), *Issues in Urban Economics*, Washington DC: The Johns Hopkins Press for Resources for the Future, 43–62.

Unioncamere (2002), *Osservatorio Unioncamere sulla Demografia delle Imprese*, Unioncamere, Roma.

Vernon, R.R. (1960), *Metropolis 1985*, Cambridge MA: Harvard University Press.

Chapter 3
Institutional Contexts, the Management of Patent Portfolios, and the Role of Public Policies Supporting New Entrepreneurial Ventures

Giovanni Battista Dagnino, Arabella Mocciaro Li Destri, and Daniela Baglieri

3.1 Introduction

This chapter aims to increase our understanding of the relationships between firm strategies, the design of institutional contexts on behalf of public agents, and the stimulation of diffused entrepreneurship within the economic system. In particular, it analyzes the way in which firm patent portfolio management strategies may systematically hinder the emergence of entrepreneurial endeavors within the economic system and, on this basis, critically discusses how the acknowledgement of these interactions should influence the design of public policies at the economic system level.

We argue that in economic contexts where intellectual property rights (IPR) are influential, large firms may intentionally develop and strategically manage wide portfolios of patents in order to purposely pre-empt the rise of direct competition and thwart the efforts of new potential entrepreneurs, rather than merely to protect the fruits of their R&D. This strategy leads to patent proliferation, eventually hindering the emergence of nascent entrepreneurship, thereby preventing the creation of new value in the system. The pre-emptive strategy described may be observed in a variety of contexts in which global firms (such as IBM, Microsoft and other firms in the biotech, nanotech and pharmaceutical industries) tend to aggressively invest in building and protecting wide ranged and overarching patent portfolios directed primarily toward preventing potential competition.

The chapter suggests an important and counterintuitive argument: although patents are institutional mechanisms typically designed with the intention of motivating economic agents to create value for the society they belong to by adopting entrepreneurial behaviors (and as such receive favorable treatment in public policies), they may also be strategically used by large firms as an offensive barrier to entry or to

G.B. Dagnino (✉), A.M.L. Destri, and D. Baglieri
University of Catania, Corso Italia, 55, 95129 Catania, Italy
e-mail: dagnino@unict.it

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_3,

imitation by potential competitors. In the latter case, given the motivation underlying the request of these IPRs, the protected new resource combinations often remain unexploited, as neither the patenting firm nor other firms proceed to implement the ideas contained in the patent. These firm behaviors therefore prove to be detrimental, not only to the emergence of new entrepreneurship, but also to the evolution of the economic system.

Though the assessment of the effects of the patent mechanism at the system level has been extensively analyzed and various authors have discussed the possibility that the former may delay the adoption and diffusion of important innovations (see Dougherty 1992; Allen 1983; Merges and Nelson 1994; Heller and Eisenberg 1998), this study shows that the negative consequences tied to patents are not an inevitable "price to pay" for the incentive structure based on this form of IPRs, but rather are often the consequence of intentional behaviors directed toward limiting potential competitors. The relevance of this possibility rests on its consequences for policy-making. In fact, in the first case the debate must be developed with regard to the benefits and limitations tied to the patent mechanism for different kinds of industries (e.g., characterized by cumulative and systemic or radical and discrete innovations), for different types of innovations etc., while in the second case attention is drawn toward the necessity to elaborate ways in which public agents may draw the line between patent request and recognition that is physiological and fruitful for the evolution of the economic system and that which is harmful.

Taking this argument one step further, we maintain that public authorities must carefully and continuously monitor the process of patent portfolio building by large firms in various institutional contexts. The recognition that patent concessions may be detrimental to the emergence of dispersed entrepreneurship calls the public agent to design new institutional mechanisms that may limit the distorted use of patents and intervene in those cases in which trigger events have occurred or a barrier level hazardous to new entrepreneurial ventures has been reached. In this way, public agents allow the unbound insurgence of new competitive entrepreneurship and openly unleash the Keynesian capitalistic spirits.

The chapter gathers a few conceptual insights stemming from four influential streams of thinking which are considered our fundamental investigative pillars:

1. The notion of institutional context draws on the neo-institutional approach in economic studies or Douglas North's view of institutions as rules and norms which lead to behavioral regularities as well as their enforcement mechanisms (North 1990, 1994).
2. The latter is fruitfully integrated with the Penrosian theory of firm growth (Penrose 1959) and, in particular, with the distinction she introduces between productive possibilities and productive opportunities.
3. The notion of entrepreneurship intermingles studies in the Austrian process and subjective view within those regarding the sources of creativity (Bower and Hilgard 1981; Brandshaw et al. 1983; Simon 1985; Mauzy and Harriman 2003; Maccoby 2003) and entrepreneurial behavior (Schumpeter 1934, 1942; Kirzner 1973, 1979, 1982; Lachmann 1956; Casson 1982).

4. The discussion on the development and management of collections of patents relates to managerial studies and consulting company reports and newsletters on the processes of building and maintenance of patent portfolios.

The remainder of the chapter is organized as follows. Moving from the analysis of the potential influence of institutional environments on agent actions and the ensuing role of agent creativity on innovation, Sect. 3.2 discusses both the endogeneity of IPR regimes and the positive effect of IPRs on innovation. Inverting this line of reasoning, in Sect. 3.3 we deepen the analysis of the potentially perverse effects that IPRs may have, focusing on how they act as barriers to diffusing innovation with specific reference to the role of industry structure and of firm strategies. It is in such contexts that firm strategy can lead to using IPR portfolios as pre-emptive barriers to imitation. Section 3.4 displays an empirical flavor in that it advances and discusses microcases of pre-emptive firm patent portfolio strategies that have had significant effects on the production of innovation in two definite economic sectors, namely bio- and nanotech. Section 3.5 purports a couple of relevant implications which may be helpful to policymakers to improve distributed entrepreneurship. Finally, Sect. 3.6 marshals the conclusion of the study paving the way for future research on this intriguing matter.

3.2 The Design of IPR Regimes as a Means to Incentivize Diffused Innovation

3.2.1 The Influence of Institutional Settings on Agent Actions

Institutions have been the focus of studies in areas of intellectual endeavor that range from economics to sociology, thus it is not surprising that they have found multiple definitions (Hodgson 1998).

The notion of institutional contexts which we refer to in this paper derives from the neo-institutional approach in economic studies (Polanyi 1957; North and Thomas 1973; North 1990, 1991, 1994, 1998; Heiner 1983, 1986; Langlois 1984, 1986, 1992a,b, 1995; Langlois 1995; Loasby 1983, 1986, 1994, 1998; Hodgson 1998). As a consequence, we consider institutional contexts to include all rules and norms that lead to behavioral regularities as well as its enforcement mechanisms. From this perspective, the rules, the norms, and the enforcement mechanisms considered may have a formal or an informal nature, therefore institutions range from commercial and tax laws, property rights and contracts, to social habits, cultures, and ideologies. In the economic sphere, formal rules and norms essentially support or hinder the exchange of tangible or intangible resources as thought desirable by the agents who define the rules; also, the rules generally need formal enforcement mechanisms. In any socioeconomic context, formal rules identify only a small part of the normative structure which regulates social life. The regulatory system of day-to-day private,

public, and business interactions is, in fact, made up of moral codes, and cultural norms of behavior, ideologies and conventions. Informal rules are thus (a) extensions, elaborations, and modifications of formal rules; (b) behavioral norms that are socially sanctioned; (c) norms of individual conduct that are internally sanctioned.

In brief, institutions are "the rules of the game in a society or … the constraints men have defined in order to discipline their relationships" (North 1990, p. 23). Institutional contexts are the structure within which economic and social interactions occur. These social interaction mechanisms are based on processes involving feedback from the cumulative results of individual actions, and thereby are capable of achieving substantial coordination and coherence in the collective performance of the ensemble of distributed agents. North (1990) uses a sport analogy to illustrate the role played by institutions and to distinguish between institutions and organizations: the first are the rules of the game, while the second are the players. In particular, North (1990, p.25) writes:

> Conceptually one must keep the rules of the game well distinguished from the players, for the objective of the first is to determine the way in which the game must be played, whereas the objective of the players is to win the game while obeying the rules through the use of a combination of ability, strategy and coordination.

Furthermore, Hodgson (1998, p. 184) specifies that while individuals and organizations act intentionally, institutions do not.

Many approaches within economic and managerial studies overlook the role played by institutional contexts completely.[1] Although these studies are numerous and present very different characteristics, underlying these "a-contextual" or "rationalist" approaches is a common belief in environmental determinism and the implicit acceptance of the Darwinian historical efficiency assumption according to which there are forces, endogenous or exogenous to firms, that assure that the firms that survive and their characteristics are the most efficient among those present in any given time and space. This assumption not only implies that institutions are structured so as to obtain efficient outcomes at the system level, but also that economic analyses may ignore them as they fail to exercise an independent influence on the economic results of the system to which they belong.

Opposite to this stance is the institutional relativism approach. This approach assumes that economic activities are embedded in an institutional context which influences their characteristics and outcomes (Granovetter 1992). At the basis of the institutional relativist approach is the idea of the division of knowledge in society (Hayek 1945). This basic idea brings to the recognition that, to the extent the idea of perfect rationality is inapplicable to economic processes in the real world, there is the necessity for theory to take into account and consider the way imperfect markets work and the role single agents play on the outcomes of the system they belong to. It is also possible to identify the empirical analyses which delve into the subject in more detail. In particular, the economic historian and Nobel laureate

[1]Such approaches range from the neoclassical approach in economics to the contingency theory to studies conducted in the original population ecology perspective.

Douglas North (1990, 1991, 1994, 1998) shows that institutions are relevant in economic analyses because they create inefficiencies that distort the final outcomes obtained by economic agents operating within the system. Institutions, for example, define the incentives that guide economic endeavor and create partial rigidities to the flow of tangible and intangible resources within economic systems.

Furthermore, characteristics of the institutional context influence what is considered efficient in the society. Institutions, in fact, define what is permitted, what is forbidden, and what the most probable consequences of the various actions possible are (North 1994). Following this reasoning through, incorporating Coleman (1993), it is possible to maintain that institutional contexts contribute to determining the distribution of resources and the rights connected to them. The acknowledgement of the innate (and increasing) heterogeneity of interests which agents develop and pursue, along with the idea that efficiency depends on the desires, needs, and preferences of the agents in the system, suggests that it is the institutional context that defines the efficiency criteria. The acceptance of the institutional relativist view leads to a dynamic sociological conceptualization of socioeconomic contexts, in which human action is structured, but there is space for intelligent perception and strategic action.

3.2.2 Contextualizing Agent Creativity to Capture the Role of Institutions on Innovation Processes

Strategy literature distinguishes value creation from value appropriation (Mocciaro Li Destri and Dagnino 2005). The former entails the creation of new sources of competitive advantage through innovation. This relies on the intuition and implementation of new resource combinations or the development of new competences or knowledge which can elevate the efficiency within the economic system. Value appropriation, on the other hand, focuses on exploitation and maintaining specific sources of competitive advantage, providing the capacity to obtain rents from transactions, given a specific combination of resources and of capabilities.

The framework that follows addresses the issue of the role played by institutional contexts on the processes underlying innovation (or value creation) carried out by heterogeneous actors. Following the institutional relativist approach which stems from the work of North and from other neo-institutional studies previously mentioned, this framework is based on the idea that economic processes are embedded in sociological processes, but are not entirely determined by them.

To appreciate the role of institutions in dynamic value creation processes, the originating forces underlying such processes must be understood. Exploring individual creativity in the system helps contextualize the endeavors of discovery and invention. This sees the institutional context as the social structure within which individual creativity occurs. As will be illustrated, given the nature of creativity, it is not possible to theorize it in deterministic terms, but one can see the potential role of institutions as a source of systematic influence directing individual efforts of discovery and invention.

The theoretical framework renders an explicit role played by the institutional context in directing individual efforts of discovery and invention. Furthermore, it enables pinpointing the principle dimensions taken into consideration when describing and evaluating distinct institutional settings and their effect on the value creation processes which take place within them.

Without describing in detail the phases underlying the construction of the theoretical representation proposed,[2] it seems sufficient to say that the methodological base of this analysis is influenced by the Austrian process and, furthermore, that the notions of value creation processes and institutional contexts are based on conceptual categories elaborated:

1. Within studies regarding the sources of creativity[3] and entrepreneurial behaviour[4]
2. Integrated with Penrose's theory of firm growth (1959) and, in particular, the distinction she introduces between productive possibilities and productive opportunities
3. With the neo-institutional approach in heterodox economics

The following conceptual representation attempts to identify the multiple layers of reality that tie individual creativity to the systemic value creation performance. We use three layers of analysis, as illustrated in Table 3.1. The firm's capacity to create value rests on individual creativity to create products and/or processes that the firm may use. It is subjective which kind of creativity helps find new solutions to old problems or helps resolve new problems. The rationality which distinguishes the entrepreneurial

Table 3.1 Three analytical levels: the multiple layers of reality which tie individual creativity to the value creation performances of the system

Micro level
Composed of the agents that operate within the system analyzed and their values, beliefs, knowledge, and motivations. This level is focused on agent creativity and the entrepreneurial behaviours which lead to the intuition and implementation of new resource combinations within the system they belong to
Meso level
Composed of the social interaction mechanisms which define the nature and characteristics of the institutional context within which specific spheres of economic endeavour take place. These institutional contexts represent the structure within which micro level agent behaviours occur
Macro level
Composed of economic organizations and their outcomes, in terms of value creation performances. The organizations considered are typically firms, but as is the case in the software industry for example, may take on other forms such as organized communities of individuals or non profit foundations

[2] For a detailed treatment of the building blocks and theoretical process underlying the framework proposed, see Mocciaro Li Destri (2005).

[3] Cf. Bower and Hilgard (1981), Brandshaw et al. (1983), Simon (1985), Mauzy and Harriman (2003), and Maccoby (2003).

[4] Cf. Schumpeter (1934, 1942), Kirzner (1973, 1979, 1982), Lachmann (1956), and Casson (1982).

behaviors that value creation has the following distinctive characteristics: (a) it has an intuitive nature that cannot be represented in Cartesian logical-deductive terms; (b) it implies the capacity to bring a variety of information and knowledge fragments to a new synthesis; and (c) it rests on the ability to foresee the potential value of the new combinations perceived.

To comprehend the role institutions play within value creation processes, one must abandon treating subjective creativity independently from the context in which individuals operate. Given the non-Cartesian nature of the intuition at the basis of entrepreneurial behaviors, microlevel analyses regarding value creation are not susceptible to deterministic theorization. However, following the mainstream "general equilibrium" implications of the microbehaviors of the agents analyzed provides a tool for identifying critical structural relationships and parameters that consent to link microlevel studies regarding individual creativity and entrepreneurial behaviors, to the emergent properties of the macrosystem. In strategy research, it is generally accepted that the possibilities to create new resource combinations are determined by the opportunities and threats present in the environment in which firms operate. However, drawing on Penrose's (1959) distinction between productive possibilities and productive opportunities, it is possible to underscore that among the infinite number of innovations that could in principle be carried out, only a small number are carried out. On the basis of this observation, in this paper we follow Penrose's idea that productive possibilities lead to the realization of new resource combinations only as long as they are perceived, the resources and the capabilities on which they rest are accessible, and there is the motivation to grasp such opportunities. The combined presence of these conditions is necessary for innovation to happen; if any one of these conditions is absent, new resource combinations remain mere abstract.

On the basis of this theoretical representation, scrutinizing the effect of the three dimensions underlying value creation opportunities identified by Penrose (1959) – perception, accessibility, and motivation – allows systematic consideration of both subjective and objective aspects and gives a balanced evaluation for each institutional arrangement.[5]

3.2.3 The Positive Effects of IPRs on Innovation

Throughout history, governments and policymakers have designed institutions designed to incentivize movement toward goals considered consistent with national interest. Among principal interests that all nations share, there is no doubt to create the incentive for individuals and firms to invent and implement new combinations of the resources within the economic system (Schumpeter 1934) and to develop new competences and new knowledge that are able to increase efficiency with which resources are used. These activities are considered innovation, and from a

[5] For an application of the model proposed to the institutional contexts which distinguish the software industry, see Mocciaro Li Destri (2006, 2007).

firm perspective they are the outcome of value creating processes aimed to obtain new competitive advantages.

The traditional, and mainstream, view of innovation believes it is possible to identify a precise moment when the new resource combination or processes at the heart of innovation is perceived. Furthermore, one can identify the individual or group of individuals who produced the new perception. Following such view, a series of formal institutions specifically used in capitalistic systems to motivate entrepreneurs and firms toward the intuition and execution of new resource combinations (or, in other terms, to create value) have been developed. The most notable are the various forms of IPRs – which include patents and copyrights. Essentially, these mechanisms motivate economic agents to create value for the society they belong to, by consenting that the success or failure of their endeavors influences them more than others (Mises 1966). Institutions grant protected rents – at least for a certain period of time – by forbidding others from imitating the resource combinations perceived. This system may be considered a kind of social contract between society and its inventors. If, on the one hand, it grants a temporary monopoly to inventors in order to motivate them to invest time and resources necessary for developing new technologies and carrying them to the market, on the other hand, the inventor receives institutional protection for the invention as long as such invention is disclosed in sufficient detail that others "practiced in the art" can replicate the invention.[6] Therefore, society grants a temporary monopoly, with the value that this may entail, in return for disclosure of the invention. This disclosure also enables other inventors to build on the earlier invention upon expiration of the protection so that the technology may be improved over time.

The traditional business models built around these institutions, in accordance with the Schumpeterian view of innovation, entail that there is only one way to access IPRs (i.e., from within your own firm or you own inventive activity) and only one way to deploy it (i.e., through the implementation of the innovation and the commercialization of its fruits on the market). This model may be described as "closed" from an intellectual property (IP) point of view; IP is in fact created internally, used internally, and brandished only on occasion externally to ward off intruders or settle litigation claims.

These mechanisms are not, however, the only ones firms (or individuals) may use to protect the rents which derive from the implementation of new resource combinations, and in some industries they are not even considered the most relevant (von Hippel 1988, pp. 44–55; Grant 1998; Moser 2004). In particular, in strategy studies a series of dynamic appropriation mechanisms which have been taken into consideration include (a) the possession or control of complementary assets necessary to produce or commercialize the innovation (Teece 1986; 2000); (b) the incorporation of a large amount of tacit and/or complex knowledge in the innovation (Agrawal 2006); and (c) taking advantage of the lead time which the first mover disposes of

[6] This description refers essentially to patents and may be applied to copyrights as well. It cannot be applied to trade secrets as these do not imply disclosure nor grant the same level of protection.

by making additional investments in technological development, production processes, and market positions.

Given the way closed innovation models work, it is unsurprising that much of the IP available is never used either by the inventor or by any other third party (Gambardella et al. 2007). It is suggested that the way to overcome this inefficiency is in the adoption of "open business models" which leverage IP more extensively both by including and working on ideas matured externally and by engaging in transactions which may render ideas developed internally available to third parties (Chesbrough 2006). These models assume that there is a tendency toward the "division of innovation labor" within modern economic systems (Arora et al. 2001).

The latter entails that one agent develops a novel idea but does not carry this idea to the market, instead partnering or selling the idea to another agent, and it is this second agent who brings the innovation to market. In order for innovative ideas to flow within the system, intermediary markets for ideas and technology develop. In these markets, new ideas related to resource combinations are exchanged on the basis of different assets, resources, competences, positions, and the history of the participating agents. These differences cause firms and individual agents to look at opportunities differently, and through intermediate markets ideas flow toward the firms where they best fit. Intellectual property is fundamental even in these intermediate markets for technology as they consent the realization of transactions around ideas and innovations, in effect these intermediate markets may be considered IP markets.

In sum, the logic underlying "closed" and "open" business models differ substantially regarding the role and the aptitude toward IP – the first sees firms developing new technologies and new products pursuing IP protection primarily for defensive reasons, to ensure their ability to practice their technology in their businesses without fear of interruption. The second sees IP as an important institutional mechanism that allows ideas to flow through the economic system from those who value them less to those who are in the position to exploit them more efficiently. Not withstanding these relevant differences regarding the role of IP, it is important to note at this stage that its existence and development is the fundamental basis on which both closed and open business models rest, though in different ways. A number of conditions that hinder these IP institutions from sustaining system wide efficiency (and some times also single firm value creation and appropriation processes) are described and analyzed as the paper proceeds.

3.3 The Perverse Effect of IPRs: When IPRs Are Barriers to Diffused Innovation

Consistent with the policy goals of IP regimes, the efficacy of typical IPRs to consent the protection of rent flows from new resource combinations once they have been created (i.e., value appropriation) is often investigated. Furthermore, typical IPRs are designed to enhance producer-centered innovation processes.

It is not designed for enabling diffused innovation processes which leverage the creativity dispersed in various levels of the external environment. As a consequence, while the efficacy of typical IPRs to enhance producer-centered innovation is often debated, their capacity to spur diffused innovation processes is far less studied.

Both the focus on the capacity to guarantee value appropriation from innovations and the central role accorded to producer-centered innovations, are (implicit) consequences of viewing the innovation process in Schumpeterian linear terms. However, following North's studies regarding the economic role of institutions, the way in which IPRs are designed (like many other institutions) also influences the social dynamics underlying value creation processes. Furthermore, numerous authors have underscored the importance of communication, learning, and social interaction both within an organization as well as between the firm and its environment for innovation to take place (Nonaka 1988; von Hippel 1976, 1988, 1994; Dougherty 1992; Brown and Eisenhardt 1995; Levin 1988; Allen 1983; Merges and Nelson 1994; Heller and Eisenberg 1998).

Departing from different logical bases, Hayek (1945, 1948a,b, 1978) and von Hippel (1976, 1988, 1994) both argue that, because the knowledge on which they rest is tacit, private and empirical, the sources of creativity underlying value creation processes are inevitably dispersed as market mechanisms fail to consent their transfer. These studies, along with those previously mentioned regarding the role of social interaction and communication for innovation processes, conclude that, within firm development, a fundamental part of the knowledge and creative effort underlying the process of value creation is often dispersed both within the organization (and not necessarily restricted to the R&D laboratory) and in the external context. Thus, the influences of institutional designs on the capacity of a system to leverage these sources of creativity gain interest, as does also the possibility to formulate open innovation models, in order increase economic efficiency (Chesbrough 2003; Tuomi 2002).

In the following sections we will turn our attention to two typical cases in which traditional IP regimes are flawed, thus hindering the general upgrading of the efficiency levels with which resources are combined: the first depends on the industry structure and the type of innovations which are carried out in an industry and the second regards the instrumental and strategic use of IP as a means to pre-empt competition.

3.3.1 The Role of Industry Structure and Types of Innovation on IPR Efficacy

As previously mentioned, strong IPRs may be a means to prevent the full deployment of innovative ideas and solutions at the system level. This is due to the possibility for innovators (firms or individuals) to either exploit their innovative ideas commercially or, if they do not wish or know how to, to sell/license their IP to third parties on the market for technologies. This possibility to enter into agreements to rearrange and exercise IPRs allows fluidity at the system level.

However, experience in many industries increasingly shows that rearranging and exercising IPRs is often difficult in practice. Although a number of authors[7] have illustrated positive effects of IP regimes on innovation rates, other authors have a more ambivalent aptitude. In her studies on the relationship between patent systems and innovation, MacLeod (1988)[8] reports that

1. the propensity to use IP to protect innovations varies greatly between industries and between geographical regions;
2. a significant amount of important innovative activities are conducted externally to the institutional system provided by IP regimes; and
3. intellectual property protection is often requested for a variety of reasons that may have nothing to do with the protected use of the ideas. If positions such as the one illustrated above show that the relationship between the development IP regimes and innovation rates is problematic, other authors show a negative relationship between these two dimensions (Allen 1983; Hunter 1949; Hilaire-Perez 2000; Nuvolari 2004).

In general, it seems possible to suggest that the influence of strong institutional protection for IP on innovation rates depends on the industry structure, the type of technology that characterizes the industry, and the specific development path.

In particular, a number of well-known studies on the evolution of technologies show the critical role played by incremental innovation processes (Rosenberg 1976) and the necessity for a series of "microinnovations" to occur in order for full manifestation of the technical and economic potential related to rough initial intuitions to take place (Mokyr 1999). Merges and Nelson (1994) argue that the role of these microinnovation processes depends on the different technologies under analysis and, in particular, assumes relevance if technologies are cumulative and systemic.[9] For these kinds of technology, a strict IP regime can hinder or block technological progress and firm development. For these types of technology, strong IP regimes may (1) allow a monopolist to determine a limitation to the development of a given class of technologies due to ownership of a property right on a critical aspect or part of the technological class considered; and (2) create excessive fragmentation of knowledge crucial for the development of a class of technologies between numerous different agents – each with the right to use a fragment of the relevant knowledge base, but preventing any one agent realizing the full potential of knowledge.

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[7] For an analysis of the metallurgic industry in Birmingham, see Berg (1991); for an analysis of the influence of the patent system on innovation rates in Great Britain, Dutton (1984); for an analysis of the effects of a strong patent system in the USA, Sokoloff (1988) and Khan and Sokoloff (1993). Even North (1981, pp. 164–166) suggests that the increase in the innovation rates, which occurred in Great Britain during the eighteenth century, may be explained as a direct consequence of the progressive development of an institutional context in which intellectual property rights are fully developed.

[8] In a similar vein, see also Moser (2004).

[9] Cumulative and systemic technologies are those technologies that are composed of a significant number of interconnected components, whose creative evolution is brought forth on the basis of past advancements.

Starting from similar stance, Heller and Eisenberg (1998) introduce the idea of the "tragedy of the anticommons" to illustrate the cases in which the existence of IPRs harms the creative capacity and potential of the agents who operate within the institutional contexts considered. The authors maintain that the knowledge trapped within excessively fragmented IPRs often remains unused as a consequence of the high level of the transaction costs which it is necessary to coordinate between numerous agents, each with different interests, opinions, and expectations.

The consideration of the role played by resource accessibility to implement innovations on the delimitation of the productive possibilities vis-à-vis the productive opportunities within a system (Penrose 1959), along with the consideration of the influence of resource and knowledge accessibility in stimulating new resource combinations (Mocciaro Li Destri 2005), shows a further negative effect of excessive IP fragmentation of diffused innovation processes at the system level.

Finally, it is relevant to refer to a number of empirical studies that show that the low levels of protection granted by IP mechanisms are not necessarily detrimental for firms or the attitude toward investments in R&D. Levin (1988), for example, shows that in "high-tech" industries, in which knowledge develops incrementally, knowledge spillovers from competing firms may increase the productivity of one's own R&D investments. In these situations, the high level of knowledge flows between firms and the external context not only spurs technological progress, but also encourages R&D. Penin (2004) argues in favor of diffused knowledge going one step further, through the description of numerous ways in which firms voluntarily and freely reveal valuable knowledge to a non-predefined nor controllable public and, furthermore, pin-points a number of mechanisms that render such behavior economically interesting also for other firms. Von Hippel (1976, 1977, 1986, 1988, 1998, 2006), instead, studies the processes and rewards which encourage individuals to invest their time in the development of innovations and to freely reveal such intuitions or innovations.

3.3.2 Firm strategies and the Use of IPR Portfolios as a Pre-emptive Barrier to Imitation

The second case in which traditional IP regimes have typically been a hindrance to the general upgrading of the efficiency with which resources are combined relates to the fact that the protections afforded by existing IP law are often used as an instrument which is strategically deployed to achieve private advantage at the expense of general innovative progress.

This strategic behavior, based on patent rights or copyrighted work in the movie, publishing, and software fields, involves investing in large portfolios of IPRs to create patent or copyright "thickets." These thickets are dense networks of patent or copyright claims across a wide field (Merges and Nelson 1994; Hall and Ziedonis 2001; Shapiro 2001; Bessen 2003). As such, they create a plausible base for infringement suits across a broad expanse. Owners of patent or copyright thickets can use the

threat of such legal suits to discourage others from investing in R&D in areas of technical advance relevant to their products. Empirical research by Hunt and Bessen (2004) shows that, on average, as firms increase investments in patent protection, investments in R&D decline. This relationship can find a plausible explanation in terms of private profit: corporations that can use a patent thicket to deter research by others. If this interpretation is correct, then patent or copyright thickets have a double negative effect: not only does it dissuade competing or third party investment in innovation through pre-emption and the menace of litigation, but it also reduces incentives for the focal firm to advance knowledge in the field.

Additionally, firms with rich patent or copyright thickets are "trolls"[10] which base part (if not all) of their business models on the possibility of profiting from litigations tied to third party infringement of their IP portfolios – worsens the negative systemic effects.

It seems important to underscore that while the first limitation is a natural consequence of the failure in the alignment of the characteristics of the development process and the way IP regimes are designed, the negative effects tied to typical IP regimes are a consequence of intentional behaviors on behalf of individuals or firms which deliberately distort the use and aim of the institutions initially designed to enhance innovation rates. In this case, the problem is slightly different and calls into question the need for ways to limit, deter, or inhibit behaviors that are contrary to the aims for which these institutions were designed. The following section is dedicated to the analysis of examples and consequences of such deviated uses of IPRs on behalf of firms in the biotech and nanotech industries.

3.4 Pre-emptive Firm Patent Portfolio Strategies and Their Effect on Innovation: Cases from the Biotech and Nanotech Industries

Since the early 1990s, patenting rates have increased drastically worldwide, including the application of patents to scientific research and its results (see Fig. 3.1). Since patents reflect the ability of transferring scientific results into technological applications, they are a prerequisite for economic exploitation of research results and are thus central for any analysis that deals with economic potentials of emerging technologies.

The recent "patent explosion" can be explained in several ways. First, the increasing number of patents can be linked to the general increase in "technological opportunities" related, in particular, to the emergence of new technological paradigms such as those concerning information technologies, biotechnologies, and nanotechnologies.

[10] Kayat and Greenberg (2006) credit Peter Detkin, formerly at Intel and now at Intellectual Ventures, for coining the term *troll*.

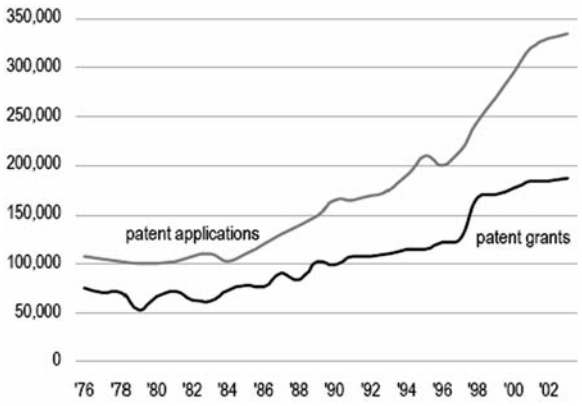

Fig. 3.1 Patent applications and grants by the USPTO, 1976—2003 (*Source:* Williams (2005))

Accordingly, the expansion of the patentability to objects and ideas, including software, research tools, business methods, genes, and artificially engineered organisms, boosts patenting rates.

Another explanation is that the patent explosion is due to changes in the legal and institutional framework, which, in turn, allow firms to act strategically by leveraging their patents portfolio (Kortum and Lerner 1999). In this respect, new regulatory settings allow new actors to enter the patenting game, most notably universities and public agencies (Mowery et al. 1998). Consequently, patents seem to have acquired a strategic value even in those industries in which they were considered nothing more than a minor by-product of R&D. This circumstance in turn influences firms' competitive strategies and extensive portfolios of legal rights are considered means for entry deterrence (Hall and Zedonis 2001).

Empirical evidence (Cohen et al. 2000) shows that preventing competitors from copying new inventions and blocking rival patents on related innovations are the leading motives for patenting, with 96% and 82% of all firms reporting these as reasons for patenting recent inventions. Prevention of infringement suits is next, after which comes the use of patents as bargaining chips in cross-licensing negotiations. The use of patents as a source of licensing revenue is the least cited motive, thus suggesting that only a minority of firms expect to sell their protected IP in disembodied form (see Table 3.2).

In addition, patents are seen as a means to increase revenue for infringement and counter infringement suits against rivals. Texas Instruments, for instance, is estimated to have gained almost $1 billion from patent licenses and settlements resulting from its aggressive enforcement policy. More in general, the number of patent suits instituted in the US Federal Courts has increased from 795 in 1981 to 2,573 in 2001. Quite naturally, this has led to a significant increase in litigation expenditures. The US Department of Commerce has estimated that patent litigation started in

Table 3.2 The use of patents as a source of licensing revenue and in suits and copying prevention in ten industrial sectors (*Source:* Cohen et al. (2000))

Industry	Licensing revenue	For use in negots.	Prevent suits	Prevent copying	Blocking
Aerospace	57	59	68	97	70
Auomotives	38	75	63	100	38
Chemicals	36	34	57	100	86
Communications equipment	47	79	74	84	79
Computers	30	80	90	85	65
Electronic components	33	58	75	92	75
General purpose machinery	13	33	50	98	80
Medical equipment	22	58	65	95	93
Pharmaceuticals	44	61	67	100	97
Semiconductors	42	67	67	92	75
All manufacturing firms	28%	47%	59%	96%	82%

1991 resulted in legal expenditures by US firms that were at least 25% of the amount of the basic research performed by these firms in the same year.

These considerations lead to the proposition that follows: The stronger the patents regimes, the more detrimental the effects on the rate of innovation.

3.4.1 Biotech Patents and Their Effects on Innovation

The current debate on property rights in biotechnology highlights similar problems whereby granting very broad claims on patents precludes the exploration of alternative applications for the patented inventions. This is particularly the case of inventions concerning fundamental pieces of knowledge: good examples are genes or the Leder and Stewart patent on a genetically engineered mouse that develops cancer. In 1988, the United States Patent and Trademark Office granted a patent to Leder and Stewart, making it possible "OncoMouse", the first "transgenic nonhuman mammal", to be patented. The mouse had genes injected into its embryo to increase its susceptibility to cancer, thereby aiding laboratory studies. The patent is owned by DuPont, which charges high royalties for its use and interprets its patent rights in a broad manner. This explains why OncoMouse generated considerable controversy, not just because it patented a life form, but also because DuPont claimed the concept of genetically engineered animals. One suggestion comes from the following example: to the extent that such techniques and knowledge are critical to consent further research that proceeds cumulatively on the basis of the original invention, the attribution of broad property rights might impede further developments. This is increasingly true once the patent protects not only the product the inventors have achieved (i.e., the "oncoMouse"), but all the class of products that could be produced through that principle (i.e., all "transgenic nonhuman mammals") or all

the possible uses of a patented invention (a gene sequence), even though they are not named in the application.

In the circumstances above, the proliferation of patents might turn out to have the opposite effect of discouraging or deterring innovation. This condition is extremely relevant if emerging economies intend to develop innovation. As firms and universities in the most developed countries protect inventions on all the most promising genes, techniques, and plant varieties, patents, cross-licenses, and material transfer agreements are making life difficult for subsequent innovators (and particularly in the least developed countries). A case in point is the so-called golden rice (i.e., the vitamin A enhanced), which needs to be further developed in order to ensure a broader diffusion, while dozens of different patents have had to be dealt with to allow its release. Graff et al. (2003) found that "golden rice" research requires payment of up to 40 licenses, depending on the country of commercialization.

The reflection heretofore discussed suggests that, when a biotech invention is actually patented, two main types of access problems can arise. The first is often referred to as a "blocking" or "hold-up" problem. Individual patent-holders simply refuse to license necessary inventions to researchers or health-care providers (perhaps because the invention is already exclusively licensed to someone else) or require license fees that are expensive for the would-be user. A case in point is breast cancer genetics, where patents owned by private companies protect all reproduction and use of the sequence and related products, including diagnosis, irrespective of the technique used. Myriad Genetics' use of its BRCA1 and BRCA2 breast cancer genes patents, issued first in the United States and then in Europe and Canada, has become the archetypal case of a blocking problem in the genetics context. Founded in 1991, Myriad Genetics emerged as a world leader in the predictive diagnostic tests which aim at determining whether a patient has a specific mutation in a specific gene, and consequently a future hereditary disease. As regards IPRs strategy, Myriad Genetics has decided to pursue an aggressive licensing strategy related to their patents. They granted only exclusive licenses implying that a very limited number of licensees over the world are allowed to use the technology and to perform these tests.

As we have previously argued, the second type of access problem has been termed as the tragedy of the anticommons. Heller and Eisenberg (1998) argue that the proliferation of patent rights, particularly those relating to DNA sequences, could substantially increase "transaction costs", potentially causing a "tragedy of the anticommons" capable of endangering progress in several biotechnology research avenues. An anticommons can, in theory, result in any technological field where a proliferation of patent rights has occurred. Take the case of the MSP1 antigen (*Plasmodium falciparum* merozoite specific protein 1), widely recognized as the most promising candidate for an antimalarial vaccine. A study of the Commission on IPRs (2002) found more than 39 patent families covering DNA fragments, methods for processing fragments, production systems, vaccine delivery systems, and so on. As a consequence, a potential innovator willing to commercialize a vaccine based on MSP1 is required to get prior permission from the owners of the property rights.

3.4.2 Nanotechnology Patents and Their Effects on Innovation

Nanotech innovations have transformed a broad range of industry environments, thus having a significant impact on the economy. Using NSTC's version of definition, nanotechnology is the creation of materials, devices, and systems through the control of matter on the nanometer-length (10^{-9} m) scale, the level of atoms, molecules, and macromolecular structures. Owing to its broader range of applications, nanotechnology is progressively gaining increasing interest, even from the financial community. In 2007, over US$ 4 billion was spent to support research worldwide. Also, the number of patent applications in the United States has increased dramatically, from 403 in 2001 to 3,842 in 2004 (Lemley 2005). In many cases, technologies which were first conceived in the 1970s and early 1980s have now become a major area of commercial development under the general nanotechnology rubric. For example, the atomic force microscope, a powerful fundamental nanotechnology tool, was patented in 1988 by Bennig and IBM. By 1994, over 100 patents were issued per year and, by 2003, over 500 patents were being issued per year referring to this tool.

Unlike biotech patents, nanotechnology patents have a notable cross-industry impact. In other words, a basic nanotech patent may have implications for semiconductor design, biotechnology, materials science, telecommunications, and textiles, even though the patent is held by a firm that works in only one of these industries. This results in a complex innovation environment, where multiple customer and distribution alliances must be formed, research and development specific to various industry applications must be performed, and process innovation plays a major role (Baglieri and Giordani 2008).

The situation leads us to devote more attention to the impacts of nanotechnologies on intermediate markets. For example, the markets for rubber, beverages (tea, coffee, cacao, and tropical fruits), and textiles are expected to be severely affected by the development of nanotechnologies as a substitute for basic commodities. These effects point to the tendency to start filing for patents at a very early stage of technological development and then exploit it with a multiple market entry. From an economic point of view, there are a number of side effects to be analyzed. Patenting at an early stage might cause more dependency, which, in turn, leads to patent and royalty stacking, which then has a blocking effect on competitors or subsequent innovators.

The overdose of patenting activity in the field may have a significant impact on start-ups. Venture capitalists will be reluctant to invest in companies where there is concern over liability for patent infringement. In order for innovative new start-ups to succeed, legal issues posed by the nanotech IP landscape must be understood. The increasing numbers of patents issued means that those seeking to commercialize new products must look out for the patents of others. In addition, patents in this area may be broad in scope if there is no previous work giving the Patent Office a basis to limit the scope of the claims. It is worth understanding the implications of such IP landscape on firms' strategies and, in turn, on innovation. In this vein, it appears relevant to make a distinction between two types of technologies:

1. "Stand alone" or discrete technologies, in which patenting is used as a direct source of income as well as a means of blocking competing products
2. "Cumulative" technologies, in which inventions incorporate many elements from previous inventions and serve as a foundation for future generations and where new products or processes are composed of a large number of separate patentable components. In such a regime, a high degree of spillovers may not only drive technical advance, but also encourage additional R&D investment. This means that a relatively *loose* IP regime, facilitating rapid diffusion of new technologies, fosters innovation and, more particularly, innovation by new-to-the-world entrepreneurial firms.

3.5 Implications for Policymakers

Moving from some of the key issues discussed in the course of the chapter, in this section we advance three main lessons from the study of the relationship between institutional contexts and management of IPRs that can prove helpful to policymakers in their attempt to forge the right incentives to ignite and/or enhance creative entrepreneurship in the economic system.

First, the study shows that the negative consequences related to patents are not an inevitable price to pay. Rather, it is often the outcome of intentional firm behaviors directed toward restraining potential competition, which appears detrimental to the overall economy. The significance of this possibility rests on its implication for public policymakers. Accordingly, policymakers should propose ways to draw lines between patent request and patent appreciation that are physiological and fruitful to the evolution of the economic system, and that which is harmful.

Consequently, we submit that the public watchdog must vigilantly and constantly scrutinize patent portfolio building processes in various institutional contexts. Regulators should draw up new mechanisms that constrain the twisted use of patents (typically by big firms) as well as intervening in those cases where innovative use of patented technology by firms in other sectors other than that of the original patentee occurs. Far from centrally constraining the economic system, the regulator is accordingly called to become the instrument to freely unleash the Keynesian capitalistic spirit, especially by means of promoting the upsurge of high-tech start-ups and new ventures and the expansion of small- and medium-sized firms.

The second consideration is that firms with rich patent or copyright thickets do not actually implement the resource combinations they protect, but are actually patent or copyright "trolls", which base their business model on profiting from litigation tied to patent infringement, thus negatively impacting the overall economy. In this respect, it is important to emphasize that, whereas the first limitation, tied to typical IP regimes, is a natural consequence of poor IP policy design, in this case the negative effects are a consequence of intentional behaviors deliberately distorting use of IP. The dilemma is different, and formulating an appropriate policy response is challenging.

Third, patent proliferation has the paradoxical effect of preventing innovation. This is a problem that must be resolved for both new ventures, small- and medium-sized firms, and in emerging economies. If firms and research centers in developed countries safeguard inventions on the most encouraging genes, techniques, and biological varieties, the ensuing patents, cross-licenses, and know-how transfer agreements would complicate matters for potential innovators and firms in the less-developed countries. This suggests that, when an invention is patented (or otherwise formally protected), key access difficulties arise that even cross-national policymakers (such as the ones located at organizations such as the EU, Asean, Nafta, Mercosur or UNO) must take into account when planning institutional strategies. The first, "hold-up" or "blocking", occurs when an individual patent holder declines to license an invention or charges an excessive fee. The second kind, the "tragedy of the anticommons" (Heller and Eisenberg 1998), calls attention on the fact that the proliferation of patent rights boosts transaction costs, thus jeopardizing scientific advancement.

3.6 Conclusion

This study ultimately aims to better conceptualize the role of institutions in fostering innovation. This means that we have tried to dig deeper on how institutions influence the dynamic processes underlying innovation carried out by heterogeneous agents which act under their influence.

By focusing on the individual agent, we show that institutions are essentially human devices. Undeniably, they are all but unalterable or immutable human devices. In fact, they are subject to be altered, changed, or reshaped in order to accommodate different kinds of human action. Consequently, institutional contours and settings at any point in time t1 are the outcome of the unambiguous double interaction that occurs at time t0 between institutional forms and human action. In particular, rather than simply explaining institutional inertia and stability, by taking this interactive approach it becomes possible to elucidate how institutions play a role in contextual dynamic developments.

Taking such a dynamic economic-sociological conceptualization, while we acknowledge that human action needs to be structured by institutions, we also argue that institutions have space for human involvement in ways such as intelligent perception and strategic action, spontaneity and creativity, human imagination and inspiration. In a single word, there is space for new "entrepreneurship" and "innovation." The crucial point is therefore to render dynamic the analytical framework we have proposed, i.e., to be able to indicate how economic activities and processes may influence and transform the sociological structures in which they are intimately embedded. For example, if public regulators chose to provide less IP protection infringement, which implies the reduction of incentives to firms to engage in excessive IP portfolio proliferation strategies, they would de facto promote the upsurge of additional distributed entrepreneurship at the level of the economic system.

But, if this is the case, what is the impact the passage of time on such kind of public policy? Should they consider just the short-term effects (shortermism) or also the long-term consequences of their choices (longtermism)?

The core of the argument drives us to tackle the fundamental difference between "problem-posing" and "problem-solving" (i.e., formulating a problem and finding its solution): "it's OK to private individuals and firms to own the solution to a problem, but not to own the problem!" And public bodies are expected to intervene in this respect. For example, in complex software owning an API (application program interface) is equivalent to own the "problem" and should not be allowed. In this regard, von Hippel (2006; pp. 115–116) suggests that a possible answer to this intricacy is to "level the playing field", a solution open and available to innovators themselves, which entails building intellectual or creative commons in particular fields. While von Hippel's proposal appears at first glance intriguing, further extensive empirical research is required to actually demonstrate that the "leveling-the-playing-field strategy" may prove to be a viable institutional solution of general application to solve this difficulty.

References

Agrawal, A. (2006). "Engaging the inventor: exploring licensing strategies for university inventions and the role of latent knowledge". *Strategic Management Journal*, 27: 63–69.

Allen R.C. (1983) "Collective invention" *Journal of Economic Behavior and Organization*, n. 4.

Arora, A., Fosfuri, A., and Gambardella, A. (2001). *Markets for Technology: The Economics of Innovation and Corporate Strategy*. Cambridge, MA: MIT Press.

Baglieri, D., and Giordani, S. (2008). "Exploiting nanotech opportunities: A strategic entrepreneurship perspective". In Gandhi, A., Giordani, S., Merhari, L., Tsakalakos, L., and Tsamis, C. (Eds). *The Business of Nanotechnology*. MRS Proceedings, 1106E. Warrendale, PA.

Berg M. (1991). "Commerce and creativity in eighteenth-century Birmingham". In Berg, M. (Ed). *Markets and Manufacturers in Early Industrial Europe*. London: Routledge.

Bessen J. (2003). *Patent Thickets*. Working paper, Research on Innovation, Boston University School of Law.

Bower, G.H., and Hilgard, E.R. (1981). *Theories of Learning*. Englewood Cliffs, NJ: Prentice Hall.

Branhdshaw, G.F., Langley, P.W., and Simon, H.A. (1983). "Studying scientific discovery by computer simulation". *Science*, 222: 971–975.

Brown, S.L., and Eisenhardt K.M. (1995) "Product development: past research, present findings, and future directions". *Academy of Management Review*, 20: 343–378.

Casson, M. (1982). *The Entrepreneur. An Economic Theory*. Oxford: Martin Robertson.

Chesbrough, H. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Boston: Harvard Business School Press.

Chesbrough, H. (2006). *Open Business Models. How to Thrive un the New Innovation Landscape*. Boston: Harvard Business School Press.

Cohen, W., Nelson, R., and Walsh, J. (2000). *Protecting their intellectual assets: appropriability conditions and why U.S. manufacturing firms patent (or Not)NBER Working Paper no. 7552*.

Coleman, J.S. (1993). Properties of rational organizations. In Lindenberg, S., and Schreuder, H. (Eds). *Interdisciplinary Perspectives on Organization Studies*. Oxford: Pergamon.

Dougherty, D. (1992). "Interpretive barriers to successful product innovation in large firms". *Organization Science*, 3: 179–202.

Dutton, H.I. (1984). *The Patent System and Inventive Activity during the Industrial Revolution*. Manchester: Manchester University Press.

Foray D. (2004). *Economics of Knowledge*. Cambridge, MA: MIT Press.

Gambardella, A., Giuri, P., and Luzzi A. (2007). "The markets for patents in Europe". *Research Policy*, 36(8).

Graff, G.D., Cullen, S.E., Bradford, K.J., Zilberman, D., and Bennett, A.B. (2003). "The public–private structure of intellectual property ownership in agricultural biotechnology". *Nature Biotechnology*, 21(9): 989–995.

Granovetter, M. (1992). "Economic action and social structure: the problem of embeddedness". In Granovetter, M., and Swedberg, R. (Eds). *The Sociology of Economic Life*. Boulder, CL: Westview.

Grant, R.M. (1998). *Contemporary Strategy Analysis: Concepts, Techniques, Application*. Oxford: Basil Blackwell.

Hall, B.H., and Ziedonis, R.H. (2001). "The patent paradox revisited: an empirical study of patenting in the U.S. semiconductor industry, 1979–1995". *RAND Journal Economy*, 32(1): 101–128.

Hayek, F.A. (1945), "The use of knowledge in society". *American Economic Review*, 35. Reprinted in *Individualism and Economic Order*. Chicago: University of Chicago Press, 1948.

Heiner, R.A. (Dec. 1983). "The origin of predictable behavior". *American Economic Review,* 4: 103–124.

Heiner, R.A. (1986). "Uncertainty, signal-detection experiments, and modeling behavior". In Langlois, R.N. (Ed). *Economics as a Process. Essays in the New Institutional Economics*. Cambridge: Cambridge Univerity Press.

Heller, M.A., and Eisenberg, R.N., (1998). "Can patents deter innovation? The anticommons in biomedical research". *Science*, 280: 698–701.

Hilaire-Perez, L. (2000). *L'Invention Technique au Siecle des Lumieres*. Paris: Albin Michel.

Hodgson, G.M. (1998). "The approach of institutional economics ". *Jounal of Economic Literature*, 36.

Hunt, R.M., and Bessen, J. (2004). "The software patent experiment ". *Business Review, Federal Reserve Bank of Philadelphia*: 22–32.

Hunter L.C. (1949). *Steamboats on the Western Rivers. An Economic and Technological History*. Cambridge, MA: Harvard University Press.

Intellectual Property Rights Commission (2002) *Integrating Intellectual Property Rights and Development Policy*. Report of the Commission on Intellectual Property Rights London.

Kayat, M., and Greenberg, T. (Feb./Mar. 2006). "IP-based open innovation pre-empts trolls". *Intellectual Asset Management* March 43–46.

Khan, Z.B., and Sokoloff, K.L. (1993). "Schemes of practical utility: entrepreneurship and innovation among 'great inventors' in the United States States, 1790–1865". *Journal of Economic History*, 53.

Kirzner, I.M. (1973). *Competition and Entrepreneurship*. Chicago: Chicago University Press.

Kirzner, I.M. (1979). *Perception, Opportunity, and Profit. Studies in the Theory of Entrepreneurship*. Chicago: University of Chicago Press.

Kirzner, I.M. (Feb. 1982). "Uncertainty, discovery, and human action: a study of the entrepreneurial profile in the Misesian system". In Israel, Kirzner, Editor, Method, Process, and Austrian Economics: Essays in Honor of Ludwig non Mires, Lexington Books, Lexington, MA (1982).

Kortum, S., and Lerner, J. (1999). "What is behind the recent surge in patenting?". *Research Policy*, 28.

Lachmann, L.M. (1956). *The Market as an Economic Process*. Oxford: Basil Blackwell.

Langlois, R.N. (1984). "Internal organization in a dynamic context: some theoretical considerations". In Jussawalla, M., and Ebenfield, H. (Eds). *Information and Communication Economics: New Perspectives*. North-Holland, Amsterdam, 23–49.

Langlois, R.N. (Ed). (1986). *Economics as a Process. Essays in the New Institutional Economics*. Cambridge, UK: Cambridge University Press, North-Holland 23–49.

Langlois, R.N. (1992a). “Transaction-cost economics in real time”. *Industrial and Corporate Change*, 1(1).
Langlois, R.N. (1992b). “External economies and economic progress: the case of the microcomputer industry”. *Business History Review*, 66(1).
Langlois, R.N. (1995). *Transaction Costs, Production Costs, and the Passage of Time*. Working papers 1995–03, University of Connecticut, Department of Economics.
Lemley, M.A. (2005). “Patenting nanotechnology”. *Stanford Law Review*, 58: 601–630.
R.C.Levin(1988). “Appropriability; R&D spending and technological performance”, in *American Economic Review*, 78.
Loasby, B.J. (1983). “Knowledge, learning and enterprise”. In Wiseman, J. (Ed). *Beyond Positive Economics?*. London: MacMillan.
Loasby, B.J. (1986). “Organisation, competition, and the growth of knowledge”. In Langlois, R.N. (Ed). *Economics as a Process. Essays in the New Institutional Economics*Institutional Economics. Cambridge, UK: Cambridge University Press.
Loasby, B.J. (1994). “Organizational capabilities and interfirm relations”. *Metroeconomica*, 45(3).
Loasby, B.J. (1998). “The Organization of capabilities”. *Journal of Economic Behavior and Organization*, 35.
Maccoby, M. (2003). *The Productive Narcisist. The Promise and Peril of Visionary Leadership*. New York, NY: Broadway Books.
MacLeod, C. (1988). *Inventing the Industrial Revolution. The English Patent System*. Cambridge, UK: Cambridge University Press.
Mauzy, J., and Harriman, R.A. (2003). *Creativity, Inc. Building an Inventive Organization*. Cambridge, MA: Harvard Business School Press.
Merges, R., and Nelson, R.R. (1994). “On limiting or encouraging rivalry technical progress: the effect of patent-scope decisions”. *Journal of Economic Behavior and Organization*, 25.
Mises, L. (1966). *Human Action. A Treatise on Economics*, 3rd edn., New York: Henry Regnery.
Mocciaro Li Destri, A. (2005). *Contesti istituzionali e sviluppo d’impresa. Un’applicazione alla produzione di software dai modelli open source ai modelli ibridi*. Torino, Giappichelli.
Mocciaro Li Destri, A. (2006). *The Strategic Management of Institutions for Value Creation: A Study of Hybrid Models for Software Development*. Paper presented at SPRU’s 40th Anniversary Conference, Brighton, 11–13 September. Also presented at the “Second Annual Conference on Institutional Foundations for Industry Self-Regulation, Harvard Business School, Boston.
Mocciaro Li Destri, A. (2007). *Designing Institutions for Open Innovation: A Comparative Study of Software Development Models*. Paper presented at the “2007 International User Innovation Workshop. Copenhagen Business School, Copenhagen, 26–28 June.
Mocciaro Li Destri, A., and Dagnino, G.B. (2005). “The Development of the resource-based firm between value appropriation and value creation”. *Advances in Strategic Management*, 22: 153–188.
Mokyr, J. (1999). “The New Economic History and the Industrial Revolution”. In Mokyr, J. (Ed). *The British Industrial Revolution: An Economic Perspective*, 2nd edn. Boulder, CL: Western Press.
Moser, P. (2004). “What do Inventors Patent”. In Proceedings of the fourth EPIP conference “What Motivates Inventors to Invent?”. Pisa, 2–3 April.
Mowery, D.C., Nelson, R.R., Sampat, B., and Ziedonis, A.A. (1998). *The Effects of the Bayh-Dole Act on US University Research and Technology Transfer: An Analysis of Data from Columbia University, the University of California, and Stanford University*. Kennedy School of Government, Harvard University.
Nonaka I. (Spring 1988). “Speeding organizational information creation: toward middle-up-down management”. *Sloan Management Review*.
North, D.C. (1981). *Structure and Change in Economic History*. New York: Norton BooksNorton.
North, D.C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge, UK: Cambridge University Press.
North, D.C. (1991). “Institutions”. *Journal of Economic Perspectives*, 5(1).

North, D.C. (1994). "Economic performance through time. Sweden: The Nobel Foundation, December 9, 1993; published in *American Economic Review* 84(3): 359–368.
North, D.C. (1998). "Where have we been and where are we going?". In Ben-Ner, A., and Putterman, L. (Eds). *Economics, Values, and Organization*. Cambridge, UK: Cambridge University Press.
North, D.C., and Thomas, R.P. (1973). *The Rise of the Western World. A New Economic* History. Cambridge, UK: Cambridge University Press.
Nuvolari, A. (2004). "The Anatomy of Collective Invention Processes: A Study of Early Nineteenth Century Steam Engineering". In Proceedings of the fourth EPIP conference "What Motivates Inventors to Invent?", Pisa, 2–3 April 2004.
Penin, J. (2004). "Open Knowledge Disclosure: An Overview of the Empirical Evidences and the Economic Motivations", in Proceedings of the fourth EPIP conference "What Motivates Inventors to Invent?", 2–3 April, Pisa, 2004.
Penrose, E.T. (1959). *The Theory of the Growth of the Firm*. New York: Wiley.
Polanyi, K. (1957). "The Economy as Instituted Process". In Polanyi, K., Arensberg, C.M., and Pearson, H.W. *Trade Market in the Early Empires*. New York: The Free Press.
Rosenberg, N. (1976). *Perspectives on Technology*. Cambridge, UK: Cambridge University Press.
Schumpeter, J.A. (1934). *The Theory of Economic Development. An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Cambridge, MA: Harvard University Press.
Schumpeter, J.A. (1942). *Capitalism, Socialism, and Democracy*. London: Unwin University Books.
Serrato, R., Hermann, K., and Douglas, C. (2005). "The nanotech intellectual property ("IP") landscape". *Nanotechnology Law and Business Journal*, 2(2) No. 3.
Shapiro C. (2001). "Navigating the Patent Thicket: Cross Licenses, Patent Polls, and Standard Setting". In Jaffe, A., Lerner, J., and Stern, S.(Eds). *Innovation Policy and the Economy*, Vol. 1. Cambridge, Ma: MIT Press.
Siegel D., and Roco, M.C. (1999). *Nanostructure Science and Technology: A Worldwide Study*. Washington, DC: National Science and Technology Council.
Simon, H.A. (1985). "What We Know about the Creative Process". In Kuhn, R.L. (Ed). *Frontiers in Creative and Innovative Management*. Cambridge, MA: Ballinger.
Sokoloff, K.L. (1988). "Inventive activity in early industrial America: evidence from patent records". *Journal of Economic History*, 48.
Teece, D.J. (1986)."Profiting from technological innovation". *Research Policy*, 15(6).
Teece, D.J. (2000). *Managing Intellectual Capital*. New York: Oxford University Press.
Tuomi, I. (2002). *Networks of Innovation. Change and Meaning in the Age of Internet*. New York: Oxford University Press.
von Hippel E. (1976) "The dominant role of users in the scientific instrument innovation process". *Research Policy*, 5(3).
von Hippel E. (1977). "Transferring process equipment innovations from user-innovators of equipment manufacturing firms". *R&D Management*, 8(1).
von Hippel E. (1986). "Lead users: a source of novel product concepts". *Management Science*, 32(7).
von Hippel E. (1988). *The Sources of Innovation*. Oxford: Oxford University Press.
von Hippelvon Hippel, E. (1994). 'Sticky information' and the locus of problem solving: implications for innovation". *Management Science*, 40(4).
von Hippel E. (1998). "Economics of product development by users: the impact of sticky local information". *Management Science*, 44(5).
von Hippel E. (2006). *Democratizing Innovation*. Cambridge, MA: MIT Press.
Williams, A. (2005). The Patent Explosion. Report of New Paradigm's Information Technology and Competitive Advantage Program (IT&CA). Available at http://www.nplc.com

Chapter 4
Entrepreneurship in European Regions: Implications for Public Policy

Niels Bosma, Veronique Schutjens, and Erik Stam

4.1 Introduction

Policy makers' interest in stimulating entrepreneurship suggests a general consensus about their beneficiary economic effects that exist. For example, the goal of the EU 2000 Lisbon Agenda to become the world's most innovative area by 2010 relies on the entrepreneurial power of regions. The European Commission, in its Green paper on Entrepreneurship in Europe (European Commission 2003, p. 9), makes it more explicit:

> The challenge for the European Union is to identify the key factors for building a climate in which entrepreneurial initiative and business activities can thrive. Policy measures should seek to boost the Union's levels of entrepreneurship, adopting the most appropriate approach for producing more entrepreneurs and for getting more firms to grow.

At national levels, entrepreneurship plays a prominent position in formal policy documents and instruments as it is regarded a cure for backward economic structures.[1] Also in cities, entrepreneurial initiatives face high expectations while battling economic problems (Trettin and Welter 2007). The implicit or explicit link between entrepreneurship and economic growth, albeit at the European, national, regional, or urban level, exists everywhere both in academic studies and policy documents (Minniti 2008).

However, how exactly might entrepreneurship affect economic growth? According to Wennekers and Thurik (1999, p. 50), the mechanisms at play are variety, competition, selection, and imitation. These mechanisms entail direct and

N. Bosma (✉), V. Schutjens, and E. Stam
Urban and Regional Research Centre Utrecht (URU), Utrecht University,
P.O. Box 80115, NL-3508 TC, Utrecht, The Netherlands
e-mail: n.bosma@geo.uu.nl

[1] See for instance the most recent Dutch government treaty (Dutch Coalition Agreement 2007) and the German "Ich-AG" (BMWi 2005).

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_4, © Springer Science+Business Media, LLC 2009

indirect components, as increasing firm entry also affects economic performance and the behavior of incumbent firms. Thus far, a full understanding of the economic effects of entrepreneurship and its underlying mechanisms is lacking, which hinders exploitation of potential policy instruments designed to increase the economic benefits of new firms. In our view, it is necessary to acknowledge the differential economic impact of new firms that do not go beyond self-employment on the one hand, and new firms with growth ambitions and innovative potential on the other. Our contribution is to search for determinants for these types of entrepreneurship, and to unravel the mechanisms behind their respective economic effects. In our view, future policy efforts should focus on these mechanisms.

We embrace several streams of literature stressing the importance of regions when it comes to investigating both causes and consequences of entrepreneurship. This chapter's main objective is to study the "determinants side," i.e., investigating regional conditions on entrepreneurial activity. The focal difference with respect to most other studies in this area is that we adopt a multilevel approach. We are interested in regional conditions impacting individual entrepreneurial behavior. This also makes sense in light of entrepreneurship policy. After all, regional and national entrepreneurship policies are designed to impact *individuals'* entrepreneurial behavior. Therefore, we work with a dataset encompassing individual behavior of over 350,000 individuals in 131 regions across 16 countries in Europe. This allows us to study the impact of regional as well as national characteristics on the engagement of individuals in several types of entrepreneurial activity.

After defining our concept of entrepreneurship in Sect. 4.2, we conceptualize and discuss the mechanisms behind the economic effects of entrepreneurship according to the literature. Next, we provide an overview of empirical studies testing the effect of different types of entrepreneurship on different types of economic growth. After presenting our conceptual model in the empirical part, we focus at the explanation of new entrepreneurship in various forms, using data from the Global Entrepreneurship Monitor. We conclude with policy recommendations to influence the level and – indirectly – the economic effects of entrepreneurship.

4.2 Entrepreneurship, Economic Growth, and the Role of Government Policy

4.2.1 Entrepreneurship and Economic Growth: Definitions, Mechanisms, and Causality

4.2.1.1 Definitions: Types of Entrepreneurship

The fact that there is no generally accepted definition of entrepreneurship is a major challenge for entrepreneurship research. Often applied definitions of entrepreneurship mirror the mechanism by which the effect on economic growth supposedly takes place.

According to Schumpeter for example, real entrepreneurs commercialize inventions and are, one way or the other, *innovative*. In the Schumpeterian world, the innovative nature of entrants leads to creative destruction, which in terms leads to economic growth. The influential paper by Birch (1979) demonstrates that a large share of economic growth was accounted for by fast-growing young businesses ("gazelles"). This implies that economic growth at least partly stems from the continuing gestation of *growth-oriented* new firms. Thus, in the literature, the alleged positive economic effects of entrepreneurship on economic growth are attributed to specific causal mechanisms, based on different *types* of entrepreneurship.

4.2.1.2 Mechanisms: Competition and Selection

New firms introduce products and methods of production that threaten incumbent firms. Through a process of competition, firms with new products make firms with old products redundant; firms with more efficient modes of production push less efficient producers out of the market.

By introducing new products and methods of production and distribution new firms directly enhance economic growth. In addition, they play an important indirect role in triggering old firms to improve or restructure their activities (with liquidation as sanction). The easy formation of new firms acts as a disciplinary device for existing firms (cf. Aghion et al. 2006). New innovative firms circumvent bureaucratic rigidity and supply older firms with an incentive – self-preservation – for taking internal measures to avoid habits and practices leading eventually to rigidity. This is for example reflected in the rise of corporate venturing, as a means for corporate renewal.

4.2.1.3 Mechanisms: Variety and Imitation

Experimentation is usually conducted on the smallest scale necessary to prove or disprove a point. Since experimentation is important for innovation, a large part of the activity in progressive economies is conducted on a small scale. Economic growth implies change and adaptation, and much of this adaptation takes place through the formation of firms that are, at least initially, small. New firms are useful for innovation, because they are established at a small, experimental scale with relatively low costs and its effort can be focused on a single innovation. The experimental and innovative aspect of new firms is reflected in the fact that they usually start small, their number is large, and as with other kinds of experimentation, most of them fail. High rates of firm entry and exit (so-called churning or turbulence) are regarded as a necessary price to pay in order to allow "exploration" of new technological and market possibilities: failures at the micro level are consistent with social benefit at the aggregate level (see March 1991; Saxenian 1994; Dosi and Lovallo 1997). A high level of new variety is needed to produce a few very successful new innovative industry leaders, like Microsoft, Google, and eBay. The experimental

approach to organizing economic activity is a key mechanism for economic progress. New firms often provide the seedbed for the emergence of new industries.[2] They have been instrumental in the introduction of electricity, the internal-combustion engine, automobiles, aircraft, electronics, aluminum, petroleum, plastic materials, and many other advances (Rosenberg and Birdzell 1986; Audretsch 1995; Baumol 2002).

In short, although a large portion of economic change is fuelled by the expansion and conversion of old firms, innovative change is brought about by new firms (see Rosenberg and Birdzell 1986; Acs and Audretsch 2003). That small firms have played a large part in economic growth is not accidental; it can be explained, at least in part, by the lower agency costs, in addition to the special suitability of smallness to the experimental stage of innovation. Innovation is more likely to occur in societies open to the formation of new enterprises than in societies that relies on existing organizations for innovation (Rosenberg and Birdzell 1986, p. 258). New, usually small, firms have an important role in bringing about change – a role depending on the degree of inertia accumulated in older bureaucracies.

Imitation entails the diffusion of existing products and practices to new contexts. The contexts may be explicitly geographic, such as introducing existing products in a different country or region. New contexts may also include a different consumer audience. For example an existing product, thus far only consumed by a small group of trend-watchers, may be disposed to a wider audience for a lower price. However, new producers entering the market by imitating successful innovations challenge the monopolistic position of the innovator and decrease the "first mover advantages." This limits his/her rewards which may even discourage innovative behavior. It should be noted, however, that for innovation to fuel economic growth, dissemination of innovative products and processes and its adoption by imitators is crucial (Baumol 2004). In this respect, innovation and imitation go hand in hand.

4.2.1.4 Combining the Innovation and Competition Mechanisms

At the start of the twentieth century, Schumpeter argued that the entrepreneur was the person bringing new ideas to the market in ways that causes economic renewal and progress. A necessary condition is that these innovations have to offer more (or the same for a lower price) than the pre-existing good. If this condition is fulfilled there might even be creative destruction: innovations that make the "old economy" redundant. A recent example is the success of the digital route planner that has partly substituted the production of roadmaps (Stam, 2008). An important indirect effect of the introduction of these innovations by new firms is that incumbents are forced to upgrade their product offerings in order to remain competitive.

[2] According to Pasinetti (1993), an economy that does not increase the variety of industries over time will suffer from structural unemployment and will ultimately stagnate. In this view, the development of new industries in an economy is required to absorb labor that has become redundant in pre-existing industries. This labor has become redundant due to a combination of productivity increases and demand saturation in pre-existing industries, characterizing the product lifecycle dynamics in each sector.

The combination of large investments in new knowledge (exploration) and high levels of entrepreneurship exploiting this knowledge is a key driver of growth in advanced capitalist economies (Acs et al. 2005; Audretsch et al. 2006). As such, diversity of enterprises is necessary for economic growth and prosperity. History shows that long-term economic growth and prosperity depends on a mix of large and especially small enterprises (Rosenberg and Birdzell 1986; Landes 1969). Many types and sizes of enterprise are useful under the right conditions and circumstances, but what matters is the diversity of economic organization in economic systems – the variety of the system's organizational repertoire rather than the size of particular enterprises (Rosenberg and Birdzell 1986, p. 270).

A recent review of empirical studies by Van Praag and Versloot (2007) shows mixed evidence on the assumption of the relatively high innovativeness of small and new firms. They conclude that "entrepreneurs and their counterparts [large incumbent firms] contribute equally importantly to the innovativeness of societies. However, they serve different goals in terms of quality, quantity and efficiency, as well as in terms of producing (and adopting) more radical (and higher cost) innovations" (Van Praag and Versloot 2007, p. 18). They show that while new and small firms have relatively high levels of innovative sales, they are relatively less likely to adopt high-cost innovations.

Many new firms come into existence because the entrepreneur merely seizes existing market opportunities. Due to high uncertainty and risks involved in setting up a new firm, many entrepreneurs choose safe, familiar economic activities already proven successful.

4.2.1.5 Causality and Measurement Issues

The link between entrepreneurship and economic growth has a recursive aspect, as in time economic growth itself changes the conditions of entrepreneurship. Prior economic growth has both positive and negative relationships with entrepreneurship rates: positive because of growth opportunities ("prosperity-pull"), and negative because unemployed workers are encouraged to become self-employed because the opportunity costs of self-employment have decreased ("recession-push") (see Thurik et al. 2008). The measurement of these recursive effects between entrepreneurship and economic growth is complex as it requires both data that cover long time spans and analytical models that control for other determinants of both entrepreneurship and economic growth.

4.2.2 Entrepreneurship and Economic Growth: Empirical Evidence

A key question is whether entrepreneurship actually causes economic growth. Before we can answer this question with empirical research, we must choose empirical indicators for entrepreneurship and economic growth. Traditionally,

economic growth is defined in terms of employment or national income growth. Recently, productivity growth is seen as the more relevant indicator. The two dominant empirical definitions of entrepreneurship are the creation of new organizations (a new legal entity; including both independent start-ups and spin-offs) and self-employment (performing work for personal profit rather than for wages paid by others). Some studies also take into account people with a preference for entrepreneurship ("latent entrepreneurship"), or people who take steps to start a new business ("nascent entrepreneurship"). The latter two indicators can be seen as potential entrepreneurship. Corporate entrepreneurship is not easily identified, and is unfortunately largely an invisible aspect of entrepreneurship in empirical research. In addition to these operational definitions of entrepreneurship, there are several measures of firm performance, such as survival, growth, profitability, and realizing an initial public offering (IPO) of the business. These performance measures may reflect high impact entrepreneurship to a lesser or greater degree. Take for example survival: new firms that survive in the long term but remain relatively small often become more conservative (i.e., less innovative) while new firms that grow into substantial corporations revolutionize the economic structure (cf. Schumpeter 1942, p. 83). In addition, there are habitual entrepreneurs that "specialize" in setting up new firms, then leaving (either successfully, for example via an IPO, or less successfully with a liquidation) to set up other ones (see Stam et al. 2008).

4.2.2.1 Differential Effects of Entrepreneurship on Economic Growth Indicators

Empirical research finds an ambiguous relationship between entrepreneurship and employment growth: the relationship is often positive (Audretsch and Thurik 2001; Audretsch and Fritsch 2002; Bosma et al. 2006; Acs and Mueller 2008; Acs and Armington 2004; Carree and Thurik 2008; Van Stel and Suddle 2008; Thurik et al. 2008)[3]; sometimes nonexistent (Audretsch and Fritsch 2002; Acs and Mueller 2008)[4]; or even negative (Van Stel and Storey 2004; Mueller et al. 2008). Growth in national income is unambiguously related to high levels of new firm formation and high-growth start-ups (Stam et al. 2007; Wong et al. 2005). Research on the effects of entrepreneurship on productivity growth is less abundant, and only shows an ambiguous positive effect of new firm formation (Callejón and Segarra 1999; Audretsch and Keilbach 2004, 2005[5]; Bosma et al. 2009) or no effect of changes in self-employment (Carree and Thurik 2008).

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[3]Even when controlled for recent macroeconomic growth and time lags of the effect on economic growth (see Thurik et al. 2008).

[4]In what Audretsch and Fritsch (2002) call "revolving door" regimes: inefficient entrants, which exit soon after entry will not make a valuable contribution to the economy.

[5]The studies of Audretsch and Keilbach find no (2005), or only very weak (Audretsch and Keilbach, 2004) associations of new firm formation in general- and labor-productivity growth. Only specific forms of entrepreneurship, like new firm formation in high-tech or ICT industries (i.e., technology start-ups) have strong positive associations with labor productivity growth.

A review of recent research on high impact entrepreneurship and economic growth reveals that high levels of new growing firms are more positively related to economic growth than high general entrepreneurship rates (Acs 2008). There is no consistently positive relationship between new firms in general and economic growth. This is not that remarkable: as explained above many new firms are a continuation of the activities that were previously done as by employees before – so these involve no new economic activities (for example the construction worker who becomes an independent handyman, and the graphic designer who is laid off during organizational restructurings, but still supplies the same services to her previous employer). The decision to enter into self-employment is more often driven by lifestyle reasons, like a strong wish for independence or self-realization (Cassar 2007) or the possibility to combine labor and care tasks more easily (Dirks et al. 2003),[6] than driven by innovation. The category "new firm formation" therefore includes both entrepreneurs aiming at self-employment and entrepreneurs with high expectations.

A critical interpretation of the overview of empirical research in Table 4.1 could be that innovation aspects are missing at the entrepreneurship side. Entrepreneurship as measured by current empirical studies does not have much to do with innovation at all. Similarly, productivity growth is probably the best output indicator of innovation, and the studies reviewed showed that entrepreneurship has hardly any effect on this. The positive effects on income and employment are not necessarily caused by innovation: consider the situation in which increased labor market participation via self-employment is registered both as an increase in new firm formation and in self-employment, this is likely to lead to an increase in employment and income, as members of society that were not involved in paid labor, now contribute both to total employment and to total income. In this situation, both employment and income are growing, without innovation as a necessary ingredient.

Table 4.1 Entrepreneurship and economic growth (in OECD countries)

	Employment	Income	Productivity
New firm formation	+/0/−	+	+/0
High-growth start-ups	+/0	+	x
Innovation-oriented start-ups	x	x	x

[+] Statistically significant positive relation; 0 no statistically significant relation;
[−] statistically significant negative relation; and x no empirical research

[6]The Global Entrepreneurship Monitor makes a distinction between "necessity entrepreneurship," which is having to become an entrepreneur (often "self-employed") because you have no better option, and "opportunity entrepreneurship," which is an active choice to start a new enterprise based on the perception that an unexploited or underexploited business opportunity exists. Analyzing data in 11 countries, Acs and Varga (2005) found that effects on economic growth and development of necessity and opportunity entrepreneurship vary greatly: necessity entrepreneurship has no effect on economic development while opportunity entrepreneurship has a positive and significant effect. They also found that the ratio of opportunity to necessity entrepreneurship in a country is positively related to GDP per capita.

4.2.3 Spheres of Public Policy Influence on Entrepreneurship and Growth

Having stressed the relevance of identifying different stages in the entrepreneurial process, different types of entrepreneurship, and different mechanisms linking entrepreneurship and growth, one must determine how entrepreneurship policy can benefit this process. Entrepreneurship policy influences not just the entrepreneurial process, but also economic growth at multiple spatial levels. Figure 4.1 gives an overview identifying three major stages where policy may impact entrepreneurship levels and growth. This framework closely relates to the eclectic framework proposed by Verheul et al. (2002). Considering the aforementioned mechanisms linking entrepreneurship and economic growth levels, it is important to identify direct and indirect effects (spheres B and C, respectively, in Fig. 4.1).

The indirect effects may outweigh the direct effects: while at the firm level, as indicated above, mixed results are found with respect to the productivity of new entrants (compared to incumbents); the impact on regional growth is more convincingly documented (see Fritsch, 2008). Recent studies show that the magnitude of the impact is conditional on characteristics of the region, specifically population density and related variety (Fritsch and Schroeter 2009; Bosma et al 2009). Therefore, it is important for regional policymakers to appreciate the local conditions. Densely populated areas tend to have younger and better educated inhabitants with stronger networks. This is the relevant context in which the entrepreneurial process of discovery, exploration, and exploitation takes place, and these may be crucial elements for the occurrence of different types of entrepreneurship as

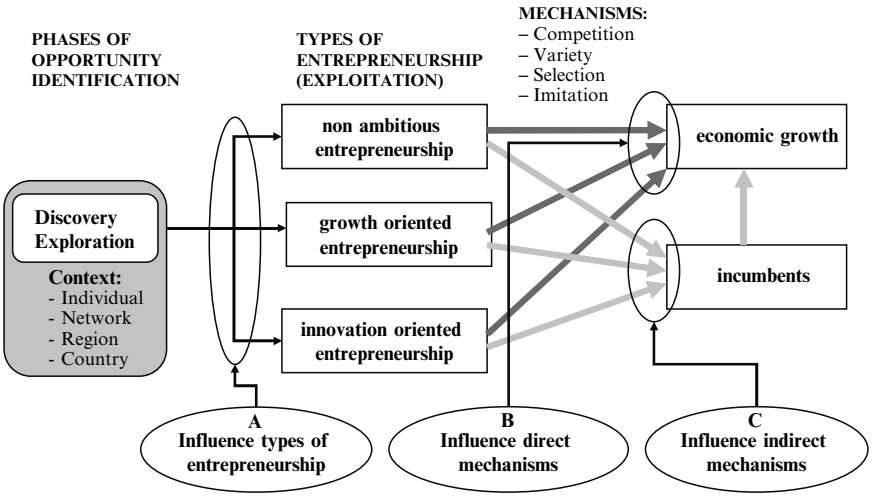

Fig. 4.1 Conceptual model of public policy influence on economic growth via entrepreneurship. Note: Growth oriented entrepreneurship and innovation oriented entrepreneurship are not mutually exclusive

displayed in Fig. 4.1. In the present contribution, we focus at the first sphere of public policy influence: stimulating different types of entrepreneurship (type A in Fig. 4.1). Below we discuss some aspects that are in potential subject to public policy efforts.

Two major views can be distinguished when it comes to investigating determinants of entrepreneurship (Koster 2006; see also Audretsch and Fritsch 1992). While the labor market perspective emphasizes the human population "at risk" to become an entrepreneur, the industrial organization literature stresses the role of existing firms in creating new economic activity, for instance through spin off mechanisms. As a result, public policy influence, instruments, and target groups differ widely between both views.

According to the industrial organization view, large existing organizations play a role in creating new firms. This can take the form of push-effects, while restructuring, their downsizing, decentralization, or strategic reorientation will render positions and employees obsolete, thus driving former firm employees to initiate innovative new firms, with or without consensus of the former employer (Koster 2006). Positively speaking, many major inventions have been reshaped, speeded, and expanded by (individuals and their) new firms with different objectives, interests, and ideas from those of the original inventing (cf. Shane 2000) or originating organization. These innovative new firms are started because the innovations were turned down by, or severely delayed by, the originating organization. These research-based organizations are often repositories of unused ideas: big firms have natural diseconomies of scope that a cluster of small start-ups does not have (Moore and Davis 2004; cf. Nooteboom 2000), and public R&D organizations often lack the incentives to commercialize ideas. One of the arguments behind the so-called open innovation strategies of large firms like Philips Electronics is exactly this: the intellectual property developed in these firms is best exploited by firms outside its boundaries than by divisions within. Technology transfer and "valorization" has also become an important function of public research organizations. University-based spin-offs commercializing knowledge have become more common worldwide (Shahid and Kaora 2007).

As large firms create new entrepreneurial opportunities, regions without larger research organizations (at the scientific or technological frontier) will probably have fewer spin-offs because of a lack of technically trained people and a shortage of ideas (Moore and Davis 2004). A mix of large and small knowledge-based organizations is a better starting point for the exploration and exploitation of new ideas than a concentration of small entrepreneurial firms only (Baumol 2002; Moore and Davis 2004; Nooteboom 1994).

From the labor market perspective, individual decisions are paramount. This is not to say that the literature covers only personality and personal characteristics of the population, the interaction between individual and contextual circumstances is widely acknowledged (OECD 2000; Verheul et al. 2002; Parker and Robson 2004). Individual entrepreneurial preferences and ambitions not only depend on the personal assessment of own capabilities and resources available, but also are strongly colored by actual and perceived market opportunities, local or regional demand and

competition, and future prospects (Davidsson 1991). Consequently, the explanations of entrepreneurship can be found at both the individual level, regional level, and national level (Tamásy 2006; Bosma et al. 2008).

The characteristics affecting individual entrepreneurial behavior are often related to the human, social, and financial capital of individuals. Age, gender, education level, professional experience, specific sector knowledge, and entrepreneurial experience are also associated with entrepreneurial involvement. In terms of social capital at the regional level, the visibility of entrepreneurs, in the sense that her/his endeavors set an example, affects entrepreneurial behavior (Bosma et al. 2008). Focusing on ambitious types of entrepreneurship, Liao and Welsch (2003) find that social capital (both network size and trust) positively influences growth aspirations, while the effect of human capital variables (experience and education) is absent. A significant positive effect of financial capital on growth aspirations, however, existed, together with the positive influence of strong shared norms and values, or cognitive capital.

The regional context affects entrepreneurship in two ways: first, through its more objective "regional economic attributes" and second, in offering a specific regional entrepreneurial attitude or culture. Regional economic attributes affecting entrepreneurship cover market size, structure and growth, economic structure in terms of competition, specialization and market concentration, accessibility, and the availability of cheap business locations. The growth of product demand, for instance, opens up new niches for entrepreneurs – and this effect might even be larger for the more specific group of ambitious entrepreneurs (Davidsson 1991). When regional income and welfare is high or growing, people expect market growth that can benefit a new ambitious firm.

Regional attitudes and values toward entrepreneurship, combined with a regional entrepreneurial culture in terms of abundant start-up activities, may also affect individual entrepreneurial behavior (see Wiklund et al. 2003; Vaillant and Lafuente 2007). In a regional atmosphere of entrepreneurial efforts, risk takers, entrepreneurial role models, and positive attitudes toward self-employment, especially ambitious individuals are likely to actually try to realize their growth or innovation plans. High regional levels of visibility of new entrepreneurs also stimulate ambitious entrepreneurship at the individual level (Bosma et al. 2008).

The national context also matters for entrepreneurship. Regulations for setting up a firm as well as hiring or firing employees are typically determined by national governments (Henrekson 2005; Stevenson and Lundström 2001). National regulations for new firm registration, taxes, and administration will influence individual entrepreneurial endeavors. This is especially relevant for more ambitious entrepreneurs: entrepreneurs, who face or perceive high administrative or institutional burdens to hiring and firing employees, have relatively low ambitions in terms of firm size (cf. Henrekson 2005). Employment protection decreases incentives to increase employment, thus limiting employment growth.

In this paper we adopt the labor market approach, making an extension to an "adult population approach" because we are interested in the entire entrepreneurial landscape; for our research question anyone in the adult population may be a

potential entrepreneur, regardless of current occupation and sector experience. For investigating causes and consequences of entrepreneurial dynamics in *specific sectors* the industrial organization view may be more relevant.

4.3 Data and Research Method

We use data from the Global Entrepreneurship Monitor (GEM) to create individual-level indicators on regional entrepreneurial activity (dependent variables) and regional-level indicators on perceptions to entrepreneurship (independent variables) (see also Bosma and Schutjens 2009; Bosma et al. 2008).[7] Additional independent variables at the regional level are obtained from Cambridge Econometrics' European Regional Dataset, appended with Eurostat's regional database. At the national level we include OECD indicators. The selection of countries and regions included in our empirical study is based on data availability.

First, we require GEM participation for at least 3 years between 2001 and 2006. This results in indices on entrepreneurial activity and entrepreneurial perceptions over 125 larger regions (NUTS 1 and NUTS 2) in 18 countries.[8] By mapping these indicators we identify spatial patterns relating to our four measures of entrepreneurial activity. In a second step, we identify some dense regions situated in the previously identified larger regions. When the sample size permits, we extract these dense regions and treat them separately from the larger region they are part of. An example is the Munich metropolitan area ("Raumordnungsregion"), situated in the Nuts1 region of Bavaria. Based on the literature we can expect different patterns of entrepreneurial activity in the Munich area as compared to the rest of Bavaria (Tamásy 2006). Therefore, we include Munich and the Bavarian region excluding Munich as two separate and distinct regions in our empirical analysis. In sum, this exercise leads to an augmented sample of 147 regions.[9] Due to data availability for the independent variables and a minimum sample size of at least 500 valid cases, we end up with 359,469 observations over 131 regions and 16 countries in the final regression analyses. Because the GEM 2001 lacks information about innovation, this is further narrowed to 334,799 observations.

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[7] See Reynolds et al. (2005) for a detailed description of the GEM methodology.

[8] NUTS stands for Nomenclature of Territorial Units for Statistics. The Eurostat introduced the standard European NUTS classification. In this selection we have indices for 125 regions corresponding to the classification used by ESRI. This classification comprises of NUTS1 levels for Belgium, France, Germany, Greece, Ireland, the Netherlands and the United Kingdom. NUTS 2 levels are applied for Croatia, Denmark, Finland, Hungary, Norway, Portugal, Slovenia and Sweden an2d a combination of NUTS1 and NUTS 2 for Italy, Spain and Switzerland.

[9] The abstracted regions are Antwerp and Ghent (Belgium); Aarhus (Denmark); Helsinki (Finland); Duisburg-Essen, Düsseldorf, Köln, Rhein-Main, Stuttgart and Munich (Germany); Budapest (Hungary); Dublin (Ireland); Amsterdam, Rotterdam, The Hague and Utrecht (Netherlands); Barcelona, Valencia, Seville and Malaga (Spain).

4.3.1 Dependent Variables

In accordance with the left-hand side of the framework in Fig. 4.1, our dependent variables are binary, indicating several types of early-stage entrepreneurial activity (ESEA). An individual is involved in ESEA if s/he is either setting up a business that s/he will (partly) own and manage, or if s/he is currently the owner–manager of a business that is not older than 42 months. The four types of entrepreneurial activity are as follows:

1. ESEA with low growth ambitions (ESEAGR_LO): individuals in ESEA who expect to have none or one employee in the next 5 years
2. ESEA with modest growth ambitions (ESEAGR_MD): Individuals in ESEA who expect to have between two and nine employees in the next 5 years
3. ESEA with high growth ambitions (ESEAGR_HI): Individuals in ESEA who expect to have ten or more employees in the next 5 years
4. ESEA with innovative ambitions (ESEAINNOV): Individuals in ESEA who expect (1) at least some customers to consider the product or service new and unfamiliar and (2) not many businesses to be offering the same products or services

We acknowledge that the last indicator may not be the perfect measure for innovative entrepreneurship. However, it gives some indication of the innovative ambitions of individuals in the region, in terms of new product–market combinations. At the regional level the indicator reveals innovative entrepreneurial ambitions, but we should keep in mind that individuals in some regions may tend to be more optimistic than in other regions, and some of them may be overoptimistic. An important advantage of our measure is that innovation in services is not underrepresented unlike those measures constructed from patent data.

While our analyses for the four types of entrepreneurial activity are at the individual level, we initially examine the spatial variation in European entrepreneurship rates. This regional pattern of entrepreneurship types, as pictured in Figs. 4.2–4.5, shows large differences, pointing to the importance and relevance of distinguishing regions instead of merely countries. The average nongrowth regional entrepreneurship rate (ESEAGR_LO) pictured in Fig. 4.2 is 2.8% and ranges from 1.2% in western France to 6.0% in Western Transdanubia region of Hungary. The rate of high-growth oriented ESEA in Fig. 4.4 ranges from 0.6% in the French Parisien Bassin to 2.6% in the Hamburg area. We should note that, since the indicators are *estimates* rather than count data, there are confidence intervals attached to these estimates. Therefore, when examining the maps one should especially focus on general patterns and not so much on the outcome for one particular region.[10]

Although national borders are still identifiable in the European maps, regional variations within countries are significant. Focusing on the differences between

[10]This issue is not relevant for our empirical analysis since it is based on the individual-level observations constituting the regional aggregates shown in Figs. 4.2–4.5.

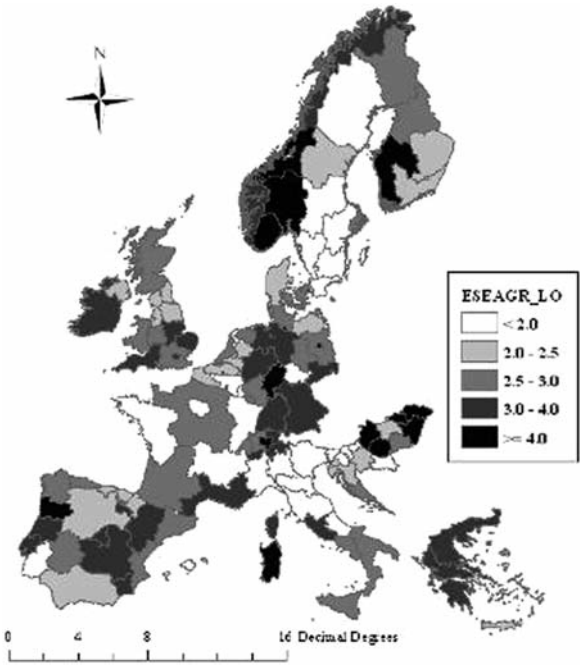

Fig. 4.2 Early-stage entrepreneurial activity with low growth ambitions (0–1 employees in the next 5 years)

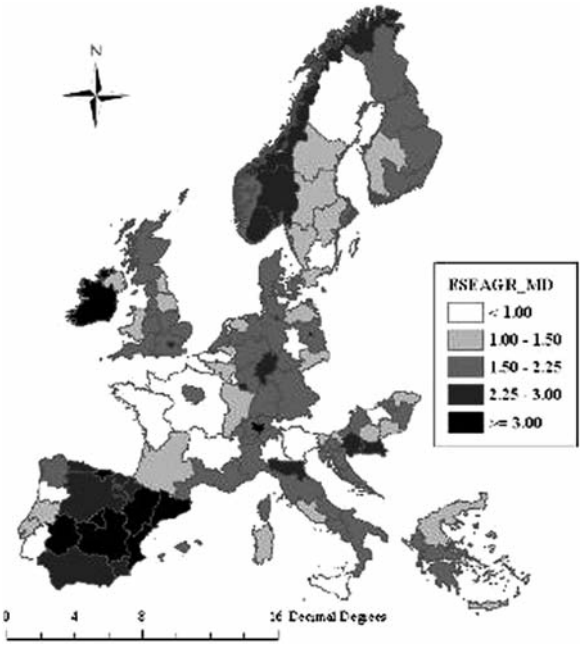

Fig. 4.3 Early-stage entrepreneurial activity with modest growth ambitions (2–9 employees in the next 5 years)

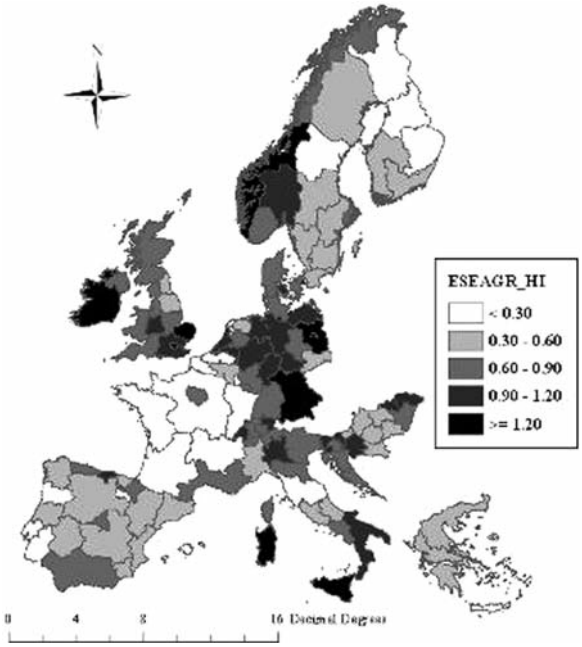

Fig. 4.4 Early-stage entrepreneurial activity with high growth ambitions (ten or more employees in the next 5 years)

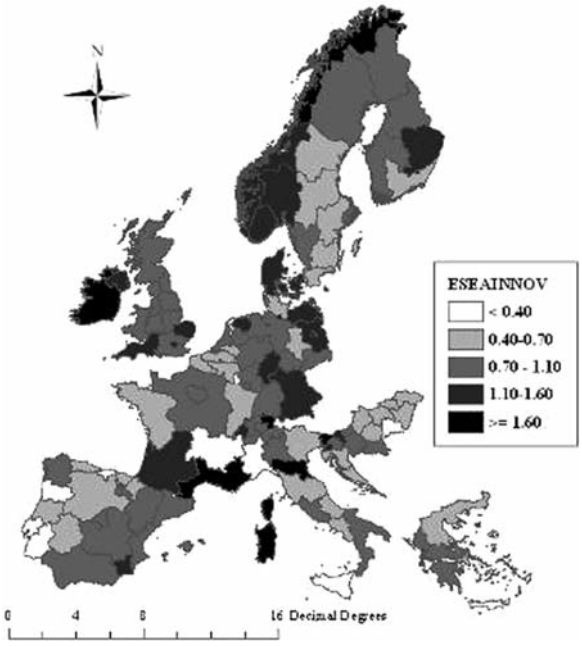

Fig. 4.5 Early-stage entrepreneurial activity with innovative orientation

low-ambition types of entrepreneurship (Figs. 4.2 and 4.3) vs. high-ambition entrepreneurship (Fig. 4.4), there are some notable differences. In general, the higher growth-oriented entrepreneurship rates are in or around populated regions. Compared to other European regions, in many Spanish areas there are fairly many early-stage entrepreneurs with low or modest growth ambitions, but the rate of ambitious ones with respect to hiring employees is relatively low. The same is true for Northern Portugal, Greece and parts of France. Sweden is an example of a country showing low overall entrepreneurship rates, but performing better on growth-oriented entrepreneurship. This is even stronger for the northern part of Italy, where there is relatively little participation in ESEA with low growth orientation, but the scores on growth ambitious entrepreneurship are clearly higher. In this respect, the Western part of Slovenia connects to Northern Italy. Within France only the Paris and Mediterranean areas have relatively many growth ambitious early-stage entrepreneurs, while other regions have significantly lower rates. Regions performing relatively bad in all types of entrepreneurship are situated in the East of France, and to a lesser extent, some Swedish regions and the whole of Belgium.

Finally, of all indicators, the innovation-oriented early-stage entrepreneurship rates (Fig. 4.5) show the greatest regional variation. We find interesting differences between high-growth-oriented ESEA and innovation-oriented ESEA. In France, for example, the Paris and Mediterranean regions stand out concerning growth orientation, while the regional pattern is more mixed if we look at orientation toward innovation. Here the Mediterranean area seems to be outstanding compared to the rest of France.[11] In UK, the London area and the Eastern region (including Cambridge) outperform other regions with respect to both growth-oriented and innovation-oriented early-stage entrepreneurship rates. Sweden and Finland show higher levels of innovation-oriented entrepreneurial activity in comparison to high growth-oriented entrepreneurship.

4.3.2 Independent Variables

We include *individual* level variables to account for basic personal characteristics. The variables included are age, gender, education, household income, and occupation status. These basically serve as control variables in our analysis since we are particularly interested in regional level determinants.

Entrepreneurial perceptions enter as *regional* level determinants. One crucial finding of the GEM studies is that cross-country variation in early-stage entrepreneurial perceptions as well as entrepreneurial activity is persistent across time. As it is shown empirically that regional variation in entrepreneurial perceptions are also persistent and reflect path-dependent developments (Beugelsdijk 2007), we merge the GEM data of 6 subsequent years (2001–2006). This merging exercise results in regional indicators on entrepreneurial perceptions that pertain to the

[11]This region includes the Sophia-Antipolis cluster.

2001–2006 period.[12] Here we excluded regions with less than 500 observations – a requirement for acceptable standard errors to the regional estimates. The regional entrepreneurial perceptions refer to:

1. *Network effects*. The percentage of individuals personally knowing an entrepreneur who started a business in the past 2 years
2. *Start-up skills*. The percentage of individuals who personally know a start-up entrepreneur and believe that they have the required skills and knowledge to start a business themselves
3. *Regional opportunities*. The percentage of entrepreneurs indicating that there are good opportunities in the region
4. *No fear of failure*. The percentage of those individuals who perceive good opportunities (as above) indicating that fear of failure would not prevent them from setting up a business

Other regional determinants involve regional composition and regional economic attributes (see Bosma and Schutjens 2009). Included economic attributes are gross regional product (GRP) per capita in purchasing power parities, GRP growth, unemployment rates, and a variable designed to measure opportunity costs. We defined this measure as the ratio between GRP per capita and compensation per employee, which at the regional level indicates the difference between production and wages and conceptually captures a region's relative advantage of entrepreneurship (as compared to wages). Data on economic attributes at the regional level are mainly drawn from the Cambridge Econometrics database on European Regions. In case of missing values (for example, unemployment rates) we use the Eurostat regional database. We also combine both data sources to derive regional composition attributes (population growth and share of people aged 18–34).

With respect to measuring determinants at the *national* level, indicators on employment protection and immigration were obtained from the OECD. In accordance with Hessels et al. (2008), we planned to include social security rates.

However, tests for multicollinearity found high correlation between social security rates and employment protection, so we include the employment protection index instead of the social security rates because it is more specific and because we are particularly interested in its effect on growth- and innovation-oriented types of ESEA. Individuals who have potential to be a growth- or innovation-oriented entrepreneur may prefer to remain employed if there are strong employment benefits. Table 4.2 shows descriptions and sources of the independent variables

[12]In line with Davidsson (1991) one could wonder why individual level perceptions of ability and opportunities to start firms are not included in our analyses. Indeed, Arenius and Minniti (2005) find a strong relationship between individuals' perceptions to entrepreneurship and their involvement in nascent entrepreneurship. However, we feel that the data poses methodological restrictions to do so, since perceived ability, opportunities, and fear of failure are posed directly after questions on involvement in entrepreneurial activity. One would not expect many people involved in early-stage entrepreneurial activity to say that they do not have the skills to start a business or that they do not see opportunities to start a business. Let alone that people already making actual preparation to start a firm will answer that fear of failure would prevent them from starting a business.

Table 4.2 Independent variables: definitions and sources

Variable	Description	Data source
Individual effects		
Age	Age in five age bands (reference category: 18–24 years)	GEM 2001–2006
Education	International harmonized education level (reference category: no secondary degree)	GEM 2001–2006
Household income	Household income, three categories in third tiles per country (reference: lowest third tile)	GEM 2001–2006
Work status	Harmonized work status (reference category: working)	GEM 2001–2006
Regional effects		
Know start-up entrepreneurs	Percentage of adult population 18–64 years (nascent entrepreneurs and business owner-managers excluded) who personally know someone who started a business in the past 2 years	GEM 2001–2006
Perceived skills	Percentage of those who know a start-up entrepreneur (as defined above) indicating to have required knowledge and skills to start a firm	GEM 2001–2006
Perceived opportunities	Percentage of adult population 18–64 years perceiving good opportunities for start-ups in the area where they live	GEM 2001–2006
No fear of failure	Percentage of those who perceive good opportunities (as defined above) indicating that fear of failure would not prevent them from starting a business	GEM 2001–2006
Share 18–34 years	Share of people aged between 18 and 34 years in the 18–64 population, 2003	Eurostat regional database
Population growth	Growth in total population, between year t-2 and t-1	Cambridge econometrics database
Opportunity costs	Ratio of GRP per capita to compensation per employee, 2003	Cambridge econometrics database
Population density	Number of inhabitants per km^2, 2003	Cambridge econometrics database
GRP per capita	GRP in PPS (European Union = 100), 2003	Cambridge econometrics database
GRP growth	Growth in GRP, between year t-2 and t-1	Cambridge econometrics database
Unemployment rate	Number of unemployed as percentage of labor force, 2001	Cambridge econometrics database and Eurostat regional database
National effects		
Employment protection	OECD Employment protection index (version 2), 2003	OECD
Immigration	Share of in-migrants (OECD + non-OECD countries) in total population	OECD Factbook

entering the regressions. Table 4.3 depicts the descriptive statistics for the variables (only for the regions included in the empirical analysis). For our regression analyses, all independent variables at the regional and national level have been standardized.

4.3.3 Methodology

We use multilevel analysis to investigate individuals' entrepreneurial behavior.[13] Therefore, we explicitly model that individuals are "hierarchically" nested in their regional environment and that regional environments are in turn nested in a national context.

Multilevel models – contrary to standard multivariate models – control the assumption of independence of observations in grouped data. In terms of our specific analysis, we acknowledge that some regional and national characteristics may shape individuals' entrepreneurial behavior, and that this context is not independent for individuals due to influences such as peer effects, regional role models, and knowledge spillovers. The covariation between individuals' behavior sharing the same regional externalities can be expressed by the *intraclass* correlation (Hox 2002). With intraclass correlation, the between-regions variance contributes to individual behavior in addition to the variance between individuals. When standard significance tests would be used treating the individual as the single unit of analysis and regional level variables are included for each individual, the important assumption of independence of residual error terms may be violated, potentially leading to large errors and too liberal significance levels (see e.g., Rabe-Hesketh and Skrondal 2005). Analyzing processes that play a role at different (individual or spatial) levels, at one single level, is causing conclusions to be harmed by ecological fallacies (aggregated correlations and individual correlations are not the same, either in magnitude or in sign). Multilevel analysis is developed for this cause and solves these kinds of problems (Hox 2002).

In our empirical exercise we use multilevel regression modeling as described by Hox (2002) and Goldstein (2003). We incorporate three levels that are fully nested: the model assumes that we have data from K countries, with a different number of regions r_j for each country. In term, each region consists of n_i respondents. At the respondent level variable Y_{ijk} denotes a binary outcome of respondent i in region j and country k. Assume there is one explanatory variable X_{ijk} on the individual (respondent) level, a region-level explanatory variable Z_{ijk} and a country-level explanatory variable C_k. To model these data, a separate regression model in each group is formulated:

[13]The general idea of multilevel analysis is that individuals in the same social context show similar progressive behavior. The most researched cases are within educational studies on school performances: students learn by individual and class influences (Raudenbusch and Bruyk 2002).

Table 4.3 Descriptive statistics for regional and national level variables[a]

				Correlation matrix															
		Mean	Std. dev	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	ESEA low growth orientation[b]	2.8	0.9	1.00															
2	ESEA modest growth orientation[b]	1.9	0.8	0.26	1.00														
3	ESEA high growth orientation[b]	0.7	0.4	0.38	0.26	1.00													
4	ESEA innovative growth orientation[b]	0.9	0.5	0.27	0.36	0.59	1.00												
5	Know start-up entrepreneurs	0.37	0.07	0.24	0.13	0.29	0.31	1.00											
6	Perceived skills	0.58	0.07	0.20	0.18	0.01	−0.15	−0.39	1.00										
7	Perceived opportunities	0.32	0.13	0.02	0.38	0.25	0.35	0.33	0.01	1.00									
8	No fear of failure	0.66	0.08	0.11	−0.17	0.18	0.10	0.09	0.18	0.05	1.00								
9	Share 18–34 years	0.37	0.04	0.02	0.35	0.04	−0.05	−0.11	0.27	0.04	−0.07	1.00							
10	Population growth	0.02	0.04	−0.06	0.45	0.01	0.20	−0.13	0.27	0.40	−0.15	0.48	1.00						
11	Population density	0.42	0.85	0.11	0.05	0.33	0.21	−0.07	0.06	0.01	0.12	0.21	0.02	1.00					
12	Opportunity costs	1.74	0.35	0.16	0.06	0.35	0.26	0.17	0.14	0.28	−0.01	−0.09	0.16	0.29	1.00				
13	GRP per capita	108	52	−0.09	0.06	0.14	0.20	0.15	−0.15	0.21	0.05	−0.05	0.12	0.24	0.39	1.00			
14	GRP growth	0.12	0.07	0.09	0.27	−0.08	−0.02	−0.16	0.22	0.09	−0.21	0.43	0.36	−0.04	0.03	−0.07	1.00		
15	Unemployment rate	7.37	4.60	−0.10	−0.01	−0.16	−0.21	0.02	−0.14	−0.31	−0.26	0.16	−0.22	−0.01	−0.40	−0.18	0.11	1.00	
16	Employment protection	2.37	0.61	−0.16	0.11	−0.35	−0.35	0.11	−0.11	−0.13	−0.34	0.32	0.21	−0.12	−0.18	−0.10	−0.05	0.32	1.00
17	Immigration	10.95	4.89	0.04	−0.15	0.15	0.19	−0.03	0.19	−0.13	0.05	−0.21	−0.04	0.02	0.39	0.09	−0.18	−0.24	−0.39

[a] All descriptive statistics are based on 131 observations (regions) over 16 countries entering the regressions

[b] *Note*. Early-stage entrepreneurial activity (ESEA) variables are described here at the regional level (in %) but enter the regression as binary independent variables at the individual level

$$Y_{ijk} = \beta^0_{jk} + \beta^1_{jk} X_{ijk} + e_{ijk}. \quad (1)$$

The variation of the regression coefficients β^0 is modeled by a region-level regression model:

$$\beta^0_{jk} = \gamma^{00}_k + \gamma^{01}_k Z_{jk} + \zeta^0_{jk}. \quad (2)$$

Finally, the variation of the regression coefficient γ^{00}_k is modeled by a country-level regression model:

$$\gamma^{00}_k = \alpha + \delta_k C_k + \eta_k. \quad (3)$$

This model is known as a three-level model with random intercepts. The difference with a usual regression model is that we assume that each region *j* has a different intercept coefficient β_{0j}, which is stochastically modeled – and in turn related to the country level. We do not model random slopes, meaning that the β^1coefficients in (1) for the individual independent variables entering the regression are assumed equal across regions and countries. We incorporate a binomial logit-link in order to investigate the probabilities of being involved in different types of early-stage entrepreneurship.[14] This chapter's main objective is to study the effect of regional conditions on individual entrepreneurial activity. In explaining our results in Sect. 10.4, we stress the results we find in this particular area.

4.4 Results

Our results are shown in Table 4.4 for each of the four types of entrepreneurial activity.

4.4.1 Individual Effects

Focusing on the first three columns, representing early-stage entrepreneurship rates with increasing growth ambitions, as expected the control variables at the individual level correlate with growth ambitions. Growth ambitious early-stage entrepreneurs are typically male, younger, and better-educated individuals. High household income and being employed also positively relates to high growth orientation of early-stage entrepreneurs. The parameters also clearly increase in size according to higher growth ambitions (ranging from low growth to high growth) especially when looking at gender, education level, and household income.

With respect to the innovative orientation entrepreneurship category, the education effect is more pronounced in explaining growth ambitions, again revealing relatively

[14] We apply Stata's gllamm procedure (see Rabe-Hesketh and Skrondal 2005), using the logit link from the binomial family.

Table 4.4 Estimation results: explaining different types of early-stage entrepreneurial activity (ESEA) at regional level[a]

Individual effects												
Gender (female)	–0.42	(0.02)	***	–0.81	(0.03)	***	–1.15	(0.05)	***	–0.64	(0.04)	***
Age: 18–24												
Age: 25–34	0.55	(0.04)	***	0.43	(0.05)	***	0.20	(0.08)	*	0.29	(0.07)	***
Age: 35–44	0.52	(0.04)	***	0.32	(0.05)	***	0.15	(0.08)	*	0.25	(0.07)	***
Age: 45–54	0.24	(0.05)	***	–0.05	(0.05)		–0.13	(0.08)	+	–0.06	(0.07)	
Age: 55–64	–0.10	(0.05)	*	–0.50	(0.06)	***	–0.47	(0.09)	***	–0.41	(0.08)	***
Education: no secondary												
Education: secondary degr.	0.12	(0.03)	***	0.15	(0.04)	***	0.29	(0.06)	***	0.32	(0.06)	***
Education: post-secondary	0.23	(0.03)	***	0.28	(0.04)	***	0.57	(0.06)	***	0.64	(0.06)	***
Education: graduate	0.30	(0.03)	***	0.35	(0.04)	***	0.76	(0.07)	***	0.95	(0.06)	***
Household income: low												
Household income: middle	–0.03	(0.03)		0.02	(0.04)		0.16	(0.06)	**	0.00	(0.05)	
Household income: high	0.00	(0.04)		0.32	(0.04)	***	0.67	(0.07)	***	0.11	(0.06)	+
Work status: employed												
Work status: unemployed	–0.63	(0.06)	***	–0.75	(0.08)	***	–0.69	(0.13)	***	–0.05	(0.09)	
Work status: student	–1.38	(0.11)	***	–1.56	(0.14)	***	–1.37	(0.21)	***	–0.88	(0.15)	***
Work status: retired	–1.50	(0.11)	***	–1.65	(0.16)	***	–1.58	(0.24)	***	–1.33	(0.19)	***
Work status: other	–1.20	(0.09)	***	–1.78	(0.15)	***	–1.26	(0.24)	***	–0.94	(0.16)	***
Regional effects												
Know start-up entrepr.	0.03	(0.03)		–0.30	(0.03)	***	0.05	(0.05)		0.13	(0.04)	**
Perceived skills	0.11	(0.03)	***	0.26	(0.03)	***	0.11	(0.05)	*	–0.05	(0.04)	
Perceived opportunities	–0.10	(0.03)	**	0.24	(0.04)	***	0.13	(0.06)	*	0.04	(0.05)	
No fear of failure	0.05	(0.03)	+	–0.16	(0.04)	***	–0.09	(0.06)		0.03	(0.05)	
Share 18–34 years	–0.03	(0.02)		–0.03	(0.02)		0.06	(0.03)	+	0.01	(0.03)	
Population growth	0.02	(0.02)		0.00	(0.02)		–0.02	(0.03)		0.08	(0.03)	**
Opportunity costs	0.04	(0.02)	*	–0.05	(0.02)	*	0.06	(0.03)	+	0.00	(0.03)	

(continued)

Table 4.4 (continued)

Population density	0.00	(0.02)		0.06	(0.02)	**	0.03	(0.02)		0.03	(0.02)	
GRP per capita	–0.01	(0.03)		0.06	(0.03)	*	0.00	(0.04)		–0.06	(0.04)	
GRP squared	0.02	(0.01)	+	–0.02	(0.01)	+	0.01	(0.02)		0.03	(0.01)	+
GRP growth	0.01	(0.01)		0.02	(0.02)		–0.02	(0.03)		0.00	(0.02)	
Unemployment rate	0.07	(0.02)	**	0.03	(0.03)		0.09	(0.04)	*	0.03	(0.03)	
National effects												
Employment protection	–0.03	(0.03)		0.02	(0.04)		–0.37	(0.05)	***	–0.09	(0.04)	*
Immigration	0.00	(0.02)		–0.08	(0.03)	*	–0.08	(0.04)	*	0.10	(0.03)	**
Constant	–3.54	(0.06)	***	–3.99	(0.08)	***	–5.05	(0.13)	***	–4.05	(22.97)	

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$. +$p < 0.10$. Standard errors between parentheses. Observations over 131 regions nested in16 countries

[a]All regressions performed using Stata (gllamm procedure with logit-link from binomial distribution) with random intercept for region and country levels

high rates among younger and high-educated individuals. Again, male and high-income individuals are relatively more innovation oriented, but the difference with their female and low income counterparts, respectively, is lower than with respect to growth ambitions (column 3). Finally, we find that in general students are not involved in early-stage entrepreneurship, although they are more prevalent in innovation-oriented entrepreneurship.

4.4.2 Regional Effects

Several regional entrepreneurial perceptions are significantly related to both growth and innovative orientation of individuals. We find that in regions where many inhabitants believe they have the necessary start-up skills (and being able to judge that as they know a start-up entrepreneur), many people engage in ESEAs, especially aiming at modest growth. The results reveal the importance of a special combination of the network and skills effect: if an individual is located in a region where perceived abilities to start a firm (among those who know a start-up entrepreneur) are high, this also tends to increase the probability of being involved in growth ambitious entrepreneurship. It should be noted that the coefficient for high growth orientation is not highly significant. For innovative orientation, however, the network effect itself is highly positive and significant. Here, perceived skills are less important.

High regional levels of perceived opportunities increase the probability of being involved in modest or high growth orientation entrepreneurship. In contrast to our expectations, a high level of people without fear of failure (while perceiving start-up possibilities), negatively correlates with growth orientation. With respect to innovation orientation, regional levels of perceived opportunities are not significant at all. This may be due to the fact that the regional entrepreneurial perception indicators all related to the start of the firm.

Next to an age effect at the individual level, also at the regional level we find a positive relation between young population composition and the probability of being involved in high growth-oriented early-stage entrepreneurship. In sum, being young or being among young people increases high growth ambitions.

Regional population growth seems to trigger innovation-oriented entrepreneurship, but not the ambitions to hire (many) employees. Population density, however, has the opposite effect: we find that densely populated regions have relatively more modest growth-oriented entrepreneurs. This urbanization effect is absent in innovative orientation.

Surprisingly we find no association between regional GRP growth and participation in any type of entrepreneurship. Instead, the squared-GRP level effects point at a nonlinear association with innovation or growth orientation. For example, innovative orientation entrepreneurship is high at both low and high levels of regional GRP. Finally, the regional employment rate is most strongly and positively associated with entrepreneurship in the low growth orientation category, which may be linked to necessity entrepreneurship.

Summarizing, we find little evidence for an effect of the regional economy on ambitious entrepreneurship with respect to growth or innovation. After controlling for individual effects regional economic characteristics do not seem to be of much importance.

4.4.3 National Effects

We find a negative relation between employment protection and growth-oriented early-stage entrepreneurship which confirms our proposition that high levels of employment protection form a barrier for new entrepreneurs to hire people. Our finding that employment protection is also related to innovative orientation is quite unexpected. Finally, we find a positive and significant effect of high immigration rates on involvement in early-stage entrepreneurship oriented at innovation. This may point at regional newcomers seeking new market niches. However, high national immigration decreases individual propensity of involvement in new entrepreneurship in the modest and high growth-oriented categories. In these immigration countries, entrepreneurship aiming at hiring people is less common.

4.5 Discussion and Public Policy Recommendations

This chapter reviews potential policy impacts on the prevalence of low and high ambition entrepreneurship, and the conceptual link with economic growth. In an empirical application, we analyze the probability of being involved in four types of early-stage entrepreneurship (identifying low, modest, and high growth-oriented entrepreneurship and innovation-oriented entrepreneurship) by applying a multilevel modeling technique. We included determinants at the individual, regional, and national level. Besides confirming the importance of individual characteristics to the explanation of involvement in entrepreneurial behavior, our results point at determinants of ambitious entrepreneurship that are regional or national in nature. In other words, identifying regions and nations, when in a study on the prevalence of promising types of entrepreneurship, is relevant and necessary. This means that we now can identify effective public policy instruments to encourage entrepreneurship and, indirectly, economic growth (see Fig. 4.1).

First, network effects in the region are important. Regions where many individuals personally know someone who recently started a business exhibit more innovation-oriented entrepreneurs. Second, at the national level we found a profound negative effect of the degree of employment protection on involvement in both growth- and innovation-oriented entrepreneurship. The underlying reasons may be twofold. First, potential growth- or innovation-oriented entrepreneurs who are currently employed may feel that the benefits of being employed are too high compared to the risks of becoming an entrepreneur. Second, early-stage entrepreneurs may perceive the employment protection as a burden and limit their growth or innovation

ambitions. Further research into the effects of employment protection on specific types of entrepreneurship is required. A third main finding is the positive effect of immigration on early-stage entrepreneurship with innovation ambitions, while its effect on employment growth ambitions is tentatively negative. This may be linked to the argument of Lee et al. (2004) that an immigrant community creates specialized market niches and brings about new business opportunities for both natives and immigrants. However, we should stress that in the empirical analysis we have only investigated the impact of immigration at the national level. Including details on immigration on the individual and regional level is preferable. At the individual level, the positive effect on innovation-oriented entrepreneurship could be explained by relatively high education levels and skills of migrants as compared to the local workforce (Spencer 1994).

We found no evidence for a positive impact of regional levels and growth of GRP on the probability of being involved in growth-oriented entrepreneurship. We find evidence for some demography effects, both from an economic geography perspective (regions with high dominance of the service sector have somewhat higher propensities of being involved in growth-oriented entrepreneurship) and from an urban geography perspective (people in dense regions have higher propensities of being involved in growth-oriented entrepreneurship).

The total supply of entrepreneurs varies across societies due to different prevailing values and beliefs related to entrepreneurship, that is its entrepreneurial culture. Economists generally share the opinion that it is not the role of government to change the attitude of its people, perhaps even leading to "social engineering" (Storey 2002), or that public policy cannot change the culture of a country in order to stimulate the supply of entrepreneurship, on the short term (Baumol 1990). Some economists argue that entrepreneurship is an omnipresent aspect of human action, and that for economic development to take place, certain institutions must be present for the entrepreneurial aspect of humans to flourish (Boettke and Coyne 2003). This omnipresence also means entrepreneurship cannot be the "cause" of economic development: it is caused by proper institutions that channel entrepreneurship in a direction that spurs economic growth (cf. Baumol 1990). Entrepreneurship policy might also include integrating entrepreneurship in the education system in order to develop entrepreneurial skills and promote an entrepreneurship culture in the long run. The other more direct role for public policy involves changing the formal institutions in order to stimulate productive entrepreneurship. Examples of these formal institutions relevant for entrepreneurship are taxation rules, bankruptcy regulations, social security rules, and immigration laws.

Taking the above into account, what are the lessons of our study for policy aiming at stimulating entrepreneurship in European regions? We focus on four special types of entrepreneurship, namely growth-oriented (in three levels) and innovative early-stage entrepreneurship. We expect that especially growth-oriented and innovative entrepreneurship would be supported by different regional or national conditions. However, this is only partly true. The largest difference exists between the conditions for low growth-ambitious entrepreneurship on the one hand and growth-ambitious and innovative entrepreneurship on the other hand. At the level of individuals, general policy

instruments that increase the share of young people (e.g., by attracting them to the region; cf. Faggian et al. 2007) and improve education levels, employment, and household incomes should lead to a regional composition that favors high levels of high growth and innovative entrepreneurship. Indirectly, creating or improving educational institutes in a region could have a positive effect, by attracting young people that will improve their educational levels. This gives a rationale to the emphasis in the EU Green Paper on the development of skilled labor in the order to "…gear enterprises to growth…" (European Commission 2003, p.15).

High growth start-ups are the economic entities that are successful in commercializing new ideas on a large scale in a short term. These firms are serious candidates for the industrial leadership of tomorrow. However, the contradiction for public policy is that policymakers grant themselves an important role in stimulating these (potentially) successful firms (Smallbone et al. 2002), but that these same firms regard government intervention as only marginally influencing success (see Fischer and Reuber 2003; Perren and Jennings 2005). Research has shown that probably the best that entrepreneurship policy could do for young high-growth firms is to stimulate (regional) communities of practice for entrepreneurs leading (potentially) high-growth firms (Smallbone et al. 2002; Fischer and Reuber 2003; Rocha and Sternberg 2005). In their Third Policy Option for Entrepreneurship, called "Towards an entrepreneurial society", the EU Green Paper stresses the need for providing both local and regional role models as well as entrepreneurial success stories. The potential power of this policy option is confirmed by our empirical results. With respect to the regional context, measures that increase the presence and visibility of regional start-up entrepreneurs are likely to stimulate levels of innovative entrepreneurship.

Furthermore, decreasing employment protection – often determined by national labor laws – would probably lead to higher levels of growth-oriented and innovative entrepreneurship. Again, this underpins one of the main obstacles the EU Green paper already signaled: the regulatory environment and especially labor market flexibility constrains entrepreneurial performance (European Commission 2003). In his recent overview of entrepreneurship policy options, Acs (2008) mentioned deregulation and regulatory flexibility as important ingredients of the entrepreneurial economy.

Finally, stimulating immigration flows might evoke innovative new entrepreneurship. The immigration policy option with respect to entrepreneurship is still absent in policy documents (see European Commission 2003; OECD 2003), while more recently academic scholars do point at the importance of an "Entrepreneurship-Friendly Immigration Policy." (Acs 2008, p. 58; Houston et al. 2008). The latter two significant national effects means that supraregional institutions should be taken into account when explaining and influencing regional economic growth.

In contrast to expectations, increasing regional wealth levels and population density do not affect entrepreneurship levels. Also the alleged positive effects on innovative and especially high growth entrepreneurial ambitions were absent in our findings. When individual characteristics are accounted for regional entrepreneurial culture effects as measured by attitudes and perceptions, they hardly affect growth- and innovation-oriented entrepreneurial behavior.

Some disclaimers apply. One limitation is that data availability restricts our definition of regions: we can only distinguish relatively large regions. In our analysis, we have exploited the available data as much as possible; still ideally for some of the countries included in our analysis one would probably use the more disaggregated NUTS 3 level as the most relevant regional level. For most European countries, NUTS 3 level regions are regarded as labor market areas.

A second limitation concerns our indicators of entrepreneurial culture, emphasizing perceived opportunities, perceived skills, and fear of failure. In general, these three indicators are only marginally significant for high growth- or innovation-oriented entrepreneurship. A possible explanation is that the regional indicators relate to "just" starting a business, while the dependent variable concerns people starting a business with a considerable expectations of employment growth. Only perceived skills were indeed linked to low and modest growth-oriented entrepreneurship.

Third, even though many studies have confirmed the positive effect of entrepreneurship on regional economic growth, this does not mean that stimulating entrepreneurship will always improve regional economic performance. A few recent studies (Bosma et al. 2009; Fritsch and Schroeter 2009) show that after reaching a certain level, more entrepreneurship is likely to be harmful for economic performance.

In this chapter, we aim to identify factors that are positively related to regional entrepreneurship levels by analyzing a sample containing all European regions. This enabled us to make some general claims about regional entrepreneurship policy. However, entrepreneurship policy in specific regions should take into account the specific history, location, and industrial structure of the region. These unique contextual factors might explain how the behavior of entrepreneurs, in how they actively interact with their environments, adapt to new situations, crises (see Feldman 2005), or opportunities using place-specific assets (see Storper 1997) and, finally, build and augment local institutions (see Keeble et al. 1999).

References

Acs, Z.J. (2008), 'Foundations of High Impact Entrepreneurship', *Jena Economic Research Papers* # 2008 – 060, Jena: Max Planck Institute of Economics.

Acs, Z.J. and C. Armington (2004), 'Employment Growth and Entrepreneurial Activity in Cities', *Regional Studies*, 38, 911–927.

Acs, Z.J. and D.B. Audretsch (2003), *Handbook of Entrepreneurship Research*, Boston, MA: Springer.

Acs, Z.J. and P. Mueller (2008), 'Employment Effects of Business Dynamics: Mice, Gazelles and Elephants', *Small Business Economics*, 30(1), 85–100.

Acs, Z.J. and A. Varga (2005), 'Entrepreneurship, Agglomeration and Technological Change', *Small Business Economics*, 24(3), 323–334.

Acs, Z., D. Audretsch, P. Braunerhjelm and B. Carlsson (2005), 'The Knowledge Spillover Theory of Entrepreneurship', *CEPR Discussion Paper* No. 5326, London: CEPR.

Aghion, Ph., R. Blundell, R. Griffith, P. Howitt and S. Prantl (2006), 'The Effects of Entry on Incumbent Innovation and Productivity'. *NBER Working Paper* 12027, Cambridge, MA: NBER.

Arenius, P. and M. Minniti (2005), 'Perceptual Variables and Nascent Entrepreneurship', *Small Business Economics*, 24(3), 233–247.

Audretsch, D.B. (1995), *Innovation and Industry Evolution*, Cambridge, MA: MIT Press.

Audretsch, D.B. and M. Fritsch (1992), 'On the Measurement of Entry Rates', *Empirica*, 21(1), 105–113.

Audretsch, D.B. and M. Fritsch (2002), 'Growth Regimes Over Time and Space', *Regional Studies*, 36, 113–124.

Audretsch, D.B. and M. Keilbach (2004), 'Entrepreneurship and Regional Growth: An Evolutionary Interpretation', *Journal of Evolutionary Economics*, 14(5), 605–616.

Audretsch, D.B. and M. Keilbach (2005),'Entrepreneurship Capital and Regional Growth', *Annals of Regional Science*, 39, 457–469.

Audretsch, D.B. and R. Thurik (2001), 'Linking Entrepreneurship to Growth', *OECD Science, Technology and Industry Working Papers* 2001/2, Paris: OECD.

Audretsch, D.B., M.C. Keilbach and E.E. Lehmann (2006), *Entrepreneurship and Economic Growth*, Oxford: Oxford University Press.

Baumol, W.J. (1990), 'Entrepreneurship: Productive, Unproductive, and Destructive', *The Journal of Political Economy*, 95(5), 893–921.

Baumol, W.J. (2002), *The Free-Market Innovation Machine – Analyzing the Growth Miracle of Capitalism*, Princeton, NJ: Princeton University Press.

Baumol, W.J. (2004), 'Four Sources of Innovation and Stimulation of Growth in the Dutch Economy', *De Economist*, 152(3), 321–351.

Beugelsdijk, S. (2007), 'Entrepreneurial Culture culture, Regional Innovativeness and Economic Growth', *Journal of Evolutionary Economics*, 17(2), 187–210.

Birch, D. (1979), *The Job Generation Process*, Cambridge, MA: MIT, Program on Neighbourhood and Regional Change.

BMWi Bundesministerium für Wirtschaft und Technologie (2005), *Nationales Reformprogramm Deutschland: Innovation forcieren – Sicherheit im Wandel fördern – Deutsche Einheit vollenden*.

Boettke, P. and C.J. Coyne (2003), 'Entrepreneurship and Development: Cause or Consequence?', *Advances in Austrian Economics*, 6, 67–88.

Bosma, N. and V. Schutjens (2009), 'Determinants of Early-Stage Entrepreneurial Activity in European Regions; Distinguishing Low and High Ambition Entrepreneurship', in: D. Smallbone, H. Landstrom and D. Jones Evans (eds), *Making the Difference in Local, Regional and National Economies: Frontiers in European Entrepreneurship Research*, Cheltenham: Edward Elgar.

Bosma, N., E. Stam and V. Schutjens (2006), *Creative Destruction and Regional Competitiveness*, Zoetermeer: EIMEIM Business and Policy Research.

Bosma, N., V. Schutjens and E. Stam (2008), 'Determinants of Growth-Oriented Entrepreneurship: A Multilevel Approach'. *Paper Presented at the AAG-conference, April 15–19 2008, Boston, MA*.

Bosma, N., E. Stam and V. Schutjens (2009), 'Creative Destruction and Regional Productivity Growth; Evidence from the Dutch Manufacturing and Services Industries', *Small Business Economics*.

Callejón, M. and A. Segarra (1999), 'Business Dynamics and Efficiency in Industries and Regions: The Case of Spain', *Small Business Economics*, 13, 253–271.

Carree, M. and R. Thurik (2008), 'The Lag Structure of the Impact of Business Ownership on Economic Performance in OECD Countries', *Small Business Economics*, 30(1): 101–110.

Cassar, G. (2007), 'Money, Money, Money? A Longitudinal Investigation of Entrepreneur Career Reasons, Growth Preferences and Achieved Growth', *Entrepreneurship & Regional Development*, January, 89–107.

Davidsson, P. (1991), Continued Entrepreneurship: Ability, Need, and Opportunity as Determinants of Small Firm Growth', *Journal of Business Venturing*, 6(6), 405–429.

Dirks, F., M. Rosenbrand and N. Bosma (2003), *De overstap naar het ondernemerschap: levensloop, beweegredenen en obstakels*, Tilburg: Organisatie voor Strategisch Arbeidsmarktonderzoek.

Dosi, G. and D. Lovallo (1997), 'Rational Entrepreneurs or Optimistic Martyrs? Some Considerations on Technological Regimes, Corporate Entries and the Evolutionary Role of Decision Biases', in: R. Garud, P.R. Nayyar and Z.B. Shapira (eds), *Technological Innovation Oversights and Foresights*, Cambridge: Cambridge University Press.

Dutch Coalition Agreement (2007), *Coalitieakkoord tussen de Tweede Kamerfracties van CDA, PvdA en ChristenUnie*, 7 februari 2007.

European Commission Commission (2003), *Green Paper: Entrepreneurship in Europe*, Brussels: European Commission.

Faggian, A., Ph. McCann and S. Sheppard (2007), 'Human Capital capital, Higher Education and Graduate Migration: An Analysis of Scottish and Welsh Students', *Urban Studies*, 44(13), 2511–2528.

Feldman, M. (2005), 'Firm Formation formation in a Regional Context', in: S. Breschi and F. Malerba (eds), *Clusters, Networks, and Innovation*, Oxford: Oxford University Press, pp. 136–168.

Fischer, E. and A. Reuber (2003), 'Support for Rapid-Growth Firms: A Comparison of the Views of Founders, Government Policymakers, and Private Sector Resource Providers', *Journal of Small Business Management*, 41, 346–365.

Fritsch, M. (2008), 'How Does New Business Formation Affect Regional Development? Introduction to the Special Issue', *Small Business Economics*, 30(1), 1–14.

Fritsch, M. and A. Schroeter (2009), 'Why Does the Effect of New Business Formation Differ Across Regions?', *Small Business Economics*.

Goldstein, H. (2003), *Multilevel Statistical Models* (3rd ed.), London: Arnold.

Henrekson, M. (2005), 'Entrepreneurship: A Weak Link in the Welfare State?', *Industrial and Corporate Change*, 14(3), 437–467.

Hessels, J., M. van Gelderenvan and R. Thurik (2008), 'Drivers of Entrepreneurial Aspirations at the Country Level: The Role of Start-Up Motivations and Social Security', *International Entrepreneurship and Management Journal*, 4(4): 401–417.

Houston, D., A. Findlay, R. Harrison and C. Mason (2008), 'Will Attracting the "Creative Class" Boost Economic Growth in Old Industrial Regions? A Case Study of Scotland', *Geografiska Annaler: Series B: Human Geography*, 90(2), 133–149.

Hox, J.J. (2002), *Multilevel Analysis: Techniques and Applications*, Mahwah, NJ: Erlbaum.

Keeble, D., C. Lawson, B. Moore and F. Wilkinson (1999), 'Collective Learning Processes, Networking and 'Institutional Thickness' in the Cambridge Region', *Regional Studies*, 33(4), 319–332.

Koster, S. (2006), *Whose child? How existing firms foster new firm formation: Individual start-ups, spin-outs and spin-offs*, Thesis, Groningen: Rijksuniversiteit Groningen.

Landes, D.S. (1969), *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present*, Cambridge: Cambridge University Press.

Lee, S.Y., R. Florida and Z. Acs (2004), 'Creativity and Entrepreneurship: A Regional Analysis of New Firm Formation', *Regional Studies*, 38(8), 879–891.

Liao, J. and H. Welsh (2003), 'Social Capital and Entrepreneurial Growth Aspirations: A Comparison of Technology and Non-Technology-Based Nascent Entrepreneurs', *Journal of High Technology Management Research*, 14, 149–170.

March, J.G. (1991), 'Exploration and Exploitation in Organizational Learning', *Organization Science*, 2(1), 71–87.

Minniti, M. (2008), 'The Role of Government Policy on Entrepreneurial Activity: Productive, Unproductive or Destructive?', *Entrepreneurship, Theory and Practice*, 32(5), 779–790.

Moore, G. and K. Davis (2004), 'Learning the Silicon Valley Way', in: T. Bresnahan and A. Gambardella (eds), *Building High-tech Clusters: Silicon Valley and Beyond*, Cambridge: Cambridge University Press, pp. 7–39.

Mueller, P., A. Van Stel and D.J. Storey (2008), 'The Effects of New Firm Formation on Regional Development over Time: The Case of Great Britain', *Small Business Economics,* 30(1): 59–71.

Nooteboom, B. (1994), 'Innovation and Diffusion in Small Firms: Theory and Evidence', *Small Business Economics*, 6, 327–347.

Nooteboom, B. (2000), *Learning and Innovation in Organizations and Economies*, Oxford: Oxford University Press.

OECD (2000), *OECD Employment Outlook*, Paris: OECD *Organisation for Economic Co-operation and Development*.

OECD (2003), *Entrepreneurship and Local Economic Development Programme and Policy Recommendations*, Paris: OECD Organisation for Economic Co-operation and Development.

Parker, S.C. and M.T. Robson (2004), 'Explaining International Variations in Entrepreneurship: Evidence from a Panel of OECD Countries', *Southern Economic Journal*, 71(2), 287–301.

Pasinetti, L.L. (1993), *Structural Economic Dynamics*, Cambridge: Cambridge University Press.

Perren, L. and P.J. Jennings (2005), 'Government Discourses on Entrepreneurship: Issues of Legitimization, Subjugation, and Power', *Entrepreneurship Theory and Practice*, 29(2), 173–184.

Rabe-Hesketh, S. and A. Skrondal (2005), *Multilevel and Longitudinal Modeling Using Stata*, College Station, TX: Stata Press.

Raudenbusch, S.W. and A.S. Bruyk (2002), *Hierarchical Linear Models*, Newbury Park, CA: Sage.

Reynolds, P.D., N.S. Bosma, E. Autio with S.A. Hunt, N. De Bono, I. Servais, P. Lopez-Garcia and N. Chin (2005), 'Global Entrepreneurship Monitor: Data Collection Design and Implementation 1998–2003', *Small Business Economics*, 24(3), 205–231.

Rocha, H.O. and R. Sternberg (2005), 'Entrepreneurship: The Role of Clusters. Theoretical Perspectives and Empirical evidence from Germany', *Small Business Economics*, 24, 267–289.

Rosenberg, N. and L. Birdzell (1986), *How the West Grew Rich*, New York, NY: Basic Books.

Saxenian, A. (1994), *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*, Cambridge, MA: Harvard University Press.

Schumpeter, J. A. (1942), *Capitalism, Socialism, and Democracy*, New York, NY: Harper and Brothers.

Shahid Y. and N. Kaora (2007), *How Universities Promote Economic Growth*, Washington, DC: World Bank.

Shane, S.A. (2000), 'Prior Knowledge and the Discovery of Entrepreneurial Opportunities', *Organization Science*, 11(4), 448–472.

Smallbone, D., R. Baldock and S. Burgess (2002), 'Targeted Support for High-Growth Start-Ups: Some Policy Issues', *Environment and Planning C*, 20 (2), 195–209.

Spencer, S. (ed.) (1994), *Strangers and Citizens*, London: Rivers Outram.

Stam, E. (2008), 'Entrepreneurship and Innovation Policy', in: B. Nooteboom and E. Stam (eds), *Micro-Foundations for Innovation Policy*, Amsterdam/Chicago: Amsterdam University Press/ Chicago University Press, pp. 135–172.

Stam, E., K. Suddle, J. Hessels, and A. Van Stel (2007), 'High Growth Entrepreneurs, Public Policies and Economic Growth', *Jena Economic Research Papers* #2007–019, Jena: Max Planck Institute of Economics.

Stam, E., D. Audretsch and J. Meijaard (2008), 'Renascent Entrepreneurship', *Journal of Evolutionary Economics*, 18(3), 493–507.

Stevenson, L. and A. Lundström (2001), 'Patterns and Trends in Entrepreneurship/SME Policy and Practice in Ten Economies', *Entrepreneurship Policy for the Future Series*, Vol. 3, Stockholm: Swedish Foundation for Small Business Research.

Storey, D. (2002), 'Innovative Entrepreneurship in the Netherlands: Observations from a UK Perspective', in: EIMEIM (ed.), *Entrepreneurship in the Netherlands. Innovative Entrepreneurship. New Policy Challenges!*, Zoetermeer: EIM Business & Policy Research.

Storper, M. (1997), *The Regional World: Territorial Development in a Global Economy*, New York, NY: Guilford Press.

Tamásy, C. (2006), 'Determinants of Regional Entrepreneurship Dynamics in Contemporary Germany: A Conceptual and Empirical Analysis'. *Regional Studies*, 40(4), 365–384.

Thurik, R., M. Carree, A. Van Stel and D. Audretsch (2008), 'Does Self-Employment Reduce Unemployment?', *Journal of Business Venturing*, 23, 673–686.

Trettin, L. and F. Welter (2007), 'Spatially Oriented Entrepreneurship Research at a Crossroad', *Paper Presented at Interdisciplinary European Conference on Entrepreneurship Research (IECER), February 28-March 2, 2007*.

Vaillant, Y. and E. Lafuente (2007), 'Do Different Institutional Frameworks Condition the Influence of Local Fear of Failure and Entrepreneurial Examples Over Entrepreneurial Activity?', *Entrepreneurship & Regional Development*, 19, 313–337.

Van Praag, C.M. and P.H. Versloot (2007), 'What is the Value of Entrepreneurship? A review of Recent Research', *Small Business Economics*, 29(4), 351–383.

Van Stel, A. and D. Storey (2004), 'The Link Between Firm Births and Job Creation: Is There a Upas Tree Effect?', *Regional Studies*, 38, 893–909.

Van Stel, A. and K. Suddle (2008), 'The Impact of New Firm Formation on Regional Development in the Netherlands', *Small Business Economics*, 30(1), 31–47.

Verheul, I., A. Wennekers, D. Audretsch and A. Thurik (2002), 'An Eclectic Theory of Entrepreneurship: Policies, Institutions and Culture', in: D. Audretsch, R. Thurik, I. Verheul and A. Wennekers (eds), *Entrepreneurship: Determinants and Policy in a European-US Comparison*, Boston, MA: Kluwer.

Wennekers, S. and R. Thurik (1999), 'Linking Entrepreneurship and Economic Growth', *Small Business Economics*, 13, 27–55.

Wiklund, J., P. Davidsson and F. Delmar (2003), 'What Do They Think and Feel About Growth? An Expectancy-Value Approach to Small Business Managers' Attitudes Towards Growth', *Entrepreneurship Theory and Practice*, 27(3), 247–266.

Wong, P., Y. Ho and E. Autio (2005), 'Entrepreneurship, Innovation and Economic Growth: Evidence from GEMGEM Data', *Small Business Economics*, 24(3), 335–350.

Chapter 5
High-Growth Entrepreneurs, Public Policies, and Economic Growth[1]

Erik Stam, Kashifa Suddle, Jolanda Hessels, and André van Stel

5.1 Introduction

Entrepreneurship is considered to be a crucial mechanism for economic development (Schumpeter 1934; Wennekers and Thurik 1999; Baumol 2002; van Stel et al. 2005). The centrality of entrepreneurship in the current economy and society is revealed by the current scientific and policy discourse on "the entrepreneurial economy" (Audretsch and Thurik 2000) and "the entrepreneurial society" (Ministerie van Economische Zaken 1999a; Von Bargen et al. 2003; Audretsch 2007). At the macro level, entrepreneurship is seen as a driver of structural change and job creation. At the micro level it is the engine behind the foundation and subsequent growth of new firms. However, there is mixed evidence on the effect of entrepreneurship in general on economic growth (Audretsch and Fritsch 2002; van Stel and Storey 2004). It has been said that in order to promote economic growth, policy makers should focus on high-growth firms instead of new, often very small, firms in general (Friar and Meyer 2003). This is confirmed with empirical research that finds more consistent positive evidence of economic growth from high-potential start-ups (Wong et al. 2005) and fast-growing firms (Mason 1985; Kemp et al. 2000). With job creation it is not the new firms that are the key, but the relatively small number of fast-growing "gazelles" that make up the lion's share of jobs in new firms (Birch 1979; Gallagher and Miller 1991; Kirchhoff 1994; Storey 1997; Schreyer 2000; Buss 2002; Henrekson and Johansson 2008). In addition, these high-growth firms are characterized by increasing labor productivity and at the same time they generate new jobs (Verhoeven et al. 2002; Littunen and Tohmo 2003). Nurturing high-growth firms, or "gazelles," has become a primary goal for

E. Stam, K. Suddle, J. Hessels, and A. van Stel (✉)
EIM Business and Policy Research, P.O. Box 7001, 2701 AA, Zoetermeer, The Netherlands
e-mail: ast@eim.nl

[1]An earlier version of this chapter was published in Spanish in the Basque Journal of Economics *EKONOMIAZ* (Stam et al., 2007). Erik Stam and André van Stel are also affiliated with the Max Planck Institute of Economics in Jena, Germany.

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_5, © Springer Science+Business Media, LLC 2009

entrepreneurship policy (Pages et al. 2003). As a result these high-growth firms are high on the agenda of regional (Fischer and Reuber 2003), national (Smallbone et al. 2002), and supranational policy makers (European Commission 2003b). In this chapter we will investigate whether the presence of *ambitious* entrepreneurs, who expect their firm to grow, is a more important determinant of national economic growth than general entrepreneurial behavior. This is not straightforward as the entrepreneur's ambitions are unrealized when they are first expressed.

The chapter is structured as follows. After starting with a review of the literature on growth ambitions of entrepreneurs and high-growth firms in Sect. 5.2, we will discuss public policy aimed at high-growth firms in general in the third section. Next, high-growth firms in the USA and the Netherlands are evaluated. In the empirical part of the chapter we will present the data and research method used in Sect. 5.5, while we will present our empirical analysis of the association of the presence of ambitious entrepreneurs and national economic growth in Sect. 5.6. Discussion and conclusions are provided in Sect. 5.7.

5.2 Growth Ambitions and High-Growth Firms

Most individuals who start a new firm do not have an innate ambition to grow their business. Growth motivation is a necessary factor for actual firm growth to materialize. Such growth motivation is determined by the perceived ability, need, and opportunity for growth (Davidsson 1989). Although some objective factors directly affect actual growth, the entrepreneur's *perception* of the ability, need, and opportunity for growth is of major importance for explaining motivation-mediated effects on growth.

There have been several studies on the determinants of growth intentions of entrepreneurs (Davidsson 1989; Wiklund 2001; Welter 2001). These studies found that growth intentions are positively associated with gender (male), youth, entrepreneurial experience, and experience as informal investor (Welter 2001; De Clercq et al. 2003). More interesting for the present chapter are studies on the consequences of growth intentions. In general, the growth intentions of entrepreneurs are found to be positively related to subsequent firm growth (Bellu and Sherman 1995; Miner et al. 1994; Wiklund and Shepherd 2003; Stam et al. 2008). However, this statistical relationship between growth intentions and the subsequent realization tends to be rather weak. It is likely that the effect of growth intention is moderated by the access to resources and the availability of opportunities. Wiklund and Shepherd (2003) showed that the effect of growth motivation on realized growth is moderated by the entrepreneur's level of education and experience as well as the dynamism of the environment in which the firm operates. Or, to put it explicitly: in order for a new business to grow, it is necessary for the entrepreneur to want the firm to grow, have the resources to let it grow, as well as have the opportunities. In practice, it remains difficult to identify high-growth firms in advance. Recent research has revealed some tendencies. For example with opportunity-based entrepreneurship, the availability of information and a spatially broad market orientation in the start-up

phase distinguishes entrepreneurs of future high-growth firms from entrepreneurs of future low-growth firms (Vivarelli 2004; Stam and Schutjens 2006; Smallbone et al. 2002).

These insights on the role of growth ambitions of entrepreneurs and initial conditions of high-growth start-ups have important policy implications. It is imperative that general policy measures are designed so that only those who will react in the intended way are rewarded.[2] If the self-employed with relatively low ambitions receive the benefits, reactions that run counter to the intentions of the policy are likely. Subsidizing entrepreneurs and new firms in general might bring about a major bias in the process of market selection. This could include *substitution* as well as *deadweight* effects (Santarelli and Vivarelli 2002; Vivarelli 2004). A deadweight effect refers to the situation in which less efficient or less ambitious entrepreneurs are given subsidies, and they remain in the market as long as they can use the subsidy; such entrepreneurs do not need subsidies for improving their business. A substitution effect arises when less efficient entrepreneurs are given an artificial seedbed, while market competition would have otherwise encouraged them to exit the market. These effects advocate a policy oriented toward ambitious entrepreneurs. This is discussed in the next section.

5.3 Public Policy Aimed at High-Growth Start-Ups

Because of the important economic, social, and political roles that new and small firms play in most economies, governments at all levels – federal, state/regional, and local – have strategies supporting entrepreneurial activity. Perhaps the first question is whether governments should support entrepreneurs at all. Why should governments do more than enhance the general investment climate? So-called market failures are often used to legitimize entrepreneurship policy (Storey 2003, 2006). In the specific context of public policy aimed at (potential) high-growth firms, information imperfections and externalities may be especially important reasons for policy interventions.

With regard to information imperfections, entrepreneurs may have too negative an expectation concerning the consequences of growth, and they may not realize the private benefits of obtaining expert advice from "outside" specialists. There may also be significant information imperfections at the side of financial institutions as they are unable to assess the viability and growth potential of new firms and (on

[2] There is another policy problem looming here if the focus is too much on achieving more high-growth firms. It should be kept in mind that high-growth firms are a means to an end: economic growth. The focus on targets like increasing the number of high-growth firms might become subject to "Goodhart's Law" (Kay 2004, p. 80): any measure adopted as a target changes its meaning. This might happen if policy makers are judged by the number of additional high-growth firms they have "created."

balance) overestimate the risk of lending to entrepreneurs of (potential) high-growth firms.

Positive externalities may be present when the social returns of certain economic activities exceed private returns. Entrepreneurs may not start projects that benefit society at large, but provide no private returns. The role of public policy is to make it worthwhile for the entrepreneur to undertake the project, thus allowing society as a whole to benefit. In the context of high-growth firms, it might be that entrepreneurs do not pursue certain projects, because the risks are too high (new technology), or because they cannot fully appropriate the returns (innovation). By improving private returns, public policy facilitates externalities such as job creation and improved national productivity, thus providing social benefits.

Sometimes markets are missing. A lack of venture capital or opportunities for initial public offerings (IPOs) may hamper the high growth of new firms. In the USA, during the 1990s, access to finance – in particular venture capital – played an important role in nurturing new high-growth firms. In Europe, financial markets are still relatively fragmented and venture capital markets are less developed. This increases financial costs and reduces the availability of capital necessary for the growth of start-ups (European Commission 2003a).

One of the most important questions regarding entrepreneurship policy is whether it should stimulate new firms, help existing firms survive, or focus on growing firms, including those that have the potential to grow (cf. Reynolds et al. 1994). Next, it is also important to decide on whether to aim for generic policy or to focus on specific regions or industries (cf. Stam 2005). One could wonder why public policy should be focused on high-growth firms and not on entrepreneurship (or innovative entrepreneurship; see EIM 2002) in general. The arguments against targeting (potential) high-growth firms are (Bridge et al. 2003, pp. 293–295) as follows:

1. Selecting potential high-growth firms is too difficult.[3]
2. Venture capitalists are able to pick winners, with the inclusion of a considerable number of potential winners that turned out to be losers (cf. Baum and Silverman 2004), while public policy would seek to back all the winners and avoid any losers.
3. In general, start-ups deserve policy support, due to their seedbed function, unequal access to finance and information, their employment creation (still most of the jobs in the small business sector come from non high-growth firms), and

[3]The difficulty to predict the growth of start-ups has led the English DTI to emphasize entrepreneurs with growth aspirations in her competitiveness policy (DTI 1998). The main rationale for this program is the potential welfare gains to the economy, which will result from enabling more new businesses with growth potential to achieve significant growth (see Smallbone et al. 2002). There is an implicit assumption of market failure in the sense of the support needs of high-growth start-ups not being adequately met by the private sector. The program is also legitimated because it is an addition to the existing start-up support program. High-growth potential of start-ups is defined as an aspiration of £1 million sales per annum. It is estimated that only about 1% of new business start-ups in the United Kingdom each year achieve annual sales of this amount. Achieving £150,000 sales within 12 months is provided as a stepping stone goal toward this threshold.

their effect on regional prosperity in the long run (see also Fritsch and Mueller 2004; van Stel and Suddle 2008).
4. What is needed is an enterprising culture that has effect on all layers of society: new firms, small firms, large firms, and public organizations.

However, there are at least as many arguments in favour of targeting (potential) high-growth firms (Bridge et al. 2003, pp. 292–293):

1. Targeting increases the *effectiveness* and *efficiency* of support measures. Focusing resources on a small group of ambitious entrepreneurs – that is, where they are most needed and where they can produce the best results – is more effective than generalized support. By applying support only to growth firms, the total requirement and its cost are reduced. This increases efficiency, as a sufficient impact is made with limited resources.
2. It provides a clearer strategic focus on the needs of high-growth businesses; high levels of expertise are more likely to be developed both in the public sector as well as in the related support fields (such as venture capitalists, bankers, and consultants).
3. More start-ups are not needed. In many European countries the number of start-ups has already increased enormously in the last two decades (Bosma and Wennekers 2003).
4. Supporting start-ups distorts market mechanisms.

In the next section we will focus on how public policy aimed at high-growth firms is formulated in two particular countries, the USA (as a "role model" country with respect to high-growth firms policies) and the Netherlands (the authors' home country).

5.4 Public Policy and High-Growth Firms in the USA and the Netherlands

5.4.1 The USA

Public policy has played a major role in the large number of high-growth start-ups in the USA (Von Bargen et al. 2003). A variety of public policies have had a profound influence on the creation of a US entrepreneurial economy, often unintentionally. Four key areas can be distinguished (Von Bargen et al. 2003, pp. 316–319; cf. Chesbrough 1999; Owen 2004; Hart 2007):

1. Creating financial markets to fund growth companies
2. Providing R&D and intellectual property protection
3. Investing in technically talented people
4. Opening new markets and easing entry for growth companies.

Policy makers in the USA made critical changes to the securities, banking, bankruptcy, tax and pension laws, as well as creating new programs to fund businesses directly in order to improve the access to capital in the start-up, early stage, and growth stage

of firm development. Moreover, policies have been initiated to increase market liquidity. First, public policies facilitated the creation of NASDAQ,[4] which has greatly enhanced investor liquidity and, consequently, businesses' ability to raise capital in public markets. Secondly accounting, antitrust, and tax law treatment for mergers and acquisitions have provided avenues for investor liquidity.

One important source of opportunities for high-growth start-ups is the changing societal knowledge base (Audretsch and Lehmann 2005). Many leading industries in the USA, including biotech, computer software, and aerospace, can be traced directly to government R&D funds. Universities and research labs have also gained the ability to license for commercial use the technologies developed with federal funds (via the Bayh-Dole, Stevenson-Wydler, and National Competitive Technology Acts). Changes to the patent and copyright laws have been instrumental to enhance intellectual property protection for entrepreneurial innovations.

As a side effect and Cold War legacy, federal policy has stimulated the expansion of science and engineering expertise. Boosted by liberal immigration policies that allow technically trained immigrants to become entrepreneurs (see Saxenian 2002), as well as policies that support flexible labor markets (see Chesbrough 1999), high-growth entrepreneurship has been supported.

Finally, enabled by the Uniform Commercial Code (UCC), completed in 1964, entrepreneurs have an enormous home market to do business. Next to this large open (territorial) market, government intervention to deregulate leading industries, such as airlines, trucking, and telecommunications, has had a large impact for high-growth opportunities.

5.4.2 The Netherlands

In the Netherlands, public policy aimed at high-growth firms is often legitimized by an unfavorable ranking in international hit lists of (potentially) fast-growing firms (EFER 1998; Ministerie van Economische Zaken 1999b; Ehrhardt et al. 2004). As long as the Netherlands keeps lagging behind the other benchmark countries, more policy efforts are needed in order to improve this "backward" situation. To stimulate growth ambitions in the Netherlands, the government has studied high-growth firms and the bottlenecks that these firms experience versus other start-ups. Peeters and Verhoeven (2005) report that the group of high-growth firms in the Netherlands is relatively small (9%), compared with the average of the European countries (15%).[5] Specifically, high-growth firms face three major bottlenecks:

[4] In 1971, the National Association of Securities Dealers set up the NASDAQ stock exchange, largely in response to pressure from the Securities and Exchange Commission to bring order into the unregulated over-the-counter market (Ingebretsen 2002).

[5] These figures relate to the percentage of firms within the population of medium-sized firms (50–1,000 employees) that grow their business with at least 60% (in terms of employment) over a period of 3 years. (1998–2001; see Peeters and Verhoeven, 2005, p. 27).

1. Fast-growing firms have difficulties in finding and hiring qualified employees capable of functioning effectively in dynamic environments. It also takes relatively much time and many efforts to acquire and dismiss employees in the Netherlands.
2. Fast-growing firms have difficulties in obtaining funding or capital with reasonable conditions. Banks are distant, because they perceive a greater risk. For the target group, it is also not always clear which subsidies and regulations exist for them and can benefit them.
3. Finally, fast-growing firms experience more management and organizational difficulties than other firms. The division of tasks is often unclear and this makes it difficult to delegate tasks.

Supporting high-growth firms is currently one of the three pillars of entrepreneurship policy in the Netherlands (next to start-ups and business closures/transfers; Ministerie van Economische Zaken 2003, 2004, 2005). The goal of this policy is to create and support more and better high-growth firms (Ministerie van Economische Zaken 2004, p. 11). The policy initiatives mainly provide *financial support*, *advice*, and *networks* to support the high-growth firms.

More specific policy measures have been the Growth Plus and Fast Growth Programs, which involves networking between, coaching of, and advice to entrepreneurs of high-growth firms (Ministerie van Economische Zaken 2003). These programs originated from the European Growth Plus organization, which was founded in 1997 with the goal of promoting entrepreneurship throughout Europe by identifying top performers and role models and supporting them by sharing best practices, providing networking opportunities, and lobbying for political support. These top performers have annually been identified with the ranking of Europe's 500 fastest growing entrepreneur-led firms. Networking among peers and mentoring by experienced entrepreneurs/managers has been recognized as an effective and efficient mechanism to improve the growth of new firms (Smallbone et al. 2002; Fischer and Reuber 2003). The increased visibility of high-growth firm entrepreneurs, acting as role models, might reduce the negative expectations concerning the consequences of growth; in this respect, successful role models may have a positive effect, especially on young people early in their occupational career.[6]

Policy actions from 2005 developed a national program of Masterclasses for entrepreneurs of high-growth firms as well as the establishment of a Business Angel Program, which connects informal investors with ambitious entrepreneurs (Ministerie van Economische Zaken 2005). Next to this public initiative, there is a private initiative – "Port4Growth" – developed by ING, Euronext, FEM Business, and Deloitte as participating organizations. Port4Growth offers a community for high-growth firms and provides the infrastructure to reach other high-growth firms

[6] According to Davidsson (1991, p. 424) persuasive attempts to stimulate growth motivation are likely to be most effective if directed at younger firms and younger owner-managers. Younger firms have a stronger objective need for expansion, and their values, attitudes, and "company cultures" are less likely to be firmly held. Younger individuals are also likely to be more sensitive to growth objectives than older entrepreneurs who have since long defined and lived up to a role as the manager of a stable firm.

and relevant subcontractors. Furthermore, it provides exposure possibilities for the firms involved.

A mixture of technology policy and high-growth firms policy can also be observed. This is legitimized by the positive externalities involved in stimulating new technology-based firms (NTBFs; see Storey and Tether 1998), as these firms may be able to turn scientific knowledge into valuable products and processes (cf. Acs et al. 2005). However, this commercialization of scientific knowledge often necessitates the development and growth of the production and marketing capabilities of these NTBFs. Two major impediments to the growth of these firms are the difficult appropriation of the value of these innovations and the lack of management skills of the entrepreneurs involved. If these impediments are not taken away, valuable innovations may never be introduced into society. In the Netherlands this mix of technology policy and high-growth firms policy has been central in the policy initiatives to stimulate the growth of new firms in biotech (Biopartner Program; see Van Dongen et al. 2005) and information and communication technology (ICT) (Twinning Program: see Hulsink and Elfring 2000). These initiatives have recently been integrated in the TechnoPartner Program. The TechnoPartner Program has become operational in mid-2004 and aims for more effective spin-offs from research institutes. Besides the encouragement of the exploitation of knowledge by research institutes, this program aims to improve the capital market for NTBFs. Furthermore, NTBFs will get more personalised and effective information and advice. Third, the government is investigating whether the American SBIR scheme [Small Business Innovation and Research scheme; for e.g., see Audretsch (2003) and Lerner (2003)] can be applied in the Netherlands. The SBIR scheme aims to stimulate research and development by innovative SMEs. To do so, the scheme pays for the development of innovative ideas, the development of prototypes and provides an official quality endorsement at the moment of the commercialization of the product. This program is likely to stimulate the growth of new and small technology-based firms.

The most important difference between the USA and the Netherlands is that public policies in the USA have been much more generic than the more targeted policy programs in the Netherlands. If the question of whether to introduce specific high-growth firms policies at all is answered positively, we need to know how effective these policies are. Unfortunately, policy interventions stimulating high-growth firms are rarely evaluated. This makes it difficult to derive normative implications from this overview of public policy aimed at high-growth firms. The least we can do is investigating whether the prevalence of ambitious entrepreneurs has an effect on national economic growth at all. In the next sections we will present empirical evidence on this issue.

5.5 Data and Research Method

It is generally acknowledged that there are differences in the distribution of entrepreneurship across countries. Studies exploring differences in entrepreneurship across countries often focus on the incidence of new firm registration or self-employment,

which may not be reliable indicators when applied to transition and developing countries with significant informal economies and fewer alternatives to self-employment. For these reasons we have used the *total entrepreneurial activity* (TEA) indicator, defined as the percentage of adult population that is either actively involved in starting a new venture or is the owner/manager of a business that is less than 42 months old. In the current study we investigate whether the presence of ambitious entrepreneurs is a more important determinant of national economic growth than entrepreneurial activity in general. Our empirical analysis builds on Van Stel et al. (2005). They investigate whether TEA influences GDP growth for a sample of 36 countries. The authors find that the TEA index indeed affects economic growth but that the influence depends on the level of economic development. In particular, the contribution to economic growth is found to be stronger for more highly developed countries than for developing countries. The authors argue that this may be related to higher human capital levels of entrepreneurs in higher developed countries.

In the current chapter we will perform a similar regression analysis but in addition to the general TEA index, we also use the TEA *high-growth* rate and the TEA *medium-growth* rate as independent variables and compare their impact on economic growth with the impact of the general TEA index. The data and model used in this study are described later.

We use a sample of 36 countries participating in the 2002 Global Entrepreneurship Monitor (GEM) study. Data from six basic variables are used in our model: TEA, TEA medium growth, TEA high growth, growth of GDP, per capita income (GNIC), and the growth competitiveness index (GCI). The sources and definitions of these variables are listed later.

5.5.1 Total Entrepreneurial Activity

TEA is defined as the percentage of the adult population that is either actively involved in starting a new venture or is the owner/manager of a business that is less than 42 months old. The TEA high-growth rate is defined as the percentage of adult population that is either actively involved in starting a new venture or is the owner/manager of a business that is less than 42 months old, *and* it expects to employ *20 employees or more within 5 years* after the start of the firm. The TEA medium-growth rate is similar, but only expects to employ 6 or more employees within 5 years of starting the firm. Data on TEA are taken from the GEM Adult Population Survey for 2002.

5.5.2 Growth of GDP (ΔGDP)

(Real) GDP growth rates are taken from the IMF World Economic Outlook database of the International Monetary Fund from September 2005.

5.5.3 Per Capita Income

Gross national income per capita 2001 is expressed in (thousands of) purchasing power parities per US dollars, and these data are taken from the 2002 World Development Indicators database of the World Bank.

5.5.4 Growth Competitiveness Index (GCI)

Data on the GCI 2001 are taken from page 32 of The Global Competitiveness Report 2001–2002. We refer to McArthur and Sachs (2002) for details about this index.

We investigate whether (high growth) entrepreneurship may be considered a determinant of economic growth, alongside the well-known determinants technology, public institutions, and the macroeconomic environment, which are captured by the GCI. As both entrepreneurship and the factors underlying the GCI are assumed to be structural characteristics of an economy, we do not want to explain short-term economic growth but rather growth in the medium term. Therefore, we choose average annual growth over a period of 4 years (2002-2005) as the dependent variable in this study. Following Van Stel et al. (2005) we use (the log of) initial income level of countries, to correct for catch-up effects, and lagged growth of GDP, to correct for reversed causality effects, as additional control variables.[7]

We allow for the possibility of different effects for highly developed and developing countries. In addition we also test whether the effect of TEA is different for transition countries.[8] TEA rates may reflect different types of entrepreneurs in countries with different development levels, implying different impacts on growth. This is tested by defining separate TEA variables for different groups of countries (rich vs. poor; highly developed vs. transition vs. developing). Our model is represented by (5.1) and (5.2). These equations are estimated separately by OLS. The hypothesis of a more positive effect for rich countries corresponds to coefficient b_1 (b_2) being larger than coefficient c_1 (c_2). Furthermore, the hypothesis that ambitious entrepreneurs contribute more to national economic growth than entrepreneurs in general corresponds to b_2 (c_2) being larger than b_1 (c_1).

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[7] When the growth expectations for the national economy are good, more entrepreneurs may expect to grow their business in the years to come. Hence, there may also be a (reversed) effect of economic growth on (high expectation) entrepreneurship. To limit the potential impact of reversed causality we include lagged GDP growth as an additional explanatory variable. We also measure TEA rates in a year (2002) preceding the period over which the dependent variable is measured (2002–2005). Still, the possibility of reversed effects cannot be ruled out completely.

[8] The 36 countries in our sample are divided into three categories: rich, developing, and transitioning. The 24 rich countries are Australia, Belgium, Canada, Taiwan, Denmark, Finland, France, Germany, Hong Kong, Iceland, Ireland, Israel, Italy, Japan, Korea, the Netherlands, New Zealand, Norway, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the USA. Our seven developing nations are Argentina, Brazil, Chile, India, Mexico, South Africa, and Thailand. The five transition countries are China, Hungary, Poland, Russia, and Slovenia. With the exception of Slovenia, the developing and transitional countries are classified as (relatively) poor.

$$\Delta \mathrm{GDP}_{it} = a + b_1 \mathrm{TEA}_{i,t-1}^{\mathrm{rich}} + c_1 \mathrm{TEA}_{i,t-1}^{\mathrm{poor}} + d \log\left(\mathrm{GNIC}_{i,t-1}\right) + e\,\mathrm{GCI}_{i,t-1} + f\,\Delta \mathrm{GDP}_{i,t-1} + \varepsilon_{it}. \quad (5.1)$$

$$\Delta \mathrm{GDP}_{it} = a + b_2 \mathrm{TEA\_high\,growth}_{i,t-1}^{\mathrm{rich}} + c_2 \mathrm{TEA\_highgrowth}_{i,t-1}^{\mathrm{poor}} + d \log\left(\mathrm{GNIC}_{i,t-1}\right) + e\,\mathrm{GCI}_{i,t-1} + f\,\Delta \mathrm{GDP}_{i,t-1} + \varepsilon_{it}. \quad (5.2)$$

To illustrate the data at hand, Table 5.1 provides the TEA rates and the TEA medium- and high-growth rates in 2002 as well as the average annual growth rates of GDP over

Table 5.1 Entrepreneurial activity rates (2002) and GDP growth rates for 36 countries (sources: GEM and IMF)

	TEA rate	TEA medium growth rate (6+)	TEA high-growth rate (20+)	Average GDP growth rate 2002–2005 (%)
USA	10.51	4.55	2.13	3.00
Russia	2.52	1.80	1.44	6.18
South Africa	6.54	2.71	1.73	3.60
Netherlands	4.62	1.85	1.04	0.60
Belgium	2.99	0.92	0.52	1.53
France	3.20	1.29	0.61	1.43
Spain	4.59	2.03	0.77	2.98
Hungary	6.64	2.57	1.67	3.50
Italy	5.90	2.07	1.65	0.48
Switzerland	7.13	3.02	1.30	0.60
United Kingdom	5.37	2.25	1.27	2.40
Denmark	6.53	2.97	1.13	1.45
Sweden	4.00	1.45	0.61	2.43
Norway	8.69	2.87	1.20	1.88
Poland	4.44	1.19	1.19	3.40
Germany	5.16	2.93	1.79	0.58
Mexico	12.40	2.70	0.54	2.40
Argentina	14.15	4.22	2.55	3.60
Brazil	13.53	4.65	3.08	2.65
Chile	15.68	9.64	5.07	4.48
Australia	8.68	2.74	1.56	3.18
New Zealand	14.01	4.83	2.21	3.85
Singapore	5.91	3.17	1.59	4.23
Thailand	18.90	3.84	1.82	5.45
Japan	1.81	0.91	0.45	1.45
Korea	14.52	6.11	3.38	4.63
China	12.34	6.09	4.24	9.08
India	17.88	4.14	2.73	6.63
Canada	8.82	3.41	2.01	2.73
Ireland	9.14	3.16	1.41	5.00
Iceland	11.32	5.47	3.86	3.28
Finland	4.56	1.57	0.82	2.50
Slovenia	4.63	2.51	1.54	3.58
Hong Kong	3.44	1.45	0.46	4.88
Taiwan	4.27	2.42	1.63	4.08
Israel	7.06	4.53	2.90	2.28
Mean	8.11	3.17	1.78	3.22
Stand deviation	4.59	1.78	1.10	1.84

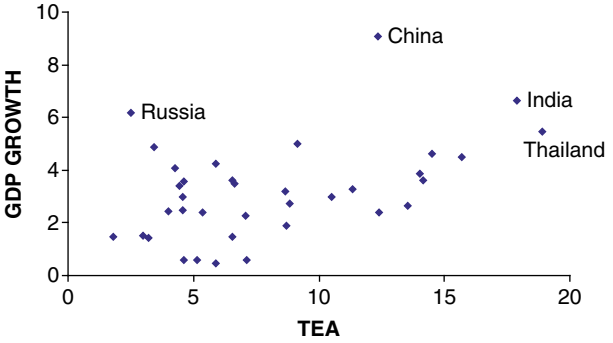

Fig. 5.1 TEA rates versus GDP growth rates

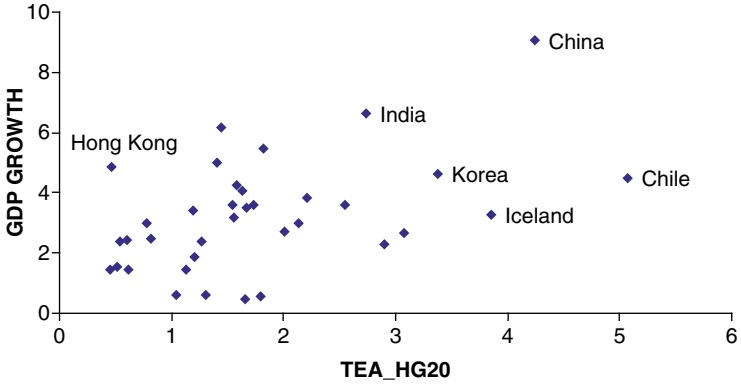

Fig. 5.2 TEA high growth rates (20+) versus GDP growth rates

the period 2002-2005. Furthermore, in Figs. 5.1 and 5.2 the TEA rate and the TEA high-growth rate are plotted against the growth rate of GDP. In these figures, the names of those countries that rank high on TEA and/or on GDP growth are indicated.

From Table 5.1 and Figs. 5.1 and 5.2 it can be seen that the ranking of countries in terms of TEA or TEA high growth may be quite different. For instance, while China ranks ninth in terms of TEA, it ranks second in terms of TEA high growth. In Sect. 5.6 we will investigate whether TEA and TEA high growth affect national economic growth differently.

5.6 Entrepreneurial Growth Ambitions and National Economic Growth

The results of our empirical exercises are shown in Tables 5.2–5.4. In Table 5.2 the regression results of the impact of the general TEA index are presented (5.1), while Tables 5.3 and 5.4 show the results using the TEA medium-growth and TEA high-growth rates as main independent variables (5.2).

The results presented in Table 5.2 confirm the earlier findings by Van Stel et al. (2005) that it is important to distinguish between different groups of countries. While the impact of entrepreneurial activity is significantly positive for rich countries, the impact for poor countries is effectively zero.[9] Furthermore, the data presented in Tables 5.2–5.4 illustrate three important results.

Table 5.2 Explaining economic growth from TEA rate; $N = 36$

TEA	Model 1	Model 2	Model 3
Constant	19.6** (4.2)	26.1** (3.0)	22.2** (2.5)
TEA	0.047 (0.8)		
TEA rich		0.087* (1.8)	
TEA poor		−0.005 (0.1)	
TEA highly developed			0.11** (2.2)
TEA transition			0.19 (1.4)
TEA developing			0.023 (0.2)
log (GNIC)	−2.2** (2.8)	−2.8** (2.7)	−2.4** (2.6)
GCI	0.62 (0.7)	0.64 (0.8)	0.63 (0.7)
Lagged GDP growth	0.37** (2.9)	0.30** (2.1)	0.22 (1.2)
R^2	0.626	0.636	0.662
Adjusted R^2	0.577	0.576	0.592

*Significant at a 0.10 level
**Siginificant at a 0.05 level
Absolute heteroskedasticity-consistent *t* values are between brackets. Dependent variable is average annual growth of GDP over the period 2002–2005. TEA is total entrepreneurial activity rate (*Global Entrepreneurship Monitor*); GCI is growth competitiveness index 2001 (*Growth Competitiveness Report*); GNIC is per capita income of 2001; Lagged GDP growth is average annual growth of GDP over the period 1998–2001

Table 5.3 Explaining economic growth from TEA medium growth rate (growth ambition > 6 employees within 5 years); $N = 36$

TEA medium growth (6+)	Model 1	Model 2	Model 3
Constant	19.8** (4.6)	22.0** (3.5)	21.5** (4.5)
TEA_hg6	0.17 (1.6)		
TEA_hg6 rich		0.22* (1.8)	
TEA_hg6 poor		0.12 (0.9)	
TEA_hg6 highly developed			0.26** (2.2)
TEA_hg6 transition			0.50** (3.1)
TEA_hg6 developing			0.090 (1.0)
log (GNIC)	−2.2** (2.9)	−2.4** (2.7)	−2.4** (3.3)
GCI	0.58 (0.7)	0.58 (0.7)	0.74 (0.9)
Lagged GDP growth	0.35** (2.6)	0.33** (2.3)	0.20 (0.9)
R^2	0.638	0.641	0.679
Adjusted R^2	0.592	0.582	0.612

Notes are as in Table 5.2

[9] Van Stel et al. (2005) refer to a possible lack of (foreign) larger companies in these poorer countries as a possible explanation for the zero effect of entrepreneurial activity.

Table 5.4 Explaining economic growth from TEA high-growth rate (growth ambition > 20 employees within 5 years); $N = 36$

TEA high growth (20+)	Model 1	Model 2	Model 3
Constant	19.8** (4.3)	19.5** (2.9)	20.0** (3.5)
TEA_hg20	0.27 (1.4)		
TEA_hg20 rich		0.25 (1.1)	
TEA_hg20 poor		0.28 (1.0)	
TEA_hg20 highly developed			0.29 (1.3)
TEA_hg20 transition			0.70** (2.7)
TEA_hg20 developing			0.17 (0.8)
log (GNIC)	−2.2** (2.9)	−2.2** (2.3)	−2.3** (2.9)
GCI	0.68 (0.8)	0.68 (0.8)	0.90 (1.1)
Lagged GDP growth	0.34** (2.4)	0.34** (2.3)	0.22 (1.0)
R^2	0.637	0.637	0.667
Adjusted R^2	0.590	0.576	0.598

Notes are as in Table 5.2

First, as hypothesized, the presence of ambitious entrepreneurs seems to be more important for achieving GDP growth than general entrepreneurship. Comparing the coefficients of the various TEA rates across the tables, we see that in each of the three model variants the impact of TEA medium growth (growth ambition of six employees) is greater when compared to the impact of TEA in general. Meanwhile, the impact of TEA high growth (growth ambition of 20 employees) is even greater. For instance, for the group of highly developed countries in model 3, the TEA rate has a coefficient of 0.11 (Table 5.2), while the coefficients of the TEA medium and high growth are 0.26 and 0.29 (Tables 5.3 and 5.4), respectively.

Second, having more entrepreneurs with high-growth ambitions seems to be particularly important in transition countries. Both the magnitude and the statistical significance of the estimated coefficient in transition countries point at a stronger impact than in highly developed or developing countries (see Tables 5.3 and 5.4). There are many reasons that could explain the importance of high-growth entrepreneurs in transition countries (Smallbone and Welter 2006). First, there are many entrepreneurial opportunities in formerly state-dominated sectors. Second, many highly qualified individuals lost their jobs at state-financed organizations (e.g., universities, enterprises, government services). Third, there are many highly qualified (potential) entrepreneurs in these countries (especially in Eastern European countries), who do not face the opportunity costs of working for large public or private organizations. Fourth, those highly qualified (potential) entrepreneurs are also well connected to the power networks that were, and to a large extent still are important in the political and economic arena of these countries, which takes away some barriers for high-growth firms in these countries. Summarizing, it may be argued that in transition economies high-growth opportunities are more widely available and hence, a higher number of ambitious entrepreneurs willing to act on these opportunities may be particularly fruitful for achieving growth in these countries. However, we should be aware of the large diversity in the group of transition countries, which comprises countries such as Russia and China, as well as Hungary and Slovenia.

Third, comparing the coefficients of the various TEA metrics over the three tables, it may be argued that it is important to have a substantial number of entrepreneurs with growth ambitions per se but that it is not so important whether these entrepreneurs expect to employ at least six employees or at least 20 employees. The differences between coefficients in Tables 5.3 and 5.4 are not that large. Also note that the model fit in Table 5.3 (TEA medium growth) is higher than that in Table 5.4 (TEA high growth). Especially in developed countries moderate growth entrepreneurs seem to be important. This might reflect the more mature industry structure in these countries, leaving more space for incremental innovations and moderate growth opportunities than the more dynamic high-growth opportunities that can be found more often in transition countries.

Our regression results should be interpreted with some care as the analysis is based on a limited number of observations (36 countries).[10]

5.7 Discussion and Conclusion

In this chapter we investigated whether the presence of ambitious entrepreneurs is a more important determinant of national economic growth than entrepreneurial activity in general. The results of our empirical exercises suggested that ambitious entrepreneurship contributes more strongly to macroeconomic growth than entrepreneurial activity in general. We found a particularly strong effect for high-expectation entrepreneurship for transition countries.

The intermediate-income or transition countries occupy a special position. Transition economies have a highly educated labor force, a relatively low GDP, and

[10] In particular, results for model 3 in Tables 5.2–5.4 might be sensitive to outliers. As a test of robustness we estimated model 3 leaving out one country at a time, i.e., we computed 36 auxiliary regressions, where each regression uses 35 observations (each time leaving one of the 36 countries out). For TEA, using the full sample, we found a significant positive impact for the highly developed countries (see Table 5.2). In the auxiliary regressions we always found a positive impact for the highly developed countries, which was significant at least at the 10% level, except for the regression excluding Korea. Here, we found a coefficient of.088 and a *t* value of 1.5. Similarly, for TEA medium growth, using the full sample, we found a significant positive impact for both the highly developed and the transition countries (see Table 5.3). In the auxiliary regressions we always found a significant positive impact for the highly developed countries except when Korea was excluded from the sample (coefficient 0.20; *t* value 1.4). For the transition countries we always found a significant positive impact except when China was excluded from the sample (coefficient 0.56; *t* value 1.4). Finally, for TEA high growth, using the full sample, we found a significant positive impact for the transition countries (see Table 5.4). In the auxiliary regressions we always found a significant positive impact, except when China (coefficient 0.76; *t* value 1.2) or India (coefficient 0.60; *t* value 1.4) were excluded. Note, however, that in all these cases, despite their insignificance, the estimated coefficients are close to the full sample estimates in Tables 5.2–5.4. Furthermore, the Jarque-Bera test on the normality of disturbances is passed for all models reported in Tables 5.2–5.4. Therefore, we feel that our results are quite robust to the potential influence of outliers.

a highly turbulent economy. Bartelsman et al. (2005a) have shown that the magnitude of firm creation and destruction is larger in transition countries than in industrial countries: many new smaller firms have been replacing obsolete larger units inherited from the central-planning period. Hungary, Estonia, Latvia, and Slovenia have experienced an especially strong creative destruction process, with strong growth after the entry and a significant contribution by new entry (and exit) to productivity growth (Bartelsman et al. 2005a). New firms in transition countries not only displace obsolete incumbents but also fill in new markets, which were either nonexistent or poorly populated in the past. Our study suggests that in transition countries, especially high-growth entrepreneurs make an important contribution to economic growth. The high degree of environmental dynamism in these countries – which is likely to positively affect the level of growth expectations and realizations of entrepreneurs in these countries (cf. Wiklund and Shepherd 2003) – requires ambitious and well-connected (especially in the Russian and Chinese context) entrepreneurs in order to translate these abundant opportunities in economic growth. This entrepreneurial growth process is facilitated by the relatively high level of human capital but still relatively low opportunity costs of self-employment of the adult population in these countries.

It would be naïve to recommend focusing policy completely on ambitious entrepreneurs and their (potentially) fast-growing firms. Economic growth is most likely achieved with a mix of small but high-growth firms with large, mature firms (Baumol 2002; Nooteboom 1994). On the one hand, the Netherlands, just like most European countries, has sufficient large firms, but seems to be lacking a sufficient number of high-growth new firms (Bartelsman et al. 2005b). On the other hand, our analyses show that rich and highly developed countries like the Netherlands may have more to gain (with respect to economic growth) with entrepreneurial activity in general, and perhaps a focus on moderately ambitious entrepreneurs, than with just stimulating high-growth entrepreneurs.

In this chapter we assumed that the presence of ambitious entrepreneurs leads to economic growth via the successful development of their firms. Indeed, our empirical analysis does suggest that high-expectation entrepreneurs contribute more strongly to economic growth at the *macrolevel* than entrepreneurs in general. This effect seems to be particularly strong in transition countries. However, we could not directly trace the assumed success at the *microlevel* of analysis. It would be worthwhile to follow the high-potential start-ups to establish whether such firms fulfill their promised potential and what factors influence their subsequent success or failure. Such research would cast light on the nature of firm growth, including the characteristics of individuals involved, the effect of environmental factors, and the long-term developmental effects of these high-potential start-ups. We should also be careful not to regard high ambitions as valuable in itself, as entrepreneurs may also be too ambitious in comparison with the financial resources that they have access to, which leads to a premature death of the new firm (Littunen 2000). If the ambitions would turn out to be unrealistic it could even be the case that the overoptimistic entrepreneurs actually contribute negatively to macroeconomic growth: social welfare would even be enhanced by discouraging entry into entrepreneurship (DeMeza 2002). Understanding the transition from growth ambitions into growth

realizations allows more effective policies to be drawn to encourage and stimulate entrepreneurial activities with growth potential. To this end more longitudinal research at the microlevel will be required.

Acknowledgment This chapter has been written in the framework of the SCALES research program carried out by EIM and financed by the Dutch Ministry of Economic Affairs.

References

Acs, Z.J., Audretsch, D.B., Braunerhjelm, P. and Carlsson, B. (2005): "Growth and Entrepreneurship: An Empirical Assessment," *Max Planck Institute Discussion Paper #32-2005*. Jena, Germany: Max Planck Institute of Economics.

Audretsch, D.B. (2003): "Standing on the Shoulders of Midgets: The U.S. Small Business Innovation Research Program (SBIR)." *Small Business Economics* 20(2): 129–135.

Audretsch, D.B. (2007): *The Entrepreneurial*Entrepreneurial *Society.* Oxford: Oxford University Press.

Audretsch, D.B. and Fritsch, M. (2002): "Growth Regimes Over Time and Space." *Regional Studies* 36: 113–124.

Audretsch, D.B. and Lehmann E.E.(2005): "Mansfield's Missing Link: The Impact of Knowledge Spillovers on Firm Growth." *Journal of Technology*Technology *Transfer* 30(1-2): 207–210.

Audretsch, D.B. and Thurik, A.R. (2000): "Capitalism and Democracy in the 21st Century: From the Managed to the Entrepreneurial Economy." *Journal of Evolutionary Economics* 10: 17–34.

Bartelsman, E., Haltiwanger, J. and Scarpetta, S. (2005a): *Microeconomic Evidence of Creative Destruction in Industrial and Developing Countries*. Washington, DC: World Bank.

Bartelsman, E., Scarpetta, S. and Schivardi, F. (2005b): "Comparative Analysis of Firm Demographics and Survival: Evidence from Micro-Level Sources in OECDOECD Countries." *Industrial and Corporate Change* 14: 365–391.

Baum, J.A.C. and Silverman, B.S. (2004): "Picking Winners or Building Them? Alliance, Intellectual, and Human Capital as Selection Criteria in Venture Financing and Performance of Biotechnology Startups." *Journal of Business Venturing* 19: 411–436.

Baumol, W. (2002): *The Free-Market*Market *Innovation*Innovation *Machine: Analyzing the Growth Miracle of Capitalism.* Princeton: Princeton University Press.

Bellu, R.R. and Sherman, H. (1995): "Predicting Business Success from Task Motivation and Attributional Style: A Longitudinal Study," *Entrepreneurship*Entrepreneurship *and Regional Development* 7: 349–363.

Birch, D.L. (1979): *The Job Generation Process*. Cambridge, MA: MIT Program on Neighborhood and Regional Change.

Bosma, N. and Wennekers, S. (2003): "Trends in het Nederlandse Starters- en ondernemersklimaat," In: Hulsink, W., Manuel, D. and Stam, E. (Eds.) *Ondernemen in Netwerken*. Assen: Van Gorcum, pp. 15–34.

Bridge, S., O'Neill, K. and Cromie, S. (2003) *Understanding Enterprise*Enterprise*, Entrepreneurship*Entrepreneurship *and Small Business* (2nd edn). Basingstoke: Macmillan.

Buss, T.F. (2002): "Emerging High-Growth Firms and Economic Development Policy.Policy" *Economic Development Quarterly* 16: 17–19.

Chesbrough, H. (1999): "The Organizational Impact of Technological Change: A Comparative Theory of National Institutional Factors." *Industrial and Corporate Change* 8: 447–485.

Davidsson, P. (1989): "Entrepreneurship and After? A Study of Growth Willingness in Small Firms," *Journal of Business Venturing* 4: 211–226.

Davidsson, P. (1991): "Continued Entrepreneurship: Ability, Need, and Opportunities as Determinants of Small Firm Growth." *Journal of Business Venturing* 6: 405–429.

De Clercq, D., Zegers, D. and Crijns, H. (2003): "Menselijk kapitaal, sociaal kapitaal, faalangst en ondernemerschap," In: Hulsink, W., Manuel, D. and Stam, E. (Eds.), *Ondernemen in Netwerken*. Assen: Van Gorcum, pp. 123–140.

De Meza, D. (2002): "Overlending?" *Economic Journal* 112(477): F17–F31.

Dongen, B.M., Van Derksen, H.T.P. and Van Diemen, A.E.A.R.A.E.A.R. (2005): Eindevaluatie BioPartner-programma. The Hague: Department of Economic Affairs.

DTIDTI (1998): *Our Competitive*Competitive *Future: Building the Knowledge*Knowledge Driven Economy, Government White *Paper*. London: Department of Trade and Industry.

EFEREFER (1998): *Europe*Europe*'s 500 Honorary Listing 1998: Europe's Most Dynamic Entrepreneurs*. Brussels: European Foundation for Entrepreneurial Studies.

Ehrhardt, J.C., Van Gelderen, P., De Jong, J.C.J., Ten Klooster, H.P. and Kuipers, J.W. (2004): *Snelle groeiers en innovatie [High Growth Firms*Firms *and Innovations]*. Den Haag: Ministerie van Economische Zaken.

EIMEIM (2002): *Entrepreneurship*Entrepreneurship *in the Netherlands*Netherlands*. Innovative Entrepreneurship. New Policy Challenges!* Zoetermeer/Den Haag: EIM/Ministry of Economic Affairs.

European Commission (2003a): *Benchmarking Enterprise Policy. Results from the 2002 Scoreboard*. Luxembourg: Office for Official Publications of the European Communities.

European Commission (2003b): *Green Paper Entrepreneurship*Entrepreneurship *in Europe*Europe. Luxembourg: Office for Official Publications of the European Communities.

Fischer, E. and Reuber A.R. (2003): "Support for Rapid-Growth Firms: A Comparison of the Views of Founders, Government Policymakers, and Private Sector Resource Providers." *Journal of Small Business Management* 41: 346–365.

Friar, J., and Meyer M.(2003): "Entrepreneurship and Start-Ups in the Boston Region: Factors Differentiating High-Growth Ventures from Micro-Ventures." *Small Business Economics* 21: 145–152.

Fritsch, M., and Mueller P.(2004): "The Effects of New Business Formation on Regional Development Over Time." *Regional Studies* 38: 961–975.

Gallagher, C. and Miller, P. (1991): "New Fastgrowing Companies Create Jobs.Jobs" *Long Range Planning* 24: 96–101.

Hart, D. (2007): "The Social Context for High-Potential Entrepreneurship in the US: An Historical-Institutional Perspective." Paper prepared for *UMSL-Shibusawa Seminar on Comparative International Entrepreneurship*Entrepreneurship, St. Louis.

Henrekson, M. and Johansson, D. (2008): Gazelles as Job Creators - A Survey and Interpretation of the Evidence. *IFN Working Paper* 733. Stockholm: Research Institute of Industrial Economics.

Hulsink, W. and Elfring, T. (2000): "Innovatieve clustervorming: het twinning-concept als voorbeeld," In: Bouwman, H. and Hulsink, W. (Eds.) *Silicon Valley in de Polder*. Utrecht: Lemma.

Ingebretsen, M. (2002) *NASDAQ: A History of the Market*Market *That Changed the World*. Roseville, CA: Forum.

Kay, J. (2004): *The Truth About Markets. Why Some Nations Are Rich but Most Remain Poor*. London: Penguin Books.

Kemp, R., Nieuwenhuijsen, H. and Bruins, A. (2000): *Bedrijvendynamiek, snelgroeiende bedrijven en regionaal-economische ontwikkeling*. Zoetermeer: EIMEIM Business and Policy Policy Research.

Kirchhoff, B.A. (1994): *Entrepreneurship*Entrepreneurship *and Dynamic Capitalism*. Westport, CT: Praeger.

Lerner, J. (2003): "The Government as Venture Capitalist: The Long-Run Effects of the SBIR Program." *Journal of Business* 72(3): 285–297.

Littunen, H. (2000): "Networks and Local Environmental Characteristics in the Survival of New Firms.Firms" *Small Business Economics* 15: 59–71.

Littunen, H. and Thomo T. (2003): "The High Growth in New Metal-Based Manufacturing and Business Service Firms in Finland.Finland" *Small Business Economics* 21(2): 187–200.

Mason, C.M. (1985): "The Geography of 'Successful' Small Firms in the United Kingdom.United Kingdom" *Environment and Planning A* 17: 1499–1513.

McArthur, J.W. and Sachs, J.D. (2002): "The Growth Competitiveness Index: Measuring Technological Advancement and the Stages of Development." In: Porter, M.E.Porter, Sachs, J.D., Cornelius, P.K., McArthur, J.W. and Schwab K.(Eds.), *The Global Competitiveness Report 2001-2002.* New York: Oxford University Press, pp. 28–51.

Miner, J.B., Smith, N.R. and Bracker, J.S. (1994): "Role of Entrepreneurial Task Motivation in the Growth of Technologically Innovative Businesses: Interpretations from Follow-Up Data." *Journal of Applied Psychology* 79(4): 627–630.

Ministerie Van Economische Zaken (1999a): *De Ondernemende Samenleving. Meer Kansen, Minder Belemmeringen voor Ondernemerschap*. The Hague: Department of Economic Affairs.

Ministerie Van Economische Zaken (1999b): *Toets op het concurrentievermogen 2000*. The Hague: Department of Economic Affairs.

Ministerie Van Economische Zaken (2003): *In actie voor ondernemers!* The Hague: Department of Economic Affairs.

Ministerie Van Economische Zaken (2004): *Meer actie voor ondernemers! Doelstellingen ondernemerschapsbeleid en voortgang acties*. The Hague: Department of Economic Affairs.

Ministerie Van Economische Zaken (2005): *Meer actie voor ondernemers!* Voortgangsrapportage 2005. The Hague: Department of Economic Affairs.

Nooteboom, B. (1994), "Innovation and Diffusion in Small Firms: Theory and Evidence." *Small Business Economics* 6: 327–347.

Owen, G. (2004): "Where Are the Big Gorillas? High Technology Entrepreneurship in the UK and the Role of Public Policy." *Discussion Paper Interdisciplinary Institute of Management*, London School of Economics, London.

Pages, E.R., Freedman, D. and Von Bargen, P. (2003): "Entrepreneurship as a State and Local Economic Development Strategy.Strategy" In: Hart, D. (Ed.), *Entrepreneurship Policy*Policy. Cambridge: Cambridge University Press, pp. 240–259.

Peeters, H. and Verhoeven, W. (2005): *Internationale Benchmark Ondernemerschap 2004.* Zoetermeer: EIMEIM Business and Policy Research.

Reynolds, P., Storey, D. and Westhead, P. (1994): "Cross-National Comparisons of the Variation in New Firm Formation Rates." *Regional Studies* 28: 443–456.

Santarelli, E. and Vivarelli M. (2002): "Is Subsidizing Entry an Optimal Policy?" *Industrial and Corporate Change* 11(1): 39–52.

Saxenian, A. (2002): "Silicon Valley's New Immigrant High-Growth Entrepreneurs." *Economic Development Quarterly* 16(1): 20–31.

Schreyer, P. (2000): "High-Growth Firms and Employment.Employment" *STI Working Paper 2000/2*. Paris: OECDOECD.

Schumpeter J.A. (1934): *The Theory of Economic Development.* Cambridge, MA: Harvard University Press.

Smallbone, D. and Welter, F. (2006): "Conceptualising Entrepreneurship in a Transition Context." *International Journal of Entrepreneurship*Entrepreneurship *and Small Business* 3(2): 190–206.

Smallbone, D., Baldock R. and Burgess S. (2002): "Targeted Support for High-Growth Start-Ups: Some Policy Issues." *Environment and Planning C* 20(2): 195–209.

Stam, E. (2005): "The Geography of Gazelles in the Netherlands.Netherlands" *Tijdschrift voor Economische en Sociale Geografie* 96(1): 121–127.

Stam, E. and Schutjens, V. (2006): "The Fragile Success of Team Start-Ups." In: Oakey, R., During, W. and Kauser, S.(Eds.), *New Technology*Technology-*Based Firms*Firms *in the New Millennium*, Vol. V. Oxford: Elsevier Science, pp. 219–233.

Stam, E., Suddle, K., Hessels, S.J.A. and Van Stel, A. (2007) "Los emprendedores con potencial de crecimiento y el desarrollo económico. Políticas públicas de apoyo a los emprendedores." *Ekonomiaz Revista Vasca de Economia* 62.2: 124–149.

Stam, E., Gibcus, P., Telussa, J. and Garnsey, E. (2008) "Employment Growth in New Firms' First Decade." In: Landström, H. (Ed.) *Entrepreneurship*Entrepreneurship*, Sustainable Growth and Performance*Performance*: Frontiers in European Entrepreneurship Research*. Cheltenham: Edward Elgar, pp. 324–351.

Storey, D.J. (1997): *Understanding the Small Business Sector*. London: International Thomson Business Press.

Storey, D.J. (2003): "Entrepreneurship, Small and Medium Sized Enterprises and Public Policies." In: Acs, Z.J. and Audretsch, D.B. (Eds.), *Handbook of Entrepreneurship*Entrepreneurship *Research.* Boston, MA: Kluwer Academic, pp. 473–514.

Storey, D.J. (2006): "Evaluating SME Policies and Programmes: Technical and Political Dimensions," In: Casson, M., Yeung, B., Basu, A. and Wadeson N.(Eds.), *Oxford Handbook of Entrepreneurship.*Entrepreneurship Oxford: Oxford University Press.

Storey, D.J. and Tether B.S.(1998): "Public Policy Measures to Support New Technology-Based Firms in the European Union.European Union" *Research Policy* 26: 1037–1057.

Van Stel, A.J.and Van Storey, D.J. (2004): "The Link Between Firm Births and Job Creation: Is There a Upas Tree Effect?" *Regional Studies* 38: 893–909.

Van Stel, A.J. and Van Suddle, K. (2008): "The Impact of New Firm Formation on Regional Development in the Netherlands.Netherlands" *Small Business Economics* 30(1): 31–47.

Van Stel, A.J., Van Carree, M.A. and Thurik A.R. (2005): "The Effect of Entrepreneurial Activity on National Economic Growth.Economic Growth" *Small Business Economics* 24: 311–321.

Verhoeven, W.H.J., Kemp, R.G.M. and Peeters, H.H.M. (2002): *"Het effect van beleid voor (innovatieve) starters en snelle groeiers op de ontwikkeling van de arbeidsproductiviteit" [The effect of policy for (innovative) start-ups and high growth firms on the development of the labor productivity]*. Zoetermeer: EIMEIM Business and Policy Research.

Vivarelli, M. (2004): "Are All the Potential Entrepreneurs So Good?" *Small Business Economics* 23(1): 41–49.

Von Bargen, P., Freedman, D. and E.R. Pages (2003): "The Rise of the Entrepreneurial Society." *Economic Development Quarterly* 17(4): 315–324.

Welter, F. (2001): "Who Wants to Grow? Growth Intentions and Growth Profiles of (Nascent) Entrepreneurs in Germany," In: Bygrave, W.D., Autio, E., Brush, C.G., Greene, P.G., Reynolds, P.D. and Sapienza, H.J., *Frontiers of Entrepreneurship*Entrepreneurship *Research 2001.* Wellesley, MA: Babson College.

Wennekers, A.R.M. and Thurik A.R.(1999): "Linking Entrepreneurship and Economic Growth," *Small Business Economics* 13(1): 27–55.

Wiklund, J. (2001): "Growth Motivation and Its Influence on Subsequent Growth," In: Bygrave, W.D., Autio, E., Brush, C.G., Greene, P.G., Reynolds, P.D. and Sapienza, H.J., *Frontiers of Entrepreneurship*Entrepreneurship *Research 2001.* Wellesley, MA: Babson College, pp. 101–112.

Wiklund, J. and Shepherd, D. (2003): "Aspiring for, and Achieving Growth: The Moderating Role of Resources and Opportunities," *Journal of Management Studies* 40(8): 1919–1941.

Wong, P., Ho Y.and Autio E.(2005): "Entrepreneurship, Innovation and Economic Growth: Evidence from GEM Data." *Small Business Economics* 24(3): 335–350.

Chapter 6
Entrepreneurship Policies: Principles, Problems, and Opportunities

Charlie Karlsson and Martin Andersson

6.1 Introduction

Today, entrepreneurship policies are a hot topic among policymakers all around the globe, despite being a relatively recent phenomenon (Audretsch 2002). A search of the Internet March 2008 gave more than 7.6 million hits for entrepreneurship policy/policies. Researchers also pay a substantial interest to the subject, with a Google Scholar search giving more than 60,000 hits. Why this large interest in entrepreneurship policies? One obvious explanation is the rapid globalization in recent years, which fundamentally changed the comparative advantages for countries and regions and the world's competitive climate. While rich western countries lost their comparative advantages in labor-intensive manufacturing and in some service sectors,[1] they gained comparative advantages in knowledge-based economic activities. However, the preferred locations of the new knowledge-based activities differ from the traditional manufacturing locations. The parallel emergence of knowledge-based agglomerations with a high volume of entrepreneurial activities and decline of employment in many traditional manufacturing regions has of course intrigued policymakers and researchers, thus stimulating the development of a rich flora of entrepreneurship policies as well as a large volume of research on entrepreneurship and entrepreneurship policies.

Verheul et al. (2001, p. 3) remark that "there is very little that generates consensus in the field of entrepreneurship." We claim that "there is very little that generates

C. Karlsson (✉) and M. Andersson
Department of Economics, Internationella Handelshögskolan,
Jönköping International Business School, P.O. Box 1026, SE-551 11 Jönköping, Sweden
e-mail: charlie.karlsson@jibs.hj.se

[1] In a parallel process, developing countries in particular in Asia have gained comparative advantages in the same industries.

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_6,

consensus in the field of entrepreneurship policies," even if it seems to be consensus that policy measures can influence the level of entrepreneurship (Storey 1991, 1994). However, it is not obvious which economic policies should be labeled entrepreneurship policies. Reyolds et al. (1994) define entrepreneurship policies as policies which

1. encourage economic agents to conceptualize business ideas;
2. facilitate the entry of new businesses;
   - Indirect measures, i.e., the facilitation of entry by modifications or improvements of institutions, regulations, and/or infrastructures
   - Direct measures, i.e. the facilitation of entry by measures directly targeting economic agents, which potentially might start a business
1. facilitate the growth of businesses; and
2. facilitate the exit of businesses.

This definition is consistent with the definition suggested by Lundström and Stevenson (2001, p. 19): "Entrepreneurship policy consists of measures taken to stimulate more entrepreneurial behavior in a region or a country …. We define entrepreneurship policy as those measures intended to directly influence the level of entrepreneurial vitality in a country or region." Thus, entrepreneurship policies focus on the process of change.

The definition implies that we do not include general macroeconomic policies with the entrepreneurship policies even if such policies and a number of other policies obviously influence the level of entrepreneurship. As we will show in this paper, there is a need for both a wide and a narrow definition of entrepreneurship policies.

Going through the scientific literature on entrepreneurship policies, one is struck by certain features. First, it is obvious that some authors see policies directed towards small businesses as entrepreneurship policies even if some authors such as Audretsch (2002) stress that an important distinction should be made between traditional small business policies and entrepreneurship policies. Small businesses per se have nothing to do with entrepreneurship. Many businesses must remain small given the product they supply and their accessible demand. Second, there is a general lack in the literature of the fundamental principles, problems, and opportunities of entrepreneurship policies.

There are several fundamental questions pertaining to entrepreneurship policies:

- What is, for example, the optimal rate of entrepreneurship?
- As all other public policies, entrepreneurship policies should focus on remedying existing market failures. This leads to the question, what are the fundamental market failures?
- What are the risks of policy failures and how can they be avoided?
- What entrepreneurship policies to pursue to remedy market failures and to avoid policy failures?
- Entrepreneurial activities are located but different locations offer very different conditions for entrepreneurship and the factors stimulating entrepreneurship

tend to differ between different locations. This implies that there is a need for different entrepreneurship policies in different types of locations. How can this be achieved?

The purpose of the current chapter is to discuss and assess the above questions. The chapter is organized as follows: In Sect. 6.2 we discuss the economic problems facing economic agents intending to start or expand a business or to let their business leave the market. The question of the optimal rate of entry, growth, and exit of businesses is discussed in Sect. 6.3. The issue of market failures is dealt with in Sect. 6.4. We then turn to policy failures in Sect. 6.5. Our conclusions are presented in Sect. 6.6.

6.2 The Entry, Growth, and Exit of Firms as an Economic Problem

Decisions by economic agents[2] to start or expand a firm or to let their firm leave the market are economic decisions concerning the future; i.e., they are based upon expectations concerning the expected lifetime of the firm (L). From an economic point of view a risk-neutral economic agent will start a firm, if the following surplus or profit condition holds:

$$\left[\int_{t_0}^{L}\left[E\left(p_t\right)E\left(q_t\right)-E\left(q_t\right)E\left(c_t\right)\right]\mathrm{e}^{-\delta t}\,\mathrm{d}t-E\left(C_0\right)\right]$$
$$\left[1-E\left(\tau_{\mathrm{F}}\right)\right]>\left[1-E\left(\tau_{\mathrm{O}}\right)\right]\int_{t_0}^{L}E\left(Y_t\right)\mathrm{e}^{-\delta t}\,\mathrm{d}t+R \tag{6.1}$$

where $E(p_t)$ is the expected product price, $E(q_t)$ is the expected sales volume, $E(c_t)$ is the expected unit cost, $E(C_0)$ is the expected fixed start-up cost, $E(\tau_{\mathrm{F}})$ is the expected average effective tax on business incomes, $E(Y_t)$ is the expected opportunity income, $E(\tau_{\mathrm{O}})$ is the expected average tax on the opportunity income, R is the risk premium demanded by the economic agent to take the risk to start a firm, and $\mathrm{e}^{-\delta t}$ is the discount factor for future costs and incomes. This simple formulation illustrates that entrepreneurship policies can influence the probability that economic agents under given macroeconomic conditions will start new firms in several ways. They can focus the costs of running a firm c_t, the costs to start a firm C_0, the tax burden of firms and business owners τ_{F}, and the risk R, taken by economic agents who start new firms.

The economic decision to let an existing firm grow can be analyzed in a similar manner:

[2] In the entrepreneurship literature there is much focus on the entrepreneur as an individual. By using the more general concept of an economic agent, we stress that the entrepreneur can also be a group of people, a firm, or a group of firms.

$$\left[\int_{t_G}^{L_2}\left[E\left(p'_t\right)E\left(q'_t\right)-E\left(q'_t\right)E\left(c'_t\right)\right]e^{-\delta t}\,dt-E\left(C_G\right)\right]$$
$$>\int_{t_G}^{L_1}\left[E\left(p_t\right)E\left(q_t\right)-E\left(q_t\right)E\left(c_t\right)\right]e^{-\delta t}\,dt+R_G \tag{6.2}$$

where $E(p_t')$, $E(q_t')$, and $E(c_t')$ are the (expected) price, output, and unit cost after the firm has grown, $E(C_G)$ is the investment cost associated with the expansion of the firm and R_G is the risk premium demanded by the economic agent to let the firm grow. The question of whether the firm will grow or not is considered at time t_G and we assume that an investment in the expansion of the firm might change the time horizon from L_1 to L_2. We see clearly that entrepreneurship policies focusing the costs to run a firm, the costs to make a firm grow, and the risk taken by economic agents who are interested in letting their firms grow can stimulate firm growth.

The third type of economic decision we consider here is the exit decision. This decision might be analyzed using the following formulation:

$$\left[\int_{t_E}^{L}\left[E\left(p_t\right)E\left(q_t\right)-E\left(q_t\right)E\left(c_t\right)\right]e^{-\delta t}\,dt\right]\left[1-E\left(\tau_F\right)\right]$$
$$>\left[1-E\left(\tau_O\right)\right]\int_{t_E}^{L_2}\left[E(Y_t)+E(K_E)E(r_t)\right]e^{-\delta t}\,dt \tag{6.3}$$

where $E(K_E)$ is the expected net value of the firm. The expected net value can either be the expected scrap value after the expected fixed costs for closing down the business or the expected sales value of the firm after expected sales costs. $E(r_t)$ is the expected rate of return from investing the expected net value of the firm in the capital market or in another venture and t_E is the time when the decision is considered. The obvious entrepreneurship policies to stimulate the exit of firms are on the one hand to keep the costs of closing down a business at a reasonable level and on the other hand to provide an efficient market infrastructure for successful business owners who want to sell their business or to make an IPO.

An analysis of entrepreneurial decisions as pure economic decisions does not imply that economic factors are the only factors determining such decisions. On the contrary, there is a rich literature convincingly showing that other factors influence such decisions (see, for example, Gimeno et al. 1997; Hamilton 2000; Scott Morton and Podolny 2002; Baden-Fuller 1989). However, we claim that these other factors are either difficult or impossible to influence by economic policies alone and that entrepreneurship policies, to the extent they are needed, should focus the involved economic factors.

The framework presented above can serve as a general background for a discussion of entrepreneurship policies. It focuses on the central entrepreneurial decision, which is about comparing different alternatives with different risk–reward profiles. It illustrates that government can influence the general conditions for entrepreneurship by influencing the demand side, i.e., changing the opportunities for entrepreneurship, or the supply and cost side in the economy, i.e., changing the resources

available for entrepreneurship and their costs. Furthermore, the government can influence the costs of entrepreneurial actions and it can influence the risk level experienced by entrepreneurs.

6.3 The Actual vs. the Optimal Rate of Entrepreneurship

For entrepreneurship policies to make sense, the actual rate of entrepreneurship must diverge from the optimal rate of entrepreneurship, where the rate of entrepreneurship represents the entry, the growth, and the exit of firms. In this section, we discuss the concept of the optimal rate of entrepreneurship and some fundamental reasons as to why the actual rate of entrepreneurship might diverge from the optimal rate. We discuss the role of the institutional framework, the size of the public sector, and the role of taxes for the actual rate of entrepreneurship. The actual rate of entrepreneurship is also influenced by the existence of different types of market failures. The influence of market failures on the actual rate of entrepreneurship is discussed in Sect. 6.4.

6.3.1 The Optimal Rate of Entrepreneurship

Reading the most popular literature on entrepreneurship policy, one quickly gets the impression that the rate of entry of firms and the propensity of firms to grow are too low, while the exit rate is too high. Although this may be true in some countries and regions, it is not a universal truth. Theoretically one identifies cases where the polar opposite is true: too many firms are formed and too few firms exit. In an optimal situation, the rate of entry should be at the level where the marginal social revenue of an entry equals the marginal social cost. Similar conditions should prevail for firm growth and exit of firms.

When analyzing the effect of various factors on the level of entrepreneurship, it is essential to distinguish between the observed actual rate of entrepreneurship resulting from the short-term interaction between supply and demand, and the long-run optimal equilibrium rate determined by the overall state of the economy, e.g., demography, technology, industrial structure, and market structure in different industries. However, there is no general agreement about what factors determine the equilibrium rate of entrepreneurship (Lucas 1978; de Wit and van Winden 1991).[3,4]

Of course, the actual rate of entrepreneurship can deviate from the optimal equilibrium rate. In a well-functioning market economy market forces should, in principle, ensure that deviations disappear. When the rate of entrepreneurship is higher than

[3] Carree et al. (2002) provide theoretical and empirical evidence of a long-term U-shaped relationship between the stage of economic development of an economy and the equilibrium rate of entrepreneurship.

[4] Given that the level of entrepreneurship in an economy influences economic, productivity and employment growth (Karlsson and Nyström 2007), governments may of course based upon political goals define their own "optimal" levels of entrepreneurship.

the optimal rate, firms face lower profitability due to higher competition, which results in higher exit or failure rates and correspondingly lower entry rates. However, there are reasons to believe that the rate of entrepreneurship and in particular the rate of entry may be too high for extended periods. It might, for example, be the case that the rate of entry is too high since the entering firms do not internalize the rents they destroy by displacing incumbents (Boadway and Tremblay 2005). This is an example of a negative external effect. In particular, the rate of entry might be too high when economic agents compete to be the first to make an innovation (Futia 1980), or when product markets are imperfectly competitive (Parker 2007). In the latter case, competition generates too much product diversity, and too little informative advertising (Grossman and Shapiro 1984). Parker (2007) presents two more reasons as to why the rate of entrepreneurship might be too high: (1) excessive participation in entrepreneurship owing to problems of asymmetric information in credit markets (de Meza and Webb 1987, 1988, 1989, 1990, 1999, 2000; Boadway and Keen 2002), and (2) over-optimism by entrepreneurs (Manove and Padilla 1999; Coelho et al. 2004; Arabsheibani et al., 2000; Puri and Robinson 2005; Cooper et al. 1988; Pinfold 2001).

6.3.2 Institutions and the Rate of Entrepreneurship[5]

The actual and the optimal rate of entrepreneurship in a market economy as well as the speed with which any gap between the two will be closed depend on the quality of the institutional framework of the specific economy, which consists of formal and informal institutions. The institutional framework consists of constitutions, laws, regulations, and collective agreements, to name a few. The formal institutional framework has two basic functions (North 1990). First, it determines how well the property rights of all economic agents in the economy are guaranteed and protected. Second, it determines the transaction costs in the economy, which includes, but is not limited to, the costs of finding trading partners, negotiating contracts, inspecting transactions, and taking legal actions when contracts are not fulfilled. It is the primary responsibility of government to see that economic agents can operate within a proper institutional framework. The reason is that the institutional framework defines the incentives for economic agents to transform their business ideas to action, and determines to what extent unnecessary barriers will hamper them (Carree and Thurik 2003).

The institutional framework contains both general and specific institutions. The general institutions apply for all markets, while the specific institutions apply to specific markets and products. General institutions, for example, regulate the general rules, which apply to the entry and exit of firms in an economy. Specific institutions

[5] "The importance of institutions for the development of entrepreneurship is paramount and deserves further study." (Carree and Thurik 2003, p. 465)

may on the other hand regulate the entry and exit of firms in a specific sector, such as nuclear power production, to take an extreme example. All markets need institutions, the common rules and regulations, to properly function properly. Dysfunctional markets where, for example, the rate of entrepreneurship is too high or too low compared to the optimal rate, often have dysfunctional institutions, which in some cases is the same as an absence of rules and regulations. The deregulation of some markets seems, for example, to have generated too high a rate of entrepreneurship because of the lack of a proper institutions being introduced.

6.3.3 The Public Sector and the Rate of Entrepreneurship

One important factor influencing the rate of entrepreneurship in the economy is the size of the public sector. There are basically three major reasons why one should expect a connection between the size of the public sector, reflected in the total overall tax rate, and the rate of entrepreneurship. First, the larger the public sector, the smaller the accessible market for potential entrepreneurs. Because the public sector not only finances a number of service activities but, in many economies, it organizes the production in publicly held organizations. Second, a generous social security system influences the individual incentives to become entrepreneurs. Third, generous social security systems, with broad coverage, reduce the incentives for individuals to save, which consequently reduces individual possibilities to become entrepreneurs since access to own savings is important to be able to establish entrepreneurial ventures (Henreksson 2005). Cross-country studies show that there is a negative relationship between the size of the public sector and the rate of entrepreneurship (Bjørnskov and Foss 2008; Nyström 2007).

6.3.4 Taxes and the Rate of Entrepreneurship

The effects of taxes on the rate of entrepreneurship are not clear-cut. On the one hand, one can claim that taxes reduce the profitability of entrepreneurship, which impedes new firm start-ups as well as the expansion of established firms (OECD 1998). Furthermore, high marginal income taxes and high corporate taxes may in particular penalize rapidly growing firms (Verheul et al. 2001). On the other hand, there is the possibility that new firms are started to avoid taxes. Firm owners have the possibility to hide some income from the tax authorities, to let the firm pay for some consumption and to transfer income of work to income of capital (Parker 1996; Hall and Sobel 2006). Empirical studies in a number of European contexts indicate that taxes have a negative influence on the entry, survival, and growth of firms (Rees and Shah 1994; Poutziouris et al. 2000). Storey (1994) emphasizes that since the tax system reduces the funds available to business owners, the growth of new and small firms is retarded since such growth mainly is financed by reinvested profits.

However, it is not only the general tax level that matters for entrepreneurship. One also has to consider the effect of various types of taxes on the rate of entrepreneurship (Verheul et al. 2001). High taxes on dividends may, for example, lead to a reliance on retained earnings to finance growth. Accordingly, there will be fewer ventures for risk capital firms to finance. Overall, there are plenty of examples of how the tax system can generate distortions in an economy and in different markets (Davis and Henrekson 1999).

6.4 Market Failures and Entrepreneurship Policies

Ever since Adam Smith laid the foundation of modern economics, it has been a widespread opinion among economists that an economic system with free markets can achieve an effective resource allocation, the Pareto optimality. It is one of the great achievements of modern welfare theory that it has shown what conditions that must be fulfilled for such a conclusion to hold in theory. In the welfare theory it has been proven that the conditions for Pareto optimality are fulfilled in perfect competition equilibrium, a system where

1. all consumers within the limit of their budgets and given market prices chose the combination of consumer products that maximizes their utility,
2. all firms under given market prices and given production technologies chose that combination of inputs and outputs that maximizes their profits, and
3. the prices are the same for all consumers and all firms and are such that all markets are cleared, i.e., demand equals supply in all markets.

In such an economy there is no need for any entrepreneurship policies and, strictly speaking, there are no entrepreneurs. However, the strict assumptions underlying the perfect competition equilibrium are not fulfilled in the real world. There are a number of market failures, which implies that the Pareto optimality is never achieved. In terms of entrepreneurship, such situations imply that the rate of entrepreneurship might be both below and above the optimal rate. This is an important observation and it implies that the assumed positive link between entrepreneurship and the economic performance of countries and regions does not automatically justify public policy intervention (Audretsch 2002). The mandate for public policy intervention must be motivated by the existence of fundamental sources of market failure. When market failures prevail, there is a gap between the evaluation of entrepreneurial activities by private economic agents and the value of such activities from a social point of view. In the sequel, we discuss various types of market failures and their implications for entrepreneurship policies.

However, it is important to realize that market failure is neither a necessary nor a sufficient condition for government action (Auerswald 2007). One reason is that the market outcome of a perfectly competitive market is not necessarily an equitable one. Naturally, concerns over equity can be a legitimate motivation for government action. However, from some aspects an unequitable market outcome is ultimately a market failure. More problematic is that if rigorously defined, market failures are

present almost everywhere. Furthermore, as we will discuss in Sect. 6.5, there is no guarantee that the policies implemented will be optimal. We also have the problem with the second-best, which implies that in an economy where many markets exhibit market failures, it is not given that policies trying to alleviate market failures in one market is the optimal policy response for all. Actually, one might claim that entrepreneurship and entrepreneurship policy exist in a world of second-best options and that entrepreneurship policies should address the various challenges that entrepreneurs face, such as uncertainty, asymmetric information, indivisibilities, and high transaction costs (Auerswald 2007).

6.4.1 Information Failures

There are multiple types of information failures with strong implications for entrepreneurship policies. The first type is the well-known case with asymmetric information (Akerlof 1970). Asymmetric information characterizes a number of markets and implies that economic actors on both the demand and supply side either do not have or possibly cannot get full information about the product involved. One obvious example is the market for entrepreneurial ideas, which does not work as a free market because of existing asymmetric information. It is certainly not obvious whether economic agents possessing an entrepreneurial idea emanating from technological and/or entrepreneurial knowledge should try to appropriate returns from that knowledge, transforming it into an innovation, by becoming entrepreneurs. They may not possess the necessary skills, motivation, and/or financial resources. The natural thing to do in such a situation would be to try to sell the idea to an existing firm or to another economic agent who might be interested in becoming an entrepreneur. The problem is that it often is difficult to find buyers to new entrepreneurial ideas, since the buyer may not be able to evaluate the idea's potential. This implies that the best way to appropriate returns from such mixtures of technological and entrepreneurial knowledge is entrepreneurial action, that the economic agent in question becomes an entrepreneur himself. This implies that there on the one hand is a substantial probability that firms will be started by economic agents who do not have the necessary qualities and, on the other hand, that a number of business ideas are lost since the economic agents possessing them might not find a willing buyer and not be willing and/or able to become entrepreneurs themselves.

Markets that are particularly vulnerable to information asymmetries are the market for credit and the risk-capital market. Situations of credit rationing may emerge when these asymmetries are strong (cf. Stiglitz and Weiss 1981). The amount of information about potential entrepreneurs is often limited and costly to obtain. The information about an existing firm is not neutral to the firm's size and age. Thus, it follows that potential entrepreneurs and small and young firms are more exposed to information asymmetries than are large and old firms, and therefore to the risk of credit rationing.

These matters are further complicated by information paradoxes (Arrow 1962). To the extent that an entrepreneurial idea cannot be protected by patents and copyrights,

the economic agent possessing the idea might well be in a position where it is impossible to sell the idea without disclosing its major elements to the buyer and by doing so make it uninteresting for the potential buyer to pay for it since he has already received it for free. This illustrates that to stimulate entrepreneurship it is important that there exist well-functioning systems whereby economic agents can protect their entrepreneurial ideas, either to exploit them themselves or to sell them to existing firms or other potential entrepreneurs.

One more information problem is that the future state of the economy is unknown, which implies that entrepreneurs have to act under genuine uncertainty (cf. Arrow 1962).

6.4.2 Collective Goods

A pure collective good is a good which have the character that it cannot be divided into pieces and sold in the market place. This implies that pure collective goods are nonrivalrous and nonexcludable (Cornes and Sandler 1986). A classical example is national defense. However, pure collective goods are relatively rare but there are many goods that have a partially collective character. Infrastructure and R&D are common examples of goods with a partially collective character. For example, the new knowledge and ideas from R&D produce have, at least partially, the nature of a collective good (Arrow 1962). The problem here is that markets do not function as allocation mechanisms for collective goods, since the individual user of the collective good is not motivated to reveal his/her true willingness-to-pay for the goods in such a market. Thus, economic agents with business ideas regarding collective goods will normally be unable to launch firms with an expected positive profit.

The collective good nature of new knowledge and new ideas is partly related to intellectual property rights since the nonexclusivity of knowledge property makes the appropriation of R&D outcomes problematic. This creates low incentives to do R&D in cases where the rights to exploit or commercially exploit new knowledge or new ideas are not properly assigned. This creates problems not least for firms engaged in early stage basic research, and creates divergences between the social and private returns from such R&D (Mansfield et al. 1977; Link and Scott 1997; Martin and Scott 2000).[6] Because of the collective goods characteristics, private provision will be suboptimal, opening the case for public intervention.

6.4.3 External Effects

There are many examples where market mechanisms do not catch all components in the consumers' utility valuations or the resource uses in the production sector.

[6]Often these problems are compounded with market distortions in the credit market.

One obvious example related to entrepreneurship policies is the existence of localized positive external effects generating clusters of firms. Such external effects can be described as proximity externalities (Johansson 2005). Proximity externalities imply that the value of a firm's capabilities is conditional upon the geographical proximity offered by its actual location. According to the theoretical scheme introduced by Marshall (1920), there are three major sources to proximity externalities: (1) accessibility to nontraded local inputs, (2) local skilled-labor supply, and (3) information and knowledge spillovers[7] (see also Jaffe et al. 1993; Ogawa 1997; Feldman and Audretsch 1999; Porter 2000).

Since to a great degree entrepreneurial activities take place where potential entrepreneurs and existing firms are localized, the variation in the strength of proximity externalities between different locations has direct effects on the rate of entrepreneurial activities in different locations. Thus, the existence of proximity externalities implies that the expected profit of becoming an entrepreneur or of expanding an existing firm is conditional on what a given locality can offer in this respect.

One important factor, which differs between locations, is the available information and knowledge concerning how to become an entrepreneur and how to run a firm successfully. Spatial variation in this type of information and knowledge is one important reason behind the high degree of path-dependence regarding the rate of entrepreneurship, where successful localities continuously outperform less successful localities. Even entrepreneurial firms that fail create positive economic values for existing and potential entrepreneurs. The failure rates for knowledge-based activities are especially high since such activities are associated with a greater degree of uncertainty. However, the failure of a knowledge-based firm does not imply that it created no value. Business ideas created by failed firms often become integral parts of other successful firms (Audretsch 2002).

The market failure here is that the individual firms in their management do not value the external effects of their operations for the other firms in the cluster. This implies that there exists a reason for entrepreneurship policies to stimulate both the establishment of more firms in clusters and the growth of existing firms to guarantee that all positive external effects of clusters are exhausted, i.e., that the cluster reaches its optimal scale.

6.4.4 Economies of Scale and Other Barriers to Entry

A market structure which approximately corresponds to the perfect market conditions will not necessarily emerge by itself or be preserved by itself. If there are scale economies in production,[8] such that unit costs decline with output, then it can happen

[7] Since knowledge, which involves new ideas, at least partly is a public good, its production generates externalities, which are more accessible close to the source.

[8] Other sources of economies of scale are distribution networks, R&D laboratories, etc.

that the optimal firm size from a private point of view is such that a firm can influence the market price. If the economies of scale are very large the result will be a natural monopoly. Of course, monopolies can also be created by government decisions. In cases like this, it will not be optimal for profit maximizing firms to offer a price equal to the marginal cost, thus implying that the resource allocation in such a market will not fulfill socioeconomic efficiency criteria.

More generally we can say that there is no incentive for private firms to facilitate or encourage perfect competition. If the opportunities emerge, it is in the interest of the individual actors to establish a position in the market such that they get influence over the market and thus cause a twist away from a resource allocation, which is efficient from a social point of view.

The literature on industrial organization offers numerous examples of barriers to entry in different markets. They include the following:

- Predatory pricing
- The existence of legally protected intellectual capital, such as patents, trade marks, and copyrights
- Customer loyalty based upon loyalty systems or extensive and expansive marketing
- Indivisibilities
- High R&D costs to develop new products
- Network effects
- Restrictive practices
- Exclusive distribution agreements
- Exclusive delivery agreements
- Inelastic demand

All these barriers to entry make it difficult for new actors to enter the market in question. This implies that effective antitrust policies that limit barriers to entry are a vital ingredient of entrepreneurship policy. However, large firms are often eager to restrict competition and they have the resources to lobby for regulations restricting competition (Holmes and Schmitz 2001).

6.4.5 Unemployment

In the perfect competition model, there is no room for unemployment. Clearing of markets implies that with given prices all economic agents can buy and/or sell the quantities they want. Unemployment, on the other hand, means that at the prevailing wages not everyone can sell the volume of work he or she wants. Since the breakthrough of Keynes' ideas in the 1930s, it has become increasingly accepted among politicians that the government has a responsibility to try to hold the total level of economic activity in the economy so that as much unemployment as possible can be avoided.

For a long time it has been a common view that measures stabilizing the general level of unemployment should be general policies. It is theoretically possible to stabilize

economic activities at the full employment level by adjusting the level of public spending, taxes, and general monetary measures. Over time the ambitions in the stabilization policy have been extended to cover also stabilization within different sectors and different regions. This has made it necessary to use more selective measures, which makes it more probable that conflicts will emerge between the stabilization goal and the demand for socioeconomic efficiency in the resource allocation.

In recent decades, following in the foot-steps of globalization and deindustrialization, unemployment has increased and entrepreneurship has emerged as a major avenue to restore full employment both generally and for different disadvantaged groups in the labor market. This implies a quite different set of measures from the traditional stabilization policies. However, macroeconomic stability in terms of the rate of inflation and interest rates is important for entrepreneurs as well.

6.4.6 Market Failures – A Round-Up

From the above survey of market failures, we may generally conclude that control of market failures is important also in the era of the entrepreneurial economy. There are, however, problems with abating market failures, which we will revisit in the next section. Furthermore, one must realize that the entrepreneurial economy differs in many respects from the traditional managed economy that prevailed during the early post-war period. In the entrepreneurial economy comparative advantages are increasingly based upon new knowledge. Of course, public policy must respond to this. Even if well-functioning markets still are important, focus must still be placed on enabling the creation, appropriation, adoption, diffusion, application, and commercialization of new knowledge. However, knowledge creation activities are highly concentrated spatially. This implies that enabling policies on the one hand increasingly must target such agglomerations of knowledge creation activities and, on the other hand, support knowledge transfers to areas without knowledge-creating capacity. Furthermore, since even the largest agglomerations of knowledge-creating activities only produce a tiny share of all knowledge produced in the world, it is essential for all such agglomerations, which want to secure their long-term position, to be connected to other knowledge-producing agglomerations.

6.5 Policy Failures in Entrepreneurship Policy

Even with the existence of market failures it is important to discuss whether public interventions create further distortions while attempting to address the original market failure. Interestingly, as far as we have been able to see there is very little discussion of possible policy failures in entrepreneurship policy in the scientific literature. Not even a standard work such as Parker (2004) offers such a discussion.

There are two major potential sources for policy failures in entrepreneurship policy: (1) the policy lag problem and (2) the policy incentive problem.

6.5.1 The Policy Lag Problem

There are strong pressures on politicians to show that they are active regularly introducing new policies that meet perceived problems in the economy. There are many problems with such reactive policies. The first problem is that it takes time to identify that a new potential problem of some kind has emerged. We may call this the observation lag. The second problem is that it takes time to study and analyze whether the potential problem is legitimate. We may call this the analysis lag. If the potential problem is real, then it takes time to formulate an appropriate policy and to analyze the policy's potential negative effects. This is the policy formulation lag. Once formulated, polices must be approved, through, for example, parliament. Such processes take time, imposing a policy decision lag. Once decided, there is an implementation lag. Finally, even after implementation, polices take time to have an effect, creating an effect lag. Cumulatively, these lags cause a considerable delay between observation and effectiveness.

Since the different markets in the economy are in more or less constant flux as a result of different rapid processes, there is a high risk that such interventionist policies will miss their target. The general conclusion from this is that entrepreneurship policies should focus on the slow processes within the economy, where the politicians can exercise much more control. Examples of such policy areas are hard and soft infrastructures.

6.5.2 The Policy Incentive Problem

The discussion in Sect. 6.4 around the neoclassical standard model for a market economy and its extension into the Pigouvian welfare theory with different kinds of desirable corrections of market failures has its distinct problems when we also consider how decisions are taken by politicians and in public bureaucracies. To be able to contribute to efficient entrepreneurship policies, it is important to know how decisions about interventions in the private sector actually are made, that is which rules and incentives govern politicians and bureaucrats in public administration. These problems with such decision-making are discussed in the public choice literature, which has been developed in the 1950s, 1960s, and 1970s by among others Downs (1957), Buchanan and Tullock (1962), Olson (1965), Buchanan (1967, 1968, 1975), and Riker and Ordeshook (1973).[9] One common starting point for the public choice literature is that the room for pure altruism is very limited and that the individuals normally try to increase their own welfare based upon they can gain as individuals as they maximize their individual utility.

[9] For early surveys, see Mueller (1976).

One problem identified by the above authors is that majority voting in political decision-making generates different types of external effects or failures in political decision-making, the so-called government failures. Furthermore, they showed that the behavior of vote maximizing politicians and parties in a multiparty system with representative democracy and majority voting generates several interesting effects. It has also been argued that politicians and different interest groups may direct subsidies in ways that benefit themselves either directly or indirectly, rather than increasing the general welfare (Stigler 1971; Becker 1983).

The decisions made by the political decision-makers are normally prepared and implemented by public administrators and bureaucracy. It is certainly naïve to assume that these administrative functionaries are obedient automats with an altruistic focus on what is best for society. Politicians and parties strive for vote maximization, while administrations can be assumed to strive for size maximization, since leaders in administrations normally get higher status, higher salaries, and/or more fringe benefits as the organization grows (cf. Downs 1967; Niskanen 1971).

A general conclusion seems to be that political decision-making and decision-making in public administration are connected with as many or even more deficiencies and imperfections as the decision-making in the market place.

6.5.3 The Targeting Problem

Parker (2007) raises two problems regarding entrepreneurship policies that target specific entrepreneurial groups. His first remark is that any targeting of entrepreneurial groups should focus on possible marginal effects and not on average effects. In this connection, he also raises the problem of identifying the relevant target groups *ex post* as well as *ex ante*.

Parker's second remark concerns the observation made by Lucas (1976) that government policies implemented in the private sector do not fully take into account that the responses of the economic agents in the private sector can lead to unintended and perverse consequences. This implies that the responses of the targeted economic agents can be such that their actions weaken, undo, or even reverse the government's intended outcome (cf. Li 2002). Parker discusses five types of inappropriate proentrepreneurship policies. His first two examples dealing with a strict enforcement of debt contracts (Zazzaro 2005) and income taxation on entrepreneurs (Boadway et al. 1991; Black and de Meza 1997; Parker 1999) demonstrate how private economic agents can completely neutralize well-meaning government policies, leading to what Parker calls policy irrelevance. The last three examples which deal with (1) tax breaks to small firms to encourage entry (Holtz-Eakin 2000), (2) policies designed to encourage innovation by new firms (Klette et al. 2000; Boadway and Tremblay 2005; Futia 1980; Grossman and Shapiro 1984), and (3) the policy of health insurance deductibility in the USA (Perry and Rosen 2004) are examples of superficially attractive policies, which turn out to be counter-productive.

6.5.4 The Crowding-Out Problems

One problem with many entrepreneurship policies is that they are expensive to implement. Accordingly, governments must spend tax money to finance their entrepreneurship policies, money that cannot be allocated to other types of public spending, which generates an opportunity cost which can be larger than the value of the entrepreneurship policy. However, there is a second opportunity cost related to entrepreneurship policies: taxation crowds-out private incomes and private capital while distorting private efforts and incentives. This implies that the costs of public funds very well can be larger than unity (Parker 2007).

6.5.5 The Information Problem

The information problem is a serious one in terms of formulating and implementing entrepreneurship policies. It is extremely difficult for governments to collect enough information and knowledge about available policies, their potential positive and negative effects, and the timing of said effects. There is also too little evaluation of the rate of success with past policies with many governments lacking the expertise to evaluate existing information and knowledge This implies substantial risk that most entrepreneurship policy formulation (as in many other fields) is based upon a too narrow information and knowledge base, thus becoming influenced by the strong need by politicians to show that they are doing something, even if it is not the right thing.

There is no guarantee that the public sector is better informed than the private sector (Parker 2007). Traditionally, public support for entrepreneurship seems to be rather ineffective (Robson and Bennett 2000).

6.5.6 Government Policies and Perverse Incentives

One interesting side-effect of government policies is that they may encourage potential and actual entrepreneurs to engage in unproductive rent-seeking activities rather than in productive activities (Baumol 1990; Murphy et al. 1993). If so, the result can be negative effects on productivity, innovation, competition and in the end economic growth (Dennis 1998; Djankov et al. 2002).

6.5.7 Policy Goals and Goal Conflicts

Much entrepreneurship policy literature assumes that governments have clear goals for different policy areas. This is often not true: many programs have either unclear goals or contradictory goals (Parker 2004). One example of conflicting goals are

the programs set up to encourage the unemployed to start their own businesses, where the economic goals, such as high survival rates, profitability, and employment creation conflict with social goals of putting the hardest to employ to work (Bendick and Egan 1987; Storey 1994). There is also often a goal conflict between the goals specified for entrepreneurship policies and the goals specified for other policy areas.

6.5.8 Conclusions for Entrepreneurship Policies

Given that modern economies are mixed with profit maximizing firms, utility maximizing firms, vote maximizing parties, and size maximizing public administrations which are strongly integrated into the global economy, there is a need to develop advanced foundations for entrepreneurship policies. These foundations must be anchored in decision theory, game theory, and theories for complex interdependent systems. It is interesting that even if economists have strong comparative advantages for such analyses compared to other social scientists, there is still a gulf between our understanding of the need for entrepreneurship policies and how such polices should be designed when needed.

6.6 Conclusions and Suggestions for Future Research

In the entrepreneurship policies literature several contributors make distinctions between five types of entrepreneurship policy (see, e.g., Verheul et al. 2001):

1. Government intervention on the demand side, i.e., measures that influence the number and type of entrepreneurial opportunities
2. Government intervention on the supply side, i.e., measures that influence the number and type of potential entrepreneurs
3. Government policies aiming at influencing the supply of input factors of entrepreneurship, i.e., qualified labor, information and knowledge, capital, services, etc.
4. Government policies aiming at influencing the preferences, i.e., the values and attitudes of potential entrepreneurs
5. Government policies directly targeting the decision-making processes of potential and actual entrepreneurs

In this paper, we discuss the current status of the literature on entrepreneurship policy. As stressed by Audretsch and Beckmann (2007), entrepreneurship policy is a new policy field. As a policy field, it developed because policymakers were dissatisfied with the results of existent policies. To a great extent, entrepreneurship policies have been developed through real world trial and error rather than theoretically developed by academics before being adopted by policymakers. As a variety of entrepreneurship policies have been applied in different countries, researchers have started evaluating the policies, thus creating a relatively new research field.

In terms of future research, there is a need to develop the concept of entrepreneurship policies from both broad and narrow perspectives. A broad perspective implies that the analysis also must consider the general conditions for entrepreneurship in terms of institutions, the role of the public sector, and the influence of market failures, to name a few. If the general conditions are wrong it can be meaningless as well as a waste of time and resources to develop sophisticated policies targeting entrepreneurs. In these cases, the important entrepreneurship polices are those directed towards the general conditions. When the general conditions are reasonable, then it might be appropriate to develop and apply narrow entrepreneurship policies. However, in both cases it is important to consider the capacity of the political system and the public administration to decide on and implement policies without high costs and government failure.

Furthermore it is important to analyze how entrepreneurship policies should be designed for countries and regions with different economic histories, different levels of economic development, different economic specializations, and different institutions. For example, the financial sector and the banking system functions very differently in different countries. Obviously, the mix of entrepreneurship policies which should be recommended differs substantially, depending upon how the financial sector and the banking systems function, since access to financing is a critical problem for potential as well as actual entrepreneurs.

References

Akerlof, G.A. (1970), The Market for 'Lemons': Qualitative Uncertainty and the Market Mechanism, *Quarterly Journal of Economics 84*, 488–500

Arabsheibani, G. et al. (2000), And a Vision Appeared to Them of a Great Profit: Evidence of Self-Deception among the Self-Employed, *Economic Letters 67*, 35–41

Arrow, K.J. (1962), Economic Welfare and the Allocation of Resources for Invention, in Nelson, R.R. (Ed.), *The Rate and Direction of Economic Activities: Economic and Social Factors*, Princeton University Press, Princeton, NJ, 609–626

Audretsch, D.B. (2002), Entrepreneurship: A Survey of the Literature, prepared for the European Commission, Enterprise Directorate General (mimeo)

Audretsch, D.B. & I.A.M. Beckmann (2007), From Small Business to Entrepreneurship Policy, in Audretsch, D.B., I. Grilo & A.R. Thurik (Eds.), *Handbook of Research on Entrepreneurship Policy*, Edward Elgar, Cheltenham, 36–53

Auerswald, P.E. (2007), The Simple Economics of Technology Entrepreneurship: Market Failure Reconsidered, in Audretsch, D.B., I. Grilo & A.R. Thurik (Eds.), *Handbook of Research on Entrepreneurship Policy*, Edward Elgar, Cheltenham, 18–35

Baden-Fuller, C.W.F. (1989), Exit from Declining Industries and the Case of Steel Castings, *Economic Journal 99*, 949–961

Baumol, W.J. (1990), Entrepreneurship: Productive, Unproductive, and Destructive, *Journal of Political Economy 98*, 893–921

Becker, G. (1983), A Theory of Competition among Pressure Groups for Political Influence, *Quarterly Journal of Economics 98*, 371–400

Bendick, M. & M.L. Egan (1987), Transfer Payment Diversion for Small Business Development: British and French Experience, *Industrial and Labor Relations Review 40*, 528–542

Bjørnskov, C. & N.J. Foss (2008), Economic Freedom and Entrepreneurial Activity: Some Cross Country Evidence, *Public Choice 134(3)*, 307–328

Black, J. & D. de Meza (1997), Everyone May Benefit from Subsidizing Entry to Risky Occupations, *Journal of Public Economics 66*, 409–424
Boadway, R. & M. Keen (2002), Imperfect Information and Public Intervention in Credit Markets, Queens University, Kingston, Canada (mimeo)
Boadway, R. & J.-F. Tremblay (2005), Public Economics and Start-Up Entrepreneurs, in Kanniainen, V. & C. Keuschnigg (Eds.), *Venture Capital, Entrepreneurshipand Public Policy*, MIT Press, Cambridge, MA, 181–219
Boadway, R., M. Marchand & P. Pestieu (1991), Optimal Linear Income Taxation in Models with Occupational Choice, *Journal of Public Economics 46*, 133–162
Buchanan, J.M. (1967), *Public Finance in Democratic Process: Fiscal Institutions and Individual Choice*, University of North Carolina Press, Chapel Hill
Buchanan, J.M. (1968), *The Demand and Supply of Public Goods*, Rand Mcnally, Chicago
Buchanan, J.M. (1975), *The Limits of Liberty: Between Anarchy and Leviathan*, University of Chicago Press, Chicago
Buchanan, J.M. & G. Tullock (1962), *The Calculus of Consent: Logical Foundations of Constitutional Democracy*, University of Michigan Press, Ann Arbor
Carree, M.A., et al. (2002), Economic Development and Business Ownership: An Analysis Using Data of 23 Modern Economies in the Period 1976–1996, *Small Business Economics 19*, 271–291
Carree, M.A. & A.R. Thurik (2003), The Impact of Entrepreneurship on Economic Growth, in Acs, Z.J. & D.B. Audretsch (Eds.), *Handbook of Entrepreneurship Research*, Kluwer, Dordrecht, 437–471
Coelho, M.-P., D. de Meza & D.J. Reyniers (2004), Irrational Exuberance, Entrepreneurial Finance and Public Policy, *International Tax and Public Finance 11*, 391–417
Cooper, A.C., C.Y. Woo & W.C. Dunkelberg (1988), Entrepreneurs' Perceived Chances of Success, *Journal of Business Venturing 3*, 97–108
Cornes, R. & T. Sandler (1986), *The Theory of Externalities, Public Goods and Club Goods*, Cambridge University Press, Cambridge
Davis, S.J. & M. Henrekson (1999), Explaining National Differences in the Size and Industry Distribution of Employment, *Small Business Economics* 12, 59–83
de Meza, D. & D.C. Webb (1987), Too Much Investment: A problem of Asymmetric Information, *Quarterly Journal of Economics 102*, 281–292
de Meza, D. & D.C. Webb (1988), Credit Market Efficiency and Tax Policy in the Presence of Screening Costs, *Journal of Public Economics 36*, 1–22
de Meza, D. & D.C. Webb (1989), The Role of Interest Rate Taxes in Credit Markets with Divisible Projects and Asymmetric Information, *Journal of Public Economics 39*, 33–44
de Meza, D. & D.C. Webb (1990), Risk Adverse Selection and Capital Market Failure, *Economic Journal 100*, 206–214
de Meza, D. & D.C. Webb (1999), Wealth, Enterprise and Credit Policy, *Economic Journal 109*, 153–163
de Meza, D. & D.C. Webb (2000), Does Credit Rationing Imply Insufficient Lending?, *Journal of Public Economics 78*, 215–234
Dennis, W. (1998), Business Regulation as an Impediment to the Transition from Welfare to Self-Employment, *Journal of Labor Research 19*, 263–276
de Wit, G. & F.A.A.M. Van Winden (1991), An m-sector, n-group Behavioral Model of Self-Employment, *Small Business Economics 3*, 49–66
Djankov, S., et al. (2002), The Regulation of Entry, *Quarterly Journal of Economics 117*, 1–37
Downs, A. (1957), *An Economic Theory of Democracy*, Harper & Row, New York
Downs, A. (1967), *Inside Bureaucracy*, A Rand Corporation Research Study, Boston
Feldman, M.P. & D.B. Audretsch (1999), Innovation in Cities: Implications for Innovation, *European Economic Review 43*, 409–429
Futia, C. (1980), Schumpeterian Competition, *Quarterly Journal of Economics 93*, 675–695
Gimeno, J., et al. (1997), Survival of the Fittest? Entrepreneurial Human Capital and the Persistence of Underperforming Firms, *Administrative Sciences Quarterly 42*, 750–783
Grossman, G. & C. Shapiro (1984), Informative Advertising with Differentiated Products, *Review of Economic Studies 51*, 63–82

Hall, J.C. & R.S. Sobel (2006), Public Policy and Entrepreneurship, Technical Report 06–0717, Centre for Applied Economics, University of Kansas, Lawrence, KS

Hamilton, B.H. (2000), Does Entrepreneurship Pay? An Empirical Analysis of the Returns to Self-Employment, *Journal of Political Economy 108*, 604–631

Hayek, F.A. (1945), The Use of Knowledge in Society, *American Economic Review 35*, 519–530

Henrekson, M. (2005), Entrepreneurship: A Weak Link in the Welfare State, *Industrial and Corporate Change 14*, 437–467

Holmes, T.J. & J.A. Schmitz (2001), A Gain from Trade: From Unproductive to Productive Entrepreneurship, *Journal of Monetary Economics 47*, 417–446

Holtz-Eakin, D. (2000), Public Policy toward Entrepreneurship, *Small Business Economics 15*, 283–291

Jaffe, A.B., M. Trajtenberg & R. Henderson (1993), Geographic Localization of Knowledge Spillover Spillovers as Evidenced by Patent Citations, *The Quarterly Journal of Economics 108*, 577–598

Johansson, B. (2005), Parsing the Menagerie of Agglomeration and Network Externalities, in Karlsson, C., B. Johansson & R.R. Stough (Eds.), *Industrial Clusters and Inter-Firm Networks*, Edward Elgar, Cheltenham, 107–147

Karlsson, C. & K. Nyström (2007), *Nyföretagande, näringslivsdynamik och tillväxt I den nya världsekonomin*, Underlagsrapport nr 5 till Globaliseringsrådet, Globaliseringsrådet, Stockholm

Klette, T.J., J. Moen & A. Griliches (2000), Do Subsidies to Commercial R&D Reduce Market Failure? Microeconomic Evaluation Studies, *Research Policy29*, 471–495

Li, W. (2002), Entrepreneurship and Government Subsidies: A General Equilibrium Analysis, *Journal of Economic Dynamics and Control 26*, 1815–1844

Link, A.N. & S.J. Scott (1997), Evaluating Technology-Technology Public Institutions: Lessons from the National Institute of Standards and Technology, in Papaconstantinou, G. & W. Polt (Eds.), *Policy Evaluation in Innovation and Technology*, OECD, Paris, 255–277

Lucas, R.E., Jr. (1976), Econometric Policy Evaluation: A Critique, in Brunner, K. & A. Meltzer (Eds.), *The Phillips Curve and Labor Markets, Vol. 1 of the Carnegie-Rochester Conference Series on Public Policy*, North-Holland, Amsterdam, 19–46

Lucas, R.E., Jr. (1978), On the Size Distribution of Business Firms, *Bell Journal of Economics 9*, 508–523

Lundström, A. & L. Stevenson (2001), *Entrepreneurship Policy for the Future*, Swedish Foundation for Small Business Research, Stockholm

Manove, M. & A.J. Padilla (1999), Banking (Conservatively) with Optimists, *Rand Journal of Economics 30*, 324–350

Mansfield, E., et al. (1977), Social and Private Returns from Industrial Innovations, *Quarterly Journal of Economics 91*, 196–240

Marshall, A. (1920), *Principles of Economics*, 8th edn, Macmillan, London

Martin, S. & J.T. Scott (2000), The Nature of Innovation Market Failure and the Design of Public Support for Private Innovation, *Research Policy 29*, 437–447

Mueller, D.C. (1976), Public Choice. A Survey, *Journal of Economic Literature 14*, 395–433

Murphy, K.M., A. Schleifer & R. Vishny (1993), Why Is Rent-Seeking so Costly to Growth?, *American Economic Review Papers and Proceedings 83*, 409–414

Niskanen, W.A. (1971), *Bureaucracy and Representative Government*, Aldine, Chicago, IL

North, D.C. (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge

Nyström, K. (2006), *Entry and Exit in Swedish Industrial Sectors*, JIBS Dissertation Series No. 032, Jönköping International Business School, Jönköping

Nyström, K. (2007), The Institutions of Economic Freedom and Entrepreneurship: Evidence from Panel Data, *Ratio Working Paper No. 114*, Ratio, Stockholm

OECDOECD (1998), Fostering Entrepreneurship. The OECD Jobs Strategy, OECD, Paris

Ogawa, S. (1997) Does Sticky Information Affect the Locus of Innovation? Evidence from the Japanese Convenience-Store Industry, *Research Policy 26*, 777–790

Olson, M. (1965), The Logic of Collective Action: Public Goods and the Theory of Groups, Harvard University Press, Cambridge, MA

Parker, S.C. (1996), A Time Series Model of Self-Employment under Uncertainty, *Economica 63*, 459–475

Parker, S.C. (1999), The Optimal Linear Taxation of Employment and Self-Employment Incomes, *Journal of Public Economics 73*, 107–123

Parker, S.C. (2004), *The Economics of Self-Employment and Entrepreneurship*, Cambridge University Press, Cambridge

Parker, S.C. (2007), Policymakers Beware!, in Audretsch, D.B., I. Grilo & A.R. Thurik (Eds.), *Handbook of Research on Entrepreneurship Policy*, Edward Elgar, Cheltenham, 54–63

Perry, C.W. & H.S. Rosen (2004), The Self-Employed Are Less Likely to Have Health Insurance than Wage Earners. So what?, in Holtz-Eakin, D. & H.S. Rosen (Eds.), *Public Policy and the Economics of Entrepreneurship*, MIT Press, Cambridge, MA, 23–57

Pinfold, J.F. (2001), The Expectations of New Business Founders: The New Zealand Case, *Journal of Small Business Management 39*, 279–285

Porter, M.E. (2000), Clusters and Government Policy, *Wirtschaftspolitische Blätter 47*, 144–154

Poutziouris, P. et al. (2000), Taxation and the Performance of Technology-Based Small Firms in the U.K., *Small Business Economics 14*, 11–36

Puri, M. & D.T. Robinson (2005), Optimism, Entrepreneurship and Economic Choice, Working Paper, Duke University, Durham, NC

Rees, H. & A. Shah (1994), The Characteristics of the Self-Employed: The Supply of Labour, in Atkinson, J. & D.J. Storey (Eds.), *Employment in the Small Firm and the Labour Market*, Routledge, London, 317–327

Reynolds, P.D., D.J. Storey & P. Westhead (1994), Cross-National Comparisons of the Variation in New Firm Formation, *Regional Studies 28*, 443–456

Riker, W.H. & P.C. Ordeshook (1973), *An Introduction to Positive Political Theory*, Prentice-Hall, Englewood Cliffs, NJ

Robson, P.J.A., & R.J. Bennett (2000), The Use and Impact of Business Advice by SMEs in Britain: An Empirical Assessment Using Logit and Ordered Logit Models, *Applied Economics 32*, 1675–1688

Scott Morton, F.M. & J.M. Podolny (2002), Love for Money? The Effects of Owner Motivation in the California Wine Industry, *Journal of Industrial Economics 50*, 431–456

Stigler, G. (1971), An Economic Theory of Regulation, *Bell Journal of Economics 2*, 3–21

Stiglitz, J. & A. Weiss (1981), Credit Rationing in Markets with Imperfect Information, *American Economic Review 71*, 93–410

Storey, D.J. (1991), The Birth of New Firms – Does Unemployment Matter? A Review of the Evidence, *Small Business Economics 3*, 167–178

Storey, D.J. (1994), *Understanding the Small Business Sector*, Routledge, London

Verheul, I., et al. (2001), An Eclectic Theory of Entrepreneurship, Tinbergen Institute Discussion Paper TI 2001–030/3

Zazzaro, A. (2005), Should Courts Enforce Credit Contracts Strictly?, *Economic Journal 115*, 166–184

Chapter 7
Support Policies to Entrepreneurship

Mário Raposo

7.1 Introduction

Nowadays entrepreneurship is a hot topic in the majority of countries. The subject has become popular and is a golden rule for politicians, opinion makers, and top businessmen, who praise the potential of entrepreneurial activity, be it small, medium, or large enterprises, be it in innovation, in teaching, in the creation of employment, or even in helping in economic revitalization and strengthening of countries' competitive capacity. Interest in the topic has reached the entire political spectrum, and it was adopted by countries' governments, independently of them being more left or more right wing. The majority of governments are investing a significant volume of time and money for the development of support programs as a stimulus and to the development of new enterprises.

The emerging interest in strategies for entrepreneurial development represents the start of something really new, but does not necessarily act, at this moment, as an alternative, coherent, and perceived model for policies of economic development, in a local and national context. Many of the essential pieces are being placed in practice: interesting pilot projects are up and running, and new research programs and reports have been developed, emerging new sources of financing. All these efforts have had success in the creation of a shockwave around the entrepreneurship concept. But apart from this distant tremor greater institutionalization of these initial advances is demanded. Programs of financial support should be consolidated and repeated over a temporary basis of several years. At the same time, studies with new data should be developed that allow one to better know the potential of entrepreneurial capacity in the economy, with the view to improving significantly current and future results. These initiatives may help to solidify progress and assure that the development of a business-minded culture becomes an integral part of a set of mechanisms for economic development.

M. Raposo (✉)
Department of Business and Economics, University of the Beira Interior,
Núcleo de Estudos em Ciências Empresariais, Covilhã, Portugal
mraposo@ubi.pt

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_7,

Businessmen have existed since the beginning of history for mankind, but until very little time ago, governments rarely worried about the stimulus to entrepreneurial activity as the principal strategic objective for economic development. In truth, entrepreneurs prosper for themselves, independently of governments' priorities for economic development. So what has led to this growing interest of politicians in entrepreneurship?

Pages (2004) upholds that, among other aspects, three sets of interrelated factors can be pointed at as giving rise to this interest. First, alterations in the macroeconomic world created conditions so that success in the market did not depend exclusively on concentrating on large-sized enterprises; having these suffered major restructuring and outsourcing, the entrepreneurship was rediscovered, making it possible for the opening of market niches to new, smaller and more flexible enterprises (Carree 1997; Thurik 1999; Wennekers and Thurik 1999). Since the pioneering works of Birch (1979, 1987), the potential of small enterprises and of new enterprises of rapid growth has been viewed as principal creators of employment in the USA. More recently and in accordance with the U.S. Small Business Administration Office for Advocacy (2004), small new enterprises represent between 60 to and 80% of the net creation of employment in the American Economy. Lundström and Stevenson (2005) also highlight that research conducted in various countries confirms the contribution of small enterprises and that of new enterprises to the creation of jobs.

Second, the forces of globalization and technological development gave rise to the so-called knowledge economy, which sets its competitiveness on innovation and competitiveness in markets of great turbulence. As international competition intensified, developed economies were forced to specialize in more innovative and more intensive knowledge-minded activities. Traditional industries, intensive in labor, were relocated to countries with lower production costs. In the opinion of Gilbert et al. (2004), as globalization resulted in the loss of jobs and in the stagnation of local and regional economies, politicians seeked new sources of growth and employment. The relationship between entrepreneurship, the creation of employment, and economic growth did not escape the attention of politicians; as a result, priorities appeared for the promotion of incentive policies toward entrepreneurship.

Third, alterations in demography and contracting practices of personnel by companies altered the relationship between employers and employees. The idea of a job secure for a lifetime has ended; evermore people consider as an alternative the possibility of becoming entrepreneur as a career option. This is particularly felt among youngsters, because of the difficulties they face today in entering the labor market. For the European Commission (2003), entrepreneurship apart from stimulating the creation of enterprises, competitiveness, and growth can also function as a vehicle of personal development and improvement in one's life in society.

Despite Storey (1991) arguing at the beginning that incentive policies to entrepreneurship had in view the absorption of sacked workers from large companies, resulting from their *downsizing* processes, for Gilbert et al. (2004), support policies to entrepreneurship should be firstly understood as one of the essential instruments for economic growth, in a context of globalization and of an economy based on knowledge.

The question of knowing if those countries that actively took on entrepreneurship benefit or not from more economic growth and greater competitiveness is of

paramount importance to politicians. It is interesting to recall that Porter (1990, p. 125), affirms that entrepreneurship is *at the heart of national advantage*. Carree and Thurik (2005) in turn highlight that many economists and politicians now have the clear intuition of the positive impact of entrepreneurship on the growth of employment and on GDP. On the other hand, despite the lack of consensus with regard to different aspects of entrepreneurship, researchers from this area seem to agree that the level of entrepreneurial activity varies simultaneously, be it along time and be it between countries; among other authors, see Blanchflower and Meyer (1994), Blanchflower (2000), Wit and Van Winden (1989), and Verhuel et al. (2001).

7.2 Entrepreneurship as a Study Field

Despite entrepreneurship nowadays being considered as a vital force for the development of countries there still exists little consensus concerning what should be considered as entrepreneurial activity. In face of this identification the question can be raised of knowing the utility in studying the topic. The data are difficult to obtain; the theory is still in development, and many of the results obtained do not differ much from those obtained in other areas of the study of businesses. Being able to capture the entrepreneurship concept is not an easy task, because of the diversity of different statistical sources and theoretical perspectives (Verhuel et al. 2001).

Shane and Venkataraman (2000) offer us three reasons for studying the subject. First, because many of the technological evolutions are being evermore incorporated in products and services, and entrepreneurship is the mechanism behind which new technological advances are converted in products and services. Second, because entrepreneurship was the mechanism that allowed one to overcome, at an economic level, many inefficiencies in localization and temporary ones (Kirzner 1997). Third, because among the different sources of change in the capitalist society, Shumpeter (1934) isolated entrepreneurship as the driving force behind introducing innovation in the product and processes. So, the absence in the study of entrepreneurship in the context of theoretical studies about the markets, enterprises, organization, and change would make one's understanding of the business world incomplete.

Cooper (2003) presents an analysis on the evolution of entrepreneurship as an autonomous study field, with one verifying that it deals with a recent area. Thus, according to this author the first course in the area of entrepreneurship apparently was offered at Harvard Business School in 1947 by Myles Race. Peter Drucker initiated a course on Entrepreneurship and Innovation at University of New York in 1953. The first academic conference about research on this area occurred in the University of Purdue, at the end of 1970, with the presence of 12 researchers. Interest toward the study of entrepreneurship grew rapidly and in the 1980s there was a boom in this research area, in its various scientific fields (Filion 1997). The transition was marked by two important events: the publication of the first encyclopedia containing "state of the art" in this area of knowledge (Kent et al. 1982) and the realization of the first major conference from Babson College, dedicated to

divulging research in this area. This conference was repeated yearly and the publication of the contents of communications was presented under the title *Frontiers of Entrepreneurship Research*, which constitutes an important contribution upon subjects in discussion in this area of scientific knowledge.

When the first researchers seeked to publish articles about the subject, there were few headings available. The Journal of Small Business Management was the first specialized heading, which began its publications in 1963 on the auspices of the founding organization of the present International Council of Small Business (ICSB). However, several other specialized magazines began to appear related to specialized topics of the entrepreneurship area. Yet the most significant is to verify that the majority of them started in the last 30 years, which reveals that we are dealing with quite a new study field. This can also be seen from the fact that only from the 1990s, of the last century, an accentuated growth in the introduction of courses in the area of entrepreneurship was noticeable at a world level, in universities.

It was starting from 1999 that GEM began Global Entrepreneurship Monitor, a research project of world dimension, transversal and comparative, which deals in providing answers to questions that appear on the creation of companies, especially its relation to economic growth. Since its implementation the number of countries involved in the investigation has been rising, allowing the realization of reliable international comparisons, as well as the identification of individual motivations for the creation of enterprises. This investigation permits the attainment of important indications to inform those responsible for public policies about the way to stimulate the development of entrepreneur human capital.

7.3 The Frontiers of Entrepreneurship

Considering that entrepreneurship policies have, generically as their objective, to stimulate individuals into becoming entrepreneurs, it is necessary to establish clearly the frontiers of entrepreneurship, in the expectation of trying to establish when the process starts and when it ends to give its place to current management.

According to Drucker (1985), entrepreneurship is not a state of being nor is it characterized by the elaboration of plans that are not followed. Entrepreneurship commences with action and that action is the creation of a new enterprise. This enterprise may or may not achieve success, but when an individual creates an enterprise the entrepreneurship phenomenon begins. For Raposo and Silva (2000), despite the entrepreneurship process commencing with the creation of a new enterprise (adventure), one should not forget the antecedents to the creation of the enterprise and that are fundamental to the process. Among these antecedents, the following can be labeled: the search for opportunities within the surrounding environment, the identification of the opportunity to pursue, the assessment of the possibility of implementing a new enterprise, individual features, sociodemographic characteristics, previous experience, the businessman's education, restrictions of the surrounding environment, and society's values. These and other aspects that

influence the formation of new enterprises should be considered as forming part of the entrepreneurship process. Nevertheless, businessmen not only make plans… they act. It is precisely this action that distinguishes them. As previously referred, without the creation of a new enterprise, the entrepreneurship process does not occur.

Having established when the entrepreneurship process begins, it is also of interest to know when it ends. For Gartner (1988), the process ends when the enterprise's creation is finalized. This would mean excluding the enterprise's growth from the process. However in another study from Gartner (1990) where the practices and ideas of various researchers are analyzed, it is generally concluded that they believe that the growth of the enterprise is an integral part of the process. For Carton et al. (1998), the enterprising process ends when the new enterprise becomes self-sustainable. Thus, factors such as the construction of an organizational structure, the accumulation of resources, the client portfolio, and the development of competitive advantages are required elements to entrepreneurship. Without these aspects self-sustainability cannot be achieved. If a new enterprise never becomes self-sustainable, it will be a failure and this will be another way of withdrawing from the process. This whole process can be observed schematically in Fig. 7.1.

Following this perspective, in the entrepreneurial process, the individuals assume as feasible the creation of an enterprise and develop ideas about the business; they learn what it is to be an entrepreneur and assume the development of the business. For Stevenson (1996), entrepreneurship can be considered as forming an integral part of both the beginning and the growth of the business.

Lundström and Stevenson (2005) affirm that with regard to the definition of policies, governments have used different names to label the entrepreneurs. Thus, in Taiwan the title of "Small and Medium Enterprises" is used to refer to entrepreneurs. In other countries such as England, Ireland, and Australia, the word entrepreneur was many

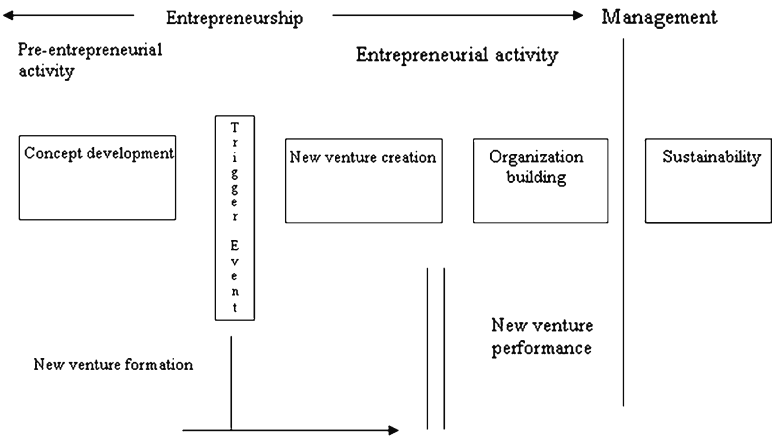

Fig. 7.1 Entrepreneurship paradigm [source: adapted from Carton et al. (1998, p. 5)]

times avoided, as it had a negative connotation in society. It was more common to refer to proprietors/owners of small enterprises or managing proprietors/owners. On the other hand, the term entrepreneur that has always been widely used in Canada and the USA was also well accepted in Holland, Spain, and the Nordic countries.

The European Commission (2004) defines entrepreneurship as a necessary process in order to create and develop economic activity, to assume risks, to innovate, and/or to create something new in the existing enterprise. Reynolds et al. (1999) define entrepreneurship as any attempt to create businesses, including self-employment, the creation of a new enterprise, or the expansion of an already existing enterprise – a process that can be developed by one or more persons in an independent manner or within an up and running enterprise. Shane and Eckhardt (2003) define entrepreneurship as the discovery, assessment, and exploration of future goods and services. In their opinion entrepreneurship should be seen as a sequential process.

Other authors refer to entrepreneurship as the result of economic dynamism or as a social phenomenon. Morris (1996) defines entrepreneurship as the relationship between the entrepreneurs, what surrounds them, and the role taken by the government in the creation of political, legal, financial, and social structures that characterize society. Lowrey (2003) defines entrepreneurship as an economic system composed of entrepreneurs, governments, and legal and institutional mechanisms. It seems one can affirm then that the frontiers of entrepreneurship not only cover what entrepreneurs do, but they also emerge as a social phenomenon within a wider context of society involving many actors (Lundström and Stevenson 2005).

The important challenge put to countries is to try to develop an entrepreneurial culture in society, but what is an entrepreneurial culture? In responding to this question, the European Commission (2004) upholds that this implies focusing on the creation of more favorable attitudes toward entrepreneurship and encouraging more people to become entrepreneurs, to assume risks, and to support the development and growth of new enterprises. The process should therefore stimulate education on entrepreneurship, as well as providing better conditions in the context of business-minded involvement.

7.4 Defining Entrepreneurship Policy and Its Fundamentals

Considering that entrepreneurship forms part of a system that includes entrepreneurs and potential entrepreneurs, institutions, and government actions, bearing in mind that the desired result of support policies is to increase the level of entrepreneurial activity, then the role of institutions and of governments will be to create conditions that allow the continuous supply of entrepreneurs, as well as facilitating their success, in the risky process of creating and developing enterprises.

From the competitive behavior of entrepreneurs results the dynamism of markets and economic progress (Kirzner 1973). The entrepreneurs look incessantly for new combinations of production factors. A stimulating entrepreneurial climate contributes to maximizing the number of new combinations obtained. Some of these combinations

may not provide positive results. But in a market economy, it is the balance between profits and losses that is used to carry out the selection between different combinations of resources, eliminating not so good ideas with losses achieved and rewarding the good ideas with profits. A competitive and growing economy does not only depend on good ideas and of the entrepreneurs and the way they take advantage of them, but also on the speed at which these new ideas disappear or transform into success.

Failures also present their positive side as they free positive resources to be used by entrepreneurs, in new combinations. In a competitive economy there exists a set of new enterprises in a phase of growth and another set in a phase of decline or death. It should not be the objective of public policies to intervene with the view to minimizing failures. This should be left to the outcome of events, as we are dealing with an aspect of uncertainty that involves all new ideas, when these arrive at the market test phase. In the opinion of Hall and Sobel (2006), a prosperous economy depends on the capacity of individual entrepreneurs to test their own ideas, as well as their approval from others and leaving to the market's mechanisms the answer concerning the success of their products.

Measuring the level of entrepreneurship of a country is still a complicated process due to the difficulty in measuring the rates of success and failure of new enterprises and from the fact that they do not yet possess a complete knowledge of the factors that may lead to a greater impulse of venturing into the economy of a given country (Lundström and Stevenson 2001). What is already known is that there is a high number of social, cultural, and political factors that influence entrepreneurial activity, and the vitality of entrepreneurial activity results from the dynamism revealed by the entrepreneur and from the state of the economy; in other words, it is the result of the creation, expansion, growth, and death process of enterprises (Wennekers and Thurik 2001).

Noticed was the existence of large variations in attitudes and in entrepreneurial capacity from the population of different countries. The European Commission (1998) identified a relevant set of areas where to act through political measures. Thus, the strengthening of an entrepreneurial culture among the population implies the following:

- Creating measures to encourage individuals to become entrepreneurs and providing them the necessary capacities in order to obtain success, as well as introducing reforms in the education and culture system, and also removing the identified obstacles from the creation of enterprises.
- Developing a business-minded climate in the community, which promotes the rise of start-ups and the development and growth of already existing enterprises.

Recommendations to achieve those objectives were the following:

- Introduce teaching about entrepreneurship in education curriculum.
- Encourage universities and investigation units to explore the results of research and development through the creation of enterprises.
- Aim at specific groups, such as women and the unemployed, to increase their interest in the potential of entrepreneurship.

- Turn the surrounding institutional environment of small and medium enterprises, more entrepreneurial and aware of the specific requirements of new enterprises.
- Promote the accompaniment of newly created enterprises by already retired businessmen or by specialists.
- Stimulate larger enterprises to outsource certain functions in order to render opportunities for the appearance of small, new enterprises.
- Involve the media, with the view of this means providing entrepreneurship due importance in society, in a positive manner.
- Adjust legislation in the area of bad debt credit, and of bankruptcies, in order to protect the rights of debtors and creditors.

As can be seen from the measures previously mentioned, it is not easy to distinguish between what can be considered as support policies to entrepreneurship and support policies to small and medium enterprises. Without an adequate clarification of these differences, the development area of entrepreneurship will remain ambiguous and marginalized in the context of global-industrial policy. In certain aspects it is difficult to see where the entrepreneurship policy starts and ends and where it crosses and intersects with the policy of small and medium enterprises, as can be seen in Fig. 7.2.

Audretsch (2002) highlights that the entrepreneurship policy resulted and stood out from the traditional policy of support to SMEs, but it is different. In his opinion two important aspects of entrepreneurship policy stand out. First, the policy is focused on stimulating and exalting new economic agents. Second, its orientation differs from traditional support policies to SMEs, as entrepreneurship is nowadays considered in society as the engine force for economic development. Audretsch (2002) also highlights another important aspect. Thus, while the support policy to SMEs is generally put in practice in countries by agencies connected to ministries or specific state agencies, entrepreneurship policies are transversal to various ministries and agencies from the economy, from education, from higher education, from trade and employment, etc. There does not exactly exist and there should not exist one sole agency for the promotion of entrepreneurship.

In the face of all that has been said, we should acknowledge that the entrepreneurship policy is complex, multidisciplinary, and interdependent, so it is not an easy task to present precisely its forms. Thus, the main difference between the two types of policies is summarized in Table 7.1 in various dimensions.

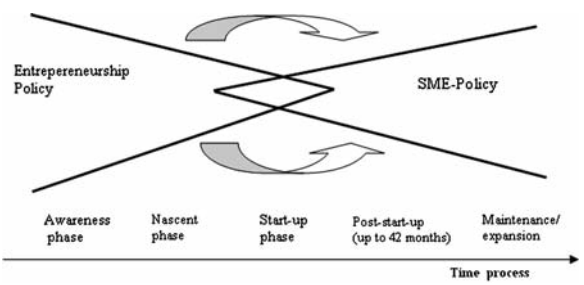

Fig. 7.2 Interface between entrepreneurship policy and SMEs policy (source: adapted from Lundström and Stevenson (2005, p. 55)]

Table 7.1 Comparison of the characteristics of SMEs policy vs. entrepreneurship policy [source: adapted from Lundström and Stevenson (2001; p. 44)]

Feature	SMEs policy	Entrepreneurship policy
Outcome	Firm growth, productivity, and growth	Growth of entrepreneurial activity
General goal	Create a favorable business climate	Create a favorable entrepreneurial climate and culture
Specific objective	To help individual firms to modernize, expand, or improve competitiveness	To encourage more people to start their own business and provide opportunity for them to learn about entrepreneurial process and develop the necessary skills
Client groups and targeting	Easy. Existing firms (targets of high-growth vectors or high-growth firms)	Difficult to identify. Targets the general population and segments within (woman, youth, nascent and new entrepreneurs)
Focus	On firms rather than individuals	On individual rather than firms
Implementation policy	Implemented through a narrow set of economic institutions	Incorporate a broad set of institutional partners in the making of its "support environment"
Primary policy levers	Use of financial/fiscal incentives to lever specific SME activities	Create of nonfinancial levers (networks, support services, education, training)
Stage of business cycle	Primary focus is on support after the business started	Support is offered in the nascent stages as well as during the critical first years of a start-up
Time period for results	More immediated (aims for results over a 3–4-years period)	More long term (process prospective could take a long period of time)

The reading of Table 7.1 allows one to identify three main areas in understanding the range of differences. Thus, the SMEs policy focuses on enterprises in post-start-up phases and supports itself on well-known structures, while the entrepreneurship policy focuses on individuals, in the pre-start-up phase and supports itself on a vast network of support institutions. The development of the entrepreneurial culture counts with the involvement of the educative community from the media, from the community in general, as well as the traditional institutions of support: financial, of regulation, and of associative nature.

7.5 Typology of Entrepreneurship Policies

An analysis of the bibliography on the entrepreneurship process allows one to conclude, in function with the investigations made, that an individual would be more able or prepared to become a businessman if:

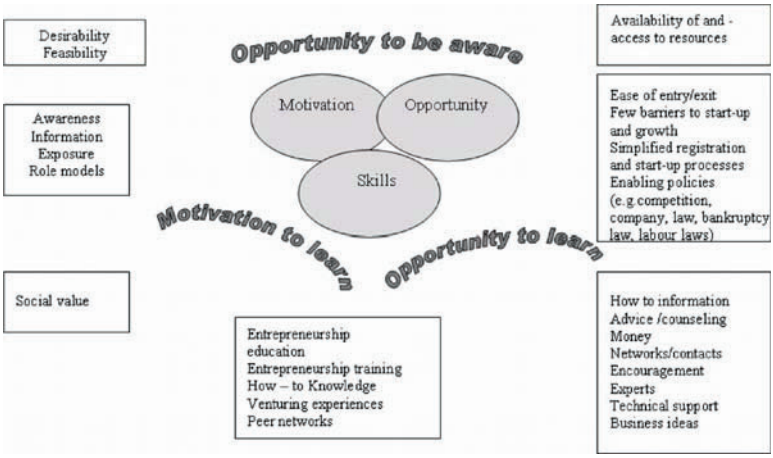

Fig. 7.3 The fundamentals of entrepreneurship policy (source: adapted from Stevenson and Lundström (2002, p. 26)]

- They are clearly aware of that option and understand that it is socially desirable.
- Understand that they can gain support, or can triumph in pursuing a business idea.
- Believe in their capacities to achieve that goal.

For Stevenson and Lundström (2002) and Lundström and Stevenson (2005), to encourage individuals into the process that leads to the creation of an enterprise, the entrepreneurship policy should be articulated and integrated around three main areas of interest: motivation, competencies, and opportunities, as can be seen in Fig. 7.3.

Following this vision, Lundström and Stevenson (2005) define the entrepreneurship policy in three axes:

1. Policies related to the stages of conception, start-up, and the post-start-up initiation point of the entrepreneurial process.
2. Policies designed and made operational to act in the areas of motivation, competences, and opportunities.
3. Take on policies that have as their main objective to encourage more individuals into considering the possibility of becoming entrepreneurs.

In face of the topic's complexity, the difficulty that governments have in determining what should be their role upon those three axes, given the inherent obstacles in understanding the aspects that influence the propensity of individuals in creating enterprises or in determining the level of efficacy of entrepreneurial activity in the population, is not surprising. For example, in a study developed by Rodrigues et al. (2007) related to the propensity for creating enterprises among university students, the most explicative variable turned out to be the role performed by education for entrepreneurship provided by the university whereas the students' personal attributes exercise greater influence on the area of motivation to create an enterprise.

Table 7.2 Features of the entrepreneurship policy [source: Acs (2005)]

	Goals	Target	Instruments
Agent – occupational choice policies	More effective entrepreneurs	Individuals	Create awareness Entrepreneurship training Facilitate networks
Business – enabling policies	Continuous innovation	New firm formation	Finance Regulatory relief SBIR Science parks Tech commercialization
Economy – supporting policies	Economic growth	Institutions – universities Government Corporations	R&D Higher education Venture capital
Society – social policies	Equal opportunity	Wealthy individuals	Philanthropy Taxes Social pressure Legal structure

Considering that the entrepreneurship policy influences, as a whole, four distinct levels of society, the individual, the business, the economy, and the society, Acs (2005) states that in an entrepreneurial society, the objectives of the entrepreneurship policy should be as follows:

- Focusing on the possibility of more individuals getting involved in the entrepreneurial activity.
- Making the constant introduction of innovation in the economy possible, facilitating its evolution and increasing productivity.
- Contribute in increasing economic growth.
- Provide equal opportunity for all individuals (Table 7.2).

In turn Stevenson and Lundström (2001), referring to the set of initiatives and policies of entrepreneurship taken on by various countries, considered that these can be categorized in six main areas: promoting an entrepreneurial culture; education on entrepreneurship; the surrounding environment for start-ups; reduction of barriers of entry; seed-capital to support start-ups; support measures and support to start-up businesses and focus on strategic segments of the population.

Lundström and Stevenson (2005), in referring as a whole to the objectives followed by the policies and measures taken in those areas, include the construction of an entrepreneurial culture, the preparation of the future generation of entrepreneur, the reduction of specific barriers of entry, filling in financial gaps in the initial stages of start-ups, enhancing the role of support structures and support to start-up businesses, and increase in the number of start-ups among strategic segments of the population; see Fig. 7.4.

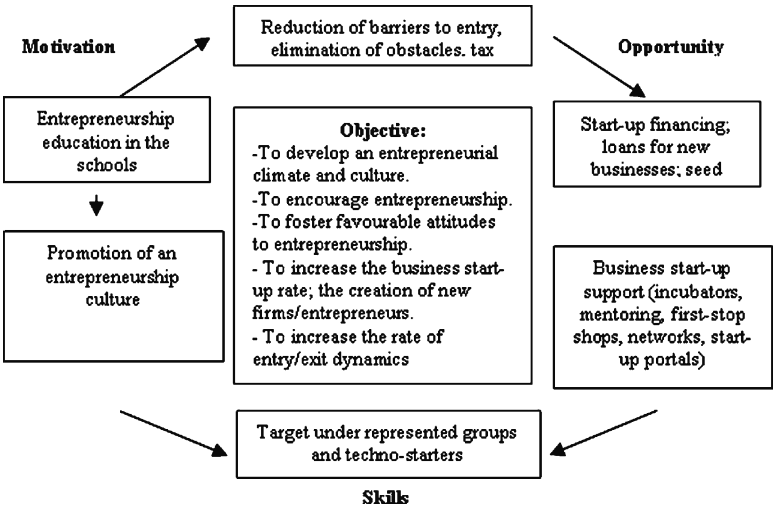

Fig. 7.4 Typology of measures of entrepreneurship policy (source: adapted from Lundström and Stevenson (2005, p. 61)]

7.6 Entrepreneurship Policy in Portugal

Portugal presents one of the lowest rates of entrepreneurial activity in the European Union and of the GEM (2004) countries as a whole. In Portugal, in every 100 people aged between 18 and 64 years old, only 4 are entrepreneurs, which positions the country in the last places of the ranking table between countries that participated in the GEM project in 2004.

In comparison to the results obtained in the ambit of the previous GEM report, which counted with Portuguese participation, in 2001, the rate of entrepreneurial activity diminished, having in 2001, 7 out of 100 people being entrepreneurs aged between 18 and 64 years. This means that in the period 2001–2004, there was a decrease in the number of entrepreneurs in Portugal, well revealing the inadequacy of state policies for the promotion of entrepreneurship or lack of them. On the other hand, it should be pointed out that Portugal, since 2004, has never again participated in the GEM project, due to lack of interest from the country, which stopped financially supporting the study and does not appear predisposition, for now, in financing the entities from doing so.

Among the principal factors seen as responsible for weak entrepreneurial culture in Portugal, we can highlight on one side the Portuguese education system, which does not prepare students to take advantage of business opportunities and neither promotes creativity nor an entrepreneurial spirit, and on the other side, the inadequacy of government support policies. But, there exists other important hindering forces, as are follows:

- The difficulties of start-ups in gaining access to sources of finance, which are not bank loans or the money of founders, or from family.
- The power of incumbents in the domestic market, having there monopolies and private oligopolies "sanctioned by the state," which increases barriers of entry in the market.
- The weakness of *antitrust* legislation and the protection of intellectual property.
- The weakness of the chain value at a professional services and subcontracting level.
- The excessive red tape of processes and the inflexible laws of labor force.

In relation to public policies that have been assumed over recent years, in the period 2001–2006, and considering the previous theoretical basis developed one can affirm that the majority of them are based on supporting the start-up phase or post-start-up period of the entrepreneurship process. It is not that these types of policies are not required in Portugal, but there lacks a cornerstone policy that seeks to alter the traditional Portuguese culture, which does not stimulate risk nor individual responsibility, and the population's lack of entrepreneurial capacity. Now this is only possible with strong political options of support to education on entrepreneurship, involving all society and all teaching sectors, in that which can be denominated as the training chain of entrepreneurs. But results can only be expected in the medium and long term.

With regard to political measures taken on by the government to encourage the creation of new enterprises and stimulate new entrepreneurs, we can say that they are centered on two principal strategies: policies centered on entrepreneurship with the main objective of stimulating innovation and the creation of wealth – assumed by IAPMEI, INPI, and ADI,[1] and policies centered on entrepreneurship with the main objective of creating employment and self-employment – assumed by IEFP.[2]

It is not our objective to make an exhaustive list of various assumed policies in favor of entrepreneurship in Portugal. However, it is interesting to present some more recent initiatives, after 2004, which have been developed in line with what are good practices at an international level:

- The creation of enterprises within an hour, which clearly follows the strategy of cutting the red tape.
- The incentive to R&D from private initiatives by means of fiscal benefits.
- The construction of Science and Technology Parks, seeking to put Universities closer to enterprises, creating clusters to stimulate innovation.
- Various competitions about ideas to create a new firm launched by various organisms.
- Various dynamized initiatives from banking entities, private companies, and universities, which is the case of COHITEC, from the National Competition for Entrepreneurship, of Lena Business, among others.

[1]IAPMEI – Institute for Support to Small and Medium Enterprises (SMEs); INPI – National Institute for Industrial Property; ADI – Agency for Innovation.

[2]IEFP – Institute for Employment and Professional Training.

- In the ambit of IAPMEI, the launch of the Scholarship program of Ideas and of Means and the PROGRAMA FINICIA.
- In the ambit of ADI, the launch of various programs such as IDEIA, NITEC, DEM TEC, NEOTEC, and NEST,[3] which generally has to do with stimulus to innovation and technology-based entrepreneurship.
- The increasing launch by state universities, of entrepreneurship courses, of degree and postgraduation level, as well as technology-based entrepreneurship courses. A forefront example being CEBT – Technology Based Entrepreneurship Course, launched in partnership by three universities of the Central Region of Portugal, the University of Aveiro, the University of Beira Interior, and the University of Coimbra, which is in its third edition.
- The Technological Plan presented by the Government for the period 2007–2013, to be carried out, seems to be an important initiative for the promotion of technology-based entrepreneurship.

Concluding this brief general vision about entrepreneurship policies in Portugal, we should point out that there nowadays exists a high degree of awareness from the government for the need to support entrepreneurship as a means of stimulating economic activity, promoting employment, and contributing to the growth of wealth and to the well-being of citizens. We have more doubts about political willingness to take action.

7.7 Conclusion

According to what has been described throughout this study, entrepreneurship plays an important role in contemporary society, not only because entrepreneurs create wealth, employment, but also because they are people who have freedom to express their creativity, to leave their own personal imprint on what they do, and they are also responsible for the development of knowledge, competences, and skills in order to manage their own business. Therefore, gradually countries, independently of their ideology and the objectives of social policy, evermore are giving emphasis to the development of entrepreneurship policies, performing in all phases of the entrepreneurial process, from raising interest in the desire of creating an enterprise to the point of support in the development and growth of small and medium enterprises.

In an economic perspective, the average life span of a business is evermore shorter, and innovations occur at a much quicker pace, in view of which enterprises are in a constant process of interest, development, birth, downsizing, and death. We know that small enterprises create more employment than job losses and are responsible for an important portion of new enterprises. So there exists a permanent need in the creation of new enterprises, in view of which it is essential to increase the number of new entrepreneurs offered.

[3]Examples of various support programs to entrepreneurship.

Thus, in an age of rapid technological changes, globalization of markets, and virtual mobility of money, of ideas, and of free movement of people, the development and implementation of entrepreneurship should be a strategic presupposition for governments.

References

Acs Z. (2005) A formulation of entrepreneurship policy. Paper published in the Tenth Year Anniversary Series of the Swedish Foundation for Small Business Research and the Business Development Agency – The FSF Nutek Award.

Audretsch D. (2002) Entrepreneurship: A survey of the literature. Prepared for the European Commission, Enterprise Directorial General, July 2002.

Birch D.L. (1979). The job generation process. A report prepared for the Economic Development Administration, US Department of Commerce.

Birch D.L. (1987) Job Creation in America. New York: The Free Press.

BlanchFlower D.G. (2000) Self-employment OECDOECD countries. Labour Economics 7, 471–505.

BlanchFlower D.G. and Meyer B.D. (1994) A longitudinal analysis of the young self employed in Australia and Unites States. Small Business Economics 6(1), 1–19.

Carree M.A. (1997) Market Dynamic, Evolution and Smallness. Amsterdam: Thesis Publishers and Timbergen Institute.

Carree M.A. and Thurik R. (2005) The impact of entrepreneurship on economic growthAcsAudretsch. In Handbook of Entrepreneurship Research, Edited by Z. Acs and D.B. Audretsch. New York: Springer, pp. 437–471.

Carton, R.B, Hofer C.W. and Meeks M.D. (1998) The entrepreneur and entrepreneurship: Operational definitions of their role in society, 43rd ICSB Conference, Singapore.

Cooper A. (2003); Entrepreneurship: The past the present the futureAcs. In Handbook of Entrepreneurship Research, Edited by Z. Acs and D. Audretsch. New York: Springer, pp. 21–34.

Drucker P. (1985) Innovation and Entrepreneurship. New York: Harper and Row.

European Comission (1998) Fostering entrepreneurship in Europe: Priorities for the future communication form the commission to the council. European Commission, April 7, Brussels.

European Comission (2003) The green paper entrepreneurship in Europe, Brussels.

European Comission (2004) Action plan – The European agenda for entrepreneurship. Com. (2004) 70 final. Communication from the Commission to the Council of the European Parliament, the European Economic and Social Committee and the Committee of the region, Brussels.

Filion L.J. (1997) From entrepreneurship to entreprenology, 42nd World Conference: the Engine of Global Economic Development – ICSB, San Francisco.

Gartner W.B. (1988) Who is an entrepreneur? Is the wrong question. American Journal of Small Business 12(4), 11–32.

Gartner W.B. (1990) What are we talking about when we talk about entrepreneurship? Journal of Business Venturing 5, 15–28.

GEM (2004) Estudo de Avaliação do Potencial Empreendedor em Portugal em 2004, SPI – Sociedade Portuguesa de Inovação, Porto.

Gilbert B.A., Audretsch D.B. and McDougall P.P. (2004) The emergence of entrepreneurship policy.Policy Small Business Economics 22, 313–323.

Hall J Sobel S.R. and (2006) Public policy and entrepreneurship, Technical Report 06-0717, The Center for Applied Economics, School of Business – The University of Kansas.

Kent C.A., Sexton D. and Vesper K.H. (1982) Encyclopedia of Entrepreneurship.Entrepreneurship Englewood Cliffs: Prentice-Hall.

Kirzner I.M. (1973) Competition an Entrepreneurship. Chicago, IL: Chicago University Press.

Kirzner I.M. (1997) Entrepreneurial discovery and the competitive market process: An Austrian approach. Journal of Economic Literature 35, 60–68.
Lowrey Y. (2003) The entrepreneur and entrepreneurship: A neoclassical approach. Presented at the ASSA Annual Meeting, January 5, Office of Advocay, Small Business Administration, Washington, DC.
Lundström A.Anders and Stevenson L.A. (2001) Entrepreneurship Policy for the Future, Vol. 1. Örebro: Swedish Foundation for Small Business Research.
Lundström A.Anders and Stevenson L.A. (2005) Entrepreneurship Policies, Theory and Practice. New York, Springer.
Morris M.H. (1996) Sustaining the entrepreneurial society. Working paper 96-01, The Small Business Foundation of America, The Research Institute for Small and emerging Business, Washington, DC.
Pages E.R. (2004) What so new about new entrepreneurship policies? State government initiatives to foster new venture creation, Knowledge Clusters and Entrepreneurship in Regional Economic Development, Minnesota.
Porter M.E. (1990) The Competitive Advantage of Nations. New York: Free Press.
Raposo M. and Silva M.J. (2000) Entrepreneurship; uma nova area do pensamento científico, in Revista de Gestão e Economia, Universidade da Beira Interior, pp. 57–65.
Rodrigues R., Raposo M., and Ferreira J. (2007) Propensão para a criação da própria empresa: Proposta e teste de um modelo conceptual com recurso a equações estruturais. Paper presented at XVII Jornadas de Gestão Científica, Logroño, Spain, Febrero.
Reynolds P.D., et al. (1999) Global entrepreneurship monitor, 1999 Executive Report – Babson College, Kaufman Center for Entrepreneurial Leadership and the London Business School.
Schumpeter J. (1934) Capitalism, Socialism and Democracy. New York: Harper & Row.
Shane S. and Eckhardt J. (2003) The individual-opportunity NexusAcsAudretsch. In The Handbook of Entrepreneurship Research, Edited by Z.J. Acs and D.B. Audretsch. New York: Springer, pp. 161–191.
Shane S. and Venkataraman S. (2000) The promise of entrepreneurship as a field research. The Academy of Management Review 25(1), pp. 217–226.
Stevenson L. (1996) The Implementation of an Entrepreneurship Development Strategy in Canada: The Case of the Atlantic Region. Paris: Territorial Services Division, OECD/ACOA.
Stevenson L. and Lundström A.Anders (2001) Patterns and Trends in Entrepreneurship/SME Policy and Practice in Ten Countries. Stockholm: Swedish Foundation for Small Business Research.
Stevenson LAnders. and Lundström A. (2002) Beyond the Rhetoric: Defining Entrepreneurship Policy and Its Best Practice Components. Stockholm: Swedish Foundation for Small Business Research.
Storey D. (1991) The birth of new firms – Does unemployment matter? A review of the evidence. Small Business Economics 3, 167–178.
Thurik R. (1999) Entrepreneurship, industrial transformation and growth. In The Sources of Entrepreneurial Activity, Vol. 11, Advances in the Study of Entrepreneurship, Innovation and Economic Growth Growth, Edited by G.D. Libercap. Stanford: JAI Press, pp. 29–65.
U.S. Small Business Administration Office for Advocacy and the Ewing Marion Foundation Kaufman Foundation (2004) Entrepreneurship in the 21st Century, Conference Proceedings. Available at http://www.sba.gov/advo.
Verhuel I., Wennekers S., Audretsch D., and Thurik R. (2001) An ecletic theory of entrepreneurship, Timbergen Institute Discussion Paper – T1 2001-030/3, Março 2001, Amsterdam.
Wennekers S. and Thurik R. (1999) Linking entrepreneurship and economic growth.Economic Growth Small Business Economics 13(1), 27–55.
Wennekers S. and Thurik R. (2001) Institutions, entrepreneurship and economic performance. In Entrepreneurship for the Future, Edited by A. Lundström and L. Stevenson. The Swedish Foundation for Small Business Research, Sweden.
Wit G. and Van, Winden F.A.A.M. (1989) An empirical analysis of self-employment in the Netherlands. Small Business Economics 1(4), pp. 263–284.

Part II
Entrepreneurship Policy in Countries and Regions

Chapter 8
Reinforcing the Entrepreneurial Innovation Capacity of Industrial SMEs with Networks

Maria José Silva and João Leitão

8.1 Introduction

For firms, external partners play a crucial role in the innovation process. Firms have a wide range of agents actively acquiring external resources, knowledge, and information essential for facilitating innovation. This paper aims to analyze whether the entrepreneurial innovation capacity of firms is stimulated by relationships with external partners. Furthermore, it will examine whether the entrepreneurial innovation capacity of Portuguese firms is stimulated by external partnership relations while analyzing the effects of R&D intensity, size, export intensity, and industry sector, on the cooperation process for firm innovation. Despite an increasing number of studies on the effects of networks on firms' innovative practices (Tether 2002; Miotti and Sachwald 2003; Faems et al. 2005; Hoang and Rothaermel 2005; D'Este and Patel 2003; Nieto and Santamaría 2007), understanding their impact on innovative advances remains an under-researched topic.

This paper analyzes, theoretically and empirically, the role of different types of collaborative networks in the achievement of product innovations. Here, a theoretical base founded on approaches in current literature, corroborated by empirical evidence, is presented. The empirical study uses a database obtained from the Community Innovation Survey II (CIS II) coordinated by EUROSTAT. Using a generalized linear regression model, we identify whether the innovative advances of industrial Portuguese SMEs are stimulated by their relationships with clients, suppliers, group firms, competitors, universities, other higher education institutions, consultancy firms, as well as other governmental and private institutions.

The article is structured as follows: the second section presents relevant literature on relationships regarding innovation, and the hypotheses to be tested in the statistical model are formulated. Section 8.3 presents the sample, the variables, and the logistic regression model for innovative advances. Section 8.4 discusses the results, while Sect. 8.5 presents policy implications and conclusions.

M.J. Silva (✉) and J. Leitão
Engineering and Management Department, University of the Beira Interior, Covilhã, Portugal
e-mail: msilva@ubi.pt

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_8,

8.2 Theoretical Framework and Hypotheses

8.2.1 An Overview of Research on Cooperation in Innovation Practices

Innovation is seen as the result of an interactive process between the firm and the environment (Kline and Rosenberg 1986; Dosi et al. 1988; Lundvall 1988, 1992; Nelson 1993; Edquist 1997; Maskell and Malmberg 1999; Fischer and Varga 2002; Lundvall et al. 2002; Silva 2003; Edquist 2005; Drejer and Jørgensen 2005; Silva et al. 2005; Leitão 2006; Lundvall 2007; Nieto and Santamaría 2007, Silva and Leitão 2009). The results of this process are designated as the entrepreneurial innovation capacity. This paper focuses on entrepreneurial innovation capacity of firms with respect to the innovative advances for products with two degree of innovation novelty distinguished: "new to the firm" vs. "new to the market." "New to the firm" innovations include modifications and improvements of the firm's existing products, as well as the products that are already on the market but are new to the firm (Kaufmann and Tödtling 2000). "New to the market" innovations include products that are new to both the firm and market (Kaufmann and Tödtling 2001).

There has been a growing interest in the study of external partnerships and their impact on innovation over the past few years. According to the network and inter-organisational relationship literature, the external relationships established among partners are characterized by relatively open information exchange with the flows stimulating innovative activities (Hakansson 1987; Cohen and Levinthal 1989, 1990; Porter 1990; Hakansson and Johanson 1992; Furman et al. 2002; Tether 2002; Becker and Dietz 2004; Drejer and Jørgensen 2005; Edquist 2005; Hessels 2007; Lundvall 2007; Nieto and Santamaría 2007). According to the systemic approach of innovation, innovation capacity is the result of an interactive process enveloping firms and the inherent synergies of networked learning within an economy (Lundvall 1985, 1988, 1992; Nelson 1993; Cooke et al. 1997; Braczyk et al. 1998; Cooke et al. 2000; Kaufmann and Tödtling 2001; Lundvall 2007).

8.2.2 Impact of Different Partners

There are studies for several countries that show the impact of external partnerships on a firm's innovation capacity (Fritsch and Lukas 1999, 2001; Kaufmann and Tödtling 2000, 2001; Bayona et al. 2001; Romijn and Albaladejo 2002; Hagedoorn 2002; Silva 2003; Silva et al. 2005; Veugelers and Cassiman 2005; Nieto and Santamaría 2007; Schmidt 2007, Silva and Leitão 2009). Thus, it would be interesting to analyze the relationship between different types of partners and different degrees of innovation novelty.

8.2.2.1 Cooperation for Innovation with Universities and Other Higher Education Institutions

According to existing literature, universities assume a special role in stimulating innovative advances. Universities produce far-ranging technological developments because they focus primarily on the creation of new knowledge regardless of economic motivation (Kaufmann and Tödtling 2001). New knowledge generated by universities and other higher education institutions have had input into the private sector's innovative activities (Fritsch and Schwirten 1999), consequently having had a positive impact on the novelty of product innovation (Nieto and Santamaría 2007). Taking these facts into consideration, the following hypothesis was formulated:

H_1: Firms that establish an innovative partnership with universities and other higher education institutions are more able to make innovative advances in product.

8.2.2.2 Cooperation for Innovation Within Clients, Suppliers, and Group Firms

Several studies point out that the innovation capacity of firms is influenced by established partnerships with business partners, namely, clients, suppliers, and group firms (Simões 1997; Fritsch and Lukas 1999, 2001; Kaufmann and Tödtling 2000, 2001). Product innovation has resulted from a collaborative relationship with clients, suppliers, and group firms (Miotti and Sachwald 2003) with this collaborations allowing firms to gain considerable knowledge about new technologies (Kaufmann and Tödtling 2001), as well as markets and process (Whitley 2002). Cooperating with suppliers enables firms to reduce the risks and lead times of product development (Chung and Kim 2003). For Fritsch and Lukas (2001) the innovative efforts targeted at achieving products innovation are associated with client collaboration. Thus cooperation is important when the goal is to develop more novel and complex innovations (Tether 2002). Amara and Landry (2005) conclude that the advantages of client-sourced information are great when the innovations being developed carry a high degree of novelty. The following hypothesis was formulated in order to discover whether the relationships established with clients, suppliers, and group firms stimulate innovative advances within the firm:

H_2: Innovative partnerships established with clients, suppliers, and group firms are positively related to the propensity of the firm to make innovative advances in product.

8.2.2.3 Cooperation for Innovation with Competitors

Given that the firm partners with competitors to facilitate innovation, this research will test whether such partnerships help the firm create new products that are not just new to the firm but also to the market. Cooperation with competitors can be complex

with the potential for anticompetitive behavior (Tether 2002). However, cooperating with competitors has two advantages for innovation (Tether 2002: 952):

1. Collaborations may relate to standard setting, whereby firms agree to introduce products based on a jointly developed, common standard
2. Competitors collaborate when they face common problems, and especially where these problems are seen as being outside the realms of competition and/or when by collaborating they can influence the nature of the regulatory environment.

However, Bayona et al. (2001) argued that cooperation does not seem to be the most appropriate mechanism for achieving product innovation. In this context, the following hypothesis was formulated:

H_3: Innovative partnerships established with competitors are positively related to the propensity of firm to make innovative advances in product.

8.2.2.4 Cooperation for Innovation Within Consultancy Firms, and Governmental and Private Institutions

Firms focus on the production of scientific and technological knowledge when partnering with consultancy firms as well as private and public research institutions, particularly when it is expected that the knowledge will be promptly commercialized (Kaufmann and Tödtling 2001). Relationships with these types of institutions are based on the demand for alternative sources of information and knowledge for innovation. In this way, these institutions supply scientific and technological knowledge. However, it is more common to supply applied knowledge, specific skills, and information (Bruce and Morris 1998; Tether 2002; Becker and Dietz 2004). To find out whether partnerships with these entities stimulate innovative advances, the following hypothesis was formulated:

H_4: Innovative partnerships established with consultancy firms as well as governmental and private institutions are positively related to the propensity of firm to make innovative advances.

The goal of the fourth hypothesis is to determine whether innovative relationships established with partners significantly influence the innovation capacity of Portuguese industrial firms at the product innovation level.

8.3 Research Methodology

8.3.1 Population, Sample, and Data

The data used in this study come from innovation survey conducted by the "OCT – Observatório das Ciências e das Tecnologias" (Sciences and Technologies Observatory) in Portugal. The data were collected in 1997 by a survey entitled the

Community Innovation Survey II, or CIS II. Results from the survey include a large number of indicators from the period of 1995 to 1997. This questionnaire was conducted under the supervision of EUROSTAT, following the Oslo Manual guidelines (OECD 1997b, 2005).

The population includes all industrial firms in Portugal with more than 20 employees. A total of 819 valid surveys were returned, representing a 57.3% response rate. These firms were asked whether "from 1995 to 1997, the company introduced technologically new or improved products which were new both to the firm and to the market served by that firm" (CIS 1999: 4). We identified a total of 95 product-innovative industrial SMEs that engaged in product innovation between 1995 and 1997, based on this question, thus forming the sample utilized in this study of firm entrepreneurial innovation capacity. These firms were further subdivided and classified as either "innovative to the market" or "innovative to the firm." We found that 43 of these firms (55%) responded that they had introduced new products into the market, while the remaining 52 firms (45%) had introduced innovations to their products that were new to the firm, but not to the market.

8.3.2 Variables

8.3.2.1 Dependent and Independent Variables

To test our hypotheses, we considered several dichotomous variables. The dependent variable is the innovative advances on product innovation (INAPI). This variable is binary, assuming a value equal to 1 if the firm has developed product innovations that are new to the market, or a value equal to 0 if their product innovations are new only to the firm. The four independents variables are as follows:

1. Relationships with universities and other higher education institutions (Re_1)
2. Relationships with clients, suppliers, and group's firms (Re_2)
3. Relationships with competitors (Re_3)
4. Relationships with research institutions and consultancy firms (Re_4)

These variables are binary assuming a value equal to 1, if the firm has at least one of that relationship types, or a value equal to 0, if there is no such relationship.

8.3.2.2 Control Variables

In line with Nieto and Santamaría (2007), we included controls for firm-specific characteristics, namely, size, R&D intensity, export intensity, and industry sector. To capture the dimensions of the firm (Cassiman and Veugelers 2002; Nieto and Santamaría 2007), firm size is measured by sales (SALES). We included a control variable for the intensity of internal R&D (R&D), represented by the ratio of internal R&D expenditure to total sales. This variable captures the notion of absorptive

capacity (Cohen and Levinthal 1990), "in so far as firms that conduct their own R&D are better able to use externally available information" (Nieto and Santamaría 2007: 372). The export intensity of firm (EXPORT) is represented by the ratio of total exports to total sales. This variable shows that export and internationalization have a positive effect on innovation (Romijn and Albaladejo 2002; Nieto and Santamaría 2007).

Finally, the firms' industrial sector is the last control variable. The classification proposed by OECD (1997a) captures the impact of the industrial and technological effects. The influence of the activity sector in the firm's innovative capacity is highlighted by previous studies (Fritsch and Lukas 1999, 2001; Kaufmann and Tödtling 2000, 2001; Bayona et al. 2001; Romijn and Albaladejo 2002; Tether 2002; Nieto and Santamaría 2007). Firms belonging to activity sectors with high technological intensity such as electronics, computer science, and biochemistry are expected to innovate more than firms in other sectors. For this study, we select the sector corresponding to the classification proposed by OECD (1997a) based on the level of technological intensity. Firms are classified based upon their responses to the OCT II survey into three categories: high, medium, and low technological intensity. Three binary variables were constructed, with firms given a 1 if they fit that category or a 0 if they did not. The three variables are labeled high technological intensity (TI_h), medium technological intensity (TI_m), and low technological intensity (TI_l).

8.3.3 Method: Logistic Regression

The logistic regression model is the most commonly used one (Agresti 1996; Ferrão 2003), because of the way it facilitates substantive interpretation of parameters. It has been the basis for previous studies of innovation capacity (Kaufmann and Tödtling 2000, 2001; Silva 2003; Silva et al. 2005). Previously, Silva and Leitão (2009) used the logistic regression model in order to test the external relationships in terms of innovative advances, omitting the newly proposed control variables. Extending the model to incorporate the control variables is relatively straight forward. We propose a logistic regression model for innovative advances with control variables using independent variables, control variables, and the residual term ε_i. The estimation is based on the maximum likelihood procedure with the following specification:

$$\begin{aligned} \mathrm{INAPI}_i = {} & \beta_0 + \beta_1 \mathrm{Re}_1 + \beta_2 \mathrm{Re}_2 + \beta_3 \mathrm{Re}_3 + \beta_4 \mathrm{Re}_4 + \beta_5 \mathrm{SALES} + \beta_6 \mathrm{R\&D} + \\ & \beta_7 \mathrm{EXPORT} + \beta_{81\_} \mathrm{TI\_h} + \beta_{82} \_ \mathrm{TI\_m} + \beta_{83} \_ \mathrm{TI\_1} + \varepsilon_i \end{aligned} \tag{8.1}$$

where INAPI=the innovative advances in product innovation; Re_1 =relationships established with universities and other higher education institutions; Re_2 =the relationships established with clients, suppliers and group's firms; Re_3 =relationships established with competitors; Re_4 =relationships established with research institutions and consultancy firms; SALES = sales; R&D = intensity of internal R&D; EXPORT = export intensity of the firm; TI = technological intensity level; ε_i= Error term.

8.4 Results and Discussion

The estimators of the final model with control variables (model B) of innovative advances in product are presented in Table 8.1, along side the initial model without control variables (model A).

According to the Wald statistics, the results of logistics regression reveal that all the estimators of the regression parameters are statistically significant up to 5%, except for the relationships established with competitors, and with research institutions and with consultancy firms. The predictive capacity of the model is 70.5%, which results from the comparison between the predicted and the observed values

Table 8.1 Logistic regression for innovative advances in product

	Model A	Model B = final model					
Model	Parameter estimator	Significance	Estimated coefficients	S.E.	Wald	Significance	EXP (B)
Independent variables							
Relationships established with:							
Universities and OHEI	3.115	0.010[a]	4.318	1.674	6.656	0.010[a]	75.017
Clients, suppliers, and group's firms	1.142	0.096	1.795	0.833	4.648	0.031[a]	6.021
Competitors	−2.011	0.282	−2.794	10.383	0.072	0.788	16.342
Research institutions and consultancy firms	−1.227	0.198	−1.057	1.023	1.068	0.301	0.347
Control variables							
Sales			0.000	0.000	3.296	0.066	1.000
R&D			−2.020	10.266	0.039	0.844	0.133
Export			0.000	0.000	3.379	0.066	1.000
Technological intensity							
–Lower intensity/ high			0.465	0.611	0.579	0.447	1.592
–Medium intensity/ high			0.124	0.667	0.035	0.853	1.132
Constant	−0.281	0.173	−0.057	0.537	0.011	0.915	0.945
Model summary							
Correct predict (%)	77.7		70.5				
X^2	41.375	0.00	27.732			0.001	
Log likelihood	89.469		103.112				
Number of cases	95		95				

[a]Significance level: 5%

of the variable answer. The value of the χ^2-test statistic is 27.732, with a proof value inferior to the 0.005 significance level. The log-likelihood statistic, 103.112, also corroborates the global significance of the model, when compared to the null model, and presents a slight improvement in the final model.

The effects of the control variables for the model of innovative advances in product are insignificant. Thus, by including the control variables in the final model, we find that the explanatory variables remain the same, both in terms of order of magnitude of the estimated parameters and to its significance. The results suggest that the explanatory variables are robust and the relationships established with these external partners have significant effects on the innovative advances made by the firm, except for those established with competitors.

The first hypothesis is supported: relationships with universities and other higher education institutions have positive and significant effects on the propensity of the industrial SMEs to make innovative advances. These results are in line with previous empirical investigations by Fritsch and Schwirten (1999), Kaufmann and Tödtling (2001), and Tether (2002). The results suggest that the innovative advances undertaken by the firms are a product of the relationships that they establish with universities and other higher education institutions.

The second hypothesis is concerned with the association between the capacity of the firm to develop innovative advances in product and its relationship with clients. The results suggest that firms that connect with clients, suppliers, and/or group firms are more able to innovate than those lacking these relationships. This supports the results obtained by other authors such as Fritsch and Lukas (1999, 2001), and Kaufmann and Tödtling (2000, 2001).

The third hypothesis lacks conclusive data; so the null hypothesis stating that there is no connection between the relationships established with competitors and the propensity of the firm to make innovative advances is not rejected.

The same can be said of the fourth hypothesis: the results are statistically insignificant. However, the connection has a negative sign. Consequently, the propensity of the firm to develop innovative advances may be negatively correlated with the establishment of such relationships, but further research is needed in order to draw such conclusions.

8.5 Conclusions

This study analyzed whether entrepreneurial innovation capacity in terms of innovative advances is stimulated by the relationships established between firms and their external partners. To achieve this aim, a conceptual model was presented followed by a model that incorporated empirical evidence obtained by the Community Innovation Survey II in Portugal.

As we analyzed each type of relationship, we found that the external relationships established with partners influence the firm's ability to make innovative advances. This positive influence is greater for relationships with universities and other

higher education institutions. The effects of the control variables for the model of innovative advances in product are not statistically significant. The results suggest that the explanatory variables are robust and the relationships established with different types of external partners have significant effects on the innovative advances of product innovations and their degree of novelty.

In terms of policy implications resulting from the present study, it should be stressed that public policies oriented towards the creation of open innovation networks are needed. To assure the success of open innovation networks, entrepreneurs and industrial or commercial associations should actively consult with universities, thus promoting an equilibrium between the demand "pull" and the supply "push" for innovation.

The main limitation of this study is the small data set of 95 innovative firms in Portugal. Further studies should seek out and identify unrecognized innovative firms not just from Portugal but from other countries.

Future research of pursuit for the current research would be to repeat the approach used in this study, using the data from CIS III and CIS IV, as a means of obtaining information that would allow the evaluation of evolutionary patterns. In this context, it is possible that data from other members of the European Union and other countries are available, as the CIS questionnaire has been implemented elsewhere. This would contribute to the development of future studies on cooperative open innovation networks.

References

Agresti, A. (1996) *An Introduction to Categorical Data Analysis*, Wiley, New York.

Amara, N., and Landry, R. (2005) Sources of information as determinants of novelty of innovation in manufacturing firms: evidence from the 1999 statistics Canada innovation survey, *Technovation*, 25, 245–259.

Bayona, C., Garcia-Marco, T., and Huerta, E. (2001) Firm's motivations for cooperative R&D: an empirical analysis of Spanish firms, *Research Policy*, Amsterdam, 30, 1289–1307.

Becker, W., and Dietz, J. (2004) R&D cooperation and innovation activities of firms – evidence for the German manufacturing industry, *Research Policy*, 33, 209–223.

Braczyk, H., Cooke, P., and Heidenreich, R. (1998) *Regional Innovation Systems*, UCL, London

Bruce, M., and Morris, B. (1998) In house, Out-sourced or a Mixed Approach to Design, in Bruce, M., and Jevnaker, B. (Eds.), *Management of Design Alliances: Sustaining Competitive Advantage*, Wiley, Chichester.

Cassiman, B., and Veugelers, R. (2002) R&D cooperation and spillovers: some empirical evidence from Belgium, *The American Economic Review*, 92(4), 1169–1185.

Chung, S., and Kim, G.M. (2003) Performance effects of partnership between manufacturers and suppliers for new product development: the supplier's standpoint. *Research Policy*,32, 587–603.

CIS II (1999) Segundo Inquérito Comunitário às Actividades de Inovação, Observatório das Ciências e Tecnologias, Ministério da Ciência e da Tecnologia, Lisboa

Cohen, W., and Levinthal, D. (1989) Innovation and learning: the two faces of R&D – implications for the analysis of R&D investment, *Economic Journal*, 99, 569–596.

Cohen, W., and Levinthal, D. (1990) Absorptive capacity: a new perspective on learning and innovation, *Administrative Science Quarterly*, 35March, 128–152.

Cooke, P., Uranga, M., and Etxebarria, G. (1997) Regional innovation systems: institutional and organisational dimensions, *Research Policy*, 26(4–5), 475–491.

Cooke, P., Boekholt, P., and Tödtling, F. (2000) *The Governance of Innovation in Europe*: *Regional Perspectives on Global Competitiveness*, Printer, London.

D'Este, P., and Patel, P. (2003) University–industry linkages in the UK: what are the factors underlying the variety of interactions with industry? *Research Policy*, 36(9), 1295–1313.

Dosi, G., Freeman, C., Nelson, R., Silverberg, G., and Soete, L. (1988) *Technical Change and Economic Theory*, Printer, London.

Drejer, I., and Jørgensen, B. (2005) The dynamic creation of knowledge: analyzing public–private collaborations, *Technovation*, 25: 83–94.

Edquist, C. (1997) Systems of Innovation Approaches – Their Emergence and Characteristics, in Edquist (Ed.) *Systems of Innovation: Technologies, Institutions and Organizations*, Printer, London, Chap. 1, 1–35.

Edquist, C. (2005) Systems of innovation: perspectives and challenges, in Fagerberg, J., Mowery, D., and Nelson, R. (Eds.), *The Oxford Handbook of Innovation*, Oxford University Press, New York.

Faems, D., VanLooy, B., and Debackere, K. (2005) Interorganizational collaboration and innovation: toward a portfolio approach, *Journal of Product Innovation Management*, 22, 238–250.

Ferrão, M. (2003) Introdução aos modelos de regressão multinível em educação, Campinas: Komedi.

Fischer, M., and Varga, A. (2002) Technological innovation and inter-firm cooperation: an exploratory analysis using survey data from manufacturing firms in the metropolitan region of Vienna, *International Journal of Technology Management*, 24, 724–742.

Fritsch, M., and Lukas, R. (1999) Innovation, Cooperation, and the Region, in Audretsch, D.B., and Thurik, R. (Eds.), *Innovation, Industry Evolution and Employment*, Cambridge University Press, Cambridge, UK, 157–181.

Fritsch, M., and Lukas, R. (2001) Co-operation in regional innovation systems, *Regional Studies*, 35(4), 297–307.

Fritsch, M., and Schwirten, C. (1999) Enterprise-university co-operation and the role of public research institutions in regional innovation systems, *Industry and Innovation*, 6(1), 69–83.

Furman, J., Porter, M., and Stern, S. (2002) The determinants of national innovative capacity, *Research Policy*, 31, 899–933.

Hagedoorn, J. (2002) Inter-firm R&D partnerships: an overview of major trends and patterns since 1960, *Research Policy*, 31, 477–492.

Hakansson, H. (1987) *Industrial Technology* Technology *Development – A Network Approach*, Croom Helm, London.

Hakansson, H., and Johanson, J. (1992) A Model of Industrial Networks, in Axelsson, B., and Easton, G. (Eds.), *Industrial Networks – A New View of Reality*, Routledge, London, 28–36.

Hessels, S. (2007) Innovation and International involvement of Dutch SMEs, *International Journal of Entrepreneurship* Entrepreneurship *and Small Business*, 4(3), 234–255.

Hoang, H., and Rothaermel, F. (2005) The effect of general and partner-specific alliance experience on joint R&D project performance. *Academy of Management Journal*, 48(2), 332–345.

Kaufmann, A., and Tödtling, F. (2000) Systems of innovation in traditional industrial regions: the case of styria in a comparative perspective, *Regional Studies*, 34(1), 29–40.

Kaufmann, A., and Tödtling, F. (2001) Science–industry interaction in the process of innovation: the importance of boundary-crossing between systems, *Research Policy*, 30, 791–804.

Kline, S.J., and Rosenberg, N. (1986) An Overview of Innovation, in Laudau, R., and Rosenberg, N. (Eds.), *The Positive Sum Strategy*: *Harnessing Technology for Economic Growth*, National Academy Press, Washington, 275–306.

Leitão, J. (2006) Open Innovation Clusters: The Case of Cova da Beira Region (Portugal), *Conference Proceedings of ISBE 2006*, Cardiff.

Lundvall, B.-A. (1985) *Product Innovation and User–Producer Interaction*, Industrial Research, Series No. 31, Aalborg University Press, Aalborg.

Lundvall, B.-A. (1988) Innovation as an Interactive Process: From User–Producer Interaction to the National System of Innovation, in Dosi, G., Freeman, C., Nelson, R., Silverberg,, G., and Soete, L. (Eds.), *Technical Change and Economic Theory*, Printer, London, Chap. 17, 349–269.

Lundvall, B.-A. (1992) *National Systems of Innovation*: *Towards a Theory of Innovation and Interactive Learning*, Printer, London.

Lundvall, B.-A. (2007) National innovation systems – analytical concept and development tool, *Industry and Innovation*, 14(1): 95–119.

Lundvall, B.-A., Johnson, B., Andersen, E., and Dalum, B. (2002) National systems of production, innovation and competence building, *Research Policy*, 31, 213–231.

Maskell, P., and Malmberg, A. (1999) Localised learning and industrial competitiveness, *Cambridge Journal of Economics*, 23(2), 167–185.

Miotti, L., and Sachwald, F. (2003) Co-operative R&D: why and with whom? An integrated framework of analysis, *Research Policy*,32, 1481–1499.

Nelson, R. (1993) *National Systems of Innovation* : *A Comparative Analysis*, Oxford University Press, Oxford.

Nieto, M., and Santamaría, L. (2007) The importance of diverse collaborative networks for the novelty of product innovation, *Technovation*, 27, 367–377.

OECD (1997a) *Revision of the High-Technology Sector and Product Classification*, STI Working Papers, 1997/2, OECD, Paris.

OECD (1997b) *OSLO Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*, OECD, Paris.

OECD (2005) *OSLO Manual: Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*, 3rd Edn, Paris, OECD.

Porter, M. (1990) *The Competitive Advantage of Nations*, Macmillan, New York.

Romijn, H., and Albaladejo, M. (2002) Determinants of innovation capability in small electronics and software firms in Southeast England, *Research Policy*, Amsterdam, 31(7), 1053–1067.

Schmidt, T. (2007) Motives for Innovation Co-operation – Evidence from the Canadian Survey of Innovation, ZEW Discussion Paper, No. 07–018, Mannheim.

Silva, M. (2003) Capacidade Inovadora Empresarial – Estudos dos Factores Impulsionadores e Limitadores nas Empresas Industriais Portuguesas, Ph.D. Thesis in Management, University of da Beira Interior, Covilhã.

Silva, M., Raposo, M., Ferrão, M., and Jiménez, J. (2005) Relacionamentos externos no âmbito da Inovação Empresarial: Modelo Aplicado aos Avanços Inovadores, *Portuguese Journal of Management Studies*, no. 1: 5–19.

Silva, M.J., and Leitão, J. (2009) Co-operation in innovation practices among firms in Portugal: do external partners stimulate innovative advances, *International Journal of Entrepreneurship and Small Business*, 7(4): 391–403.

Simões, V. (1997) *Inovação e Gestão em PME*, Gabinete de Estudos e Prospectiva Económica (GEPE), Ministério de Economia, Lisboa.

Tether, B. (2002) Who co-operates for innovation, and why. An empirical analysis, *Research Policy*, 31, 947–967.

Veugelers, R., and Cassiman, B. (2005) R&D cooperation between firms and universities: some empirical evidence from Belgian manufacturing, *International Journal of Industrial Organization*, 23(5–6), 355–379.

Whitley, R. (2002) Developing innovative competences: the role of institutional frameworks. *Industrial and Corporate Change*, 11, 497–528.

Chapter 9
KIBS Growth: Diagnosis and Suggestions for Public Policy to Promote Entrepreneurship in Portugal

Zélia Serrasqueiro and Paulo Maçãs Nunes

9.1 Introduction

Entrepreneurial activity in Portugal is clearly dominated by "entrepreneurship of needs," which may decisively limit the quality and possibility of survival of new companies in Portugal, and deceased firms do not improve Portugal's economic productivity (Baptista 2008). Baptista and Thurik (2007) found that the great majority of new Portuguese companies are not leading agents for structural changes in markets or for increasing business productivity, thus making an insignificant contribution toward economic growth.

Baptista (2008) suggests that investment should be made in companies whose activities are based on innovation and knowledge and in companies that are expected to be more likely to introduce products to the market based on the results of scientific and technological investigation. The companies whose activities are based on innovation and knowledge have high potential to increase employment and economic growth in Portugal; however, the high initial investment needed for start-up, and above all for the growth of this type of company, can be difficult without alternative financing sources to internal finance. The government intervention may be relevant in this context, given that public policies encouraging entrepreneurship may stimulate the birth and growth of these types of company in Portugal.

This study addresses these questions by determining the determinant factors of the growth of innovation- and knowledge-based companies, as well as offering guidelines for public policy to promote entrepreneurship and company growth. With this goal in mind, based on the literature centered on knowledge-intensive business services (KIBS) as the suppliers of knowledge-intensive services, we analyze 161 Portuguese small and medium-sized enterprises (SMEs) that can be classified as KIBS, for the period 1999–2005.

Using a foundation based on the existent growth determinant literature we take three types of variables (1) traditional variables; (2) variables that measure innovation

Z. Serrasqueiro (✉) and P.M. Nunes
Department of Management and Economics, University of Beira Interior, Covilhã, Portugal
zelia@ubi.pt

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_9,

propensity; and (3) variables of sources of finance. To carry out diagnosis of the relevant determinant factors for Portuguese KIBS growth, we use OLS regressions. In order to test Gibrat's Law, we use the Chow test. After diagnosing the relevant determinant factors of Portuguese KIBS growth, we suggest important measures for public policy to promote entrepreneurship, aiming to contribute to effective and sustained growth and enabling future diversification of activities.

After this introduction, the study takes the following form: Sect. 9.2 presents a literature review, with Sect. 9.3 describing the database used, variables, and methodology. Section 9.4 presents the empirical results; Sect. 9.5 discusses the results; and finally, Sect. 9.6 presents the conclusion and implications, concerning particularly suggestions for public policy to Portuguese KIBS.

9.2 Existing Literature

Since Gibrat's (1931) pioneering study, many studies seeking the determinants of company growth have been conducted. According to Gibrat, small and large companies are equally likely to find a certain rate of growth. Those that find this certain rate of growth are more able to grow and survive, while those that do not find it may leave the market. This became known as Gibrat's Law. Afterwards, numerous empirical studies tested Gibrat's Law. When a statistically significant relationship is found between size in the previous period and growth in the current period, Gibrat's Law is not accepted. On the contrary, when there is no relationship between size in the previous period and growth in the current period, Gibrat's Law is considered valid.

The principal motivation for SME growth is the search for a minimum scale of efficiency that allows survival. For that reason, the possibility of rejecting Gibrat's Law in the context of SMEs is greater than what happens in the context of large companies (Barkham et al. 1996; Audretsch et al. 2004). When empirical evidence from studies of SMEs point to rejecting Gibrat's Law, the authors conclude that SME growth is independent of previous size (Mata 1994; Fotopoulos and Louri 2001; Heshmati 2001; Becchetti and Trovato 2002; Lotti et al. 2003; Yasuda 2005; Honjo and Harada 2006; Oliveira and Fortunato 2006; Moreno and Casillas 2007).

Jovanovic (1982) concludes that as companies advance through the life cycle, growth rates diminish as they approach the minimum level of efficiency allowing market survival. We consider age as a determinant factor of company growth, since from the conclusions of Jovanovic (1982), age became a more regularly considered determinant factor of growth, principally in the case of SMEs (Mata 1994; Fotopoulos and Louri 2001; Heshamati 2001; Becchetti and Trovato 2002; Lotti et al. 2003; Yasuda 2005; Honjo and Harada 2006; Oliveira and Fortunato 2006; and Moreno and Casillas 2007).

Several studies include intangible assets as a determinant factor for SME performance and growth since such assets give them a greater ability to take on diverse strategies, reflecting their propensity to innovate (Griliches and Licthenberg 1984; Pusher 1995; Smith et al. 2004; Rogers 2004; Chen et al. 2006). However,

empirical evidence about the specific influence of intangible assets on SME growth is scarce, with exceptions for Yasuda (2005) and Calvo (2006).

Concerning the relevance of expenditure on Research and Development in the context of SMEs, several studies (Kimura 1988; Sutton 1998; Andries and Debackere 2007) conclude that SMEs with greater research and development intensity are more likely to innovate. Consequently, greater innovative tendency in SMEs allows them greater strategic flexibility, and consequently a greater possibility to diversify activities, which can mean relevant increases in profitability and growth.

This study considers two measures of the innovation propensity of Portuguese KIBS: (1) level of intangible assets and (2) expenditure on research and development. The choice of expenditure on research and development has to do with the relevance of the weight of research and development against the total intangible assets of Portuguese KIBS.

Recently, empirical investigation about the determinant factors of SME growth has given special emphasis to sources of finance as a determinant factor of growth. Many studies (Audretsch and Elston 2002; Carpenter and Peterson 2002; Cabral and Mata 2003; Oliveira and Fortunato 2006; Moreno and Casillas, 2007), analyze the effect of internal finance on SME growth, while others analyze the effect of external finance (Heshmati 2001; Becchetti and Trovato 2002; Honjo and Harada 2006). This study considers both sources of finance as possible determinants of the growth of Portuguese KIBS: (1) internal finance, using cash flow for the purpose and (2) external finance, where besides total debt and its separation into short-term debt and long-term debt, we use public support for investment.

9.3 Database, Variables, and Methodology

This section presents first the database used in this study, as well as the selection criteria for the sample and its final composition. Then we present the variables used in the study, and finally present the estimation methodology used.

9.3.1 Database

This study uses the SABI (Sistema de Balanços Ibéricos – System Analysis of Iberian Balance Sheets) database provided by Bureau van Dijk's, for the period between 2000 and 2005. We select SMEs based on the recommendation of the European Union L124/36 (2003/361/CE). According to this recommendation, a business is a SME when it meets two of the following criteria: (1) fewer than 250 employees; (2) assets under 43 million euros; and (3) business volume under 50 million euros.

Because one of the goals of this study is to see if Portuguese KIBS SMEs receiving public grants grow faster, we select Portuguese SMEs, according to KIBS sectors based on NACE Rev. 1.1. Nomenclature: NACE division 72: Computer and related activities; NACE division 73: Research and experimental development;

and NACE division 74: Other business activities. Using the data, collected for the period between 1999 and 2005, firms that satisfy simultaneously the three criteria mentioned above and that received public grants at least once in the period under analysis were identified. Since not all companies were operational in 1999, the panel used in this study is not uniform and is made up of 161 companies with a total of 783 observations.

9.3.2 Variables

We consider sales growth as the dependent variable. For the independent variables, given the aims set out in the introduction to this study, we consider three groups of variables (1) size in the previous period, and age; (2) as measures of propensity of innovation, we consider level of intangible assets[1] and expenditure on research and development; and (3) cash flow, as a measure of internal finance and total, long-term, and short-term debt, as well as public grants, as measures of external finance.

The variables used in this study, together with their corresponding measures, are presented in Table 9.1

Table 9.1 Measurement of variables

Variables	Measurement
Dependent	
Growth ($GROW_{i,t}$)	First difference to logarithm of sales
Independent	
Size ($SIZE_{i,t-1}$)	Logarithm of total assets in previous period
Age ($AGE_{i,t-1}$)	Logarithm of the number of years of company existence in previous period
Intangible assets ($INT_{i,t-1}$)	Ratio between intangible assets and total assets in previous period
Research and development ($RD_{i,t-1}$)	Ratio between research and development and sales in previous period
Internal finance ($CF_{i,t-1}$)	Ratio between earnings before interest and taxes, and depreciations and total assets in previous period
Total debt ($LEV_{i,t-1}$)	Ratio between total liabilities and total assets in previous period
Short-term debt ($SLEV_{i,t-1}$)	Ratio between short term liabilities and total assets in previous period
Long-term debt ($LLEV_{i,t-1}$)	Ratio between long term liabilities and total assets in previous period
Public grants ($GS_{i,t-1}$)	Ratio between public grants and total assets in previous period

[1]Besides Research and Development expenditure, intangible assets include installation expenses, intellectual property, other rights, and other intangible assets.

9.3.3 Methodology

This subsection presents first the estimation methodology and continues with the justification for its selection as opposed to other possible approaches.

The classic test of Gibrat's Law consists of testing the relationship between growth in the current period with size in the previous period. The test of the empirical relationship can be presented as follows:

$$\mathrm{SIZE}_{i,t} - \mathrm{SIZE}_{i,t-1} = \beta_0 + (\beta_1 - 1)\mathrm{SIZE}_{i,t} + d_t + e_{i,t}, \tag{9.1}$$

where $\mathrm{SIZE}_{i,t}$ is size in the current period; $\mathrm{SIZE}_{i,-t}$ is size in the previous period; d_t are annual dummy variables measuring the impact of possible macroeconomic changes on growth; and $e_{i,t}$ is the error which is assumed to have normal distribution.

Company growth is given by

$$\mathrm{GROWTH}_{i,t} = \mathrm{SIZE}_{i,t} - \mathrm{SIZE}_{i,t-1}. \tag{9.2}$$

Solving (9.1) to the order of $\mathrm{SIZE}_{i,t}$, this can be presented as follows:

$$\mathrm{SIZE}_{i,t} = \beta_0 + \beta_1 \mathrm{SIZE}_{i,t-1} + d_t + e_{i,t}. \tag{9.3}$$

The test of Gibrat's Law consists of testing the null hypothesis H_0: $\beta_1 = 1$, against the alternative hypothesis $\beta_1 \neq 1$. By not rejecting the null hypothesis, then $\beta_1 \approx 1$, and Gibrat's Law is valid: growth in the studied period is independent of size in the previous period. On the contrary, if $\beta_1 \neq 1$, Gibrat's Law is rejected, since size in the previous period is related to growth in the current period. If $\beta_1 > 1$, then it shows an explosive tendency of growth, since growth increases as size increases. The rarest situation is when Gibrat's Law is rejected because $\beta_1 < 1$: growth is decreasing as company size increases.

As mentioned previously, starting from the study by Jovanovic (1982), company age is considered fundamental in explaining growth. Considering age as a determinant factor of SME growth, we add it as an explanatory variable of growth, and so after estimating the regression presented in (9.3), we estimate the following regression:

$$\mathrm{SIZE}_{i,t} = \beta_0 + \beta_1 \mathrm{SIZE}_{i,t-1} + \beta_2 \mathrm{AGE}_{i,t-1} + d_t + e_{i,t}, \tag{9.4}$$

where $\mathrm{AGE}_{i,t-1}$ is company age in the previous period.

At a later stage, we test the possibility of level of intangible assets and expenditure on research and development contributing to the growth of SMEs in the KIBS sectors. Given that expenditure on research and development is an integral part of intangible assets, we introduce the variables separately in the regressions. Therefore, the regressions to estimate can be presented as follows:

$$\mathrm{SIZE}_{i,t} = \beta_0 + \beta_1 \mathrm{SIZE}_{i,t-1} + \beta_2 \mathrm{AGE}_{i,t-1} + \beta_3 \mathrm{INT}_{i,t-1} + d_t + e_{i,t}, \tag{9.5}$$

$$\text{SIZE}_{i,t} = \beta_0 + \beta_1 \text{SIZE}_{i,t-1} + \beta_2 \text{AGE}_{i,t-1} + \beta_3 \text{RD}_{i,t-1} + d_t + e_{i,t}, \tag{9.6}$$

where $\text{INT}_{i,t-1}$ and $\text{RD}_{i,t-1}$ are, respectively, the level of intangible assets in the previous period and expenditure on research and development in the previous period.

Next we analyze the effects of internal and external finance on the growth of Portuguese SMEs belonging to the KIBS subsectors. Given the collinearity between total, short-term, and long-term debt, we do not introduce the variables simultaneously in the regressions. The regressions to estimate, considering the effects of internal and external finance on growth, are:

$$\begin{aligned}\text{SIZE}_{i,t} = {} & \beta_0 + \beta_1 \text{SIZE}_{i,t-1} + \beta_2 \text{AGE}_{i,t-1} + \beta_4 \text{CF}_{i,t-1} \\ & + \beta_4 \text{LEV}_{i,t-1} + \beta_5 \text{ES}_{i,t-1} + d_t + e_{i,t},\end{aligned} \tag{9.7}$$

$$\begin{aligned}\text{SIZE}_{i,t} = {} & \beta_0 + \beta_1 \text{SIZE}_{i,t-1} + \beta_2 \text{AGE}_{i,t-1} + \beta_4 \text{CF}_{i,t-1} \\ & + \beta_4 \text{SLEV}_{i,t-1} + \beta_5 \text{ES}_{i,t-1} + d_t + e_{i,t},\end{aligned} \tag{9.8}$$

$$\begin{aligned}\text{SIZE}_{i,t} = {} & \beta_0 + \beta_1 \text{SIZE}_{i,t-1} + \beta_2 \text{AGE}_{i,t-1} + \beta_4 \text{CF}_{i,t-1} \\ & + \beta_4 \text{LLEV}_{i,t-1} + \beta_5 \text{ES}_{i,t-1} + d_t + e_{i,t}.\end{aligned} \tag{9.9}$$

Finally, to test robustness of the results, we present the regressions with all the variables used in this study. However, we do not consider simultaneously in the same regressions: first, we consider the level of intangible assets and expenditure on research and development and second, total, short-term, and long-term debt.

We use OLS regressions in order to estimate the equations presented earlier. The choice of OLS regressions rather than use of panel models, admitting the existence of random or fixed nonobservable individual effects, or use of dynamic panel estimators is due to the reasons explained below.

First, nonobservable individual effects tend to have nonexistent correlation with the dependent variable, given that the estimated regressions are equivalent to having a dependent variable in first differences, and, more importantly, the possible correlation of nonobservable individual effects with the lagged dependent variable, in this study$\text{SIZE}_{i,t-1}$, would lead to biased estimates of the estimated parameters.

Use of dynamic estimators would be problematic in terms of interpretation of the estimated results, since we have a nonuniform panel with only a few years worth of data. When using dynamic estimators, lagged dependent and independent variables are used as instruments and the nonexistence of second-order autocorrelation is a necessary condition to test robustness of the obtained results. In this context, Arellano and Bond (1991) conclude that it is convenient that the units under analysis are consecutive for a minimum of 5–6 years in the sample, so that they can be included in the obtained results. This does not happen in this study, since some companies enter the market later than 1999. In this way, interpretation of dynamic estimators in this study could be problematic.

Since heteroschedasticity is normally a problem in company growth in general, and in the case of SMEs in particular, given the great variability of company

growth (Becchetti and Trovato 2002), we consider estimates of standard deviations consistent with the existence of heteroschedasticity, using the White estimator for this purpose.

To test Gibrat's Law, we use the Chow test. As already mentioned, the null hypothesis is $H_0 : \beta_1 = 1$, the null hypothesis being $H_1 : \beta_1 \neq 1$. By not rejecting the null hypothesis, that is, $\beta_1 \approx 1$, Gibrat's Law is accepted as valid. When rejecting the null hypothesis, $\beta_1 \neq 1$, Gibrat's Law is rejected. We present the results of the Chow test for all the regressions carried out in this study.

9.4 Results

This section presents the empirical results of this study: (1) first, the descriptive statistics of the variables used in this study; (2) then the variable correlation matrix; and, finally, (3) results of the regressions and the Chow test of Gibrat's Law.

9.4.1 Descriptive Statistics

Table 9.2 presents the results of the descriptive statistics of the variables used in this study.

The standard deviation of growth variable is substantially above of the mean of this variable, evidencing considerable volatility. This may be for two fundamental reasons (1) first, growth volatility can be considerable for each of the companies over the period of analysis and (2) second, the differences in growth between companies can also be considerable.

Also of note is the high volatility of cash flow, public grants, level of intangible assets, and expenditure on research and development. It is relevant that the mean of long-term debt of Portuguese KIBS is considerably higher than the mean of short-term debt.

Table 9.2 Descriptive statistics

Variable	Observations	Mean	Standard deviations	Minimum	Maximum
$GROW_{i,t}$	783	0.043698	0.578269	−3.57208	6.27620
$SIZE_{i,t}$	783	13.89415	1.534098	7.06801	17.60021
$AGE_{i,t}$	783	2.356187	0.771869	0	4.159993
$INT_{i,t}$	783	0.023643	0.0670316	0	0.673191
$RD_{i,t}$	783	0.016954	0.1120945	0	0.419124
$CF_{i,t}$	783	0.073865	0.212186	−2.44653	0.649955
$LEV_{i,t}$	783	0.740027	0.510975	0.011508	0.984712
$SLEV_{i,t}$	783	0.540995	0.190635	0	0.984712
$LLEV_{i,t}$	783	0.199032	0.190635	0	0.724191
$GS_{i,t}$	783	0.047518	0.2055522	0	0.784198

9.4.2 Correlation Matrix

Table 9.3 presents the correlation matrix of the variables used in this study.

Based upon the correlation between independent variables and the growth of Portuguese KIBS, we conclude that (1) size and age are correlated negatively with growth, the correlations being statistically significant; (2) cash flow, total debt, and long-term debt, and expenditure on research and development are correlated positively with growth, the obtained correlations also being statistically significant; and (3) for the remaining variables, we find statistically insignificant correlations with growth.

The correlations between independent variables allow us to state the following relationships: (1) government funding is given in greater quantities to smaller SMEs than to larger ones; (2) older Portuguese KIBS have greater cash flow, reducing their dependency on short-term debt, while younger Portuguese KIBS have more intangible assets and larger research and development investments; and (3) the results suggest that the activities of Portuguese KIBS, embodied in intangible assets in general and in expenditure on research and development in particular, are generally financed through long-term debt and cash flow. Short-term debt and public grants are less relevant in financing of Portuguese KIBS.

9.4.3 Regressions

Table 9.4 presents the results of the growth regressions of Portuguese KIBS, with size and age in the previous period as dependent variables.

We find that (1) the relationship between size in the previous period and size in the current period is positive and statistically significant at 1%, the estimated parameter in all circumstances being less than 1 and (2) the relationship between age in the previous period and size in the current period is negative and statistically significant at 1%.

Next, Table 9.5 adds level of intangible assets and expenditure on research and development as possible determinant factors of Portuguese KIBS growth.

For the relationship between the variables that measure the innovating tendency of Portuguese KIBS and their growth, we conclude that (1) the relationship between level of intangible assets in the previous period and size in the current period, although negative, is not statistically significant and (2) the relationship between expenditure on research and development in the previous period and size in the current period is positive and statistically significant at 1%.

It is noticeable that the relationships between size and age in the previous period and size in the current period do not change significantly, concerning the magnitude of the estimated parameters and their statistical significance, when the regressions include level of intangible assets and expenditure on research and development in the previous period.

Table 9.3 Correlation matrix

	$GROW_{i,t}$	$SIZE_{i,t-1}$	$AGE_{i,t-1}$	$INT_{i,t-1}$	$RD_{i,t-1}$	$CF_{i,t-1}$	$LEV_{i,t-1}$	$SLEV_{i,t-1}$	$LLEV_{i,t-1}$	$GS_{i,t}$
$GROW_{i,t}$	1									
$SIZE_{i,t-1}$	−0.241***	1								
$AGE_{i,t-1}$	−0.237***	0.226***	1							
$INT_{i,t-1}$	−0.027	0.054	−0.176***	1						
$RD_{i,t-1}$	0.124***	−0.041	−0.092**	0.420***	1					
$CF_{i,t-1}$	0.131***	0.076*	0.156***	−0.005	−0.031	1				
$LEV_{i,t-1}$	0.090**	−0.105**	−0.232***	0.073*	0.020	−0.349***	1			
$SLEV_{i,t-1}$	0.061	−0.079*	−0.208***	0.045	−0.025	−0.307***	0.916***	1		
$LLEV_{i,t-1}$	0.141***	−0.062	−0.055	0.068*	0.110***	−0.141***	0.196***	−0.211**t*	1	
$GS_{i,t-1}$	−0.023	−0.158***	−0.061	−0.007	0.043	0.0197	0.002	−0.011	0.035	1

Notes. ***Indicates significance at the 1% level, **indicates significance at 5% level, and *indicates significance at the 10% level

Table 9.4 Classic test and age

***Dependent variable: $SIZE_{i,t}$		
Independent variables	I	II
$SIZE_{i,t-1}$	0.90644*** (0.01558)	0.92331*** (0.01570)
$AGE_{i,t-1}$		–0.14027*** (0.02957)
CONS	1.35096*** (0.21895)	1.44339*** (0.21590)
R^2	0.8531	0.8585
$F(N(0,1))$	3384.66***	1765.99***
Observations	585	585

Notes. ***Significant at 1% level, **significant at 5% level, and *significant at 10% level; Year – dummies are included, but not shown; Bootstrapped standard errors (1,000 reps) are shown in parentheses; and Corrected heteroscedasticity OLS according to White's estimator

Table 9.5 Classic test, age, and innovation variables

Dependent variable: $SIZE_{i,t}$		
Independent variables	I	II
$SIZE_{i,t-1}$	0.92534*** (0.01577)	0.92255*** (0.01558)
$AGE_{i,t-1}$	–0.14785*** (0.03012)	–0.14171*** (0.02933)
$INT_{i,t-1}$	–0.15285 (0.24419)	
$RD_{i,t-1}$		0.60485*** (0.18693)
CONS	1.44372*** (0.21578)	1.46837*** (0.21431)
R^2	0.8589	0.8610
$F(N(0,1))$	1179.27***	1199.97***
Observations	585	585

Notes. ***Significant at 1% level, **significant at 5% level, and *significant at 10% level; Year – dummies are included, but not shown; Bootstrapped standard errors (1,000 reps) are shown in parentheses; and Corrected heteroscedasticity OLS according to White's estimator

Table 9.6 shows addition of the variables referring to the sources of finance of Portuguese KIBS: (1) cash flow; (2) total debt; (3) short-term debt; (4) long-term debt; and (5) public grants, as possible determinant factors of the growth of Portuguese KIBS.

Based upon the results, we make the following conclusions (1) the relationships between cash flow and long-term debt in the previous period and size in the current period are positive and statistically significant at 1%; (2) the relationships between total debt and short-term debt in the previous period and size in the current period are positive, although statistically insignificant; and (3) the relationship between public grants in the previous period and size in the current period is negative, but statistically insignificant.

Also, as in the case of adding the variables referring to propensity to innovate, addition of the variables referring to sources of finance as possible determinant

Table 9.6 Classic test, age, and financial variables

Dependent variable: $SIZE_{i,t}$			
Independent variables	I	II	III
$SIZE_{i,t-1}$	0.91945*** (0.01580)	0.91869*** (0.01580)	0.91918*** (0.01580)
$AGE_{i,t-1}$	−0.13296*** (0.03013)	−0.13719*** (0.03004)	−0.14111*** (0.02942)
$CF_{i,t-1}$	0.41684*** (0.15054)	0.39174*** (0.12712)	0.38419*** (0.13071)
$LEV_{i,t-1}$	0.07771 (0.05364)		
$SLEV_{i,t-1}$		0.04764 (0.05328)	
$LLEV_{i,t-1}$			0.18777*** (0.04762)
$GS_{i,t-1}$	−0.11625 (0.12388)	−0.11612 (0.12404)	−0.122289 (0.12396)
CONS	1.39724*** (0.22941)	1.45139*** (0.22507)	1.45424*** (0.22140)
R^2	0.8612	0.8609	0.8610
$F(N(0,1))$	718.36***	716.49***	717.54***
Observations	585	585	585

Notes. ***Significant at 1% level, **significant at 5% level, and *significant at 10% level; Year – dummies are included, but not shown; Bootstrapped standard errors (1,000 reps) are shown in parentheses; and Corrected heteroscedasticity OLS according to White's estimator

factors of the growth of Portuguese KIBS does not mean significant changes to the parameters estimated previously, concerning the relationships between size and age in the previous period and size in the current period.

Finally, Table 9.7 presents the results of regressions considering all the variables considered as possible determinants of the growth of Portuguese KIBS in this study.

We find that the obtained parameters concerning relationships between possible determinants and the growth of Portuguese KIBS are relatively similar, as regards their magnitude and statistical significance, to those estimated previously in Tables 9.4–9.6, which confirms the robustness of the obtained results in this study.

As a whole, the empirical results of this study allow us to conclude that (1) size, age, cash flow, long-term debt, and expenditure of research and development are determinant factors of the growth of Portuguese KIBS; size and age influencing growth negatively, while cash flow, long-term debt, and expenditure on research and development influence growth positively and (2) total and short-term debt, public grants, and level of intangible assets cannot be considered as determinant factors of the growth of Portuguese KIBS.

Next we present results of the Chow test of Gibrat's Law for all regressions presented in this study. Table 9.8 presents these results.

In all cases, the results reject the null hypothesis that the parameter measuring the relationship between size in the previous period and size in the current period is equal to 1. Therefore, we can conclude that Gibrat's Law is rejected in the context of Portuguese KIBS: growth is not independent of size in previous periods.

Table 9.7 All variables

Dependent variable: $SIZE_{i,t}$						
Independent variables	I	II	III	IV	V	VI
$SIZE_{i,t-1}$	0.92191*** (0.01586)	0.92100*** (0.01586)	0.92162*** (0.01587)	0.91861*** (0.01568)	0.91789*** (0.01568)	0.91833*** (0.01569)
$AGE_{i,t-1}$	−0.14149*** (0.03058)	−0.14568*** (0.03053)	−0.15010*** (0.02995)	−0.13478*** (0.02990)	−0.13873*** (0.02981)	−0.14261*** (0.02920)
$INT_{i,t-1}$	−0.14581 (0.24794)	−0.12336 (0.21497)	−0.14201 (0.22498)			
$RD_{i,t-1}$				0.59021*** (0.18583)	0.59429*** (0.18599)	0.58909*** (0.18597)
$CF_{i,t-1}$	0.43601*** (0.15085)	0.40816*** (0.15115)	0.36093*** (0.10917)	0.40082*** (0.14946)	0.37753*** (0.12004)	0.38417*** (0.10971)
$LEV_{i,t-1}$	0.08298 (0.05368)			0.07430 (0.05324)		
$SLEV_{i,t-1}$		0.05036 (0.05325)			0.04645 (0.05286)	
$LLEV_{i,t-1}$			0.19432*** (0.05002)			0.18964*** (0.04910)
$GS_{i,t-1}$	−0.11700 (0.12372)	−0.10491 (0.12391)	−0.12414 (0.12381)	−0.12201 (0.12292)	−0.12996 (0.12130)	−0.12263 (0.12301)
CONS	1.39039*** (0.22917)	1.44872*** (0.22484)	1.45066*** (0.22114)	1.42788*** (0.22784)	1.47891*** (0.22347)	1.48375*** (0.21989)
R^2	0.8618	0.8614	0.8616	0.8636	0.8633	0.8634
$F(N(0,1))$	600.55***	598.76***	599.83***	609.71***	608.28***	608.95***
Observations	585	585	585	585	585	585

Notes. ***Significant at 1% level, **significant at 5% level, and * significant at 10% level; Year – dummies are included, but not shown; Bootstrapped standard errors (1,000 reps) are shown in parentheses; and Corrected heteroscedasticity OLS according to White's estimator

Table 9.8 Chow test to Gibrat's Law

	I	II	III	IV	V	VI
Table 9.4	$F(1,579)$	$F(1,578)$				
	36.05***	23.83***				
	(0.0000)	(0.0000)				
	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)				
Table 9.5	$F(1,577)$	$F(1,577)$				
	22.39***	24.70***				
	(0.0000)	(0.0000)				
	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)				
Table 9.6	$F(1,575)$	$F(1,575)$	$F(1,575)$			
	25.97***	26.45***	26.13***			
	(0.0000)	(0.0000)	(0.0000)			
	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)			
Table 9.7	$F(1,574)$	$F(1,574)$	$F(1,574)$	$F(1,574)$	$F(1,574)$	$F(1,574)$
	24.23***	24.79***	24.40***	26.92***	27.40***	27.09***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)	$\beta_1 \neq 1$ (R)

Notes. ***Significant at 1% level, **significant at 5% level, and *significant at 10% level; Probabilities are shown in parentheses; and *R* Significant rejection to Gibrat's Law

9.5 Discussion of the Results

In this section we discuss the empirical results. Although effectively interconnecting the results, we divide their discussion into three groups of variables (1) size and age; (2) possible determinant factors referring to propensity to innovate; and (3) possible determinant factors referring to sources of finance.

9.5.1 Size and Age

Growth of Portuguese KIBS is not independent of their previous size, rejecting Gibrat's Law ($\beta_1 \neq 1$). The empirical results allow us to conclude that the previous size of Portuguese KIBS is a determinant growth factor, but that growth becomes gradually slower. The empirical results in this study, in the context of Portuguese KIBS, are similar to those obtained for SMEs in general in other countries: Mata (1994) and Oliveira and Fortunato (2006) for Portugal; Fotopoulos and Louri (2001) for Greece; Heshmati (2001) for Sweden; Becchetti and Trovato (2002) and Lotti et al. (2003) for Italy; Calvo (2006) and Moreno and Casillas (2007) for Spain; as well as Yasuda (2005) and Honjo and Harada (2006) for Japan, all conclude that SME growth is not independent from the previous size, thus rejecting Gibrat's Law.

According to Barkham et al. (1996), the motivation for company growth is different according to their size: (1) small companies grow with the aim of reaching

a minimum scale that allows them to survive; while (2) large companies, that may already have reached that minimum scale, grow above all for strategic reasons, in response to possible changes of the markets in which they operate. In this context, the conclusions of Barkham et al. (1996), reinforced by Audretsch et al. (2004), point toward the probable acceptance of Gibrat's Law, as company size increases. For small companies, there is a greater probability that the previous size influences their growth, with the influence diminishing when companies reach a certain size.

According to Baptista (2008), successful KIBS-based SMEs upon reaching the minimum size necessary for survival need greater growth and investment than SMEs in other sectors, since KIBS SMEs require a greater size than those in sectors that concentrate less on research and development and knowledge for their business. Given that, countries, including Portugal, need these KIBS SMEs' high growth rates and job creation to support their economies, public policy should facilitate the ability of targeted companies reaching their minimum scale of efficiency as quickly as possible.

The empirical evidence found in this study lets us conclude that younger Portuguese KIBS grow more quickly than older KIBS. Empirical evidence obtained for SMEs as a whole in other countries corroborate the empirical evidence obtained in this study, in the context of Portuguese KIBS, in that the growth rate of SMEs diminishes as they get older: Portugal (Mata 1994; Oliveira and Fortunato 2006); Greece (Fotopoulos and Louri 2001); Italy (Becchetti and Trovato 2002); Spain (Calvo 2006; Moreno and Casillas 2007); and Japan (Yasuda 2005; Honjo and Harada 2006). In the specific case of Portuguese KIBS, we find that the youngest companies have activities involving a greater level of intangible assets and research and development, but they depend on short-term debt to finance those activities. As Ang (1991) concludes, excessive dependence by SMEs on short-term debt can put their survival at risk, due to the excessive financial stress they are subject to with the need to make periodic payments of debt charges.

9.5.2 Innovating Tendency

For the variables used to measure the propensity for Portuguese KIBS to innovate, we find that expenditure on research and development is a determinant factor for their growth, although intangible assets as a whole are not a determinant. Although the results for Portugal, in terms of research and development, echo those for other nations (Yasuda 2005 and Calvo 2006), the overall results for intangible assets do not, thus they cannot be considered a determinant of Portuguese KIBS growth. Therefore, we can conclude that expenditure on industrial property, other rights, and other intangible assets is less relevant for the growth of Portuguese KIBS than expenditure on research and development. Contributing to this could be the fact that expenditure on research and development is the largest portion of intangible assets in Portuguese KIBS, accounting for, on average, around 72% of the total.

The empirical evidence obtained in this study, given the negative correlation between age and expenditure on research and development and the positive influence of expenditure on research and development on the growth of Portuguese KIBS, leads us to conclude that it is possible the propensity of Portuguese KIBS to innovate is not apparently affected by the risk associated with these activities; the desired positive effect of expenditure on research and development on growth being immediate instead of a delay that other studies (Yasuda 2005) expect to find.

It is quite curious that the empirical results shown in the variable correlation matrix suggest that long-term debt is the principal source of finance for expenditure on research and development in Portuguese KIBS, with only negligible internal finance, short-term debt, and public grants used to facilitate the activities. From this we draw two important conclusions (1) lenders apparently recognize the innovating activities of Portuguese KIBS as investment opportunities so the companies are subjected less to the financial stress of excessive use of short-term debt, a typical situation which is problematic in the case of SMEs and (2) public grants received by Portuguese KIBS do not seem to contribute to promoting companies' innovating capacity.

9.5.3 Sources of Finance

Internal finance and long-term debt are determinant factors for the growth of Portuguese KIBS, while both short-term and total debts as well as public grants appear irrelevant for Portuguese KIBS growth.

The relevance of internal finance for Portuguese KIBS SMEs mirrors the results found for other countries, such as Germany (Audrestsch and Elston 2002). Since in most situations SMEs do not have access to the stock market, debt is especially relevant as source of finance when internal finance is insufficient. The empirical evidence from this study shows that Portuguese KIBS growth, in cases of insufficient internal finance, is financed by turning to long-term debt, with short-term debt not appearing irrelevant. Decreased dependence on short-term debt when internal finance is insufficient allows companies to take greater advantage of possibilities to grow and diversify activities, since they are not subject to excessive financial stress as a consequence of being able to pay off the debt and its charges over a longer period of time.

Although public grants facilitate growth of SMEs in some nations (Honjo and Harada 2006), in the case of Portuguese KIBS, public grants are not a determinant factor for growth. The empirical evidence obtained in this study shows that public policy, involving funding, does not have the desired effect, since it does not contribute to the effective growth of Portuguese KIBS. Based on the variable correlation matrix, we identify that public granting is negatively correlated with the size of Portuguese KIBS. This result appears to indicate that government funding aiming to support smaller SMEs does not affect expenditure on research and development or make an effective contribution to the growth of Portuguese KIBS.

9.6 Conclusions and Implications

This study ascertains the relevant determinant factors of Portuguese KIBS growth. From the study carried out, we can draw the following conclusions (1) smaller, younger Portuguese KIBS grow more quickly than larger, older Portuguese KIBS; (2) internal finance, long-term debt, and expenditure on research and development are determinant factors for the growth of Portuguese KIBS; and (3) total and short-term debt, public grants, and the level of intangible assets as a whole do not seem to be relevant determinant factors for the growth of Portuguese KIBS.

Given the great relevance of SMEs in general, in the context of the Portuguese economy, and in particular SMEs whose activities are based on innovation and knowledge, diagnosis of the determinant factors for Portuguese KIBS growth allows us to propose the following public policy measures to promote entrepreneurship at KIBS level:

1. Facilitate rapid and sustained growth of Portuguese KIBS, so that they can reach the minimum scale of efficiency to ensure long-term survival
2. Efficiently use government funding to focus on research and development, thus contributing to rapid and efficient growth
3. Create special channels of long-term credit supporting research and development activities for companies whenever internal finance is insufficient and they have difficulty accessing long-term credit as a way to finance growth
4. Design support programs for new KIBS enterprises that have limited access to financing yet need it to continue their research and development.

For future research we suggest to compare the determinant factors of Portuguese KIBS growth with the determinant factors of Portuguese non-KIBS growth, with special emphasis on the role of public grants on the company growth.

References

Andries, P. and Debackere, K. (2007) Adaptation and performance in new businesses: Understanding the moderating effects of independence and industry, *Small Business Economics*, 29, pp. 81–99.

Ang, J. (1991) Small business uniqueness and the theory of financial management, *Journal of Small Business Finance*, 1, pp. 1–13.

Arellano, M. and Bond, S. (1991) Some tests of specification for panel data: Monte Carlo evidence and application to employment equations, *Review of Economic Studies*, 58, pp. 277–297.

Audretsch, D. and Elston, J. (2002) Does firm size matter? Evidence on the impact of liquidity constraints on firm investment behavior in Germany, *International Journal of Industrial Organization*, 20, pp. 1–17.

Audretsch D., Klomp, L., Santarelli, E., and Thurik, A. (2004) Gibrat's Law: Are the services different?, *Review of Industrial Organization*, 24, pp. 301–324.

Baptista, R. (2008) Inovação Tecnológica, Competitividade e o Desafio do Empreendedorismo. In: J. Leitão, J. Ferreira e S. Azevedo (eds), *Dimensões Competitivas de Portugal: Contributos dos Territórios, Sectores, Empresas e Logística*, Capítulo 3, pp. 69–092, Lisboa, Portugal.

Baptista, R. and Thurik, A. (2007) The relationship between entrepreneurship and unemployment: Is Portugal an outlier?, *Technological Forecasting and Social Change*, 74, pp. 75–89.

Barkham, R., Gudgin, G., Hart, M., and Harvey, E. (1996) *The determinants of small firm growth: As inter-regional study in the United Kingdom 1986–90*, Routledge, London.

Becchetti, L. and Trovato, G. (2002) The determinants of growth for small and medium sized firms, *Small Business Economics*, 19, pp. 291–306.

Cabral L. and Mata, J. (2003) On the evolution of the firm size distribution: facts and theory, *The American Economic Review*, 93, pp. 1075–1095.

Calvo, J. (2006) Testing Gibrat's Law for small, young and innovating firms, *Small Business Economics*, 26, pp. 117–123.

Carpenter, R. and Petersen, B. (2002) Is the growth of small firms constrained by internal finance?, *The Review of Economics and Statistics*, 84, pp. 298–309.

Chen, Y.-S., Lin, M.-J. and Chang, C.-H. (2006) The influence of intellectual capital on new product development performance – The manufacturing companies of Taiwan as an example", *Total Quality Management*, 17, pp. 1323–1339.

Fotopoulos, G. and Louri, H. (2001) Corporate growth and FDI: Are multinationals stimulating local industry development?, *CEPR Discussion Paper Series*, No. 3128.

Gibrat, R. (1931) *Les Inégalités Économiques*. Paris: Librairie du Recueil Sirey.

Griliches, Z. and Lichtenberg, F. (1984) R&D and productivity growth at industry level: Is there still a relationship?. In: Z. Griliches (ed), *R&D, Patents and Productivity*, University of Chicago Press, Chicago, IL.

Heshmati, A. (2001) On the growth of micro and small firms: Evidence from Sweden, *Small Business Economics*, 17, pp. 213–228.

Honjo, Y. and Harada, N. (2006) SME policy, financial structure and firm growth: Evidence from Japan, *Small Business Economics*, 27, pp. 289–300.

Jovanovic, B. (1982) Selection and evolution of industry, *Econometrica*, 50, pp. 649–670.

Kimura, Y. (1988) *The Japanese Semiconductor Industry: Structure, Competitive Strategies, and Performance*, JAI Press, London.

Lotti, F., Santarelli, E., and Vivarelli, M. (2003) Does Gibrat's Law hold among young, small firms? *Journal of Evolutionary Economics*, 14, pp. 213–235.

Mata, J. (1994) Firm growth during infancy, *Small Business Economics*, 6, pp. 27–39.

Moreno, A. and Casillas, J. (2007) High-growth SMEs versus non-high growth SMEs: A discriminant analysis, *Entrepreneurship and Regional Development*, 19, pp. 69–88.

Oliveira, B. and Fortunato, A. (2006) Firm growth and liquidity constraints: A dynamic analysis, *Small Business Economics*, 27, pp. 139–156.

Pusher, G. (1995) Equity ownership structure, leverage, and productivity: Empirical evidence from Japan, *Pacific-Basin Finance Journal*, 3, pp. 241–255.

Rogers, M. (2004) Networks, firm size and innovation, *Small Business Economics*, 22, pp. 141–153.

Smith, V., Harsenm, M., Eriksson, T., and Madsen, E. (2004) R&D productivity in Danish firms: Some empirical evidence, *Applied Economics*, 36, pp. 1797–1806.

Sutton, J. (1998) *Technology and Market Structure: Theory and History*, MIT, Cambridge, MA.

Yasuda, T. (2005) Firm growth, size, age and behavior in Japanese manufacturing, *Small Business Economics*, 24, pp. 1–15.

Chapter 10
On the Road to a "Culture of Entrepreneurship"?: Assessing Public Support for Entrepreneurship and SMEs in Germany

Friederike Welter

10.1 Introduction

Traditionally, policy interventions have not specifically fostered entrepreneurship; rather interventions generally support both new and small firms. This is especially true in Germany. The first program supporting new businesses was established in 1949. Today Germany has several hundred programs with a mixture of public and private supporters. Since the mid-1990s, several new approaches to support SMEs and entrepreneurship evolved. For example, the national government, along with several state governments, turned to public partnerships. New support approaches are increasingly identified through competitions, with an emphasis on public–private partnerships. In general, start-ups are supported in an attempt to push new businesses and employment opportunities; although some of these initiatives are bundled with existing programs without an apparent overall strategy. Nevertheless, innovative elements include a shift toward public–private networks for mentoring and coaching new entrepreneurs. This often goes hand in hand with the development of integrated approaches where assistance is not limited to only finance or consulting.

This paper reviews the German support system, proceeding as follows: Sect. 10.2 sets out a framework for discussing and analyzing public policies and support, with a short overview of the German support system for fostering entrepreneurship and SMEs, focusing on the specific institutional structure as well as the main policy areas and trends in support emerging over the past decades. Then, the paper will assess the German system, looking at the rationales for supporting new and small firms as well as demonstrating some strengths and shortcomings, in an attempt to find potential lessons outlined in Sect. 10.5. Particular emphasis will be paid to considering the potential of the support system in fostering entrepreneurship and an entrepreneurial culture as well as identifying overall barriers to implementing an entrepreneurial culture.

F. Welter (✉)
Small Business Management and Entrepreneurship, University of Siegen,
PRO KMU, FB 5, Hölderlinstr. 3, 57068, Siegen, Germany
e-mail: welter@uni-siegen.de

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_10,

The assessment is based on several projects in which I participated. This includes a large-scale evaluation of the support system and institutional infrastructure carried out by the Rhine-Westphalia Institute for Economic Research (RWI) in the mid-1990s (see Klemmer et al. 1996; Welter and Lageman 1996) as well as in-depth knowledge gained from several small-scale evaluation and research projects dealing with specific parts of the support system and/or the general environment for entrepreneurship and small businesses in Germany (Achtenhagen and Welter 2004, 2006; Frick et al. 1998; Lageman and Welter 1999, 2003; Welter 2004; Welter and Lageman 2003).

10.2 A Framework for Assessing Entrepreneurship and SME Support Policies

Adopting a broad view of the role of government policy as influencing the nature and extent of entrepreneurship, Smallbone and Welter (2001) identify five main policy types through which government influences entrepreneurship, including:

1. The influence government has on the macroeconomic environment in which business is conducted
2. The impact of government legislation and regulations, which may have a differential impact on firms of different sizes thus contributing to huge compliance costs for new and small firms
3. The impact of government on the development of those institutions that are a necessary part of a market economy, such as banks and other financial intermediaries; business courts; training the business services organizations
4. Direct support measures and programs that are designed to assist new and small enterprises in overcoming size-related disadvantages
5. The value government and society places on enterprise and entrepreneurship within the wider society

While this classification emphasizes the institutional components of public interventions, Verheul et al. (2001) apply a different perspective to categorize government interventions, focusing on entrepreneurship as an individual phenomenon. As public policy can influence most of the contextual factors that affect both the demand for, and supply of, entrepreneurs, they distinguish between five types of government interventions:

1. Interventions on the demand side of entrepreneurship, influencing the number, type, and accessibility of entrepreneurial opportunities
2. Intervention on the supply side of entrepreneurship; influencing the number and type of potential entrepreneurs
3. Policies aiming at the availability of resources, skills, and knowledge of individuals required for entering entrepreneurship and developing a business, dealing with input factors for entrepreneurship such as labor, capital, and information

4. Policies aiming to influence individual preferences for entrepreneurship
5. Policies (directly) aimed at individual decision making.

Similarly, Lundström and Stevenson (2005), drawing on individual-oriented approaches to government intervention, state that government's rationale for supporting entrepreneurship should be based on increasing motivation, opportunities, and skills. They identified that the main objectives of entrepreneurship policies were to develop an entrepreneurial climate and culture; encouraging entrepreneurship; and fostering favorable attitudes toward entrepreneurship. These are geared toward developing an entrepreneurial mindset in the society thus increasing the business start up rate as well as increasing market dynamics as indicated in the rates of entries and exits and survival rates.

Lundström and Stevenson (2005) also introduce an interesting, albeit blurred, distinction, between entrepreneurship policies and SME support. In their understanding, SME support is aimed at the individual firm level helping firms to expand, modernize, and improve; often focused solely at the firm level and on existing firms instead of individuals and potential entrepreneurs. SME policy targets high-growth SMEs, mainly relying on what they label "traditional" types of intervention such as facilitating access to domestic and international markets and improve financing, training, and counseling. Entrepreneurship policies on the other hand, Lundström and Stevenson suggest, are focused on growing the number of businesses and entrepreneurs, which means that the policies concentrate on encouraging individuals to set up businesses, shifting support from the firm-level focus. Moreover, support is concentrated on nascent stages and the first years of a young firm, leaving out developmental problems of small firms in later years. Where entrepreneurship policies are targeted, they as a rule support subgroups within the population such as women or ethnic minorities instead of selecting specific industrial sectors. Although entrepreneurship policies use "traditional" interventions, based on the SMEs support model, a distinguishing feature is its focus on creating an entrepreneurial culture (Lundström and Stevenson 2005). In this regard SME and entrepreneurship policies differ with respect to when results are expected: SME policy is focused on immediate or short-term results, while entrepreneurship policy has a long-term time horizon, understandable given it is attempting to change societal attitudes and values.

In further developing their entrepreneurship policy framework, Lundström and Stevenson (2005) then distinguish elements of a "genuine" entrepreneurship policy, as defined by them, from "traditional" SME policies. Policy aimed at creating an entrepreneurial culture includes entrepreneurship promotion in order to raise a population's awareness of that entrepreneurship could be an attractive professional career and entrepreneurship education. Other policy areas are concerned with reducing macroeconomic and regulatory barriers to entry, early-stage growth, and exit, facilitating access to resources that measures "traditional" firm-level approaches of SME policies, which facilitate starting a venture and increase the diversity of entrepreneurship through facilitating access of diverse groups.

The elements of a framework for entrepreneurship and SME policies as set out here are used to frame the discussion and analysis of the German support system. In particular, I will discuss the institutional elements of the support approach, main support areas, and shifts in rationales as well as strengths and weaknesses of the German approach.

10.3 An Overview of the German Support System

10.3.1 The Institutional Structure for SME Support and Entrepreneurship Policies

Generally support for small and new firms is institutionalized at three different levels: a macrolevel, an intermediary level, and a microlevel (Welter 1997). The *macrolevel* encompasses government organizations such as ministries, departments, and agencies at the national and regional level. Their role could be defined as supervisory: designing support strategies and facilitating co-ordination. Here, the German support system for SMEs is determined by the government's structure with public and private intermediaries delivering support. The main political actors involved in SME support is the federal government, the 16 state governments, and local governments at district and city level (the latter are cities such as Bremen, Berlin, and Hamburg which are legally independent of states) and the European Union.

At the federal level there is neither a special law nor a central agency. The *Grundgesetz* indirectly defines federal SME support as a joint task of federal and state governments, with the latter responsible for executive tasks; while the federal government is responsible for legislative tasks. The federal government uses a variety of public and private organizations to deliver support to SMEs. The idea here is to decentralize SME promotion as far as possible. This is due to the principle of subsidiary support action on behalf of the federal state (*Subsidiaritätsprinzip*). Examples of federal state involvement include the public bank *Mittelstandsbank*, which designs and administers financial support programs; although applications of SMEs are still handed in at commercial banks. Another example is a federal agency (*Bundesamt für Wirtschaft*) which approves applications of small and new firms routed through chambers of commerce and business associations seeking consultancy support or export and marketing support.

Most states have SME laws which do not specify any support measures. In general terms, the laws state that the state government must support small enterprises, regularly reporting to parliament on their status. The states also have different approaches to SME policy. These range from an uncoordinated approach where a number of ministries and departments are involved and coordination often is problematic to special state banks or investment agencies, which are responsible for administrating (and, sometimes, implementing) all state programs. In those cases, the goal is to provide a one-stop-agency resulting in simplified procedures and transparent structure.

The local municipal and district governments foster investments in their regions in order to support economic development. Although it includes support for new and existing small firms, it is not restricted to this group of businesses. Main actors at the local level are economic development corporations, often owned or partly owned by municipalities. They offer a variety of services including information and consulting services, advice regarding public support programs for establishing new ventures, and acting as an intermediary between local government and investors. However, business support initiatives at local levels are rarely innovative "new" approaches by local government, but are actually embedded in federal and state programs and policy approaches.

The *mesoinstitutional level* includes the general legal and financial infrastructure as well as unions, associations, and chambers of commerce interest groups both lobbying the government and delivering support to new and small firms. These institutions are classified as part of the general infrastructure necessary for entrepreneurial activities and services are typically offered to all enterprises regardless of size. The financial system's task lies in offering broad financial possibilities for enterprises, with institutions mediating between entrepreneurs and government. Institutions working on the *microlevel* are normally specifically focused on entrepreneurship and SME support. These include training agencies, business support organizations, and technology centers, to name a few. Their main task is to carry out assistance at the firm level, with a variety of structures, offering programs ranging from minimalist to broad, designed to help new and young firms to overcome startup challenges. The role is compensatory; the organizations compensate for the deficiencies of the market system.

In Germany, a variety of actors on the meso- and microlevel are involved in implementing support measures. Besides the general financial system, there are chambers of commerce and craft, which enterprises must join after establishment; business associations for various sectors or professions; technology and start-up centers as well as other business support organizations. Chambers of commerce, which can act as financial advisors, also provide consultation and training programs. Chambers of commerce are an integral part of an entrepreneur's support network, providing assistance and consultation along side tax advisors and banks (Klemmer et al. 1996). In Germany, commercial banks play an important gate-keeping role in financing businesses because they act as the individual firm's "housebank" for financial programs, both auditing project proposals and arrange the disbursements. Institutions at the microlevel such as technology and start-up centers support enterprises with respect to infrastructure facilities and sometimes business consultancy.

10.3.2 Areas of Support: Moving from Firm-Level Measures to Enabling Policies

Traditionally, Germany offered and continues to offer support at both the firm and individual level, helping potential and new entrepreneurs as well as existing small businesses in four broad fields: financing; consultancy and training; research and

development; and innovation with respect to marketing and sales. An evaluation by the RWI conducted in 1995 analyzed the number of measures in these four fields, finding that federal and state governments mostly concentrate their support on financing (Klemmer et al. 1996). Such support policies are focused on improving the financial conditions of firms through overcoming resource deficits or a lack of access to resources. For example, the access to financial resources of new and small firms might be fostered through setting up a broad range of programs and structures offering credit lines, access to business angels, or venture capital or originating microfinance programs from the late 1990s onward. In general, such support aims at leveling out (perceived) difficulties of new and young firms to access resources, information, skills, infrastructure, etc. and this has been a guiding principle of the German system since industrialization started, as Sect. 10.4.2 will illustrate.

Since the 1990s, a pronounced shift toward policies aimed at stimulating entrepreneurial activities of specific subgroups of the German population occurred. Programs at the federal and state level designed to support women entrepreneurs have gained importance [see Welter and Lageman (2003) and Welter (2004) for more details]. However, German support for women entrepreneurs often only focuses on financial or human capital needs, neglecting the overall legal and institutional framework.

Another "new" target are ventures created by pupils, students, or graduates which gained importance with the federal competition "EXIST," first launched in 1997 by the then Federal Ministry of Education and Research. This initiative includes different programs encouraging entrepreneurship by university and university of applied sciences (*Fachhochschulen*) graduates. Besides targeting a different subgroup of potential entrepreneurs, this approach is notable for its decentralized, regional approach and selection of projects through a nation-wide competition. This is a stark change from policies that have traditional sought to build up infrastructure and support businesses in less-developed regions. Instead, this program, similar to others set up in the 1990s, focuses on establishing regional centers of excellence, independent of their location. For example, *Innoregio* is aimed at fostering innovation by new firms in former East German states by initiating science-, industry-, or policy-led regional innovation networks. Here, merely organizing competitions might have had large "indirect" effects on fostering entrepreneurship in Germany, through initiating regional networks of public and private actors and bringing together actors across different levels of governance.

All this reflects an overall "profound shift" (Gilbert et al. 2004: 313, 314) toward an entrepreneurship policy approach, involving two main elements: On the one hand, since the mid-1990s, support measures were redirected toward targeting more potential entrepreneurs instead of mainly new or existing enterprises. On the other hand, the overall support approach started moving toward creating an enabling environment instead of focusing (solely or at least to a large extent) on firm-level measures. This was partly facilitated by the European Union. In concordance with the European Employment Strategy, the German federal and state governments initiated projects designed to improve the entrepreneurial environment including reducing red tape for business start-ups, simplifying laws and regulations,

introducing tax relief for small enterprises, setting up one-stop-agencies, and creating an Internet portal to facilitate succession in established ventures.

Another element of enabling policy focuses on the "soft" societal factors that play an important role in encouraging entrepreneurship. Federal, state, and local actors started looking for ways to influence societal attitudes toward entrepreneurship in Germany; normally said to be wanting in entrepreneurial spirit. For example, the late 1990s saw an increase in local and regional awards for entrepreneurs [Welter and Lageman (2003) with an overview related to women's entrepreneurship], which is thought to a good way to promote entrepreneurial spirit. In this regard, Sect. 10.4 will now turn to assess progress made with the shift toward enabling policies, while examining the strengths and weaknesses of the German system.

10.4 Reviewing the German system

10.4.1 Strengths and Weaknesses of the German Approach

One of the strongest aspects of the German system is its *decentralized approach*, which makes possible a broad range of support measures. Potential entrepreneurs and existing small firms can usually find a program to help them cope with the problems they encounter. Another advantage is the dense support network of public and private partners, although the public–private partnerships are a new phenomenon, first appearing in the late 1990s. Moreover, federal financial programs have a sound financial basis, as they are principally financed with funds from the European Recovery Program, better known as the Marshall Fund, first set up in 1948 to restructure the German economy.

However the picture is not completely rosy: there are a number of shortcomings, both at the institutional and conceptual levels, the latter referring to program design and implementation. One problem faced by Germany policy development is an overall lack of systematic evaluation of existing programs, not just because most programs cannot provide the necessary data, but because objectives are often vague and missing coherent and explicit operational criteria, strategy, and vision. This strongly resonates with Storey's (2000) observation that "…what governments favour are lists of policies. (…) Not only is there a conspicuous absence of clear objectives for SME policy, but the implied objectives can often be conflicting." Storey provides a six-step framework for ideal evaluations. Currently the German system seems to concentrate on steps 1–3, namely monitoring policies and support programs through asking for the take-up of support schemes, the opinion of participants regarding the programs, and their assessment of any difference as made by the assistance. Only recently, in line with overall tightening budgets and the increasing need to justify public expenses, a shift toward a more evidence-based evaluation approach for German policies has occurred [see Schmidt (2007)]. These evaluations of policy and support (steps 4–6 of Storey's framework) use sophisticated statistical

techniques (matching and control groups) in evaluating policies and support, which, in Germany, is often impeded by a lack of data.

The complex support system means that entrepreneurs often do not know about specific options the state offers. In 1996, the RWI (Klemmer et al. 1996) found 20 different federal and state government assistance programs that new business in North-Rhine Westphalia could access.

Although declining public budgets have compelled federal and state governments to streamline support policies, a multitude of similar (sometimes identical) programs still exists. There are several explanations for this. First, post-Cold War German reunification led to a number of new federal programs specifically for entrepreneurship and small businesses in the former East Germany.

Second, changing rationales for supporting entrepreneurship and/or small businesses, which go hand in hand with growing expectations concerning the economic contribution of new and small firms, often lead to new programs without eliminating old ones. Additionally, German industrial traditions play a significant role in shaping modern SME policy.

However, rationales for the German support system, discussed in Sect. 10.4.2, have roots in regional and local traditions that have played a significant role in the evolution of the German support system at the state level. German states that industrialized relatively early have a long tradition of industry and commerce promotion. Trade and crafts supports were implemented as far back as the seventeenth century (Blaich 1973). During the nineteenth century industrial revolution, regional governments started building an institutional infrastructure needed to support emerging firms and businesses (Schmidt 1994: 40). The "Central office for Commerce and Trade" in Baden-Württemberg was created in 1848, initially led by Ferdinand Steinbeis. Steinbeis Centers, named in his honor, still facilitate some state support (Boelcke 1992). Consequently, for those German states where there was early promotion of crafts and industry, today's support policies are more diversified and numerous than in other states. Moreover, at the state level, the negative influence of politicians adds complexity to the support system, as state governments are "quick" in using unique regional or sectoral problems of "their" businesses to justify new programs. This resulted in numerous small and costly programs which are limited to a certain region or sector, reaching only very small numbers of new or existing firms (Welter and Lageman 1996).

Additionally, European Union membership provides another layer of complexity. General EU regulations concerning direct subsidies for businesses can conflict with German support policies. EU Support activities are problematic because it acts as a political actor that does not pay attention to German "political conventions." One example is the mid-1990s Joint Initiative for SMEs, when federal and state governments initially planned a joint program. They could not agree, consequently the EU approached all 16 states and the Joint Initiative in Germany ended up with 16 similar or even identical operational programs.

However, when it comes to direct firm level interventions, federal and state governments increasingly prefer cofinanced programs as a reaction to decreasing funding in public budgets. This addresses some of the shortcomings mentioned in

this section, particularly where this goes hand in hand with a clear strategic vision and rationale of why to foster SMEs and entrepreneurship.

10.4.2 Entrepreneurship and SME Support Rationale in Germany

This section looks at the rationale used to justify SMEs and entrepreneurship support in Germany. In general, support for new and small firms can be explained by three basic sets of reasons: structural; economic and social; as well as firm-related arguments, although some overlap exists between the categories. Market failures lead to structural supports that attempt to redress the failures. Economic and social arguments emphasize the contribution of new and small firms to the economy and society, such as job generation, innovation, or social inclusion. Firm-related arguments focus on liabilities connected with the newness, adolescence, and smallness of enterprises. All three categories are visible in the German support policies contributing to a wide-ranging and fragmented policy approach.

From an economic policy point of view, support for new and small firms often is justified by emphasizing firm-related disadvantages of enterprises as well as market failures. These include asymmetries of information relating to bank financing and an insufficient provision of capital for new and small enterprises. In Germany, both arguments are implicitly used to justify SME support (Klemmer et al. 1996). After the Second World War, SME support in Germany started in the 1950s based upon the argument that SMEs are disadvantaged because of their size. Research confirms effects related to size as large firms have economies of scale and scope with the ability to modify production more quickly to unexpected turbulence. Although bureaucracy and transaction costs are smaller for small firms, when it comes to access to finance and research, they are disadvantaged due to market failures and information asymmetries. However, this reflects the "traditional" understanding of the role that new and small firms play in the economy.

These "defensive" arguments have been set aside, replaced with SME and entrepreneurship policies supporting dynamism, growth and, consequently, economic wealth, justified by an economic rationale. Ever since the 1979 Birch Report, which showed that SMEs accounted for approximately 80% of net employment growth in the US between 1969 and 1976, policy makers at the local, regional, and national levels have focused on the contribution by SMEs to employment creation. Moreover, research recognized the innovative potential of new firms (e.g., Acs and Audretsch 1992). Therefore, since the 1970s, new and small firms in Germany, just like other Western countries, are supported because of their contribution to economic growth and a dynamic economy. The contribution of SMEs to employment grew as large enterprises started reducing employment while an economic recession resulted in growing unemployment rates. Governments started seeing SMEs as job generators; innovative and flexible companies fundamentally restructuring the German economy.

In this regard, programs promoting innovation by SMEs or supporting high-technology new ventures are seen as an important step toward fostering the contribution of small and new firms to a more dynamic and competitive economy. Subsequently, these arguments helped justify a shift in support policies: In the 1980s, Federal and state governments started favoring measures directed toward strengthening intermediary infrastructure of those technology centers and start-up centers important for entrepreneurs.

Structural changes on a large scale and a (perceived) loss of economic dynamics along with massive unemployment growth caused another in the 1990s. As unemployment grew, social inclusion gained, leading to programs that foster entrepreneurship by the unemployed. Moreover, there was a persistent call for German society to become more entrepreneurial, a call explored and assessed in Sect. 10.4.3.

10.4.3 The Difficult Road Toward an Entrepreneurial Culture

One governmental role previously stressed is how it influences societal values, in particular toward entrepreneurship. Individuals are more likely to become entrepreneurs if they are aware of the option and if they perceive that the option is societal desirable and acceptable. The odds increase if their social environment is supportive and if they see or perceive opportunities that they think that they can exploit. The individuals must also feel that they have the required skills, abilities, and resources (or access to resources). Here, government plays a critical role in supporting an entrepreneurial culture, for example through attempting to influence the values and attitudes of individuals [see Lundström and Stevenson (2005) and Verheul et al. (2001)].

This gained importance in Germany throughout the 1990s, reflecting an environment in a unified Germany where structural changes contributed to unemployment and changing labor markets. Achtenhagen and Welter (2006) draw attention to the fact that during the early 1990s, the mass media and political discourse diagnosed Germany with a lack of entrepreneurial spirit, calling for a new "culture of entrepreneurship." Without this new culture, Germany would not manage the challenges of globalization and (post-)industrial change. One early call for a new "culture of entrepreneurship" came during a symposia held by one of Germany's most well-known entrepreneurs and company owners, Reinhard Mohn of the Bertelsmann Publishing company in 1991 (cf. Mohn 1991).

Lageman and Welter (1999) trace the discourse in Germany during the 1990s. They observe that although public discourse suggested that this perceived lack of an entrepreneurial culture could only be politically resolved, the larger general concept was not defined, thus society lacked clarity of what constituted an entrepreneurial culture. Politicians and practitioners were quick to blame the lack of an entrepreneurial culture for Germany's economic problems in the 1990s. Moreover, politicians utilized the call for an entrepreneurial culture to rally action. In the late

1990s, this resulted in the "Reform Committee," which was initiated by the Bertelsmann-Foundation and staffed with both prominent politicians and researchers, who investigated ways to generate an entrepreneurship renaissance.

However, because there was no agreement of what constituted a new "culture of entrepreneurship," what was "new" about this culture, or whether entrepreneurial spirit was truly lacking in Germany (Lageman and Welter 1999), it was impossible to determine when the goal was achieved. In critically reviewing the concept, Lageman and Welter (1999) identified three main streams of interpretation: Economic actors (managers, industrialists, entrepreneurs, and small business owners) expected an increase in societal acceptance and an improvement of entrepreneurial conditions. This was a reflection of the negative image Germans had of entrepreneurs, although oddly entrepreneurship lacked that problem. The second interpretation, put forward by intellectuals, discussed the potential of new information and communication technologies, expecting personal accountability and intrapreneurship to thrive in all parts of society and economy. Third, for politicians, the concept of a new "entrepreneurial culture" signaled a simple recipe to increase innovation and employment by fostering more start-ups in an ageing economy. For example, in Bavaria, a government-initiated committee, studying the future of employment and developing recommendations, stated that "The leitmotif of the future is the individual being the entrepreneur of his own manpower and taking provisions for his own existence…. own initiative and one's own responsibility, i.e., the entrepreneurial element within the society, need to be unfolded." (Kommission für Zukunftsfragen Bayern – Sachsen 1997: 36; translated by author).

Perhaps because of its lack of specificity and its openness to multiple interpretations, movement toward an "entrepreneurial culture" was widely accepted by Germans, regardless of social strata or economic wellbeing (Lageman and Welter 1999; Bröckling 2007). This stands in stark contrast to the British debate, where "enterprise culture," the British name, was never widely accepted by society with disinterested economists while sociologists scoffed at it (Ritchie 1991).

However, Germany's persistent call for entrepreneurial culture may suggest that Germany has made only minimal progress down the road toward a culture of entrepreneurship. However, one must take into account that values, norms, and attitudes change slowly and that some progress is visible in the reorientation of the German support system toward a more enabling approach.

10.5 Conclusions: Are there Lessons to be Learned from German Experiences?

What lessons can we gleam from the German experience? In theory, policy should be limited with minimal intervention into market processes. Governments then must follow indirect approaches to support entrepreneurs, which includes creating institutional and legal conditions ensuring equal access regardless of size to external resources. "Direct" measures for specific firms or individuals are always

a second-best solution. However, the economic and political reality is different. In Germany, entrepreneurship and SME support programs, as well as other policy measures, developed with scant attention to ideal design. Furthermore, vested interests impede a fundamental reorganization of the political landscape; existing actors supporting new and small firms wish to sustain the status-quo. Future interventions should be centered on indirect market and institutional interventions, while recognizing that there may be occasions when direct intervention is politically necessary and expedient. A shift was evident in the middle of the twenty-first century's first decade: the German policy approach started to focus on indirect support; in particular it was focused on reducing bureaucracy while improving the business environment and facilitating market entry.

There are a number of "rules" implied for SME and entrepreneurship support in Germany and elsewhere. Most appear simple, but the German experience shows that they are not consistently applied in Germany (Klemmer et al. 1996). One set concerns the design and implementation of programs: there must be clear evidence showing a need by entrepreneurs or firms justifying new direct support measures. Furthermore programs should not be offered for free. That implies that firm level grants and subsidies should be the exception, not the rule. However, this does not apply to programs that try to resolve structural disadvantages or programs concerned with building up an adequate infrastructure. Programs of this kind should be evaluated regularly in terms of current firm need. Program aims should be clearly defined with a hierarchy of general and detailed objectives. Systematic evaluations should be used, tailored to evaluate firm and market needs. Moreover, actors and intermediaries at all levels must define their responsibilities and tasks to ensure a coherent meta-policy encouraging and fostering entrepreneurship. This also suggests that the overall national aims for entrepreneurship support should be coordinated with other political goals (those for regional policy, innovation policies, and industrial policies) to avoid conflicts of interest.

This leaves a number of questions concerning lessons from the German experience. The first question is what is the *best way to institutionalize and regulate entrepreneurship support* in order to ensure a consistent, transparent, and coherent system? Germany's decentralized model of support stands in stark contrast to the United States' centralized approach with their Small Business Administration and specific laws supporting women owned business, exporting SMEs, and for ethnic minorities, to name a few. While a decentralized and localized approach provides easy access to customers (SMEs, potential entrepreneurs), the agency model provides a coordinated approach with simple procedures and transparent structures that prevent politicians from creating new programs for populist reasons. Yet there is no final answer as different models have different requirements for funding and intermediaries. In Germany the decentralized support approach favors the involvement and commitment both of public and private actors, thereby paving the way for the now ubiquitous public–private partnerships. Certainly Germany's strong intermediary sector, where chambers both lobby the government and implement policy for the government, is an accident of history. Nevertheless, the question remains how much a central agency successfully can stimulate public–private partnerships.

A second question concerns *good practices* with respect to the "correct" mixture of "indirect" approaches and direct instruments. Since the 1980s, Germany has been relying more and more on direct support programs to support SME and entrepreneurship (Klemmer et al. 1996). Of course, at first glance it is quicker and easier to start a new technology center instead of changing laws or simplifying the tax system. Yet again, there is no simple answer. *Direct instruments* are an *important* part of SMEs support systems when trying to create a private business sector, especially in the *short term*. For example, this was important in formerly socialist countries transitioning to a market economy. Direct programs assisted in getting private business off the ground and running while the business environment was created. However, in the long run, particularly while fostering an enabling business environment and entrepreneurial culture, an *indirect approach to supporting entrepreneurship gains importance in order to sustain a competitive and viable economy*. Of course an indirect approach is less costly and is more compatible with the general principles of market economies. Additionally indirect approaches ensure broader "support" for the enterprise sector than any direct measures that are focused on specific segments of enterprises or (potential) entrepreneurs. One vital unanswered question for programs at the firm or individual level concerns the selection procedures, that is, the question of how to pick the winners, i.e., those enterprises which in future will be the most innovative or will have the largest employment potential.

Finally, when discussing German lessons, we must discuss *transferability*. Is it possible to transfer German support programs and institutional structures to another context? While this is an underlying principle of development cooperation, evaluations confirm that there is no definitive answer yet. The so-called "Mittelstand" has traditionally played a major role in economy and society and small enterprises are considered a vital part of the German economy. In transitioning or developing countries governments SMEs, especially the microenterprises, are regarded as a means for poverty alleviation or to remedy social exclusion. This approach needs different instruments. Furthermore, SMEs are heterogeneous, comprising of widely differing enterprise and entrepreneurial forms. Therefore, it might be easier to transfer single elements as opposed to whole instruments; although any transferring of entrepreneurship and SME policy instruments elements must take into account the target country's institutional and cultural environments as well as the importance that new and existing small firms play in the target country.

In conclusion, there are three key issues that must be resolved while discussing the transferability of policy approaches. First, different country contexts result in different policy agendas as has been shown for example by Smallbone and Welter (2006) for transition economies. Second, different target groups for entrepreneurship policy require different approaches. Take, for example, female entrepreneurship which would ideally require a joined-up policy, where direct interventions (e.g., training programs to bring more women into entrepreneurship or microcredits) only work if women have access to child care. Third, the policy design process is more than just crude policy transfer. A coherent approach to fostering entrepreneurship requires a "joined-up" approach, a holistic approach harmonizing with other policies and

clear objectives. Implementation requires administrative capacities at the regional and local level as well as clear responsibilities on who is going to do what between different policy levels.`

References

Achtenhagen, L. and F. Welter (2004), Linking the entrepreneurship discourse to its context – The development of entrepreneurship in Germany in the years 1997–2001, in: M. Dowling, J. Schmude and D. zu Knyphausen-Aufsess (eds.), Advance in Interdisciplinary European Entrepreneurship Research, Münster, pp. 1–25.

Achtenhagen, L. and F. Welter (2006), (Re-)Constructing the Entrepreneurial Spirit, Frontiers of Entrepreneurship Research 2005, pp. 104–117.

Acs, Z.J. and D.B. Audretsch (1992), Innovation durch kleine Unternehmen, Berlin.

Birch, D. (1979), The Job-Generation Process. MIT, Cambridge, MA.

Blaich, F. (1973), Die Epoche des Merkantilismus, Wiesbaden.

Boelcke, W.A. (1992), "Glück für das Land": Die Erfolgsgeschichte der Wirtschaftsförderung von Steinbeis bis heute, Stuttgart.

Bröckling, U. (2007), Das unternehmerische Selbst: Soziologie einer Subjektivierungsform, Frankfurt/Main.

Frick, S., B. Lageman, H. Voelzkow, B. von Rosenbladt and F. Welter (1998), Möglichkeiten zur Verbesserung des wirtschafts- und gesellschaftspolitischen Umfeldes für Existenzgründer und kleine und mittlere Unternehmen – Wege zu einer neuen Kultur der Selbständigkeit, Untersuchungen des RWI, 25, Essen.

Gilbert, B.A., Audretsch D.B., and McDougall P.P. (2004), The emergence of entrepreneurship policy, Small Business Economics, 22, 313–323.

Klemmer, P., B. Lageman, W. Friedrich, S. Frick, M. Halstrick-Schwenk, D. Knospe, M. Puxi, M. Scheuer, H. Schrumpf and F. Welter, with assistance from A. Kuhnert (1996), Mittelstandsförderung in Deutschland – Konsistenz und Transparenz sowie Ansatzpunkte für Verbesserungsmöglichkeiten, Untersuchungen des RWI, 21, Essen.

Kommission für Zukunftsfragen Bayern – Sachsen (eds.) (1997), Erwerbstätigkeit und Arbeitslosigkeit in Deutschland: Entwicklung, Ursachen und Massnahmen, Teil III: Massnahmen zur Verbesserung der Beschäftigungslage, Bonn.

Lageman, B. and F. Welter (1999), Eine "neue Kultur" der Selbständigkeit? Zur Diskussion einer wirtschaftspolitischen Idee, in: D. Bögenhold (ed.), Unternehmensgründungen und Dezentralität – Eine Renaissance der beruflichen Selbständigkeit, Opladen, pp. 111–126.

Lageman, B. and F. Welter (2003), Gründungsfinanzierung, in: R. Sternberg (ed.), Endogene Regionalentwicklung durch Existenzgründungen? Empirische Befunde aus Nordrhein-Westfalen, Arbeitsmaterialien der Akademie für Raumforschung und Landesplanung, 299, Hannover, pp. 54–70.

Lundström, A. and Stevenson L.A. (2005), Entrepreneurship Policy: Theory and Practice. International Studies in Entrepreneurship. Springer, New York, NY.

Mohn, R. (1991), Hindernisse und Erfolge auf dem Weg zu einer neuen Kultur der Selbständigkeit, in: Bertelsmann-Stiftung (ed.). Für eine neue Kultur der Selbständigkeit. Der Abschied von starren Ordnungen – Mehr Selbstbestimmung und Kreativität in Wirtschaft, Politik und Verwaltung, Textdokumentation des Symposiums zu Ehren von Reinhard Mohn anlässlich seines 70, Geburtstages, Gütersloh, pp. 80–88.

Ritchie, J. (1991), Enterprise cultures. A frame analysis, in: Burrows, R. (ed.), Deciphering the Enterprise Culture: Entrepreneurship, Petty Capitalism and the Restructuring of Great Britain. Routledge, London, pp. 35–52.

Schmidt, K.-H. (1994), Theoretische Grundlagen und Entwicklung der Gewerbeförderung, in: Landes-Gewerbeförderungsstelle des nordrhein-westfälischen Handwerks (eds.), 1954–1994: 40 Jahre Gewerbeförderung für das Handwerk NRW, Düsseldorf.

Schmidt, C.M. (2007), Policy Evaluation and Economic Policy Advice, Ruhr Economic Papers, #1, Essen and Bochum.

Smallbone, D. and F. Welter (2001), The role of government in SME development in transition countries, International Small Business Journal, 19(4), 63–77.

Smallbone, D. and F. Welter (2006), Institutional development and entrepreneurship in transition economies, in: Galbraith C. and Stiles C. (eds.), Developmental Entrepreneurship: Adversity, Risk and Uncertainty. Elsevier, Amsterdam, pp. 37–53.

Storey, D. (2000), Six steps to heaven: Evaluating the impact of public business in developed economies, in: Sexton D. and Landström H. (eds.), Handbook of Entrepreneurship. Blackwell, Oxford, pp. 176–194.

Acs and D. Audretsch (eds.), The Handbook of Entrepreneurship Research. Kluwer, Dordrecht, pp. 473–511.

Verheul, I., S. Wennekers, D. Audretsch, and R. Thurik (2001), An Eclectic Theory of Entrepreneurship: Policies, Institutions and Culture. EIM Research Report 0012/E. Zoetermeer: EIM. http://www.tinbergen.nl/discussionpapers/01030.pdf

Welter, F. (1997), Small and Medium Enterprises in Central and Eastern Europe: Trends, Barriers and Solutions, RWI Paper, No 51, RWI, Essen.

Welter, F. (2004), The environment for female entrepreneurship in Germany, Journal of Small Business and Enterprise Development, 11(2), 212–221.

Welter, F. and B. Lageman (1996), Auf der Suche nach dem "optimalen" Fördersystem für kleine und mittlere Unternehmen: Überlegungen im Anschluss an die deutschen Förderpraktiken, in: H.J. Pleitner (ed.), Bedeutung und Behauptung der Klein- und Mittelunternehmen in einer neuen Umfeldkonstellation, St. Gallen, pp. 303–315.

Welter, F. and B. Lageman with assistance from Stoytcheva, M. (2003), Gründerinnen in Deutschland: Potenziale und institutionelles Umfeld, Untersuchungen des, RWI, Essen.

Chapter 11
Entrepreneurship Policy in Finland: Quest for New Jobs

Pia Arenius

11.1 Background: Entrepreneurial Activity in Finland

Entrepreneurship is tied to the context with the supply of entrepreneurs varying across nations because of differences in the values and cultures (Hayton et al. 2002). Although public policy cannot be used to change culture thus stimulating entrepreneurship in the short term (Baumol 1990), it can be used to influence the institutional context. Following the context description model of Lundström and Stevenson (2002, 2005), Heinonen and Hytti (2008) describe the context of the entrepreneurial activity and entrepreneurship policy in Finland. A relatively high education level, combined with both strong innovation performance and the positive development of the venture capital market, characterizes the Finnish context (Heinonen and Hytti 2008). According to Doing Business (2008), Finland is among the top performing countries in terms of ease of doing business. According to the Global Entrepreneurship Monitor (GEM) study, the conditions for entrepreneurship are generally favorable (Stenholm et al. 2008).

Entrepreneurship is thriving in Finland. At the end of 2006, there were a total of 250,378 firms in Finland, an increase of 12% since the beginning of the century and largest number of firms ever. According to the GEM study, about 14% of the adult population in Finland was engaged in entrepreneurial activity in Spring 2007 (Stenholm et al. 2008). The labor force survey of the Statistics Finland reports comparable numbers. According to the 2007 survey, 12.6% of people aged between 15 and 74 consider themselves to be self-employed or as unpaid family workers (Table 11.1). However, over the last 20 years the number of respondents declaring self-employment has decreased[1] (Labor force surveys 1990–2007; Statistics Finland).

P. Arenius (✉)
Turku School of Economics, Turku, Finland
e-mail: Pia.Arenius@tse.fi

[1] Entrepreneurs are persons who using the inputs they own engage in economic activities on their own account and at their own risk. Entrepreneurs can be freelancers, sole entrepreneurs, or they can have paid labor force (so-called self-employed employer). A person in a limited company who alone or with his or her family owns at least one half of the enterprise is an entrepreneur.

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_11,

Table 11.1 Key figures for Finland

	2000	2007
Number of firms[a]	222,817	250,378
Number of new firms created annually[b]	24,089	35,121
Closed firms[c]	20,500	22,317 (in 2006)
Early-stage entrepreneurial activity (% of adult population)[c]	7.8	6.9
Self-employed of the labor force (%)[d]	13.7	12.6

[a]*Source:* Statistics Finland; Finnish Enterprise (http://www.tilastokeskus.fi/til/syr/index.html in Finnish).
[b]*Source:* Statistics Finland; Enterprise Openings and Closings (http://www.tilastokeskus.fi/til/aly/index_en.html in English).
[c]*Source:* Global Entrepreneurship Monitor – study (Stenholm et al. 2008).
[d]*Source:* Statistics Finland, Labor Force Survey (http://www.tilastokeskus.fi/til/tyti/index_en.html in English).

Finland has a relatively high level of overall business ownership consisting of many older mature firms. Businesses that are older than 42 months make up 7.6% of the self-employed individuals (Stenholm et al. 2008). In comparison, nascent entrepreneurs make up 4.3% of the population, with 2.7% considered baby business owners. The GEM study suggests that new business survival is high in Finland. The results also indicate that the Finns engage in entrepreneurial activity only when they are relatively sure about their motives. This may also reflect some lack of dynamism in the labor market.

11.2 History of Entrepreneurship Policy in Finland[2]

In 1993, following the early 1990s recession, an advisory committee for small- and medium-sized enterprises was set up to advise the Ministry of Trade and Industry on ways to develop the SME sector. The final report, published that year, outlined proposals for objectives as well as short- and long-term priorities for an SME programme. In 1996, the committee made recommendations on simplifying administrative procedures, favorable taxation, lowering labor costs, availability of SME funding, and business development services. Some interventions started the following year. Already by then the objective of the SME program was to support new firm creation and grow existing firms, presuming that new jobs would be created. Finland's SME programs and industrial development policy focused on SMEs, not on entrepreneurship (Routamaa 2004).

According to Stevenson and Lundström (2007), entrepreneurship policy is aimed at the very early stages of a firm, including the prestart, the start-up, and early post-start-up phases. Furthermore, entrepreneurship policy addresses the

[2] This summary is based on Routamaa (2004).

motivation, opportunity, and skills of individuals (Stevenson and Lundström 2007). SME policy in turn typically refers to policies promoting SMEs, comprising of firms with between 1 and 250 employees, and aimed at increasing firm growth and productivity (Audretsch 2002). The interventions of the SME programs in Finland mainly fall under the SME policy definition.

In the mid-1990s, the "Decade of Entrepreneurship 1995–2005" project was launched with the goal of organising the existing fragmented entrepreneurship projects under a single framework. Led by the Ministry of Labour, the coordination group included representatives from other ministries, labor organisations, and other business-related institutions. The project suffered from lack of funding and protection of self-interests (Routamaa 2004).

The Entrepreneurship Project of the Finnish Government was launched in 2001, 2 years later than planned. The 2-year project focused on market access and market functioning (e.g., tendering for public contracts), stimulating entrepreneurial activity (e.g., role of education system, attitudes), entrepreneurial start-up (e.g., ease of start-up, advisory services), surviving critical first years (e.g., finance, administrative burden), and firm growth (e.g., internationalisation, usage of ICT). Following the typology of Lundström and Stevenson (2002), Finnish entrepreneurship policy was a combination of new firm creation policy with SME policy extension. Unfortunately, the Entrepreneurship Project was ultimately a random collection of projects from different ministries without proper funding (Routamaa 2004).

11.3 Government Goals and Entrepreneurship Policy in 2003–2007

During the first decade of the twenty-first century, the economic policy goal was the creation of new jobs. During his first term, Prime Minister Vanhanen promised to find 100,000 jobs by the end of 2007. The government acknowledged that both fostering new firm creation and supporting the growth and development of existing firms were necessary to reach the job creation targets. Finnish economic policy included making "Finland among Europe's leading countries in terms of operating conditions for entrepreneurship" (source: Entrepreneurship Policy Program).

Policy programs were the key elements of the government's job creation goals. During Prime Minister Vanhanen's first term, he launched four policy programs led by cabinet ministers. The Entrepreneurship Policy Program[3] was led by the Minister of Trade and Industry. The policy goal was to ensure that resources were dedicated to improving the operating conditions and to ensure that there was horizontal cooperation across governmental departments. Specifically the policy recognises that the goal requires inputs from multiple government departments. Facilitating goal

[3] Other programs were Information Society Program (Prime Minister), Employment Policy Program (Minister of Labor), and Civil Participation Policy Program (Minister of Justice).

achievement, a policy program management group consisting of representatives from 11 ministries was assembled,[4] led by an appointed program director.

The aim of the Entrepreneurship Policy Program was to investigate possible incentives for entrepreneurship, ways of promoting the operations and expansion of SMEs in the start-up and growth stages, and support for women's entrepreneurship. The main instruments used by the Entrepreneurship Policy Program were interventions focusing on five different functional areas. These interventions were modified after the mid-term elections to follow the business life cycle model (Entrepreneurship Policy Program – final report 2007):

1. Measures promoting the start-up enterprises
2. The improvement of business conditions for growth entrepreneurship
3. The promotion of generational transfer and change of ownership in companies
4. The development of business services in a way that advances competencies and innovation
5. The predictability of regulatory environment, the operation of markets, and the reform of public service production

Specific examples of the interventions used in each segment are given in Table 11.2. Some of the interventions were general in nature (e.g., reduction of income and company tax rate), while others were directed at specific types of entrepreneurs. Types included women entrepreneurs, rural entrepreneurs, immigrant entrepreneurs, creative businesses, and craft entrepreneurs. Studies were commissioned to provide background information and specific recommendations for intervention selection and design. A summary report, the Final Report of the Entrepreneurship Policy Program (MTI 11/2007), provides a comprehensive review of interventions. Using the typology of Lundström and Stevenson (2001), the Government of Finland was adopting a more holistic approach on entrepreneurship policy.

The results of the Entrepreneurship Policy Program were continuously monitored at the program level. Initially the results were measured in terms of number of firms and entrepreneurial attitudes. The specific indicators measured included the number of firms, number of entrepreneurs, firm dynamics, and indicators of the international Business Demography in Europe study. A second set of indicators focused on attitudes towards entrepreneurship and entrepreneurial intentions. The exact indictors included two measures based on the GEM study: the early-stage entrepreneurial activity level and indicators on the attitudes towards entrepreneurship. During the course policy program's success criteria were merged, although retaining the original indicators. In 2004 the Ministry of Trade and Industry began publishing an annual Review on Entrepreneurship.[5] The review provides a current picture of Finland's

[4] The following ministries participated: Prime Minister's Office, Ministry of Justice, Ministry of Interior, Ministry of Finance, Ministry of Education, Ministry of Agriculture and Forestry, Ministry of Trade and Industry, Ministry of Social Affairs and Health, Ministry of Transport and Communication.

[5] The reviews are available at the online publication register of the Ministry of Trade and Industry: http://julkaisurekisteri.ktm.fi/

Table 11.2 The entrepreneurship policy program focus areas and examples of interventions (*Source:* MTI Publications 11/2007)

Focus areas in 2003–2005	Example of intervention	Focus areas in 2005–2007	Example of intervention
Entrepreneurship education and information	2004: Policy line for entrepreneurship education covering the whole educational system in Finland	Measures promoting the start-up enterprises	2005: Start-up capital available also to those leaving paid employment, domestic work, ending studies as well as unemployed job seekers
Establishment, growth and internationalization of businesses	2004: Program for financing new technology-based companies (Finnish Funding Agency for Technology and Innovation)	The improvement of business conditions for growth entrepreneurship	2005: Growth company service
Taxes, duties, and fees affecting entrepreneurship	2005: Reduction in company and capital tax rates	The promotion of generational transfer and change of ownership in companies	2008: Proposal to lower the taxation in the case of generational transfer
Regional entrepreneurship		The development of business services in a way that advances competencies and innovation	2006: Agreement about the development of the Enterprise Finland support service 2008: http://www.enterprisefinland.fi
Regulations concerning companies and the operations of markets	2006: Mandatory minimum share capital of a private limited company set to 2,500 euros	The predictability of regulatory environment, the operation of markets, and the reform of public service production	

general business conditions and development trends. The Ministry of Trade and Industry also tracked the implementation of each intervention. Although two self-evaluation studies have been completed by the Ministry of Trade and Industry, there has not been an external review.

11.4 Current Government Goals and Entrepreneurship Policy

New job creation continues to be a main goal of the Finnish Government. During his second term between 2007 and 2011, Prime Minister Vanhanen's goal is to create between 80,000 and 100,000 new jobs while raising the employment rate to 72%. According to preliminary Statistics Finland data, GDP grew by 4.4% in 2007.[6] The estimates of the Ministry of Finance[7] and the Research Institute of the Finnish Economy[8] predict that the GDP growth will decelerate in 2008 to 2.8%. In light of these estimates, Prime Minister Vanhanen's goal to "achieve economic growth that is much faster than that presented in the economic forecasts for Finland (*source:* Government program 2007–2011)" becomes even more challenging.

Vanhanen launched three policy programs during his second term, of which the Work, Entrepreneurship and Worklife Policy Program's goal is to improve conditions for creating and expanding new risk-bearing businesses.[9] Although high levels of entrepreneurial activity currently exist, a lack of high-expectation and high-growth entrepreneurs is behind the second term policy shifts of Prime Minister Vanhanen. Many activities and measures from the original Entrepreneurship Policy Program are being continued under the new program, but responsibility has been shifted to the newly established Ministry of Employment and the Economy.[10] The new ministry reflects the policy changes emphasising the need to integrate the needs of Finnish employers and employees to promote economic growth and employment.

It is expected that during 2008–2009 the Work, Entrepreneurship and Worklife policy program will focus on two areas related to entrepreneurship: (1) conditions of high potential entrepreneurship and growth motivation, and (2) lowering the administrative burden of firms. To improve the conditions for high potential firms and entrepreneurs, the government is addressing the availability of funding, taxation, increasing the managerial capabilities of entrepreneurs, and the availability of high-quality public support services. To decrease the administrative burden of entrepreneurs and firms, interventions focusing on expanding the availability and usage of electronic services have been developed and implemented. For example, in 2010 a system of firm tax account is likely to be implemented.

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[6] Source: Statistics Finland, Annual national accounts: http://www.tilastokeskus.fi/til/vtp/index_eng.html

[7] Source: The Ministry of Finance, Economic Bulletin 1/2008: http://www.vm.fi/

[8] Source: The Research Institute of the Finnish Economy; Suhdanne 2008/1 (in Finnish); http://www.etla.fi/files/1960_Suhdanne%202008_1.pdf

[9] Other programs are Health Promotion Policy Program, and Policy Program on the Well-being of Children, Youth, and Families.

[10] This ministry was created by combining the Ministry of Trade and Industry and the Ministry of Labour.

11.5 High Potential Entrepreneurship and Innovation Policy

Finland invests significantly in both education and research and development. In 2006, expenditures on R&D totalled € 5.8 billion. The private sector contributed 71%, the public sector 10%, and higher education 19%. In total, 3.45% of the GDP is spent on R&D. Geographically R&D work is clustered with approximately 50% of all R&D work carried out in Helsinki and its environs.

At the same time, research shows that Finnish entrepreneurs do not have high growth aspirations. Less than half a percent of nascent and new entrepreneurs expect to employ at least 20 employees within 5 years of establishment (Autio et al. 2007). This lack of growth motivation is evident: 98.9% of Finnish firms employ fewer than 50 people in 2006 (Statistics Finland). Hyvärinen and Rautiainen (2006) found that the average firm employed only the focal entrepreneur.

There is an agreement that the Finnish entrepreneurship and innovation policies have had unsatisfactory results with respects to the number of innovative and high potential firms. As a result, the policy, as of 2008, is being rewritten. At the same time the Finnish higher education system is facing major changes. The goal is to create financially stronger universities that can be internationally competitive with respect to teaching and research. Universities are also being encouraged to commercialise research results. To help achieve these goals, universities are being consolidated and restructured. For example the Helsinki University of Technology, the University of Arts and Design Helsinki, and the Helsinki School of Economics will be merged, becoming the Aalto University, effective August 1, 2009. Additionally, under the revised Universities Act, the legal status of universities will be transformed from entities under the State budget to independent body corporates, which allows for increased autonomy in university administration and finances.

11.6 Conclusion

This chapter has reviewed Finnish entrepreneurship policy. Focusing on entrepreneurship, the Finnish government feels that it will be one of the main sources of new jobs. On the basis of analysis, the emphasis of government policy shifted from SME policy towards a more holistic entrepreneurship policy in the late 1990s. Currently, Finnish policy shows some signs of shifting back towards an SME emphasis again, with a focus on the growth and internationalization of firms. However, the promotion of entrepreneurship education and the creation of new structures, products, and services for new start-ups, and under-represented target groups will continue. The entrepreneurship policy in Finland has a dual focus on both existing SMEs and new firms.

Finnish entrepreneurship policy has a clear objective of creating new jobs. Its strength is the cross-ministry involvement of policy design and implementation. This facilitates horizontal cooperation and coordination. In recent years a wide variety of interventions have been designed and implemented. Some address aspiring

entrepreneurs and entrepreneurs in general, while others focus on certain groups. The abundance and variety of initiatives appears to be a significant weakness of the entrepreneurship policy in Finland (GEM studies 1999–2007). An external evaluation of the entrepreneurship policy and the specific interventions is needed to identify the focus areas.

Heinonen and Hytti (2008) conclude their analysis of the Finnish entrepreneurship and innovation policies by observing that

> the systems and services do not seem to solve the basic problem in Finland. Too few persons, particularly with a university degree, are motivated enough by entrepreneurship as a personal career option. Similarly, too few researchers, research institutes and university departments are motivated in creating new innovations but are more focused towards academic outputs and careers (p. 92).

This suggests that Finland needs more entrepreneurship policy. According to Arenius and Minniti (2005), perception about skills and opportunities and having entrepreneurial role models are the most important predictors of entrepreneurial activity. These are the areas that Finnish entrepreneurship policy needs to address and in which entrepreneurship education plays a significant role. In Finland, entrepreneurship education is an obligatory part of all primary and secondary school curricula. It is also being included in higher education. However, it will take several years before investments in entrepreneurship education translate into entrepreneurial attitudes, entrepreneurial actions, and new jobs.

References

Audretsch, D.B. (2002). Entrepreneurship: A Survey of the literature. European Commission, Enterprise Directorate General.

Arenius, P., Minniti, M. (2005) Perceptual variables and nascent entrepreneurship. *Small Business Economics*, 24, 233–247.

Autio, E., Kronlund, M., Kovalainen, A. (2007) High-Growth SME Support Initiatives in Nine Countries: Analysis, Categorization, and Recommendations. Ministry of Trade and Industry, Publications 1/2007.

Baumol, W. (1990) Entrepreneurship: Productive, unproductive and destructive. *Journal of Political Economy*, 98, 893–921.

Doing Business 2008. World Bank Group. www.doingbusiness.org

Entrepreneurship Policy during Prime Minister Matti Vanhanen's Term of Government 2003–2007: Entrepreneurship policy programme – final report. Ministry of Trade and Industry, Nov. 2007.

Government Program (2003–2007) The Government Programme of Prime Minister Matti Vanhanen's Government on 24 June 2003. http://www.vn.fi/tiedostot/julkinen/vn/hallitus/vanhasen-hallituso-hjelma-2003/en.pdf

Government Program (2007–2011) Government Programme of Prime Minister Matti Vanhanen's Second Cabinet on 19 April 2007. http://www.vn.fi/hallitus/hallitusohjelma/pdf/en.pdf

Hayton, J.C., George, G., Zahra, S.A. (2002) National culture and entrepreneurship: A review of behaviour research. *Entrepreneurship Theory and Practice*, 26(4), 33–52.

Heinonen, J., Hytti, U. (2008) *IPREG Country Report Finland: Analysis of Entrepreneurship and Innovation Policy*. Turku School of Economics, Publications of the Business Research and Development Centre, TSE Entre Series Research Reports E1/2008.

Hjorth, D. (2008) Nordic entrepreneurship research. *Entrepreneurship Theory and Practice*, 32(2), 313–338.

Hyvärinen, J., Rautiainen, A.-M. (2006) Innovaatiotoiminnalla kilpailukykyä ja kasvua. Tutkimustoiminnan vaikuttavuus yhteiskunnassa, Teknologiakatsaus 188/2006. Tekes. (in Finnish).

Kasvuyrittäjyyden neuvonantoryhmän muistio. 2004. Ministry of Trade and Industry, Publications 34/2004 (in Finnish).

Lundström, A., Stevenson, L. (2002) On the Road to entrepreneurship policy (vol. 1). Stockholm: FSF.

Lundström, A., Stevenson, L. (2005). entrepreneurship policy: Theory and Practice: Springer, USA.

Routamaa, V. (2004). The case of Finland. In Lundström, A. (Ed.). Towards an Entrepreneurship Policy – A Nordic Perspective. Nordic Innovation Centre. FSF 2003:2.

Stenholm, P., Pukkinen, T., Heinonen, J., Kovalainen, A. (2008) Global Entrepreneurship Monitor, 2007 Executive Report, Finland. Turku School of Economics, Publications of the Business Research and Development Centre, TSE Entre Series Research Reports B2/2008.

Stevenson, L. & Lundstrom, A. (2007). Dressing the emperor: the fabric of entrepreneurship policy. In D.B. Andretsch, I. Grilo & A.R. Phurik (Eds), Handbook or Research an entrepreneurship (pp. 94–129). Cheltenham: Edward Elgar.

Chapter 12
Promoting Equity Flows into Smaller Businesses: The UK Enterprise Investment Scheme and Venture Capital Trusts

Marc Cowling, Gordon Murray, and Pete Bates

12.1 Introduction

The availability of risk capital[1] for high-potential, young companies has been a key policy issue for government in the context of promoting economic development via the growth of innovative (new knowledge-based) small- and medium-sized enterprises (SMEs) (Aho et al. 2006). Issues regarding the importance of risk capital to the early-growth stages of young companies have been debated widely in political and academic circles both in the UK and continental Europe (HM Treasury 1998, 2003; European Commission 2003, 2005, 2006a,b; Cressy and Olofsson 1997; Cressy 2002) since the 1980s. The US experience has provided an example and reference to watch. The conspicuous successes of new US companies that grow rapidly into positions of international dominance within the arena of new technologies and knowledge-based opportunities are widely admired.

This debate on the effective financing of entrepreneurial activity must be set within the wider context of SMEs support. We know that at any particular instant in time only a small minority of young companies will need, and seek-out, external equity finance in order to accelerate development in their early years (Small Business Service 2006; Maula and Murray 2007; 1984 Myers and Majluf 1984). Yet, it is also widely accepted that this relatively small number of high-potential young enterprises will probably have a disproportionately large impact on future economic growth by any measure, whether employment creation, additional

M. Cowling (✉), G. Murray, and P. Bates
Principal Economist, Institute for Employment Studies, University of Sussex,
Brighton, BN1 9RF, UK
e-mail: marc.cowling@employment-studies.co.uk

[1] The terms "risk capital" and "venture capital" are used interchangeably in this Chapter. They both refer to equity investments in start-up and early-growth enterprises by knowledgeable investors for the purposes of an eventual capital gain. Venture capital is used in the US sense in that it does not relate to management buyouts nor other types of private equity activity with large and established businesses.

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_12,

innovation, or productivity growth for their host economy (Storey 1998; Westhead and Cowling 1995).

Such companies, given their potential, are of considerable interest to policymakers. Impediments to the genesis or growth of such companies are a cause for concern and often policy prescription, for example, if the factor markets that these companies rely upon are imperfect or discriminatory, their growth can be impeded, thus hurting the future economy. Evidence of capital constraints or credit rationing (Bank of England 1996) provides motivation for government to initiate processes by which public capital supports these growth-oriented, but often highly risky, companies. Government support at the earliest stages of these companies' growth is seen as particularly important as nascent enterprises are particularly vulnerable tending to have relatively high, and frequently unmet, need for external finance. Given the fragile financial state of many growth-oriented, early-stage companies combined with their lack of collateral, bank debt financing is problematic (Denis 2004; European Commission 2000, 2005). Accordingly, less traditional sources of enterprise finance that can accommodate higher risk and uncertainty, for example additional equity from business angels and/or venture capitalists, frequently assume a critical role. Therefore, it is common for policymakers in advanced economies to institute initiatives and incentives that directly foster an environment conducive to the growth of both formal and informal risk capital markets.

The fact that capital markets do not always function efficiently and/or fail to produce a socially optimum outcome provides the rationale for public intervention in the market provision of risk capital to growth-oriented, innovative younger companies at a relatively early stage in their development (Murray 1998, 2007; Lerner 1999, 2002). Potential investors are often deterred from investing in young companies because the expected returns will compensate them fully for the considerable risks they incur. Theory suggests that the socially optimal level of risk capital may not be made available for several reasons. First, positive externalities are not accounted (e.g., knowledge spillovers) because the social benefits are not captured by the financial investors. Second, information asymmetries might distort the market. Due diligence costs and scale economies in the provision of risk capital can deter investment where information asymmetries are present (Cressy 2002; Cassar 2004). Third, the infrastructure might not facilitate networking externalities in the sense that all the key stakeholders required to support a successful, venture-based economy might not be present or, even if they are present, ineffectively coordinated. This requirement has been termed by Gilson as the "simultaneity problem" (Gilson 2003).

As argued by Maula et al. (2007) and several other academics (Bottazi et al. 2005; Cumming et al. 2006), "the key role of government in fostering growth-oriented entrepreneurship is to provide a conducive framework and environment for informed and profitable risk-taking by private investors." They further contend that the primary function of government, in the context of entrepreneurship, should be to ensure that the tax and legal frameworks do not inhibit well-functioning markets, specifically those that influence the supply and demand for both informal and formal venture capital. These views, with their strong implication for more indirect

government interventions, have increasingly been adopted by national policymakers in Europe. This policy perspective assumes the preeminence of market-mediated decisions with government rarely intervening. The importance of working with existing capital markets was a focus of the UK government's Venture Capital Summit held Autumn, 2005 in London (UK Presidency of the EU and European Commission 2005). It was also the main outcome and conclusion of a 2005 Expert Group of European Commission and US government officials that convened to determine, and communicate, good practice for the public support of early-stage venture capital markets (US Dept of Commerce and European Commission 2005). OECD reviews of venture capital activity and the role of public intervention come to similar conclusions regarding the primacy of using market agents to meet public policy objectives (OECD 2004, 2006).

The UK government took a proactive stance in response to the well-documented difficulties for both the demand and the supply of risk capital to smaller and younger entrepreneurial ventures.[2] As well as supporting formal venture capital through a range of policy measures, the UK government made the encouragement of informal venture capital, provided by high net worth individuals or Business Angels, a significant part of its entrepreneurship policies (Small Business Service 2004). Such policies recognize that at the earliest stages of investment in nascent, high-potential, entrepreneurial companies, the formal venture capital industry plays a modest if not incidental role.[3] There is an increasing awareness that informal investors represent a considerably more powerful source for funding than professional VC companies at the earliest stages of new company formation. The diminishing role of formal venture capital organizations at the earliest stages of new enterprise investment is a phenomenon not restricted to Europe or the USA (Prowse 1998; Riding et al. 1993; Sohl 2003, 2006; Mason and Harrison 2001). Japan and South Korea are also experiencing this shift in new venture funding.

Schemes stimulating informal investment in SMEs by private individuals require meaningful incentives to investors, both as economic agents and as private citizens. These kinds of policies are substantially different from the policies that encourage professional venture capital companies and institutional investors to invest in earlier stage equity deals. Frequently, institutional investors are tax exempt (e.g., pension funds) or operate through a tax transparent vehicle where tax liabilities rest with the final recipients of the investment returns. At the forefront of UK government's strategy in this area are two programs: the Enterprise Investment Scheme (EIS) and Venture Capital Trusts (VCTs).

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[2] The UK government has a long tradition of financing robust investigations of the financial environment facing UK small- and medium-sized enterprises going back to the Macmillan Report 1931 and the Bolton Report 1971. More recent and influential reports have included a series from the Bank of England on SME financing and several recent reports from the Treasury on the "equity gap."

[3] The Report of Bank of England (1996) argued that the role of formal venture capital had an extremely small contribution to the financing of new technology-based firms.

The EIS was introduced in 1994. It succeeded the Business Expansion Scheme which, while groundbreaking in its focus on individual rather than institutional action, produced several anomalies that diluted its focus and impact on the targeted companies. The purpose of the EIS is to help targeted types of small higher-risk unquoted trading companies raise external growth capital.[4] It does so by providing a range of tax relief for private individuals investing in qualifying shares in these companies. Any person who subscribes for shares in such a company may be able to get income tax reduced based on the amount invested. They may also be able to postpone capital gains taxes arising from asset disposal occurring around the time they invested in the high-risk firms. In addition, they may be eligible for tax relief if they sold their shares at least 5 years after investing. The eligibility for tax relief was reduced to 3 years effective from April 5, 2000. Subscriptions must be for new ordinary shares. From April 6, 2006, investment limits eligible for income tax relief at 20% for individuals making subscriptions into qualifying EIS companies rose from £200,000 to £400,000 per annum. Capital Gains tax deferral relief at up to 40% remains. Subscriptions during the first half of the tax year can carry back relief to the previous year. Limits increased from £25,000 to £50,000.

Meanwhile, VCTs, introduced in 1995, were designed to increase the supply of finance to small unquoted, higher-risk trading companies by encouraging individuals to invest in young enterprises *indirectly* through managed funds.[5] VCTs are companies broadly similar to investment trusts. Essentially a retail venture capital product for private investors who wish to invest in a diversified portfolio managed by a professional investment manager, VCTs must be listed on a stock exchange and can invest up to £1 million per annum in qualifying companies. Funds are exempt from corporation tax on capital gains arising from disposal of their investments. VCTs must wholly or mainly form shares or securities, and at least 70% of its investments must be "qualifying holdings." The VCT has 3 years from the time it raises funds to meet the 70% requirement. A qualifying holding consists of newly issued shares or securities (including loans of at least 5 years) in companies similar to those that qualify for the EIS. Subscribers of new ordinary shares in VCTs are entitled to claim income tax relief on their subscriptions provided their shares are held for at least 3 years (previously 5 years prior to April 6, 2000). The maximum annual investment for which income tax relief is available increased from £100,000 to £200,000 in April 2004. No income tax is payable on dividends received from ordinary shares in VCTs, or on their disposal. Following a temporary 2-year boost to income tax relief to 40%, the rate of relief was permanently increased to 30% from April 6, 2006. However, the income tax relief period was raised from 3 to 5 years. Maximum relevant assets before the raising of funds were reduced from £15 to £7 millions, and the value of assets after funds have been raised was reduced from £16 to £8 millions.

Given that the UK government initiated these two schemes, which both represent tax losses for the Treasury, it is appropriate that the net benefit (or otherwise) of

[4] *See* http://www.hmrc.gov.uk/eis/index.htm
[5] *See* http://www.hmrc.gov.uk/guidance/vct.htm

the EIS and VCT programs be evaluated in the context of their stated aims of promoting the flow of risk capital to smaller, unquoted, higher-risk companies. A rigorous analysis and evaluation is valuable as both programs have existed for more than a decade, enough time for both to become well established. Finally, the salience of both schemes, at least in demonstration effect, extends far beyond the UK. Despite the popularity of government subsidies to attractive and "worthy" recipients, such as high-tech young companies, there remains a serious deficiency in our knowledge regarding the efficacy of tax-based interventions in risk capital market. A number of governments are presently looking at the effectiveness of such schemes (Ireland and Finland) in order to encourage greater early-stage support for entrepreneurial companies in the absence of well-developed risk capital markets prepared to invest at the earliest stages of new enterprise.[6]

12.2 Objectives, Data, and Methodology

The study is designed to evaluate quantitatively the impact of the availability of both government programs (EIS and VCT) on those young companies that receive financial investments directly as a result of the two programs. The objectives of the study are as follows:

- to compare the performance of UK companies that have received funding through the EIS and/or VCT schemes[7] against the performance of similarly matched companies that have not received such funding;
- to compare the performance of companies dynamically, that is before and after initial EIS or VCT investment; and
- to quantify the effect on business performance indicators for each scheme of key variables including company age, size, and sector.

The core data for this evaluation are derived from two sources. First, we were provided with full EIS and VCT scheme records for each company that received at least one investment under either scheme. These data, collected over the period 1994, 2006, represent more than 12,000 companies using the EIS scheme and more than 1,000 companies under the VCT scheme. Both programs facilitated investment in 660 of these companies. First we construct a large "control" group of unsupported companies using the FAME company accounts database. The parameters were such that initial matching was conducted to ensure appropriate sectoral, fixed assets and incorporation date (age of company) distributions. We opted to use fixed

[6] Policy discussions at the Norface Entrepreneurial Finance Seminar in Helsinki October 2006 confirmed the present policy interest in fiscal incentives for entrepreneurial investment activity in several developed economies. The lack of an established body of empirical research in the area (with a few notable exceptions) was also noted.

[7] Some firms are in receipt of funds through both schemes.

assets as this variable had a high reporting coverage in the FAME database (some 87% of companies had fixed asset data). In total, the "control" (nontreatment) group contained more than 80,000 companies. This control group was large because of the difficulty in matching individual companies on multiple criteria[8]. We also collected company accounts information for the target and matched companies for the years 1994–2006 inclusive, where this data were available (Table 12.1). The information included:

- company demographics (i.e., date of incorporation, sector, and current survival status),
- profit measures (gross profits, operating profits, and profit margins),
- asset measures (fixed assets),
- debt/equity measures (gearing ratio),
- capital and investment measures (new investment), and
- size measures (sales turnover and employment).

The best method for this sample that incorporates nearly 90,000 companies is panel data analysis. It is an optimal method for studying a particular subject within multiple sites, periodically observed over a defined time frame. In economics, panel data analysis is often used to study the behavior of companies over time. With repeated observations of enough cross-sections, panel analysis permits the researcher to study the dynamics of change with short time series. The combination of time series with cross sections can enhance the quality and quantity of data in ways that would be impossible using only one dimension (Gujarati 2003: 638). For us, panel analysis provides a robust framework for exploring the performance of companies and the effects of EIS and VCT investments, as we consider both the space and time dimension of the data.

t.1 **Table 12.1** Variables of the model specification

t.2	Gross profits	Real gross profits expressed in 2005 prices
t.3	Employment	Number of employees
t.4	Age	Years since incorporation
t.5	Sector	One-digit Standard Industrial Classification codes
t.6 t.7 t.8 t.9	Scheme	Dummy variables for the existence of an EIS, VCT, or joint EIS–VCT investments, or a variable indicating the actual (real) value in pounds of the EIS or VCT investment (*see* Sect. 5 on treatment variables for a full explanation and derivation of each scheme variable)
t.10	(Size*Scheme)	Employment size/scheme variable interaction terms
t.11	(Age*Scheme)	Age of company/scheme variable interaction terms
t.12	(Sector*Scheme)	One digit SIC codes/scheme variable interaction terms
t.13	Time	Individual year dummy variables

[8] In future, a more efficient method might be to generate one, or possibly several, "matched" companies *at the time of initial funding* on a one-for-one basis across a small number of variables (e.g., size, sector, and age).

Panel data analysis endows regression analysis with both spatial and temporal dimensions. The spatial dimension pertains to a set of cross-sectional units of observation, which for our data are companies. The temporal dimension are the periodic observations for the set of variables characterizing these cross-sectional units over a particular time span, which for us is typically 4–6 years.

Our panel dataset is a collection of UK companies for which there are same economic and accounting variables – such as fixed assets, gross profits, investment, employment, sales, profit margins, gearing ratios, labor productivity, and survival – collected annually for a maximum of 11 years (from 1994 to 2005), although the average in our data is 4–6 years. This pooled dataset, sometimes called time series cross-sectional data, contains a "potential" maximum total of 9,90,000 observations, the 90,000 companies multiplied by 11 years of observations. There is also a problem with missing data, a problem which forces us to of restrict the time dimension of our analysis, and, because of the investment variable, makes the modeling process particularly problematic.

As we are interested in explaining performance in our panel of companies and identifying any potential scheme effects on performance, the equation explaining performance might be expressed as:

$$Y_{it} = a_i + \beta_1 X_{it} + e_{it} \tag{12.1}$$

Which when expanded into plain English results in:

$$\begin{aligned}\text{GrossProfits}_{it} = {} & a_i + \beta_1 \text{Employment}_{it} + \beta_2 \text{Age}_{it} + \beta_3 \text{Scheme}_{it} \\ & + \beta_4 \text{Sector}_t + \beta_5 \left(\text{Size} * \text{Scheme}\right)_{it} + \beta_6 \left(\text{Age} * \text{Scheme}\right)_i \\ & + \beta_7 \left(\text{Sector} * \text{Scheme}\right)_{it} + \beta_8 \text{Time} + e_{it}\end{aligned} \tag{12.2}$$

Variables which are collected and expressed in monetary values have been standardized on 2005 values using the retail prices index. The performance variables for fixed assets, employment, sales, and labor productivity are expressed in natural log form. In the latter case, labor productivity is expressed as real output (sales) per employee and includes an additional explanatory variable which defines the capital/labor ratio (fixed assets per employee) expressed in monetary terms.

Table 12.2 Scheme variables and definitions

Scheme variable	Definition
nEIS	Dummy variable coded 1 if company has received an EIS investment else 0
nVCT	Dummy variable coded 1 if company has received an VCT investment else 0
nEIS_only	Dummy variable coded 1 if company has received an EIS investment else 0
nVCT_only	Dummy variable coded 1 if company has received an VCT investment else 0
nEIS_nVCT	Dummy variable coded 1 if company has received an EIS and VCT investment else 0
Ceis	Cumulative EIS investment measured in real pounds at 2005 prices
Cvct	Cumulative VCT investment measured in real pounds at 2005 prices

(continued)

Table 12.2 (continued)

Scheme variable	Definition
Reis_0	Value of current year EIS investment measured in real pounds at 2005 prices
Reis_1	Value of 1 year previous EIS investment measured in real pounds at 2005 prices
Reis_2	Value of 2 years previous EIS investment measured in real pounds at 2005 prices
Rvct_0	Value of current year EIS investment measured in real pounds at 2005 prices
Rvct_1	Value of 1 year previous EIS investment measured in real pounds at 2005 prices
Rvct_2	Value of 2 year previous EIS investment measured in real pounds at 2005 prices
Neis_0	Dummy variable coded 1 if had an EIS investment in the current year else 0
Neis_1	Dummy variable coded 1 if had an EIS investment in the previous year else 0
Neis_2	Dummy variable coded 1 if had an EIS investment 2 years previous else 0
Nvct_0	Dummy variable coded 1 if had an VCT investment in the current year else 0
Nvct_1	Dummy variable coded 1 if had an VCT investment in the previous year else 0
Nvct_2	Dummy variable coded 1 if had an EIS investment 2 years previous else 0
One_eis	Dummy variable coded 1 if had single EIS investment else 0
Multi_eis	Dummy variable coded 1 if had more than one EIS investment else 0
One_vct	Dummy variable coded 1 if had single VCT investment else 0
Multi_vct	Dummy variable coded 1 if had more than one VCT investment else 0

Of the panel data analytic models, we use the fixed effects (FEs) and random effects (REs) specifications. This reflects the fact that models must be estimated by methods that handle the problems afflicting them. Use of ordinary least squares on data pooled across companies implies that unobserved company factors do not exist (Wilson and Butler 2004) resulting in incorrect parameter estimates if there is variation in the intercepts (the αs) and mean levels of the independent variables across companies. Missing variables are also a problem if they are company specific, as opposed to randomly distributed within, and across, companies, an assumption of pooling.

This can be addressed by explicitly modeling the differences between companies as some variables vary from year to year within companies, but other variables are constant across years and vary only between companies. The RE model assumes that the αs are random, while the FE model assumes the αs are fixed. The FE model then generates estimates that are unbiased and efficient. The model is estimated by subtracting the company-specific mean from each observation and estimating an equation of the form $Y_{it} - \text{mean}Y_i = \beta (X_{it} - \text{mean}\, X_i) + v_{it}$. Again, Y is the performance variable and the Xs explain performance.

The first of two main empirical drawbacks to the FE model is that it uses up degrees of freedom with each new parameter introduced into the model. The second is that variables fixed over time cannot be included, and variables that change only slowly over time are likely to have large standard errors. The alternative is the RE model which requires that the unobserved effects are not systematically related to the other explanatory variables (Xs) in the model. This assumption is often violated. Whether this is the case for the companies in our dataset, it is an important empirical issue.

For our data, omitted variables biases[9] might be an issue. For example, self-selection into VCT and EIS funding by "higher" quality companies may cause endogeneity.

[9] Nonobserved heterogeneity.

Simple cross-sectional analysis which relies on the between-company comparisons is not appropriate in this case, but panel data can identify the true effect even in the presence of self-selection. Indeed, if most omitted variables are time-constant (e.g., quality measures), FE works well with this assumption.

A further issue is that we have an unbalanced panel where T differs over companies. This type of data is particularly suited to the FE estimator and we also have attrition in the data as companies cease trading. In this case, attrition, even when correlated with v_i, does not bias FE estimates. In the context of our data, we rely on the quality of company data reported and collated from Companies House, The official UK government register of UK companies.

To determine which of the two specifications, FE or RE, of our performance models is more appropriate, we employ a Hausman (1978) test which is the common way of model selection. The Hausman specification test is a classical test for significant correlation between the unobserved company-specific REs and the explanatory variables. If there is such a correlation, the RE model is rejected in favor of the FE model.

Creating the variables that capture the impact of EIS and VCT (and joint EIS–VCT) funding was the next step. The most commonly used approach in evaluations is to create a dummy variable coded 1 if the unit of observation is "treated" and 0 otherwise (*see*, e.g., Oxera 2007). We define two dummy variables in the first instance (nEIS and nVCT). The dummies are coded 1 if the company received an EIS or VCT investment. As only a small subset of companies received both VCT and EIS investment, we also created three other dummy variables (nEIS_only, nVCT_only, and nEIS_nVCT), the last capturing companies who received both types of funding. These types of variables act to shift the intercept in our models (upward if the treatments had a positive impact and downward if they had a negative impact). For example, this would be analogous to examining the impact of marriage on wages if the individual got married within the panel time series (and remained married).

But we also have data on the scale of investments made under both schemes, expressed in British Pounds. In this case, we can create a continuous variable which captures the amount of funding received under each scheme. These variables are named C_eis and C_vct, respectively, and are expressed in standardized 2005 currency (i.e., all figures are adjusted by the retail prices index to their 2005 equivalent). In this case, the coefficients on the treatment variables reflect the relationship between the amount of funding and the performance variable. This would be interpreted in the same way as years of schooling would be in a wage equation example cited above. As we are also interested in the way that investment effects performance in a dynamic sense, we also create current and lagged investment variables (Reis_0, Reis_1, Reis_2 and Rvct_0, Rvct _1, Rvct_2). Here the "Rs" indicate that the variables have been adjusted to equate to 2005 price equivalents. This allows us to identify if there is a relationship between the time the company receives an EIS/VCT investment and any changes in subsequent performance. As the time series element of our data is relatively short, we cannot explore this dynamic other than in the short-term. It would be preferable to have a time series of at least 10 years. In an interpretative sense, if the coefficients on these three variables are different, we can see how an

initial investment impacts on performance in the year it was made, 1 year later and 2 years later. We also create equivalent time dummy variables (Neis_0, Neis_1, Neis_2, Nvct_0, Nvct_1, and Nvct_2).

Finally, our data contains some companies which have received multiple rounds of funding under EIS and VCT schemes. To capture any potential differences between companies that only received a single investment and those who received multiple investments, a variable was created which switches from 0 to 1 if a company receives an EIS (VCT) investment and an additional variable which switches if that company receives additional EIS (VCT) investment. These variables are One_eis, Multi_eis, One_vct, and Multi_vct. It is important to note here that a smaller subset of companies have received third, fourth, and fifth funding rounds. However, these companies represent a very small proportion of the total of those receiving multiple funding rounds that for estimation purposes it was more appropriate to include them in an aggregated multiple funding round dummy variable. Thus in total, we have six sets of "treatment" variables, each capturing a different aspect of VCT and EIS funding.

We are interested in identifying any potential effects of EIS and VCT funding on a number of key performance variables of the recipient companies. So the issue here is to select variables which have relevance to potential investors and also to the stated government objectives for the EIS and VCT schemes. On the investor side, it is normal to assume that they are motivated by the potential returns.[10] In a broad sense, profit measures capture these returns to capital as the investment decision is based on the expected returns being higher than the opportunity cost of capital (the returns to alternative potential investments). The actual mechanism by which new investment feeds through into higher profitability can be related back to efficiency arguments rooted in production theory. This may be particularly relevant in this case as our companies are typically small or medium sized, as defined by the EU.[11]

It is assumed, and often empirically supported, that new and smaller companies face higher average costs as they are operating at a scale too small to exhaust all economies of scale (*see* Cowling 2003). In short, their output is not high enough and their costs of producing output are higher, per unit, than larger companies. Thus, new investment in productive capacity enables them to operate at a larger scale, thus benefiting from lower average costs per unit of output. This problem is exacerbated in situations where technology changes quickly. With these issues in mind, we collected

[10] We know that in practice perhaps a majority of angels have a range of other "psychic" outcomes from being investors in addition to any economic returns achieved (Freer et al. 1994; Van Osnabrugge 1998; Mason and Stark 2004).

[11] We use the old definitions of 1–9 employees = micro enterprise, 10–49 employees = small, 50–249 = medium, and 250+ employees = large. New definitions of a micro, small, and medium companies were adopted by the European Commission and became operational from January 1, 2005. The definition embraces three criteria per size group: headcount, sales turnover, and balance sheet total. *See* http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=en&numdoc=32003H0361&model=guichett

data on gross profits, operating profits and profit margins to capture short-term returns to investment. In addition, as a proxy for new investment in productive capacity, we collected data on investment in fixed assets We also derive a measure of labor productivity to explicitly model any potential impacts of the schemes' funding on efficiency.

A related important argument is that smaller companies are constrained in their ability to raise capital versus equivalent larger companies (Berger and Udell 1998). This market failure argument is implicit (and often explicit) in any government intervention in capital markets (Cowling and Mitchell 2003). This is often attributed to information asymmetry as potential investors lack information about company quality and the probability of success for specific investments (Stiglitz and Weiss 1981).

In this case, where external equity is sought, there is an additional constraint as venture capitalists and business angels want quicker returns on their investments than the recipient companies' owners and managers (Gompers and Lerner 1999).

Smaller companies also tend to use a lot of debt financing with very little equity (Berger and Udell 1998 op cit.; Davidson and Duita 1991). This causes two problems. First, debt repayment burdens are large and must be made regardless of project success. This squeezes cash flows thus creating liquidity problems. Second, smaller companies often benefit from enhanced human capital when experienced investors invest in their companies (Sapienza 1992). The result of underinvestment in smaller companies is that they are less likely to bring new products and services to market and are thus less likely to survive and grow (Cressy and Olofsson 2006). As is the case in many government interventions in financial markets relevant to smaller companies, there is a potentially important "demonstration effect" in that successfully supported interventions can lead to higher levels of unsupported funding in the future as informational barriers are lowered (Murray 1998). With these issues in mind, we collected data on gearing ratios (debt/equity ratios) and investment. A priori, we predict that gearing will be reduced by EIS and VCT investments, and that there may be a positive investment multiplier as scheme funding is complemented by other unsupported sources of investment funding.

Finally, we consider more general, and commonly used, variables which can be used as proxies for company performance. In the empirical literature, and in the overwhelming majority of company-level evaluations, the issue of company survival, size, and growth are used as proxies for performance. On survival, it is noted that the vast majority of new start-ups do not continue trading beyond the fifth year (Bruderl et al. 1992; Gimeno et al. 1997). For an investor, this represents a potential loss of investment, although many venture capitalists take a portfolio approach thus reducing the impact of one failure (Norton and Tenenbaum 1993; Bergemann and Hege 1998). On size, most studies use sales turnover and employment to capture these effects. Smaller companies in particular are associated with higher net job creation rates. This is particularly evident in technology-based sectors.[12] In the short-run, we might expect that scheme funding increases probabilities of company

[12] The Anglo-German Foundation report by Burgel et al. (2004) showed that the annualized growth rates of surviving high-tech start-ups for their first 5 years is a creditable 25–35% per annum (sales) and 17–25% per annum (employment).

survival and increases their scale measured in sales or employment terms by allowing expansion of activities and additional capacity.

12.3 Sample Description

Here we present a summary of the basic descriptive evidence for supported companies funded through EIS and VCT.

12.3.1 Age Profile

The majority of both EIS and VCT recipient companies were incorporated after 1998, with peak formation in 1999 and 2000. This period reflected a time of unprecedented popular interest in both creating and investing in young, high-potential enterprises in the UK (as well as several other mature economies). Newly formed companies using VCTs tailed off dramatically after 2000 and remained at a level below that recorded in 1995 between 2004 and 2006. Again, this pattern is linked to the exceptional period over the new millennia when stock markets were extremely bullish toward entrepreneurial companies, particularly in new technologies, before a savage downward correction of stock markets internationally in Q1, 2000 (Sohl 2003). The decline in newly formed companies using EIS after 2000 was similar. The net result of these market movements was to imperil the equity position of investors in overvalued young businesses. Business angels and early-stage venture capital companies were particularly hard hit by these market movements. The net result was a decidedly jaded appetite for investing risk capital in speculative young companies after the first quarter of 2000. The UK Global Entrepreneurship Monitor data shows that by 2006, business angel investments had not recovered to pre-2000 levels.

In Fig. 12.1, one can see that the general pattern of EIS and VCT initial investments are remarkably similar over time. Both schemes experienced rapid

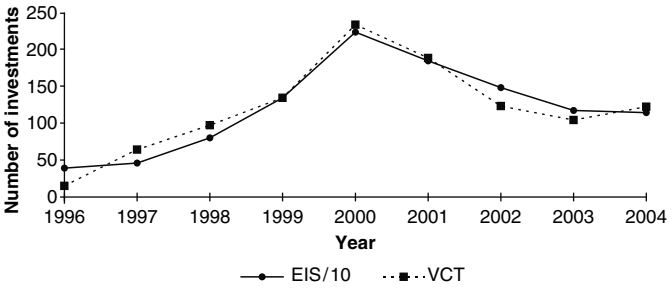

Fig. 12.1 Number of first-time EIS and VCT users (Source: Institute for Employment Studies)

growth in the late 1990s and 2000, followed by a substantial decline starting in 2001, lasting until 2003. Subsequently, however, new take-up of VCT leveled off while new EISs continued to decline. From 1998 to 2000, the patterns were quite similar in EIS and VCT take-up. Subsequently, all indexes fell.

Some 55.3% of companies receive their first VCT investment, and 59.1% of companies their first EIS investment, within 2 years of incorporation. The proportion of brand new companies receiving EIS in their initial year has fallen over time (Fig. 12.2). The most dramatic reduction was between 1999 and 2001 (from 27.9% to 17.4%), although the trend was downward through at least 2004. In contrast, brand new companies using VCT in their start year increased from 6.7% to 20.8% between 2001 and 2003. The behavior of VCT funds may reflect professional investment managers' behavior. One outcome of the 2000 market correction was that company valuations reduced sharply in the succeeding years giving investors the opportunity of buying into young companies at lower prices. It is likely that professional investment managers are more aware of, and able to exploit, stock market cyclicality than individual investors using the EIS route.

12.3.1.1 Postinvestment Survival

Figure 12.3 shows the survival of scheme companies over time. From the underlying data, we know that 26% of total VCT recipients are nonsurvivors or not currently trading. The comparable figure for EIS recipients is 24.8%. Importantly, we cannot ascribe a reason for these statistics. Some companies will have failed and others will have not. The way survival is captured from FAME is simply that the company is no longer actively trading. As FAME data are drawn from Companies House, we have an adequate degree of confidence that is consistently measured across our treatment and control groups. The attrition rate for new and young companies is relatively high, and typically peaks about 2 years after start-up. The propensity for cessation is

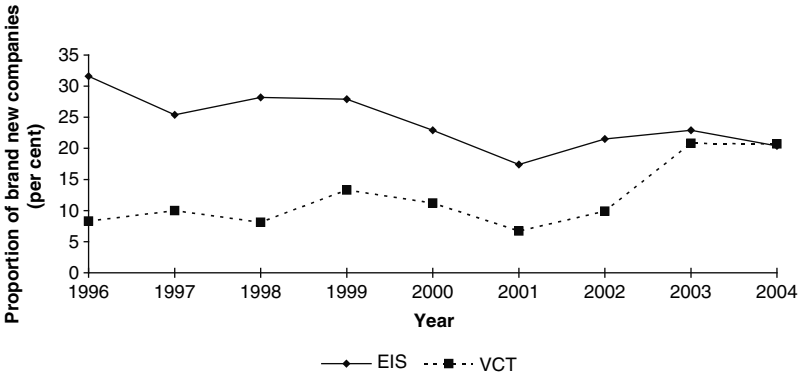

Fig. 12.2 Time profile of brand new companies receiving EIS/VCT investment (Source: Institute for Employment Studies)

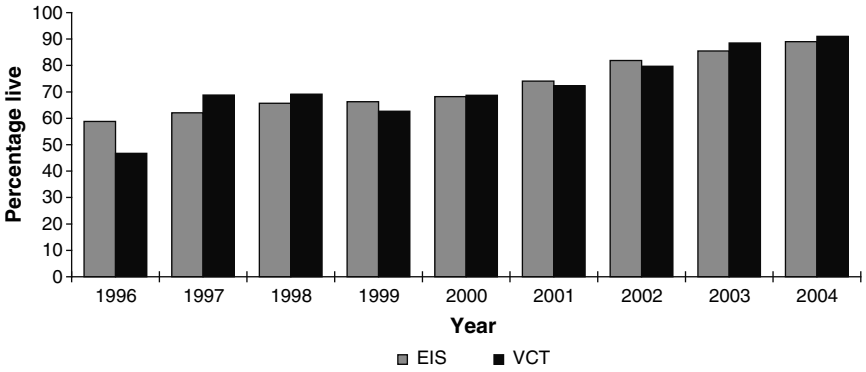

Fig. 12.3 Company status and year of first investment (Source: Institute for Employment Studies)

clearly related to company age (which is highly correlated with year of initial investment), with around 40% of companies receiving investments pre-1997 not currently live and trading. For companies receiving their initial investments in 2004, this figure is only 10%. Given the increased likelihood of the nonsurvival of a company over time, this pattern would be expected. To put these figures into context, of the UK start-ups financed by Barclays Bank plc in 2003, 66% were still active after 24 months of trading. Beyond this period, conditional closure rates fall continuously. By month 120, ten years later, only 17% of companies are still in business[13].

12.4 Econometric Results

In this section, we discuss the core findings of our econometric analysis. As indicated in our panel data methodology, we use the Hausman test to identify whether the RE or FE models is more appropriate for each case. In addition, we also present some survival models. We then estimate the same set of models, including time dummy variables. Finally, we report further models which include scheme and sector, scheme and size, and scheme and age interaction terms. Here, we note that we refer to companies that have multiple sectors. By this we mean we have coded companies that report several sectors, and do not distinguish between them, to this multiple sector as we assume they operate fairly equally across the various sectors reported. Our seven models differ in the dummy variables they use to estimate the impact of EIS and VCT (Table 12.2):

- Model 1: FE with dummies for any scheme use (nEIS and nVCT).
- Model 2: FE with dummies for any use of EIS only (nEIS_only), VCT only (nVCT_only), or both (nEIS_nVCT).
- Model 3: FE with the value of cumulative investment raised through EIS (C_eis) and VCT (C_vct).

[13] We are indebted to Richard Roberts (2007), SME Research Director of Barclays Bank plc, for the cited figures.

- Model 4: FE model with up to 2 years lagged values of investment raised through EIS and VCT (i.e., Reis_0 to 2).
- Model 5: FE model with dummies with up to 2 years lagged indicator of any scheme usage (i.e., Rvct_0 to Rvct_2).
- Model 6: FE model with dummies single or multiple years of scheme usage (i.e., One_eis and Multi_vct).
- Model 7: RE model with dummies for Standard Industrial Classification (SIC) (i.e., Sic_transport_eis).

Before we begin our reporting, we again reiterate that, in an ideal evaluation framework, we would have preferred to have data for a longer than the typical 4–5 years we have in our dataset. This would have allowed more sophisticated, dynamic model specifications and also allowed enough time to have elapsed since an EIS or VCT investment for the full effects to work their way through the system. Thus, our analysis is limited by the time series in our sample data.

12.4.1 Results Summary

The structure of Table 12.3 is as follows:

- The first column lists performance measures.
- Column 2 shows the predicted sign (direction) of the relationship between EIS and VCT investment and the corresponding performance measure.
- In column 3, the actual results from our econometric models are shown. Here, a "+ve" indicates that the relationship is statistically significant and is positively associated with the performance measure. A "−ve" indicates statistical significance, but a negative association with the performance measure. A zero indicates no statistical significance.
- Column 4 gives an indication of the magnitude (or scale) of the statistical association between EIS and/or VCT and the performance measure.
- Finally, columns 5, 6, and 7 report more detailed results for sectors, company size, and company age.

From Table 12.3, we can see that scheme variables generally have little discernible impact on real gross profits or investment, although the latter estimation was problematic due to missing data. Further, VCT appears to have no impact on labor productivity. Investments under both schemes tended to be negatively related to profit margins. Where scheme variables did show positive relationships in general were in respect of real fixed assets, real sales turnover, and employment. For EIS only, the scheme was also associated with reduced gearing and improved labor productivity. Thus on balance, scheme investments, and particularly EIS, tended to be associated with general building of capacity (fixed assets and jobs) and an expansion in sales, but not with any corresponding increase in profitability. Indeed, we find strong evidence that investments reduced margins.

Table 12.3 Results summary

Performance measure	Hypothesized effect	Statistical significance of scheme results	Scale of scheme results	Sector variation	Size effects	Age effects
Gross profits						
EIS	+ve	(+ve)	n/a		−ve	0
VCT	+ve	0	n/a	Hospitality (+)	−ve	0
Profit margins						
EIS	+ve	−ve	Small	Construction (+)	0	0
VCT	+ve	−ve	Small		v0	+
Fixed assets						
EIS	+ve	+ve	Small	Other services (+)	+ve	+ve
VCT	+ve	+ve	Small	Transport (+) business services (+) other services (+)	+ve	0
Gearing						
EIS	−ve	−ve	n/a	Business services (+) Other services (+)	0	+ve
VCT	−ve	0	n/a		0	0
Investment						
EIS	+ve	0	n/a		0	0
VCT	+ve	0	n/a		0	0
Sales						
EIS	+ve	+ve	Small	Multiple sectors (+)	0	0
VCT	+ve	+ve	Small	Utilities (+) Other services (−ve)	0	0
Labor productivity						
EIS	+ve	(+ve)	Small	Multiple sectors (+)	−ve	0
VCT	+ve	0	n/a	Utilities (+) Other services (−ve)	−ve	0

Employment						
EIS	+ve	+ve	Small	Multiple sectors (+) Hospitality (−ve) Finance (+) Business services (+) Other services (+)	+ve	+ve
VCT	+ve	+ve	Small	Hospitality (−ve) Business services (+)	+ve	+ve
Survival						
EIS	+ve	−ve	n/a			
VCT	+ve	−ve	n/a			

Notes: "+ve" indicates generally positive and statistically significant effects for scheme variables. "(+ve)" indicates some statistically significant and positive scheme variables. "0" indicates insignificant scheme variables. "−ve" indicates generally negative and statistically significant effects for scheme variables. "small" indicates scheme variable coefficient is quantifiably small

We find that company size reduced the effectiveness of scheme investments in terms of gross profitability and labor productivity and increased the effectiveness of scheme investments in terms of fixed asset accumulation and employment. Older companies actually increased their gearing on EIS. In contrast, younger companies tended to generate more employment, on VCT higher profit margins and on EIS more fixed assets.

With regard to sector, we find that public administration is a sector where there is the highest probability of a positive, scheme-related, effect. This holds for profit margins fixed assets (only VCT), sales (only VCT), labor productivity (only EIS), and employment (only EIS). However, these results may well be overstated given the likelihood of omitted variable bias and the fact that the underlying data shows that only a small handful of companies in this sector have participated in the schemes.

Companies operating in multiple sectors (i.e., those with not one but several main SIC codes) also performed well on EIS in terms of sales and employment. Business service companies had higher fixed asset formation (only VCT) and higher employment. In contrast, "other" service companies performed poorly in respect of sales (only VCT) and labor productivity (only EIS). Finally, we note thatvthe survival rate for EIS- and VCT-supported companies is significantly lower than that of unsupported companies, although those receiving both EIS and VCT investments had broadly comparable survival rates.

12.5 Findings

The first point to note is that in many of our performance models, the absolute size of our scheme coefficients show a very small quantitative impact on business performance. However, in many cases, these effects are statistically significant which suggests that they cannot be ignored. On the contrary, omitted variable bias may also play a role which might lead to an overestimate of the true scheme effect. In a purely econometric sense, we would have liked to have a much longer time series of data than was available to us in order to achieve greater clarity about the impact of EIS and VCT on company performance, particularly in terms of the causality of the relationships observed in the data.

In general, we found that the majority of EIS- and VCT-supported companies were incorporated within the last decade. For both schemes, a majority of companies were founded either in the year of their first scheme investment or in less than 12 months before the scheme investment. We also noted that activity on both schemes peaked in the year 2000, after which there was a substantial decline in the number of first investments. We also found that the proportion of brand new companies receiving EIS investments is fairly stable over time, while the period post-2001 was characterized by an increase in the share of new companies using VCT investment. Historically, around one quarter of all EIS and VCT recipient companies are no longer actively trading and (as would be expected) the cessation rate increases the more time that has elapsed since the initial investment.

We estimated nine sets of performance models using gross profits, profit margins, fixed asset accumulation, gearing, investment, sales, employment, labor productivity and survival as our company level, and performance measures. Various model specifications were initially estimated for each performance measure and after further testing, the preferred models were identified. Key findings from our econometric analysis indicated that EIS and VCT, in general, were found to be positively associated with (real) fixed asset formation, (real) sales turnover, and employment. For EIS only, the scheme was associated with lower gearing and higher labor productivity. However, on average, the EIS and VCT schemes generally have had little discernible impact on real gross profits or investment. Furthermore, investments made under EIS and VCT tended to be associated with companies exhibiting lower profit margins.

On balance, investments made under EIS and VCT (but particularly EIS) tended to be associated with *general capacity building* (i.e., fixed assets and employment) and an expansion in sales. However, there was no evidence of a corresponding increase in profitability. Indeed, we find robust evidence that scheme investments were associated with lower profit margins, at least over the period observed. It is also important to note that, while we did find several instances of improved client company performance associated with EIS and VCT investments, in most cases the actual quantitative improvements in performance implied by our estimates are very small.

The impact of company size (i.e., sales turnover, no. of employees) or age (i.e., the time since formation) depends on the performance or outcome variable being appraised. It also depends on which scheme is being monitored. We found that both schemes had different effects for different sizes and ages of company. For example, the greater the size of company receiving EIS or VCT support, the lesser the effectiveness of scheme investments when appraised by (real) gross profits and labor productivity. In contrast, company size enhanced the effectiveness of scheme investments when measured by fixed asset accumulation or employment.

The age of company receiving EIS investments tended to be positively associated with the ratio of debt to equity (gearing), employment, and fixed asset accumulation. Conversely, older companies receiving VCT investments tended to have larger employment numbers and profit margins. Thus, not only do we observe differentials for companies of different ages receiving support, but these relationships vary across the two schemes.

There were also varying EIS and VCT program effects across sectors. For example, public administration was found to be that sector where there is the highest probability of a positive, scheme-related, effect on performance. This holds for profit margins, fixed assets (VCT only), sales (VCT only), labor productivity (EIS only), and employment (EIS only). Companies operating in multiple sectors also benefited from EIS investments in terms of higher sales and employment. Business services companies have higher fixed asset formation (VCT only) and higher employment. In contrast, "other" service sector companies performed relatively poorly in terms of sales (VCT only) and labor productivity (EIS only).

Finally, survival rates for EIS- and VCT-supported companies were also significantly lower than those recorded in unsupported companies. However, for companies receiving both EIS and VCT support, survival rates were broadly comparable with those of unsupported companies.

12.6 Discussion

The results of the econometric analyses of panel data summarized above are not always simple or intuitive to understand. As such, the findings require some brief explanation.

First, it needs to be noted that these results represent our best knowledge at this stage of the recipient companies' life cycles. They are still young companies with less than 10 years of economic activity. Thus, we can describe with some (although not perfect) accuracy the behavior and outcomes of the companies to date. What we cannot comment on, nor have we sought to estimate, is their future growth trajectories. We can only comment with final authority on the companies which have survived or not survived up to a relatively short period after inception, on average.

Second, we are talking about SMEs at a relatively early stage of their growth. As Penrose (1959) famously noted, small and large companies are as different as caterpillars and butterflies. Thus, performance metrics have to be seen and interpreted within an SME context. For example, we would expect immature companies to have low profitability as resources are frequently directed into establishment and market growth. The "J curve" is particularly likely to be important for high-potential young companies in new knowledge and technology-based areas. Cumulative net cash flow may frequently be negative for some considerable time given relatively high costs and low margins prior to market establishment. Nascent companies have few economies of scale or scope. Similarly, higher productivity is likely to be more evident as companies establish themselves in markets, find customers, suppliers etc., and through growth accrue additional economies of experience. Young companies have frequently low productivity although the productivity of new ideas and innovation activity is not fully measured through traditional statistics. In short, all other things being equal, profitability and factor productivity are both likely to be positively related to company age. In measuring the modest performance figures, we may well be measuring the immaturity of these companies.

Similarly, the issue of company survivability is not necessarily obvious. Certainly, survivability is a desirable state especially for the firm's owners and employees. We know that most nascent companies will terminate, either voluntarily or involuntarily during their first 3 years of existence (Cressy 2006). However, survivability is not necessarily directly correlated with economic benefit to the wider society. Survival is a necessary, but not sufficient condition. Government is much more likely to be interested in those young enterprises that have the capacity to grow into larger and successful companies even if the attempts at such growth increase the threat of company failure. Thus, a vigorous and entrepreneurial economy – replete

with exciting, young companies taking risks to gain commercial advantage – is likely to be widely viewed as a desirable goal by policymakers. Such an environment will also likely record higher failure rates among such companies than would be evident among a majority of more established but low growth companies that are neither significantly innovative nor employment creating.

Taken together, these results indicate that EIS and VCT investments can have positive effects on capacity building in recipient companies, but that in quantitative terms these effects are, as yet, modest. Similarly, there is evidence that injections of funds via the schemes are associated with lower profit margins, at least initially. However, we also note that both schemes appear to have differential effects on performance depending on the size, age, and sector of the recipient company and this is an important point. For government and private investors looking forward, the key question is whether these supported companies can in the future turn their investment in general capacity building into higher returns, reinvestment, and employment than comparable companies not in receipt of such support. The present study does not allow us to make such a conclusion. In future, however, a rather longer time series aspect to the dataset used here may allow us to be more definitive about the overall impact of EIS and VCT on recipient company development and performance. Such a study should also be able to better examine the equally fundamental question of whether the schemes benefit UK economic performance overall – whether outcomes in terms of company performance justify the transfer payments of tax receipts foregone.

References

Aho, E., Cornu, J., Georghiou, L., and Subirá, A. (2006) *Creating an Innovative Europe*. Report of the Independent Expert Group on R&D and Innovation appointed following the Hampton Court Summit. Brussels: European Commission

Arellano, M. and Bond, S. (1991) "Some tests of specification for panel dataPanel Data: Monte Carlo evidence and an application to employment equations." *Review of Economic Studies*, Vol. 58(2), pp. 277–297

Armour, J. and Cumming, D. (2006) "The legislative road to silicon valley." *Oxford Economic Papers-New Series*, Vol. 58, pp. 596–635

Bank of England (1996) *The Financing of Technology Based Small Firms*Firms. London: Bank of England

Bergemann, D. and Hege, U. (1998) "Venture capital financing, moral hazard and learning." *Journal of Banking and Finance*, Vol. 22, pp. 703–735

Berger, A. N. and Udell, G. F. (1998) "The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle." *Journal of Banking and Finance*, Vol. 22, pp. 613–673

Bolton J. E. (1971) *Report of the Committee of Enquiry on Small Firms*. Cmnd. 4811, HMSO: London

Bottazzi, L., Da Rin, M., and Hellmann, T. (2005) "What Role of Legal Systems in Financial Intermediation? Theory and Evidence." *RICAFE Working Paper No. 022*

Boyns, N., Cox, M., Spires, R., and Hughes, A. (2003) *Research into the Enterprise Investment Scheme and Venture Capital Trusts. A Report Prepared for Inland Revenue*. Cambridge UK: PACEC Public and Corporate Economic Consultants

Bruderl, J., Preisendorfer, P., and Ziegler, R. (1992) "Survival chances of newly founded business organizations." *American Sociological Review*, Vol. 57, pp. 227–242

Bürgel, O., Fier, A., Licht, G., and Murray, G. C. (2004). *The internationalization of young high-tech firms*. ZEW Economic Studies 22. Mannheim: Physica-Verlag

Burgelmann, D. and Hege, U. (1998) "Venture capital financing, moral hazard, and learning." *Journal of Banking and Finance*,Vol. 22(6), pp. 703–735

Cassar, G. (2004) "The Financing of Business Start-Ups." *Journal of Business Venturing*, Vol. 19(2), pp. 261–283

Chay, K. and Powell, J. (2001) "Semiparametric censored regression models." *Journal of Economic Perspectives*, Vol. IS(4), pp. 29–42

Cowling, M. and Mitchell, P. (2003) "Is the small firms loan guarantee scheme hazardous for banks?" *Small Business Economics*, Vol. 21, pp. 63–71

Cowling, M. (2003) "Productivity and corporate governance in smaller firms." *Small Business Economics*, Vol. 20, pp. 335–344

Cressy, R. and Olofsson, C. (1997) "European SME financing: An overview." *Small Business Economics*, Vol. 9, pp. 87–96

Cressy, R. (2002) "Funding gaps: A symposium." *Economic Journal*, Vol. 112(477), pp.F1–F16

Cressy, R. and Olofsson, C. (2006) "Why do most firms die young?" *Small Business Economics*, Vol. 26, pp. 103–116

Cumming, D., Fleming, G., and Schwienbacher, A. (2006). "Legality and venture capital exits." *Journal of Corporate Finance*, Vol. 12, pp. 214–245

Davidson, R. and MacKinnon, J. G. (1993) *Estimation and Inference in Econometrics*. New York: Oxford University Press, pp. 320, 323

Denis, D. J. (2004) "Entrepreneurial finance: An overview of the issues and evidence." *Journal of Corporate Finance*, Vol. 10, pp. 301–326

European Commission (2003) *Benchmarking Business Angels. Best Report No 1*, Enterprise Directorate-General, Brussels: European Commission

European Commission Commission (2005) *Best Practices of Public Support for Early-Stage Equity Finance*. Directorate General for Enterprise and Industry. Belgium: European Commission

European Commission (2006a) *Community Guidelines on State Aid to Promote Risk Capital Investments in Small and Medium-Sized Enterprises*. Directorate General for Enterprise and Industry. Brussels: European Commission

European Commission (2006b) *Financing SME Growth – Adding European Value*. COM(2006) 349 Final. Directorate General for Enterprise and Industry. Brussels: European Commission

European Commission (2006c) *Report of the Alternative Investment Expert Group: Developing European Private Equity*. Directorate General for Internal Market and Services. Brussels: European Commission

Freear, J, Sohl, J, and Wetzel, W (1994) "Angels and non-angels – are there differences?" *Journal of Business Venturing*, Vol. 9(2), pp 109–123

Gilson, R. J. (2003) "Engineering a venture capital market: Lessons from the American experience." *Stanford Law Review*, Vol. 55, pp. 1067–1103

Gimeno, J., Folta, T., Cooper, A., and Woo, C. (1997) "Survival of the fittest: Entrepreneurial human capital and the persistence of underperforming firms." *Administrative Science Quarterly*, Vol. 42, pp. 750–783

Gompers, P., Lerner, J. (1999) *The Venture Capital*Venture Capital *Cycle*. Cambridge, MA: MIT Press

Greene, W. H. (2002) *LIMDEP Version 8.0. Econometric Modeling Guide*, Vol. 1. Plainview, NY: Econometric Software, Inc.

Greene, W. H. (2003) *Econometric Analysis*. 5th ed. Upper Saddle River: Prentice HallHall

Greene, W. H. (2003) *LIMDEP Version 8 Econometric Modeling Guide*, Vol. 1. Plainview, NY: Econometric Software

Gujarati, D. (2003) *Basic Econometrics*. 4th ed. New York: McGraw Hill

Harding, R., Cowling, M., and Murray, G. C. (2003) *Assessing the Scale of the Equity Gap in the UK Economy: Report to HM Treasury and Small Business Service* Business Service, London: HM Treasury and DTI

Hausman, J. A. (1978) "Specification tests in econometrics." *Econometrica*, Vol. 46, pp. 1251–1271
HM TreasuryHM Treasury (1998) *Financing the High Technology Business: A report to the Paymaster General*, London: HMSO
HM Treasury & Small Business Service. (2003) *Bridging the Finance Gap: Next Steps in Improving Access to Growth Capital for Small Businesses*. London: HM Treasury & Small Business Service
Lerner, J. (1999) The government as venture capitalVenture Capitalist: The long-run impact of the SBIR program. *Journal of Business*, Vol. 72(3), pp. 285–318
Lerner, J. (2002) When bureaucrats meet entrepreneurs: The design of effective "public venture capital"Venture Capital programs. *Economic Journal*, Vol. 112, pp. F73–F84
Macmillan H. (1931) *Report of the Committee on Finance*Finance *and Industry*. Cmnd. 3897, London: HMSO
Mason, C. M. and Harrison, R. T. (2001) "Investment readiness": A critique of government proposals to increase the demand for venture capitalVenture Capital. *Regional Studies*, Vol. 34, pp. 663–668
Mason, C. M. and Harrison, R. T. (2004) "Improving access to early stage venture capitalVenture Capital in regional economies: A new approach to investmentInvestment readiness." *Local Economy*, Vol. 19, pp. 159–173
Mason, C. M. and Stark, M. (2004) "What do investors look for in a business plan?" *International Small Business Journal*, Vol. 22(3), pp. 227–248
Maula, M., Murray, G. C., and Jääskeläinen, M. (2007) *Public Financing of Young Innovative Companies in Finland: Report to the Finnish Ministry of Trade and Industry*, Helsinki: MTI Publications
Murray, G. C. and Marriott, R. (1998) "Why has the investment performance of technology-specialist, European venture capital funds been so poor?" *Research Policy*, Vol. 27, pp. 947–976
Murray, G. C. (1998) "A policy response to regional disparities in the supply of risk capital to new technology-based firms in the European Union: the European seed capital fund scheme." *Regional Studies*, Vol. 32, pp. 405–409
Murray, G. C. and Lott, J. (1995) "Have venture capitalVenture Capital firms a bias against investment in high technology companies?" *Research Policy*, Vol. 24, pp. 283–299
Murray, G. C. (1994) "The second equityEquity gap: Exit problems for seed & early stage venture Capitalists and their investee companiesCompanies." *International Small Business Journal*, Vol. 12, pp. 59–76
Myers, S. C. and Majluf, N. (1984) "Corporate financing decisions when firms have investment information that investors do not." *Journal of Financial Economics*, Vol. 13(2), pp. 187–221
Norton, E. and Tenenbaum, B. (1993) "Specialization versus diversification as a venture capital investment strategy." *Journal of Business Venturing*, Vol. 8, pp. 431–442
OECD (2004) *Venture Capital: Trends and Policy Recommendations*. Science Technology Industry, Paris: Organisation for Economic Co-operation and Development
OECD (2006) *OECD Keynote Paper for SME Financing Gap: Theory & Evidence*. Paris: Organisation for Economic Co-operation and Development
Oxera (2007 forthcoming) *Tax-advantaged employee share schemes: analysis of productivity effects. Report 1: Productivity measured using turnover*. Research Report, London: HMRC
Penrose, E. (1959) *The Theory of the Growth of the Firm*. Oxford: OUP
Prowse, S. (1998) "Angel investors and the market for angel investments." *Journal of Banking and Finance*, Vol. 22, pp.785–792
Riding, A. L., Dal Cin, P., Duxbury, L., Haines, G. and Safrata, R. (1993) *Informal Investors in Canada: The Identification of Salient Characteristics*. Ottawa: Carleton University
Roberts, R. (2007) *The Business Lifespan of Firms in England & Wales: An analysis using account and customer data: SME market Analysis*. UK Banking, London: Barclays Bank plc
Sapienza, H. (1992) "When do venture capitalVenture Capitalists add value?" *Journal of Business Venturing*, Vol. 7, pp. 9–27
SAS Institute (1999) *SAS User's Guide, Version 8. Vol. 2*. Cary, NC: SAS Institute
Sayrs, L. (1989) *Pooled Time Series Analysis*. Newbury Park, CA: Sage
Small Business Service (2004) *Action Plan for Small Business*, London: DTI & SBS

Small Business Service (2006) *Factors Determining the Performance of Early Stage High-Technology Venture Capital Funds*, URN 06/902

Sohl, J. E. (2003) "The private equity market in the USA: Lessons from volatility. Venture capital." *An International Journal of Entrepreneurial Finance*, Vol. 5, pp. 29–46

Sohl, J. E. (2007) "The organization of the informal venture capital market," in H. Landström (Ed.), *Handbook of Research on Venture Capital*. London: Edward Elgar Publishing Ltd

Stata (2003) *Cross-Sectional Time Series*, College Station, Texas: Stata Press

Stiglitz, J. E. and Weiss, A. (1981) "Credit rationing in markets with imperfect information." *American Economic Review*, Vol. 71(3), pp. 393–410

Storey, D. J. (1998) *The Ten Percenters. Fourth Report: Fast Growing SMEs in Great Britain*, London: Deloitte & Touche Tohmatsu

Twisk, W. (2003) *Applied Longitudinal Data Analysis for Epidemiology*. New York: Cambridge University Press

UK Presidency of the EU and the European Commission (2005) *Conference Report on the Risk Capital Summit 2005: Investing for Growth and Competitiveness in Europe*. London: DTI and HM Treasury

United States Department of Commerce and European Commission (2005) *Working Group on Venture Capital. Final report*, United States Department of Commerce, International Trade Administration and European Commission, Directorate-General for Enterprise and Industry. Brussels: European Commission

Van Osnabrugge, M. (1998) *The Financing of Entrepreneurial Firms in the UK: A Comparison of Business Angel and Venture Capitalist Investment*. Venture Capital Report, Oxford

Westhead, P. and Cowling, M. (1995) "Employment change in independent owner managed high technologyTechnology firmsFirms in Great Britain." *Small Business Economics*, Vol. 7(2), pp. 111–140

Wilson, S. and Butler, D. (2004) *A Lot More to Do: The Promise and Peril of Panel Data in Political Science*. Provo, Utah: Brigham Young University

Woolridge, J. (2002) Econometric Analysis of Cross-Section and Panel Data. Cambridge, MA: MIT Press

Chapter 13
Support Programs for Entrepreneurship in Spain: A Multiple Case Study

David Urbano and Nuria Toledano

13.1 Introduction

Today there is no doubt about the importance of new firms when it comes to generating wealth, employment, and social welfare (Birch 1979; Storey 1994; Wennekers and Thurik 1999; Reynolds et al. 2002; Carree and Thurik 2003; Parker 2004, among others). Consequently, both governments and researchers have increased their interests in new and small businesses. Currently, in many nations and regions, policymakers are designing support programs to foster entrepreneurship. Additionally, in Europe, increasing attention has been given to the role and nature of SMEs support services (European Commission 2002). At the same time, several authors are analyzing EU and US entrepreneurship policy (North et al. 2001; Lundström and Stevenson 2001; Audretsch and Thurik 2001; Stevenson and Lundström 2002; Storey 2003; Lambrecht and Pirnay 2005, among others).

In this context, Spain is not an exception. On the one hand, the government is improving regional and local conditions fostering dynamic and innovative new firms. On the other, the increased competences endowed by its autonomous regions[1] in the last few decades have allowed them to develop new support programs for entrepreneurship. Furthermore, intrinsic to the development of support programs for new and small businesses is the growing academic interest to identify the best practices and issues involving the support programs, such as the nature of activities, services, and immediate outcomes.

This article contributes to empirical research about entrepreneurship policies, taking into account the support programs that have been designed and implemented

D. Urbano (✉) and N. Toledano
Business Economics Department, Autonomous University of Barcelona, Barcelona, Spain
e-mail: david.urbano@uab.is

[1] Spain is politically and administratively divided into "autonomous communities," which are normally referred to via the term *regions*. An autonomous community is a territorial area that is endowed with legislative autonomy and executive powers, as well as the ability to administrate through its elected representatives (Spanish Constitution, 1978).

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_13,

in Spain from 1984 until 2002. In this study the similarities and differences between the assistance programs are examined. The specific research questions are the following: (1) How do support programs stimulate the creation of new firms in Spain? (2) How does the institutional context affect the creation of new firms?

These issues are addressed from the perspective of Institutional Economics (North 1990, 2005). This theory stresses the function of institutions in economic and social development and has become one of the most suitable frameworks for the study of new firm creation (Díaz et al. 2005; Urbano 2006). The empirical research is carried out through a multiple-case-study approach.

The main results of the study suggest a set of propositions emphasising the importance of some environmental factors, particularly the assistance measures and the entrepreneurial culture for new firm creation in Spain. Implications of this research could be useful for improving existing policies for entrepreneurship as well as for designing new measures adapted to the necessities of entrepreneurs.

After this Introduction, in the following section, an explanation of the main aspects of the Institutional Economic Theory is presented. In the third section, the research-design method of data collection is described. Research findings and discussion are shown in the fourth section. Finally, the article ends by summarizing and emphasizing the main conclusions of the research.

13.2 Support Programs for Entrepreneurship and the Institutional Approach

The interest for support policies and programs for entrepreneurship has intensified in recent years (European Commission 2002), and academics have focused research on this topic (Lundström and Stevenson 2001; Audretsch and Thurik 2001; Stevenson and Lundström 2002; Storey 2003; Lambrecht and Pirnay 2005, among others). Also, in Spain, researchers have analyzed the policy interventions in the entrepreneurship field (Fonfría 2001; Toledano 2003; Urbano 2003, 2006; Carrasco and Toledano 2004; Toledano and Urbano 2007), although few scholars have explored support mechanisms from the Institutional perspective. As stated before, this theory stresses the function carried out by institutions in economic and social development (North 1990, 2005), and has become one of the most suitable frameworks for the analysis of environmental factors that determine the entrepreneurial activity in specific contexts (Díaz et al. 2005; Urbano 2006).

The Institutional Theory develops a very wide concept of "institutions." North (1990: 3), one of the main authors in this field, proposes that "institutions are the rules of the game in a society, or more formally, institutions are the constraints that shape human interaction." Since the main function of institutions in a society is to reduce uncertainty by establishing a stable structure for human interaction, North (1990, 2005) attempts to explain how institutions and institutional framework affect economic and social development.

Institutions can be either formal – such as political rules, economic rules, and contracts – or informal – such as codes of conduct, attitudes, values, norms of behavior, and conventions, or, rather, the culture of a society. In addition, North (1990, 2005) also explains how there can exist "radically differential" performances of economies over long periods of time. He follows up his path-dependency argument by describing the embedded character of informal institutions as a result of their cultural content.

In the entrepreneurship field, institutions are the set of rules that articulate and organize entrepreneurial activity, with repercussions on economic growth and social development. In this paper, formal institutions will be the support mechanisms and measures for new firm creation and informal institutions the legitimisation of business activity and the entrepreneurial culture (Díaz et al. 2005; Urbano 2006).

13.3 Methodology

13.3.1 Research Design

The paper uses a qualitative case-study approach as its research methodology (Glaser and Strauss 1967; Eisenhardt 1989; Yin 1994). A case study is an empirical enquiry that investigates a contemporary phenomenon within its real-life context, and it is especially useful when the boundaries between phenomenon and context are not clearly evident (Yin 1994). This strategy of research is increasingly being used in entrepreneurship (Godel 2000; Rialp et al. 2005; Leung et al. 2006; Neergard and Ulhoi 2006; Corbett el al. 2007; Urbano and Toledano 2007, among others), and it enjoys a wide acceptance in the context of support programs where it has become particularly useful for detecting the differences and similarities among public interventions (Yin 1994; Patton 2002). Case-study research can include both single- and multiple-case-studies (Yin 1994), with the later generally regarded as more robust by providing the observation and analysis of a phenomenon in multiple settings. The multiple-case-study design also enables a replication logic in which the cases are treated as a series of independent experiments (Eisenhardt 1989; Yin 1994). On the basis of the strength of the multiple-case design (Eisenhardt 1989; Yin 1994), we use it in this study to investigate the main support policies for entrepreneurship in Spain.

13.3.2 Selection of the Case Studies

Following the qualitative approach used in this paper, the selection of the case studies was based on a theoretical sample (Eisenhardt 1989; Yin 1994). Moreover, the sample selection was carried out in several phases.

First, with the aim of achieving an adequate theoretical replication (Stake 1994; Yin 1994), different Spanish regions were analyzed employing business density and total

early stage entrepreneurial activity (TEA)[2] data, as shown in Table 13.1. Specifically, the regions selected in our study were Valencia, the Basque Country, Cataluña, Asturias, Navarra, Galicia, Madrid, Andalucía, Extremadura, and Castilla-León.

Second, ten support programs – one for each region – were selected according to three criteria: (1) the variety of beneficiaries, (2) the increase in budget attributed to the programs since they were started, and (3) the age of the programs. In this respect it should be noted that the selection of cases was carried out giving priority not only to the variety of programs chosen (theoretical replication), but also the possibility of accessing the necessary sources of information and the learning opportunities offered by the incorporation of each new case study were considered.

13.3.3 Data Collection and Data Analysis

During the data-gathering stage, data were collected using different methods and tools. To triangulate the case findings and enhance the validity and reliability of the study, we used focused interviews, structural interviews, and diverse documental material (Yin 1994).

Table 13.1 Indicators of business dynamism and entrepreneurial activity in Spanish regions (*Source:* Self-elaborated based on the data published by the DIRCE-INE (Firm Directory of National Statistics Institute) (2006) and from the GEM Spanish data (2006))

Spanish regions	No. of firms	No. of inhabitants	Business density[a]	Rate of activity	Unemployment rate	TEA
Andalucía	511,728	7,975,672	64	55.3	12.6	6.06
Aragón	92,162	1,277,471	72	56.5	5.5	9.01
Asturias	72,276	1,076,896	67	49.8	9.3	5.57
Baleares	91,254	1,001,062	91	64.1	6.4	4.19
Canarias	140,414	1,995,833	70	61.0	11.6	7.83
Cantabria	39,560	568,091	70	55.3	6.5	7.31
Castilla León	170,319	2,523,020	67	53.0	8.1	6.61
Castilla-Mancha	132,906	1,932,261	69	55.0	8.8	7.65
Cataluña	612,404	7,134,697	86	62.1	6.6	8.57
Valencia	368,586	4,806,908	77	59.6	8.3	7.43
Extremadura	66,232	1,086,373	61	51.5	13.4	8.33
Galicia	200,020	2,767,524	72	53.6	8.4	6.01
Madrid	503,000	6,008,183	84	63.5	6.3	9.28
Murcia	97,374	1,370,306	71	58.9	7.8	6.60
Navarra	43,142	601,874	72	60.6	5.3	6.25
Basque Country	164,431	2,133,684	77	58.0	6.9	5.44
La Rioja	23,404	306,377	76	59.4	6.1	6.94
Spain	3,000,036	44,566,232	75	58.3	8.5	7.27

[a]Number of firms per 1,000 inhabitants

[2] TEA (reflects the entrepreneurial activity of regions participating in the GEM Project (Global Entrepreneurship Monitor) (Reynolds et al. 2002).

In the context of support programs, or from a supply perspective, the regional bodies responsible for administering support policies for each case study initially telephoned. Next, focused interviews were conducted with those implementing those support policies (10 people in total, 1 for each case study). These interviews followed a standard protocol with a common set of open-ended questions designed to elicit a discussion of the nature of the support policy for entrepreneurship, specifically about how support programs stimulated the creation of new firms. The bulk of these interviews were conducted between February and June 2007,[3] lasting between 90 and 120 min. Additionally, ten experts in these topics were consulted.

Concerning the beneficiaries, or from the demand side, 50 entrepreneurs, 5 for each case study, were interviewed.[4] The questions dealt with issues regarding the influence that the support programs and other environmental factors had in new firm creation in the specific context. Finally, different documented sources, such as reports, statistics, and web pages were reviewed and analyzed.

Regarding the data analysis, a research database was initially created with the resulting information from data collection. The presence of a case-study database increased the reliability of the entire research (Yin 1994). Also, for the inductive part of the study, the data were analyzed using a theory-building approach (Eisenhardt 1989; Yin 1994). In this sense, the search for alternative propositions was assisted by using the Institutional Economic Theory (North 1990, 2005). Previously, we conducted both within-case analysis and cross-case analysis. Through the first one, the main characteristics of the case studies were summarized, and a cross-case analysis was applied in order to identify differences and similarities among the cases.

13.4 Research Findings and Discussion

In this section, a brief description of the case studies is offered. Afterwards, in the light of the institutional approach, the similarities and differences of the cases are analyzed and presented according to the research questions.

13.4.1 Case Studies

Table 13.2 shows the main characteristics of the subjects of the case studies analyzed in this research.

[3] Previously, in 2005, some key informants were contacted to develop a preliminary and pilot study with six programs analyzed in this research.

[4] The first 30 interviews were used in a preliminary study, and are included in this research's total number of 50 interviews.

Table 13.2 Characteristics of the case studies (*Source:* self-elaborated)

Case study[a]	Year	Spanish regions	Promoter	Main objectives
1	1984	Valencia	Government of Valencia	Foment innovation processes in industry
				Modernise existing firms
				Favor the appearance of new business owners
2	1985	Basque Country	Councils of Bajo Deba	Generate employment
				Help the creation and consolidation of firms
				Offer services to promote tourism
3	1986	Cataluña	Council of Barcelona	Generate employment
				Support the creation and consolidation of firms
				Encourage networking among businesses
				Foment the entrepreneurial spirit
4	1987	Asturias	Government of Asturias	Encourage firm creation
				Promote the generation of innovative projects in large organisations
5	1988	Navarra	Government of Navarra	Encourage the entrepreneurial spirit
				Identify, promote and develop business projects
				Support innovation in firms and their consolidation
6	1992	Galicia	Galician Economic and Social Council	Encourage economic activity that favours balanced and integrated development in firms
				Promote the creation of firms in sectors with the highest impact in the region
				Promote activities that generate employment
7	1996	Madrid	Council for Economic and Technological Innovation	Support firm creation
				Support the consolidation and competitiveness of established firms
8	2000	Andalucía	Government of Andalucía	Promote and support firm creation
				Enable the implementation of practices based on the idea of improving competitiveness and innovation
				Improve the chances of firm survival and the consolidation and expansion of SMEs

(continued)

Table 13.2 (continued)

Case study[a]	Year	Spanish regions	Promoter	Main objectives
9	2001	Extremadura	Several public and private agents	Support the creation and consolidation of firms Reduce the risk of business failure Create an entrepreneurial culture Train entrepreneurs Optimise resources
10	2002	Castilla-León	Government of Castilla-León	Generate business initiatives based on new technological and industrial development Make the community more aware of the importance of innovation Make the use of technology in the region more dynamic

[a]The names of the case studies have been replaced by numbers for confidential reasons

It is important to note that despite the differences among the public organisations that promote support programs, their implementation was always carried out through partnerships between public and private agents (local City Halls, business federations, rural development networks, etc.). In addition, in all case studies, the objective of creating new businesses was closely linked to the promotion of SMEs and the generation of new jobs.

13.4.2 Cross-Case Analysis

13.4.2.1 Policies and Mechanisms to Promote the Creation of New Businesses

In analyzing how support programs stimulate new firm creation in Spain, several similarities were found among the cases analyzed. Concretely, with the exception of Case 1, all case studies focused on the prestart phase (see Table 13.3). These cases aimed at reducing the difficulties entrepreneurs face through advice for developing business ideas and for analyzing viability. Our evidence also indicates three different types of advice: (a) complete personal advice (Cases 2, 4, 5, 6, 7, and 8), (b) partial personal advice (focused on elaborating a business plan and the necessary administrative procedures for setting it up) (Cases 3 and 10), and (c) virtual advice through the Internet (Cases 3 and 9). These traits are shown explicitly in Table 13.3.

During the start-up stage, it is interesting to note that while experts highlight the financial difficulties as a principal problem for entrepreneurs, only Cases 1 and 5 offer financial services.

Table 13.3 Main measures and services for new firm creation (*Source:* self-elaborated)

Subphases		Prestart	Start-up	Poststart	Target beneficiaries					
		Conception	Gestation	Creation	Consolidation	Growth				
	Case study	Motivation	Advice	Incubation	Partial financing	Partial financing	Advice	General	Specific	
			Complete personal	Partial personal	Virtual					
1				√	√	√			√	
2	√								√	
3		√	√	√				√		√
4	√			√				√		
5	√			√	√				√	
6	√						√	√		
7	√							√		√
8	√			√			√	√		√
9			√					√		√
10		√					√		√	

Data from our research shows that few cases give priority to offering services that help new and small firms in the process of consolidation and growth (Cases 1, 6, 8, and 10). These aspects have been previously identified by other studies analyzing support mechanisms in Spain (Fonfría 2001; Urbano 2003, 2006; Toledano and Urbano 2007).

In other cases, particularly 1, 2, 5, and 10, specific incentives for groups of beneficiaries (firms and entrepreneurs) were implemented, taking into account the environmental characteristics, including the population's attitudes toward the entrepreneurial activity. For example, Case 2 attempted to increase business initiatives linked to the sectors of tourism, with the objective of promoting its historical and natural wealth and the potential of their human resources. In the same way, Cases 1, 5, and 10 focus on the most innovative firms providing specific incentives, which are motivated by recent technological advances. In this sense, we deduce that support programs and entrepreneurial spirit – formal and informal institutions respectevely, from North's (1990, 2005) perspective, articulate and organise economic interactions and influence entrepreneurial activity in the local context in Spain. The following proposition summarizes this relationship:

Proposition 1 *In general terms, the institutional context influences the new firm creation*.

13.4.2.2 The Role of Support Programs and Entrepreneurial Culture for New Firm Formation

Overall, our evidence suggests that all cases influence new firm creation. Nevertheless, their impact differs depending on the context characteristics.

Specifically, in entrepreneurial environments such as Valencia, Cataluña, Navarra, and Madrid, where Cases 1, 3, 5, and 7 are located, respectively, support programs contributed to entrepreneurial activity, facilitating and accelerating the entrepreneurial process. In these cases, the data showed a high number of entrepreneurial initiatives emerging to exploit business opportunities. In this sense key informants highlight the positive influence that the existing pool of entrepreneurs, and potential entrepreneurs, trained and motivated, have on these results. Therefore, it is possible to deduce that the stimulus for entrepreneurship in entrepreneurial contexts is both support programs for new firm creation and enterprise culture, or in other words, formal and informal institutions.

On the contrary, different antecedents in the context implied different results for public interventions. Specifically, in areas where a salaried culture predominated, such as the regions where Cases 4, 6, 8, and 9 were implemented, support programs for entrepreneurship had no direct influence on entrepreneurial activity or new firm creation. In these cases, we found that a large proportion of the new companies were the result of the citizens attempting to end their unemployment. Therefore the mere existence of support programs does not imply new firm emergence. The evidence suggests that the existence of potential entrepreneurs, or in other words,

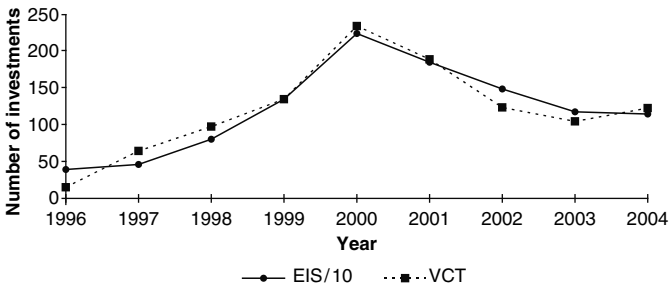

Fig. 13.1 The theoretical model (*Source:* self-elaborated)

people who desire and have the intention to become entrepreneurs, is essential for increasing the number of new businesses. Consequently, and in the light of institutional approach (North 1990, 2005), it is possible to affirm that informal institutions (such as social factors) are especially relevant in nonentrepreneurial contexts, which explain the levels of new firm creation in these areas.

Therefore, we suggest the following propositions:

Proposition 2: *In an entrepreneurial context, institutions (formal and informal) have a direct influence on new firm creation.*

Proposition 3: *In a nonentrepreneurial context, informal institutions have a direct influence on new firm creation.*

Figure 13.1 integrates and synthesizes the theoretical model of this research.

13.5 Conclusions and Implications

Over the last few years public policies aimed at reducing the regional imbalances have improved some local economies through the promotion of new firms. To analyze these policies, we explored how support programs that foster entrepreneurship in Spain function as well as how the institutional context affects new firm creation in several Spanish regions.

Toward this end the Institutional Economics (North 1990, 2005) was used as a theoretical framework, guiding development of a multiple-case-study approach to do the empirical research. Specifically, ten cases that provide different examples of support programs for entrepreneurship in Spain were selected as a theoretical sample.

Based on the evidence a first conclusion is that in Spain the majority of public interventions for promoting entrepreneurship are currently included in wider policies aimed at generically supporting SMEs development (Lundström and Stevenson 2001; Stevenson and Lundström 2002).

Moreover, on the basis of the Institutional Theory framework, three propositions were induced using a theory-building approach (Eisenhardt 1989; Yin 1994). In this

sense, a second issue that deserves attention, and the one that we believe offers the greatest potential, is how informal institutions influence in the creation of new businesses. In this respect, it is interesting to note that the case-studies' evidence shows that in nonentrepreneurial environments, informal institutions, such as the culture of the society, explain, in a great part, the level of new firm creation. In these areas, formal institutions, such as support programs for entrepreneurship, have neither a great nor a direct effect on entrepreneurial activity, especially, because there are not a lot of people who have the intrinsic motivation to become entrepreneurs. On the basis of this, we suggest that in these scenarios governmental policies should be orientated to stimulate informal institutions that legitimize entrepreneurship. This, in turn, facilitates the creation of a pool of potential entrepreneurs who will create businesses and exploit the business opportunities. In this sense, it is advisable, for instance, to promote entrepreneurial attitudes among the local populations, through information campaigns and fostering entrepreneurial education among university students. Later, formal institutions might influence in the creation of new businesses through the acceleration of the entrepreneurial process (reducing procedures and costs), which would contribute positively to entrepreneurial activity.

In summary, this research contributes to the overall discussion of entrepreneurship policies and raises implications for emerging support programs. From an academic point of view, this study also contributes to the Institutional Theory (North 1990, 2005) by expanding the understanding of institutional influence on entrepreneurship. Nevertheless, because our analysis is based on a case study, more extensive investigations are required to test the generalization of our arguments. Despite this limitation, we believe that our exploratory study might provide a starting point for future research within the support policies for entrepreneurship field, especially for investigations adopting an institutional approach.

Acknowledgments The authors express their appreciation for the financial support received from research projects funded by the Ministry of Science and Technology and the Ministry for Education and Science, SEJ2007–60995 and SEC2006–06017, respectively. They also thank all of those who have provided relevant information that has enabled the completion of this study and, in particular, those in charge of the programs that gave access to data on new firm creation.

References

Audretsch, D.B., Thurik, A.R. (2001). What is new about the new economy? Sources of growth in the managed and entrepreneurial economy. *Industrial and Corporate Change*, 10(1), 267–315.

Birch, D.L. (1979). *The Job Generation Process*. Cambridge, MA: MIT.

Carrasco, M., Toledano, N. (2004). La promoción de nuevas empresas en el medio rural. Análisis de la incidencia del LEADER II en la provincia de Huelva. *Revista Española de Estudios Agrosociales y Pesqueros*, 202, 199–221.

Carree, M.A., Thurik, A.R. (2003). The impact of entrepreneurship on economic growth. In D.B. Audretsch and Z.J. Acs (Eds.), *Handbook of Entrepreneurship*Entrepreneurship *Research* (pp. 437–471). Boston: Kluwer.

Corbett, A.C., Neck, H.M., DeTienne, D.R. (2007). How corporate entrepreneurs learn from fledgling innovation initiatives: cognition and the development of a termination script. *Entrepreneurship, Theory and Practice*, 31(6), 829–852.

Díaz, C., Urbano, D., Hernández, R. (2005). Teoría económica institucional y creación de empresas. *Investigaciones Europeas de Dirección y Economía de la Empresa*, 11(3), 209–230.

Eisenhardt, K.M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532–550.

European Commission. (2002). *Good practice in business support measures*, Enterprise division, http://forum.europa.eu.int/irc/sme. Accessed 15 June 2007.

Fonfria, A. (2001). *Instrumentos y objetivos de las políticas de apoyo a las PYMEs en España*. Madrid: Instituto de Estudios Fiscales.

Glaser, B., Strauss, A. (1967). *The Discovery of Grounded Theory. Strategies of Qualitative Research*. London: Wiedenfeld and Nicholson.

Godel, S. (2000). Klaus B: the success story of an entrepreneur: a case study. *European Journal of Work and Organization Psychology*, 9(1), 89–92.

Lambrecht, J., Pirnay, F. (2005). An evaluation of public support measures for private external consultancies to SMEs in the Wallon Region of Belgium. *Entrepreneurship and Regional Development*, 17, 89–108.

Leung, A., Zhang, J., Wong, P.K., Foo, M.D. (2006). The use of networks in human resource acquisition for entrepreneurial firms: multiple "fit" considerations. *Journal of Business Venturing*, 21(5), 664–686.

Lundström, A., Stevenson, L. (2001). *Entrepreneurship Policy for the Future, Vol. 1 of the entrepreneurship for the future series*. Sweden: Swedish Foundation for Small Business Research, Swedish Ministry of Industry, Employment and Communications, NUTEK, and the Örebro University.

Neergard, H., Ulhøi, J.P. (2006). Government agency and trust in the formation and transformation of interorganizational entrepreneurial networks. *Entrepreneurship Theory and Practice*, 30(4), 519–539.

North, D.C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.

North, D.C. (2005). *Understanding the Process of Economic Change*. Princeton: Princenton University Press.

North, D., Smallbone, D., Vickers, I. (2001). Public sector support for innovating SMEs. *Small Business Economics*, 4, 303–317.

Parker, S.C. (2004). *The Economics of Self-Employment and Entrepreneurship*. Cambridge: Cambridge University Press.

Patton, M.Q. (2002). *Qualitative Research and Evaluation Methods*. London: Sage.

Reynolds, P., Bygrave, W., Erkko, A.L., Hay, M. (2002). *Global Entrepreneurship Monitor 2002 Summary Report*. Babson Park, MA: Babson College, Ewing Marion Kauffman Foundation and the London Business School.

Rialp, A., Rialp, J., Urbano, D., Vaillant, Y. (2005). The born-global phenomenon: a comparative case study research. *Journal of International Entrepreneurship*, 3, 133–171.

Stake, R.E. (1994). Case studies. In N.K. Denzin and Y.S. Lincoln (Eds.), *Handbook of Qualitative Research* (pp. 236–247). Thousand Oaks, CA: Sage.

Stevenson, L., Lundström, A. (2002). *Beyond the Rhetoric: Defining Entrepreneurship Policy and Its Best Practice Components*. Sweden: Swedish Foundation for Small Business Research. Swedish Ministry of Industry, Employment and Communications, NUTEK, and the Örebro University.

Storey, D.J. (1994). Employment. In D.J. Storey (Ed.). *Understanding the Small Business Sector* (pp.160–203). London: Routledge.

Storey, D.J. (2003). Entrepreneurship, small and medium sized enterprises and public policy. In Z.J. Acs and D.B. Audretsch (Eds.). *International Handbook of Entrepreneurship Research*. Dordrecht: Kluwer.

Toledano, N. (2003). *Análisis de las políticas de desarrollo rural en la provincia de Huelva. Un estudio comparado de la iniciativa Leader II, el programa Proder y el programa Escuela de Empresas*. Málaga: Analistas Económicos de Andalucía & Fundación Unicaja.

Toledano, N., Urbano, D. (2007). Políticas de apoyo a la creación de empresas en España: un estudio de casos. *Boletín Económico del ICE*, 2905, 33–46.

Urbano, D. (2003). Marco institucional forma de la creación de empresas en Cataluña: oferta y demanda de servicios de apoyo. In E. Generesca, D. Urbano, J.L. Capelleras, C. Guallarte, J. Verges (Eds.) *Creación de Empresas – Entrepreneurship*. Barcelona: Servicio de publicaciones de la Universidad Autónoma de Barcelona.

Urbano, D. (2006). *New Business Creation in Catalonia: Support Measures and Attitudes Towards Entrepreneurship*. Barcelona: Generalitat de Catalunya.

Urbano, D., Toledano, N. (2007). El estudio de casos como estrategia de investigación en creación de empresas: cuestiones preliminares. *Revista OIKOS*, 24, 135–160.

Urbano, D., Vaillant Y.Vaillant, Toledano, N. (2007). Nuevas empresas e instituciones de apoyo: el caso de la promoción empresarial en los ámbitos rurales y urbanos de Cataluña. *Revista Española de Estudios Agrosociales y Pesqueros*, 214, 103–126.

Wennekers, S., Thurik, R. (1999). Linking entrepreneurship and economic Growth. *Small Business Economics*, 13, 27–55.

Yin, R.K. (1994). *Case Study Research. Design and Methods*. London: Sage.

Chapter 14
Rural Technology-Based Entrepreneurs: Catalonian Experiences

Christian Serarols, Yancy Vaillant, and David Urbano

14.1 Introduction

Entrepreneurship is now an important element of economic growth and prosperity for many regions of the world. Entrepreneurial activity has positive repercussions on employment generation (Storey 1982, 1988, 1994; Birley 1985; Kirchhoff and Phillips 1988, 1992; White and Reynolds 1996) and on economic growth (Kent 1982; Sexton 1986; Dubini 1989; Storey 1994; Wennekers and Thurik 1999). But according to a US National Commission on Entrepreneurship report (NCOE 2001) the most important contribution of entrepreneurship at the local level is "innovation." Entrepreneurship and innovation, combined, have four principal benefits (NCOE 2001, p. 1):

- Improved quality of life
- Creation of new jobs
- Improved economic competitiveness
- Creation of economic growth and new wealth

The local spillover benefits of innovative entrepreneurship are profound (Drucker 1984, 1985; Pavitt et al. 1987; Acs and Audretsch 1988; Acs and Varga 2004). Since World War II, small entrepreneurs in the USA have been responsible for 67% of inventions and 95% of radical innovations (Timmons 1998), fuelling job creation and economic growth. As a result, promoting technology-based firms has a fundamental role in regional development strategies.

Entrepreneurship support policies are now the norm at all levels of governance, from urban to rural, from national to local regions, including even the most remote rural areas. In the first decade of the twenty-first century, the EU and many OECD countries

C. Serarols (✉), Y. Vaillant, and D. Urbano
Business Economics Department, Universitat Autònoma de Barcelona, Barcelona, Spain
e-mail: christian.serarols@uaf.es

J. Leitao and R. Baptista (eds.), *Public Policies for Fostering Entrepreneurship*,
International Studies in Entrepreneurship 22,
DOI 10.1007/978-1-4419-0249-8_14, © Springer Science+Business Media, LLC 2009

introduced policies using entrepreneurship as an essential tool for rural development.[1] In Europe, diversifying the productive base of rural areas was one rural development policy objective (European Commission 1997). Likewise, for lagging European regions, increasing the demand and interest in new business formation was a key element of development and revitalization policy (Rosell and Viladomiu 2001). For its part, the OECD included entrepreneurship, endogenous economic growth, and innovation as the main focus of its new rural paradigm (OECD 2006).

Still rural areas lag far behind their urban counterparts with respect to technology-based firm creation (Roper and Love 2006). In this sense, classical and contemporary economic thinking has consistently portrayed urban agglomerations as the preferred setting for conducting business (Smith 1776/1952; Marshall 1920; Hoover 1948; Myrdal 1957; Jacobs 1969; Krugman 1981, 1991).

Nevertheless, improvements in the transport and communication infrastructure have significantly shrunk the physical and psychological distance between rural and urban areas (Grimes 2000; Phelps et al. 2001). Although much of the formal institutional and infrastructure disadvantages in Europe and other OECD countries have been eliminated now, on the whole rural areas did not experience the shift toward technology-based entrepreneurship that occurred in urban areas. This is consistent with the findings of Bade and Nerlinger (2000) who report that rural areas in western Germany are much less successful in meeting the requirements of new technology-based firms (NTBF) than are urban areas.

Spain's autonomous region of Catalonia is an example of this. Even as rural Catalonia has some of the highest entrepreneurial activity levels in Europe, according to the Global Entrepreneurship Monitor (GEM-Catalunya) survey (Veciana et al. 2004), the proportion of new high and medium technology-based manufacturing firms (HMTBMFs) established in rural Catalonia is comparatively low. Vaillant and Lafuente (2007) report an entrepreneurial activity level of up to 11.44% for 2003 amongst Catalonia's rural adult population, with an increase of 25.7% over the 5-year period from 1996 to 2001 in the number of nonagricultural businesses established in rural Catalonia, which is far above the rate of 10.4% growth registered in urban Catalonia over the same period (Vaillant 2006). The increased entrepreneurial activity of rural Catalonia has been accompanied by increasing economic prosperity, with many parts of rural Catalonia benefiting from greater economic growth compared with urban areas (Lafuente et al. 2007).

In fact, rural Catalonia experienced, starting at the dawn of the new millennium, a population influx with an urban-to-rural migration flow (Coll and Aguilera 2004). Viladomiu et al. (2004) found that over half of the observed rural Catalan entrepreneurs were previously based in urban areas and were often using entrepreneurship as a way to establish themselves in rural locations.

However, if we only focus on HMTBMFs[2] we find that the proportion of these firms in rural areas is lower than that in urban areas. While such firms accounted

[1] Measures facilitating new business formation in rural areas are found in the European Commission document (1997) under the article 33 of "Agenda 2000" within Chapter IX, "Promoting the adaptation and development of Rural Areas."

[2] See Sect. 14.3.1 for a definition of technology based start-ups.

for 2.37% of all rural businesses, in urban areas HMTBMFs comprised 3.66% behind rural Catalonia's high entrepreneurial rates of the enterprises.[3]

One might conclude that rural Catalonian "lifestyle" motivations could explain the relative shortfall in technology-based manufacturing firms. However, rural Catalonia's entrepreneurial boom has, in fact, been accompanied by an increasing share of HMTBMF start-ups. Of Catalonian HMTBMFs created since 2003, 7.36% were established in rural areas, an increase from the 5.31% share of rural HMTBMFs represented from the entire sample of Catalan HMTBMFs. As shown in Table 14.1, the share of newly created HMTBMFs is greater in rural areas (8.54%) than in urban areas (6.03%).

To identify the localization and geographic dispersion of these firms and the trends characterizing the newly created firms amongst them, this study analyses new HMTBMFs established in rural areas of Catalonia, Spain. The main research objective of the study is to determine the variables that influence the choice of location made by new HMTBMFs in rural areas. In Sect. 14.2, the chapter reviews the literature related to technology-based firms in order to identify the most common variables said to explain the localization decisions of technology-based start-ups. Then, in Sect. 14.3, a list of propositions related to the factors guiding technology entrepreneurship localization is formulated. These propositions will be contrasted to the sample of newly created HMTBMFs that have established themselves in rural areas of Catalonia. Sect. 14.6 provides some conclusions and implications for future research.

14.2 Literature Review and Theoretical Framework

The location of economic activities has been a major topic of economic analysis since the seminal works of dealing with the impact of transportation costs on the location decision (Weber 1909), agglomeration economies (Marshall 1920), Central Place Theory (Christaller 1933), the spatial division of the market combining agglomeration and transportation costs (Hoover 1948), market areas (Lösch 1954), land-use models in urban settings (Alonso 1964; Muth 1969), amongst others. These works, individually and collectively, have profoundly influenced economic analysis (Arauzo 2005, p. 107), and they have been divided in multiple ways.

Capello suggests that these theories fall into two distinct categories[4] in addressing the economic logic explaining firm location or why some areas are more developed than others: (1) location theories that deal with the economic mechanisms that distribute activities in space and (2) regional growth and development theories focusing on spatial aspects of economic growth and the territorial distribution of income (Capello 2007).

On the other hand, one could divide these contributions into three distinct approaches: neoclassical, behavioral, and institutional (Hayter 1997). The neoclassical

[3] Based on the SABI database, representing sociedad limitadas (S.L.) and sociedad anonima (S.A.) registered firms only.

[4] These theories make up what Capello (2007) calls "regional economics."

Table 14.1 Catalan firms distributed by different criteria (source: SABI Database)

	All Firms in sample "A"	Catalan technology-based firms "B"	Proportion of firms that are technology-based "B/A" (%)	All new firms in sample "C"	New Catalan technology-based firms "D"	Proportion of newly created firms that are technology-based "D/C" (%)	Proportion of technology-based firms that are newly created "D/B" (%)
All of Catalonia	210,482	7,494	3.56%	26,502	462	1.74%	6.08%
Urban Catalonia	193,719	7,096	3.66%	24,378	428	1.76%	6.03%
Rural Catalonia	16,763	398	2.37%	2,124	34	1.60%	8.54%
Rural/all firms	7.96%	5.31%		8.01%	7.36%		

approach relates to location theory, focusing its analysis on profit maximization and cost-minimizing strategies such as transportation costs, labor costs, and external economies. The institutional approach looks at firm location centered on the location's institutional environment, looking at everything from the potential clients, suppliers, trade unions, regional systems, the government, and other firms. Finally, the behavioral approach looks at imperfect information and uncertainty situations, where entrepreneurs make decisions using noneconomic factors. The noneconomic-location decision process is frequent in the case of SMEs, which usually select their location based upon the entrepreneur's geographical location, previous experience in the sector, or financial status (Arauzo and Manjón 2004).

The literature offers other variables that can not be classified in the aforementioned approaches. For example, many empirical studies stress "the size of the firm" as a factor that influences its location (Johnson and Cathcart 1979; Chapman and Walker 1991; Callejón and Costa 1996; Cotorruelo and Vázquez 1997; Costa et al. 2000, 2004; Figueiredo et al. 2002); however, this factor is often omitted in theoretical studies.

14.2.1 Factors Explaining New Technology-Based Firms

The review of the literature into the factors explaining the location decisions of NTBF follows Hayter's (1997) three theoretical classifications. Although most studies of the factors explaining NTBF simultaneously use variables belonging to different approaches, their findings can, for the most part, be clustered according to Hayter's classification.

14.2.1.1 Neoclassical Approach

Although there are several studies focussing on location factors for NTBF, few analyze why some firms might choose rural areas. For example, Smith and Barkley (1991) found that in the western USA, the main determinant of establishment location was whether or not the plant was high or low tech, with high-tech firms less likely to choose rural areas. One possible reason explaining this is a shortage of research in rural areas. However, with the development of information technologies, especially Internet, Grimes (2000) identified an increasing number of NTBF settling in rural areas.

The location of R&D activities is influenced by factors that are both internal and external to the firm (Ouwersloot and Rietveld 2000). Ouwersloot and Rietveld identify four external factors that influence location decisions: labor supply (highly qualified workers), information infrastructure (presence of public research institutes, universities, knowledge transfer centers, etc.), agglomeration economies, and physical infrastructure (expressway density and access to hub or regional airports). Interestingly, their results show that the location decisions differ

according to whether the firms are manufacturers or service-based. For traditional manufacturing, the industrial composition of the area was the most important local variable. Meanwhile, the physical infrastructure was most important for service-sector firms.

Assuming physical infrastructure matters, Holl (2004) conducted a study evaluating the spatial pattern of new plant location in Spain at a very detailed geographical level. Using geographic information systems (GIS) to calculate accessibility based on the road network, he found that ground transportation played an important role in manufacturing plant location, affecting the spatial distribution of new manufacturing establishments by increasing the attractiveness of municipalities sporting the needed infrastructure. However, the type of desired accessibility varies across industries. Additionally, the author concludes that the positive effects of closeness to firms in the same industry suggest that clustering is an important factor. Boix and Trullén (2007) find that employment in high-tech firms (and by inference their location) grows in places with a high density of small firms, assuming that there is very good road infrastructure and some distance from high-cost large cities.

Costa et al. (2004) analyzed if there was a relation between a technologically dense base of firms and the urban environment in which they appear. Based on a sample of new industrial firms created in Spain from 1980 to 1994, they also tried to find whether the location decision of new firms differed according to the characteristics of the industry life cycle, the firm, and the product. They found that at early stages of the industry life cycle, business turnover is high; specific knowledge of the sector circulates without excessive difficulty, and the firms are located in big cities with diversified productive structures and a large pool of human resources. However, at the stage where the product is standardized, business turnover is substantially lower, especially with respect to the entrance of new firms. Then, tacit intrafirm knowledge acquires greater importance and firms tend to locate in less densely populated surroundings where the internal labor market and the reduction of certain costs (salary levels, price of industrial land, etc.) surpass the benefits of the externalities offered by the more highly populated cities (Klepper 1996).

14.2.1.2 Institutional Approach

Another approach to study NTBF location was adopted by Egeln et al. (2004). Their main research question was which location characteristics attract spin-offs from public research institutions and if these characteristics differ from nonacademic firm creations. Their results show that spin-offs in high-tech manufacturing tend to rely on technology pushes from science, locating close to their parental institution. Service-oriented spin-offs are more likely to move away from their parent institution. These results echo that of Meyer (2003). In that sense, the location of the incubator organization is an important factor influencing the choice of business location.

In a similar study, Audrestch et al. (2005) focussed on the role of accessing knowledge spillovers in the location decision of new firms. In their model, the authors included a large number of factors, including geographic distance from firm to

universities, number of articles published by the university faculty, number of students in science, number in social sciences, city population, price of the most expensive hotel, firm age, and sector. They found that new firms in high-technology industries are influenced not just by the traditional regional characteristics, but also by the opportunity to access knowledge generated by universities. However, the impact of university output on new firm location is sensitive to both the type of knowledge and mechanism used to access that knowledge. For example, the larger the number of students in the natural sciences, the more closely firms locate to the university.

Understanding the role of local environment in the commercialization of scientific results through the creation of biotech start-ups in France between 1993 and 1999 was the goal of Autant-Bernard et al. (2006). Based on three main determinants, (proximity to sources of knowledge, local environment, and local industry environment), they examine the spatial trends in this highly innovative science-based sector. Their results show that a large and diversified scientific and technological base within a region is necessary for a continuous flow of new firm creation.

In Spain, large cities that are more densely populated and with higher levels of productive diversification are less attractive than smaller cities with higher levels of specialization for new R&D intensive firms (Costa et al. 2000). This contrasts with empirical results obtained by Alonso (1999) and Trullén (2001). They found that new science-based firms tend to agglomerate in the outskirts of large metropolitan areas, particularly when the new start-up has more than a 100 employees. Newly created medium and large firms belonging to intensive R&D industries tend to locate near the biggest cities to capture the technological externalities generated by other agents. They also locate in areas where the production costs are lower.

14.2.1.3 Behavioral Approach

The behavioral approach to location decision-making literature emphasizes quality of life and amenities as the most important factors for the location choice of high-technology firms (Galbraith 1985; Schmenner 1987; Malecki and Bradbury 1992).

A survey of 98 top high-tech firm executives located in Orange County, CA concluded that high-technology firms operate on a different set of factors than traditional industry in making location decisions (Galbraith 1985). The three primary factors determining location were the availability of professional and technical personnel, the general ambiance and lifestyle of the area, and the desires of the owner/manager. In this case, proximity to markets and suppliers is of secondary importance.

These conclusions are also supported by Arauzo and Viladecans (2006, p. 21):

> We suspect that the suburbanisation process is especially important for high technology firms. These firms move from bigger cities in higher metropolitan areas (their traditional location) to smaller cities which have improved accessibility due to transport infrastructure investment. Indeed, smaller cities seem to be the preferred locations for technology-intensive firms; they offer amenities that are highly valued by skilled individuals working in those industries.

Similar conclusions are drawn by Boix and Trullen (2007), who suggest that the process goes beyond suburbanization with high-tech firms acting as "small spiders who move across the web." In their analysis, employment in high-tech firms grows in places with a high density of small firms, very good infrastructure, and an export dynamic – all while escaping high-cost locations.

Theoretically one could argue that metropolitan areas have better physical and network infrastructure, which would drive firms to seek out urban locations (Felsenstein 1996). However, using a sample of 160 firms from both metropolitan and nonmetropolitan areas in Israel, he analyzed the tendency of high-technology firms to choose metropolitan locations, concluding that location choice is not a calculated, utility-grounded decision. This is especially the case for small and new firms that are spun out of a local university or firm, and, thus, have not made an active strategic decision about location.

14.2.2 Model and Propositions

In Table 14.2 we review the most studied variables related to NTBF's localization decisions found in the literature review. We use Hayter's (1997) approach to classify these variables.

From the literature and from the theoretical clustering of the variables identified as those most influential for the localization decisions of new rural technology-based firms, the model in Fig. 14.1 has been made to help guide the study. From this model we make three propositions that are used in reaching the research objectives.

Proposition 1 (P1) *Variables from the neoclassical approach best explain the localization decisions of new rural HMTBMFs*.

Proposition 2 (P2) *Variables from the institutional approach best explain the localization decisions of new rural HMTBMFs.*

Proposition 3 (P3) Variables from the behavioral approach best explain the localization decisions of new HMTBMFs.

14.3 Method and Definitions

14.3.1 Convening Technology-Based Start-Ups

The growing body of literature studying technology firms reveals the subject's complexity. While there is no doubt of the importance and contribution technology firms make to modern economies, there is still considerable difficulty in defining and classifying the firms and their role. Often they are associated with innovation, growth, competitiveness, and regional and national development. After reviewing 200 publications, Grinstein and Goldman (2006) proposed three dimensions under-

Table 14.2 Most studied variables regarding locational decisions of NTBF

Neoclassical approach (profit maximization and cost minimization)
Distance from every municipality to the two kinds of centers considered: the capital of the comarca (county) where the municipality is located and the nearest city with at least 100,000 inhabitants
Distance to market and size of agglomerations
Motorways and road infrastructure
Geographical specialization
Skill level of human capital (qualified local labor)
Land costs
Salary level
Sectoral specialization (industrial districts)
Industrial diversity
Population density (km^2)
Concentration of jobs
Level of economic activity in the municipalities
Other physical infrastructure (trains, airports, telecommunications, etc.)
Proximity to raw materials
Proximity to services
Institutional approach (institutional thickness)
Incubator organization and linkages with it
Access to knowledge generated by universities or research institutions
Try to locate close to administrative centers
Access to science parks
Incentives to R&D, firm creation, or job creation among others
Proximity to education (universities and secondary schools)
Technology-oriented fairs
Role models (entrepreneurs, R&D firms, etc.)
Behavioral approach (quality of life and personal aspects of the entrepreneur)
Owner/CEO/key workers want to live in the area
Proximity to good housing stock
Climate
Community attitudes toward business
Recreation and leisure opportunities
To be born in the area (geographical origin)
Good transportation for people
Financial status of the entrepreneur
Proximity to founder's residence

lying the essence of the technology firms: R&D activity with the associated organizational and market characteristics, product strategy characteristics, and corporate culture characteristics. Other studies in management, entrepreneurship, innovation, and organization tend to give definitions and characteristics of technology firms generating disparity in criteria and a situation similar to a "definitional Tower of Babel" (Koberg et al. 1996). Since this article examines the localization decisions of technology firms in rural settings, we do not enter the definition and classification debate.

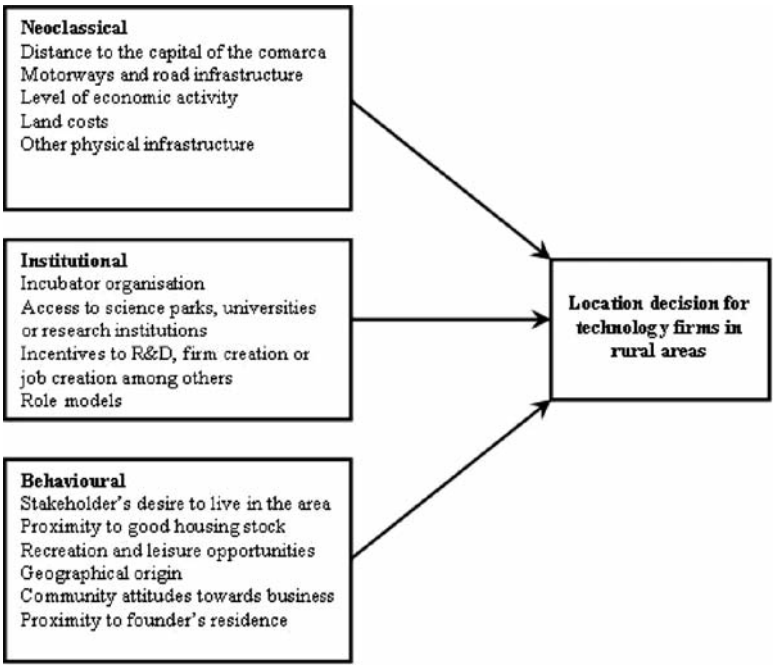

Fig. 14.1 Model for localization decisions

Industry classification based on technology includes the OECD's classification of manufacturing industries based on R&D intensity calculated after converting countries' R&D expenditure, value added and production values (OECD 2003), resulting into four main categories: (1) high-technology industries, (2) medium–high technology industries, (3) medium–low technology industries, and (4) low-technology industries.[5]

Notwithstanding the debate, for this study we use the OECD classifications. This choice is motivated by the simplicity of operationalizing our existing variables and the study objectives. We would like to test Grinstein and Goldman's multidimensional characteristics of the technology firms in a future study.

14.3.2 Convening Rurality

No universally convened definition of what is and is not rural territory exists. Some countries even use several definitions at once, varying across ministries and projects (OECD 2007). However, together with absolute population figures, population density is a common criteria used by policy makers and academics to distinguish between rural and urban areas (North et al. 2001; Rosell and Viladomiu 2001;

[5] The various sectors included in the defined technology-intensive industries are presented in the Appendix A.

Smallbone et al. 2002). The OECD defines rural areas as those areas with fewer than 150 inhabitants per km^2 (OECD 1996).

The European Commission also uses population density to measure rurality. In *Rural Development. CAP 2000 Working Document* (European Commission 1997: DG V1), the Commission defines rural areas as those with with fewer than 100 inhabitants per km^2. This is the criteria applied in previous research examining rurality and entrepreneurship in Catalonia (Viladomiu et al. 2004; Rosell et al. 2006). We continue the trend set by existing literature by adopting the European Commission's criteria.

We use the Catalan *comarca* as our geographical unit of analysis. The *comarca* is roughly equivalent to an English county. Historically it represented a territorial unit composed of several municipalities that gravitated around a common market-place or business center. Today the *comarca* is an administrative entity governed by a county council. This is especially important in rural areas where municipalities often do not have the necessary critical population and resource mass to allow effective public services.

The use of counties as a unit of analysis is not perfect. Some counties defined as rural include urban centers. This is the case of the rural Catalan counties of Alt Empordà, Baix Ebre, and Garrotxa, which all have municipalities of over 20,000 inhabitants. Using municipalities as a unit of analysis offers its own challenges: suburban municipalities, even if immediately adjacent to metropolitan areas, may end up being classified as rural because of their demographic distribution.

14.3.3 Data

An exploratory, qualitative research approach was adopted for this study. We focus our attention on new high and medium–high technology-based manufacturing firms created between 2003 and 2005. The sample was obtained from the Sistema de Análisis de Balances Ibéricos (SABI) database,[6] which offers the most complete data for Spanish businesses available for researchers. This research uses the January 2007 release containing information for businesses registered through the end of 2005. The database includes 210,482 businesses from Catalonia, 16,763 of which (8% of Catalan firms) were established in rural Catalonia. Of these rural businesses, 398 were registered as HMTBMFs. Of all the HMTBMFs in rural Catalonia, 34 were after January 1, 2003 and before December 31, 2005. These 34 new rural HMTBMFs are the sample population used to evaluate the propositions previously established in this chapter.

We conducted semistructured interviews with the executive entrepreneur of the sampled firms (Rubin and Rubin 1995). These in-person interviews were held over

[6] The SABI Top 500,000 database offers detailed financial and operational data for half a million Spanish businesses registered as private limited (S.L.) or unlimited (S.A.) firms. The database is annually updated.

a month-long period and guided by a set questionnaire. First, the respondents were asked to identify the five main reasons explaining the current location of their business. The entrepreneur was then presented a list of variables coinciding with those from the behavioral, neoclassical, and institutional approaches, as shown in Fig. 14.1, and asked if these factors played a role in the decision of where their new firm is located. To determine the chief factor, the respondents were asked which factor had the greatest impact. Follow-up interviews, via telephone, were conducted when necessary to obtain complementary information or make clarifications.

14.4 Spatial Distribution of HMTBMFs in Catalonia

14.4.1 Rural Catalonia: Some Features

The Catalan territory is divided into 41 counties, 22 of which meet the European Commission's definition of being rural. As can be seen in Fig. 14.2, the rural counties of Catalonia are distributed along the French and Aragon borders, coinciding with the Perinean mountains to the north, and, with exception of the Lleida valley, with most of the interior counties of western Catalonia. Most urban counties of Catalonia are found along the Mediterrian Sea, except for those falling within the metropolitan belt of Catalonia's provincial capitals.

Although rural Catalonia has a relatively uniform and homogeneous institutional framework from both the formal and informal perspective, there is variation in population density across the 22 rural Catalan counties. The 22 rural counties account for 60% of the territory, but only 9.7% of the population, with an average population density of 34.1 citizens per square kilometer. Further details are given in Table 14.3.

14.4.2 HMTBMFs in Catalonia: Rural and Urban

Figure 14.3, which presents existing Catalonian HMTBMFs, shows that the distribution of these firms is not uniformly spread across Catalonia. Most technology-based manufacturing firms in Catalonia are located in and around the metrololitan area of Barcelona, with other smaller clusters formed around provincial capitals and along main roads.

In Fig. 14.4, we limit our observations to the defined, newly established HMTBMFs in Catalonia. Barcelona is, again, the most fertile area. Apart from the province of Barcelona, the new firms are spread fairly evenly across the Catalan territory, albeit a slightly greater proportion choosing to locate in Girona.

Rural Catalonian HMTBMFs are usually situated close to important population centers or along the main roadways. Two points of concentration appear – one in

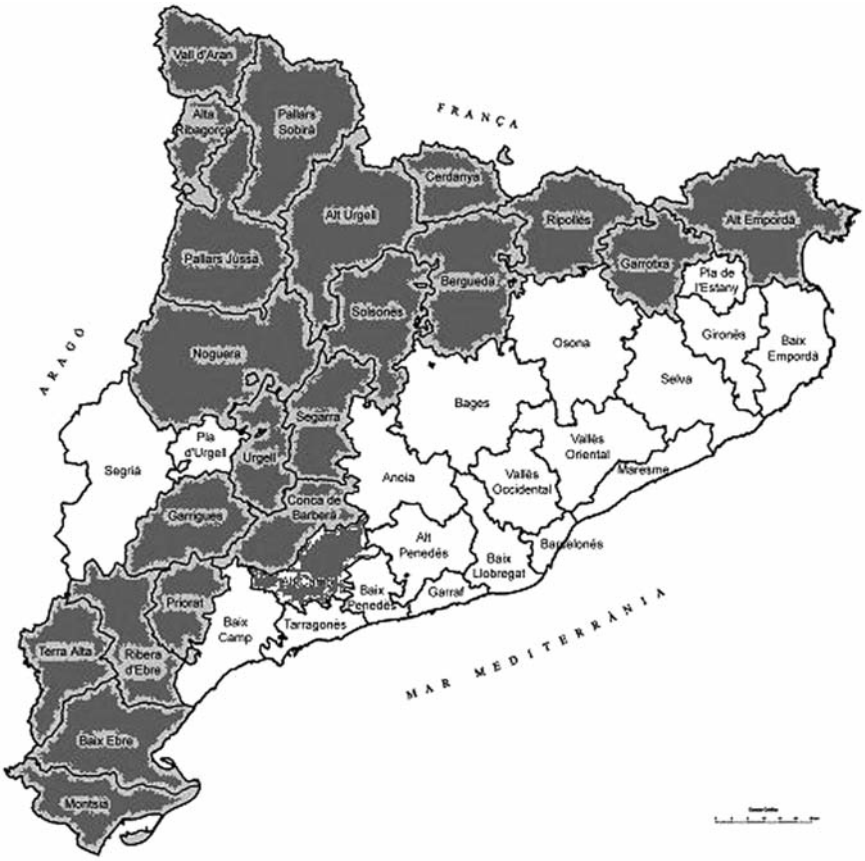

Fig. 14.2 Rural counties of Catalonia [source: adapted from Viladomiu et al. (2004)]

Table 14.3 Total area, population, and density of rural areas of Catalonia, 2005 [source: adapted from Viladomiu et al. (2004), based on figures from IDESCAT]

	Total area	Population	Density (hab/km^2)
Rural counties	19,881.3	677,299	34.1
Urban counties	12,225.2	6,317,907	572.2
Catalonia	32,106.5	6,995,206	217.9
Rural counties/Catalonia (%)	61.9	9.7	15.6

the northern counties of the Girona province and another in the southernmost counties – the county of Montsià (Fig. 14.5).

By limiting ourselves to new HMTBMFs in rural Catalonia, established between 2003 and 2005, as shown in Fig. 14.6, it is easy to see that the north-eastern comarcas of the Girona province seem to have the greatest concentration of new start-ups.

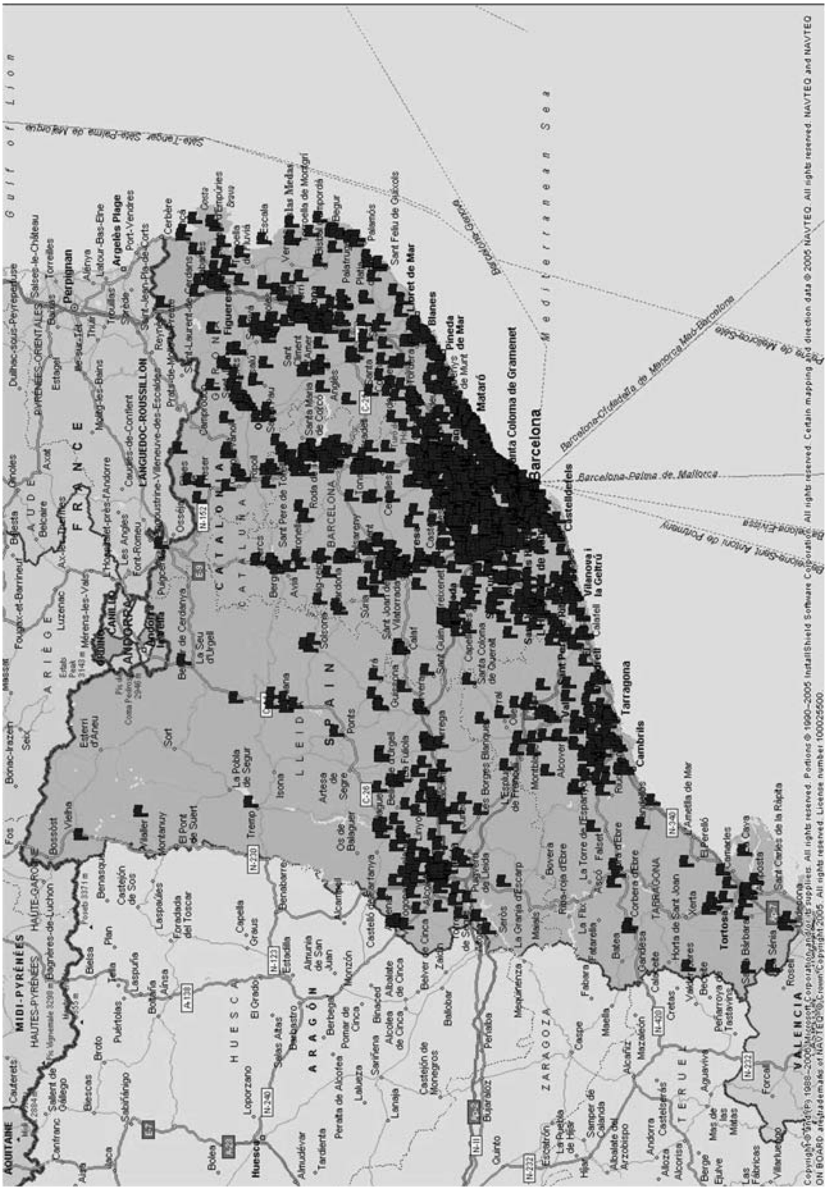

Fig. 14.3 Catalonian HMTBMFs based on OECD classification

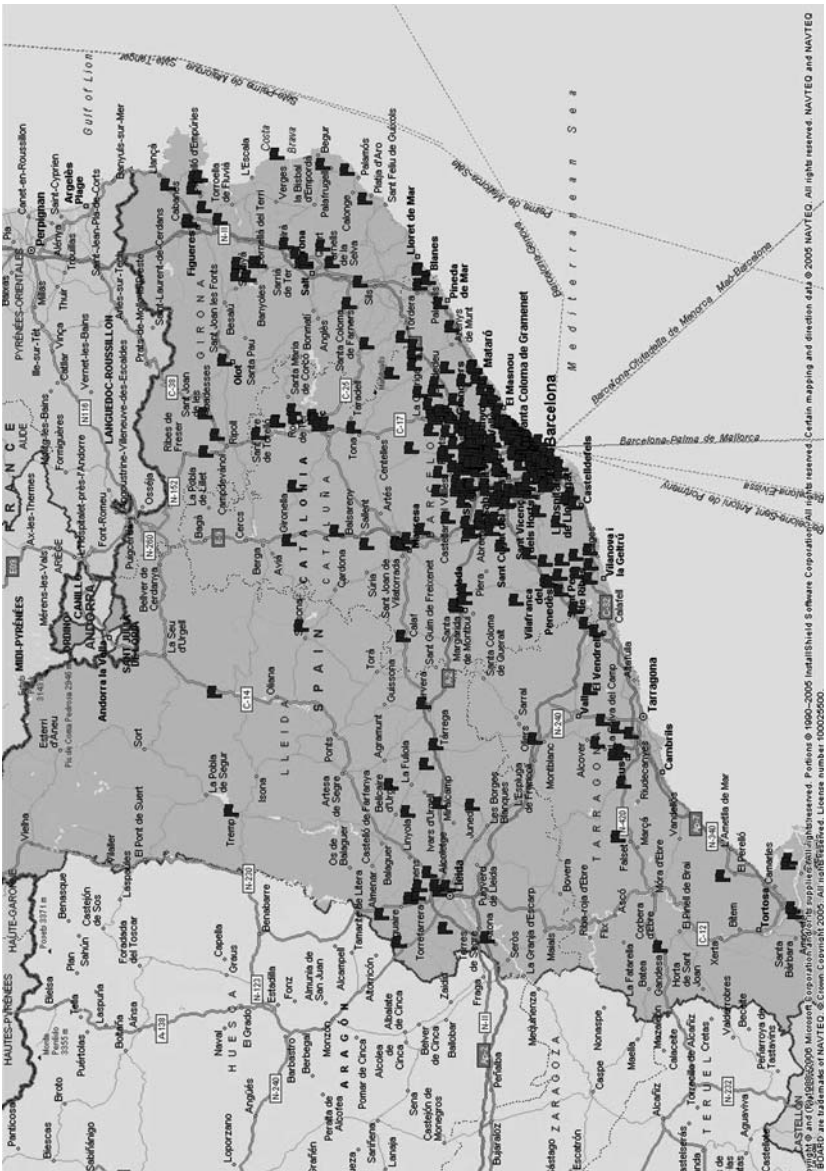

Fig. 14.4 New Catalonian HMTBMFs created 2003–2005

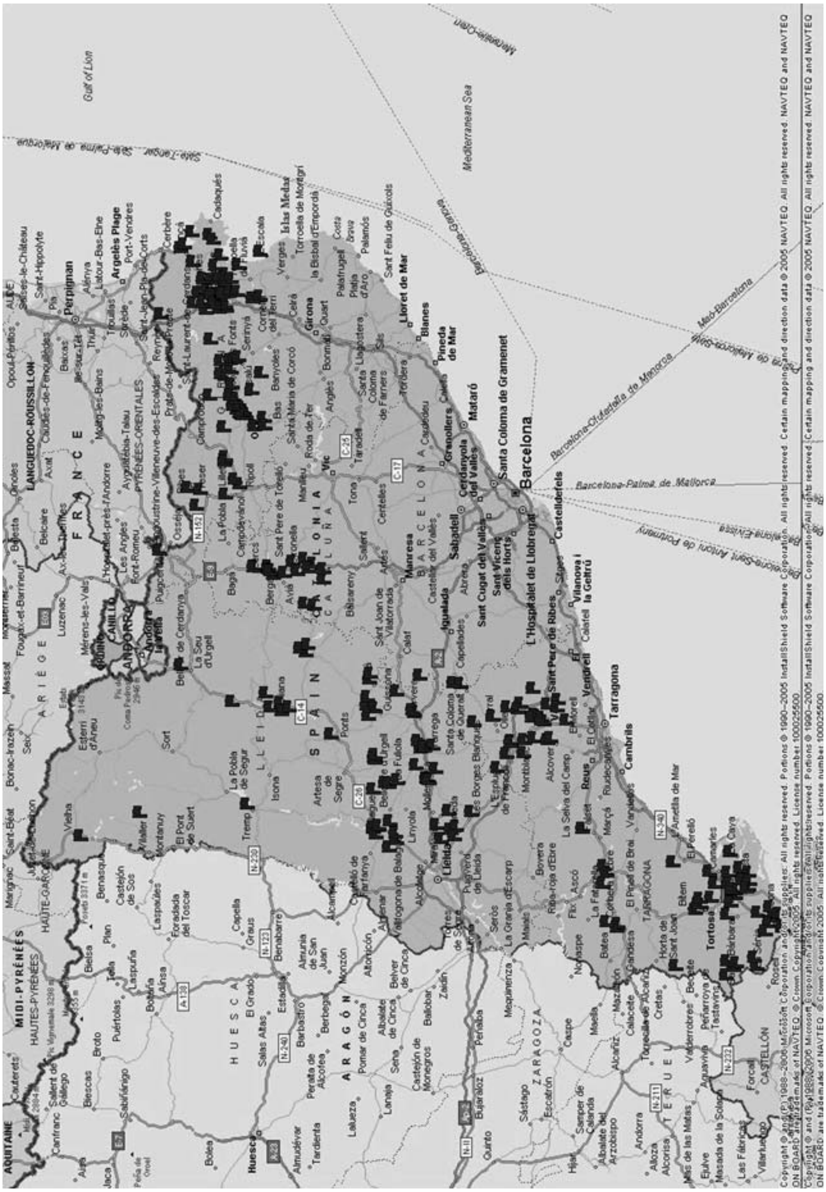

Fig. 14.5 Rural Catalonian HMTBMFs

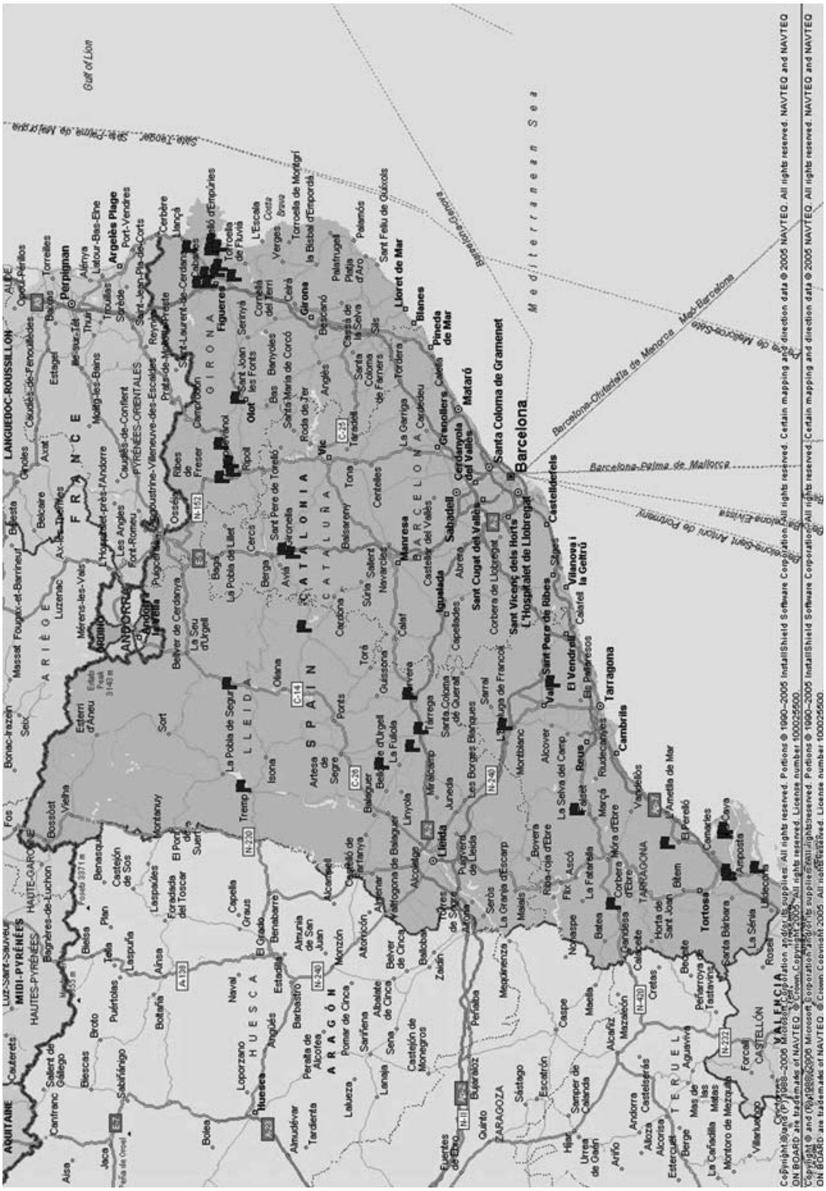

Fig. 14.6 New HMTBMFs in rural Catalonia

The towns of Figueres, Ripoll, and Castelló d'Empùries have multiple HMTBMF start-ups.

14.5 Results

From the SABI database, we found 34 new HMTBMFs created between 2003 and 2005 in Rural Catalonia. The founders or executive directors of these firms were contacted in order to carry out a structured interview aimed at determining the most influential motives behind their decision to establish their business in a rural community. Of the 34 new HMTBMFs, 10 no longer existed at the originally listed address, and another 11 businesses did not participate in the study. Leaders of the 13 remaining firms were personally interviewed, guided by a common questionnaire.

There was great variety amongst the 13 observed HMTBMFs. As shown in Table 14.4, the activities carried out by these firms range from chemical-based gardening products to elevator parts manufacturing. Although some of the businesses had links with traditional rural industry, others had an urban market focus.

The observed businesses are spread throughout the rural Catalan territory, although there is a tendency to be located in or near county capitals. We would not argue that any of the firms are located in remote areas. Most entrepreneurs were born and raised locally or were already in the area prior to starting their firm.

All but one of the observed HMTBMFs would be considered as small businesses at birth. Nevertheless, these 13 firms generated 152 new jobs at start, with an average of 11.69 workers each. More significantly, after less than 4 years these rural HMTBMFs have almost doubled the number of full-time employees to an average of 23.54 employees – a total of 306 full-time workers across all firms. This growth is unevenly distributed, with three firms not experiencing any employment growth and four others growing over 400%.

At start-up, only one of the observed HMTBMFs had a local market focus. The remaining 12 sold more than half of their goods outside the rural county where they are located. The biggest change is the number of firms developing international markets since creation. Where only one of the rural HMTBMFs had a predominant international orientation at birth, three had developed an international orientation at the time of the interview, and the remaining nine stated that a stable proportion of their goods were exported.

The entrepreneurs were asked to elaborate on the motives behind where they located their HMTBMFs. As part of the interview, they rated all the determinant factors in our model, as shown in Fig. 14.1, using a five-point Likert scale to show how the factors had influenced the business location. The overall average ratings, as well as the average ratings given to factors identified as influential by entrepreneurs, are shown in Tables 14.5 and 14.6. Behavioral factors dominated how location was chosen by those interviewed. The most important factor, identified by 10 of the 13 entrepreneurs, was the desire to live and/or establish their residence in the municipality

Table 14.4 Short descriptions of the entrepreneurs

Main activity	Municipality	Entrepreneur was born or raised locally	Entrepreneur's activity prior to business	Location of this prior activity	Number of employees at start-up	Current number of employees	% of sales local at start-up	% of current sales, local	% of sales, international at start-up	% of current sales, international
Producers of quality control machinery for the cork industry	Figueres	Yes	Working in same industry	Local	4	5 (+1)	10	10	0	50
Producers and importers of cultivation equipment	Figueres	Yes	Manager in same industry	Local	1	3 (+3)	2	2	14	14
Manipulation and bending equipment for steal industry	Palau de Sta. Eulàlia	Yes	Owned other business	Local	4	28 (+24)	0	2	0	15
Fiberglass producers for agricultural, automotive, and nautical industries	Siurana	Yes	Working in same industry	Local	2	7 (+5)	100	47,5	0	5
Designers and producers of packaging equipment	L'Atmetlla de Casserres	Yes	Working in other industry	Local	8	36 (+28)	0	0	35	50
Radio and Communicat-ions equipment	Deltebre	Yes	Working in other industry	Within the province	2	2 (=)	50	50	0	0
Elevator parts manufacturer	Falset	Yes	Working in same sector	Local	100	130 (+30)	20	20	10	20

(continued)

Table 14.4 (continued)

Main activity	Municipality	Entrepreneur was born or raised locally	Entrepreneur's activity prior to business	Location of this prior activity	Number of employees at start-up	Current number of employees	% of sales local at start-up	% of current sales, local	% of sales, international at start-up	% of current sales, international
Cable manufacturing for railways and metros	Deltebre	Yes	Working in other industry	Local	4	6 (+2)	0	0	0	0
Train door manufacturer	Amposta	Yes	Owned other business	Local	15	60 (+45)	0	0	0	0
Electric cable manufacturer	Ripoll	Yes	Working in other industry	Local	1	1 (=)	0	0	0	0
Producers of agricultural machinery	Anglesola	No	Manager in same industry	Within Catalonia	3	12 (+9)	0	0	0	30
Chemical-base gardening products	Tàrrega	Yes	Manager in same industry	Local	4	4 (=)	0	0	20	20
Designers and manufacterers of external cleaning installations for skyscrapers	Solsona	Yes	Owned other business	Local	4	12 (+8)	0	0	60	90
Mean					11.69	23.54	14.00	10.12	10.69	22.62

Table 14.5 Most important determinants of sampled HMTBMF's localization decision

	Average rating "when identified" as a determinant factor (0–5)	Average rating of determinant factors across entire sample (0–5)
Entrepreneur's residential desire	4.6	3.5
Land costs	4.6	2.8
Proximity to entrepreneur's residence	4.4	2.7
Born/raised locally	4.1	2.5

Table 14.6 Average rating of factors determining location decisions

	Average rating "when identified" as a determinant factor (0–5)	Average rating of determinant factors and approaches (0–5)
Neoclassical		1.0
Distance from county capital	4.0	0.3
Road infrastructure	4.0	0.9
Other infrastructures	4.0	0.3
Land costs	4.6	2.8
Local economics	3.5	0.5
Local specialization	4.7	1.1
Institutional		0.3
Incubator organization	4.0	0.6
Access to research inst.	0.0	0.0
Public incentives	2.0	0.2
Local trade shows	0.0	0.0
Local role models	3.3	0.8
Behavioral		1.6
Entrepreneur's residential desire	4.6	3.5
Worker's residential desire	5.0	1.5
Proximity to entrepreneur's residence	4.4	2.7
Housing accessibility	3.8	1.5
Born/raised locally	4.1	2.5
Local leisure possibilities	0.0	0.0
Local climate	4.0	0.3
Local business attitudes	4.0	0.9

where the business was established. Low land cost was also identified by 8 of the 13 entrepreneurs as a stimulus to locate the business in a rural community. The same numbers also indicated that an important motivation for choosing the area where they established the business was that they had either already lived in the area, or they had grown-up in the area.

Of the neoclassical variables included in the model, the main influence over the location choice of HMTBMFs came from "land cost advantages," mentioned by 8 of the 13 interviewed entrepreneurs, with an average rating of 4.6 out of 5 for those who identified this factor as influential. For the entire sample the average rating is 2.8. Another influential neoclassical variable, although it was only mentioned by three entrepreneurs, was the existence of a local specialization in the industry where

their firms are competing. The firms that named this factor as influential were the manufacturers of specialized machinery for the cork and agricultural industries, both situated in Figueres, and the producer of chemical-based gardening products situated in Tàrrega. These firms gave an average rating of 4.7 out of 5 to quantify the importance of this factor in their choice of location.

None of the institutional factors included were identified as being influential by the HMTBMFs. Contrary to Meyer (2003) none of the observed firms mentioned the possible access to research institutions as influential, even though these exist in almost all of the counties where the observed HMTBMFs are located. The presence of incubator organizations was mentioned by two entrepreneurs, with an average impact rating of 4. Local role models were also mentioned, but with an average impact of only 3.3. Overall, none of the institutional factors can be considered influential because all fall below 1 on the average rating of location-determining factors.

On the contrary, the behavioral factors included in the model have an important impact on the location decision of the observed rural HMTBMFs. The most frequently mentioned factor was the desire of the entrepreneur to live where the business was established. The average impact rating of this factor by the ten entrepreneurs who mentioned it was 4.6. Other popular influential behavioral factors included the proximity of the business location to the entrepreneur's existing residence (4.6) and the fact that the entrepreneur was born or had been raised locally (3.8), both mentioned by eight entrepreneurs. Another behavioral factor that received a very high impact rating by those who mentioned it as being influential was their workers' desire to reside in the area. Although this factor was only mentioned by four entrepreneurs, those who mentioned it gave it the highest possible rating, 5. Of the entrepreneurs who see their workers' desire to live in the rural locality as a very important factor that influenced the location of their HMTBMFs, two had prior business experience in the municipality and one was a spin-off from a local firm where the founder previously worked.

Proposition 3, which states that "the variables from the behavioral approach best explain the localization decisions of new HMTBMFs," is confirmed under the observed sample of recently created rural Catalonian HMTBMFs.

14.6 Conclusions and Implications

In this chapter, we analyzed recently created HMTBMFs established in rural areas. Following an exhaustive literature review, a list of the most frequently mentioned key determinants of the location decisions of technology-based firms was compiled and classified based on a methodology developed by Hayter (1997). Those variable were then divided into three theoretical groups: those falling under a neoclasical approach, those related to an institutional approach, and a third group following a behavioral approach. Based on this classification, propositions were formulated in order to test which approach offered the variables that, according to the owners of new HMTBMFs in rural Catalonia, influence their business location decision the

most. After analysing the location and geographic dispersion of HMTBMFs in Catalonia and the trends characterising the newly created firms amongst them, 13 new HMTBMFs out of a population of 34 such businesses[7] were interviewed about how they selected where the firm is located.

We find that the theoretical framework that offers the most influential variables for the sampled new rural Catalan HMTBMFs is the behavioural approach. Both "the desire to live in the community" and the fact that the entrepreneur already "lived in the area" influenced the rual location choice. Also influential, from the neoclasical approach, was the importance of low land costs. Institutional approach variables had little impact on the location choice decision for the sampled rural entrepreneurs.

These findings have important implications for both academics and policy makers. Contrary to much literature, this study indicates that the location decision of technology-based entrepreneurship in rural areas is not a fruit of calculative and rational economic thinking, nor is it apparently swayed by the potential benefits that may come from institutional spillovers or from public incentives. Rather, the conclusions coming from the sampled entrepreneurs point toward a decision-making process that is more emotional, revolving around the entrepreneurs' desire to establish residence or remain part of the rural community where they located their businesses. Some academics have tended to associate higher knowledge-based entrepreneurship with greater economic rationality and strategic thinking. What this paper has found through its qualitative analysis is that in the case of the interviewed rural Catalan HMTBMFs the search for a specific lifestyle and quality of life dominated the business location decision-making process.

This contrasts with the orientation that many policy makers have taken in order to help encourage greater value-added entrepreneurship in rural areas. According to our findings, the current institutional efforts attempting to stimulate technology-based entrepreneurship through incentives or infrastructural investments should be complemented by placing greater emphasis on giving rural areas amenities that improve living conditions and quality of life, thus making them more desirable places to live.

Comparative research is needed to determine whether the important behavioural motives behind the location decisions of new businesses represent a diferentiated decision-making process unique to rural technology firms, or whether this trend is reflected in urban high-tech entrepreneurship. Other types of knowledge-based entrepreneurship, such as knowledge-intensive service activities (KISA) should also be analyzed. Past studies point out the influence of life-style and behavioural factors upon the entrepreneurial decisions of rural businesses in Catalonia (Viladomiu et al. 2004); future research should now attempt to identify whether this is also the case for rural technology-based firms in other parts of the world.

[7] Of the 34 new HMTBMFs created in rural Catalonia over the period 2003 and 2005, ten no longer existed at the originally listed address due to closure because they had moved out of the community. In future research it would be interesting to analyze further those firms that have chosen to abandon their original rural location.

Appendix A Technology-based manufacturing firms classification

Type of firms	ISIC – Rev. 3	Type of firms	ISIC – Rev. 3
High-technology industries		Medium–low-technology industries	
Aircraft and spacecraft	352	Building and repairing of ships and boats	351
Pharmaceuticals	2423	Rubber and plastic products	25
Office, accounting, and computing machinery	30	Coke, refined petroleum products, and nuclear fuel	23
Radio, TV, and communications equipment	32	Other nonmetallic mineral products	26
Medical, precision, and optical instruments	33	Basic metals and fabricated metal products	27–28
Medium–high technology industries		Low-technology industries	
Electrical machinery and apparatus, n.e.c.	31	Manufacturing, n.e.c.: recycling	36–37
Motor vehicles, trailers, and semitrailers	34	Wood, pulp, paper, paper products, printing, and publishing	20–22
Chemicals excluding pharmaceuticals	24 excl. 2423	Food products, beverages, and tobacco	15–16
Road equipment and transport equipment, n.e.c.	352 + 359	Textiles, textile products, leather, and footwear	17–19
Machinery and equipment, n.e.c.	29		

References

Acs, Z.J. and D.B. Audretsch (1988) Innovation in large and small firmsFirms: An empirical analysis. *The American Economic Review* 78(4), 678–690.

Acs, Z.J. and A. Varga (2004) Entrepreneurship, agglomeration and technological change. *Paper presented at the First GEM Research Conference*, 1–3 April, Berlin.

Alonso, L.F. (1999) Modelos de crecimiento y cambios espaciales recientes en las ciudades españolas: Un panorama desde el fin de siglo. *Papeles de Economía Española* 80, 231–247.

Alonso, W. (1964) *Location*Location *and Land Use*. Cambridge, MA: Harvard University Press.

Arauzo, J.M. (2005) Determinants of industrial location: An application for Catalan municipalities. *Papers in Regional Science* 84(1), 105–120.

Arauzo, J.M. and M.C. ManjónManjón (2004) Firm size and geographical aggregation: An empirical appraisal in industrial locationLocation. *Small Business Economics* 22, 299–312.

Arauzo, J.M. and E. Viladecans (2006) Industrial locationLocation at the intra-metropolitan level: A negative binomial approach. *Estudios de Economía Española* 224, FEDEA.

Audretsch, D.B., E. Lehmann and S. Warning (2005) University spillovers and new firm location. *Research Policy*Policy 34, 1113–1122.

Autant-BernardAutant-Bernard, C., V. Mangematin and N. Massard (2006) Creation of biotech SMEs in France. *Small Business Economics* 26, 173–187.

Bade, F.J. and E.A. Nerlinger (2000) The spatial distribution of new technologyTechnology-based firmsFirms: Empirical results for West-Germany. *Papers in Regional Science* 79, 155–176.

Birley, S. (1985) The role of networksNetworks in the entrepreneurialEntrepreneurial process. *Journal of Business Venturing* 1, 107–117.
Boix, R. and J. Trullén (2007) Knowledge, networks of cities and growth in regional urban systems. *Papers in Regional Science* 86(4), 551–574.
Callejón, M. and M. Costa (1996) Geografía de la producción Incidencia de las externalidades en la localización de las actividades en España. *Información Comercial Española* 754, 39–49.
Capello, R. (2007) *Regional Economics*. New York: Routledge Advanced Texts in Economics and Finance.
Chapman, K. and D. Walker (1991) *Industrial Location*Location. *Principles and Policies*. Oxford: Basil Blackwell.
Christaller, W. (1933) *Central Places in Southern Germany*Germany. Translated by C.W. Baskin (1966). Englewood Cliffs, NJ: Prentice Hall.
Garcia Coll, A.G. and D.S. Sanchez Aguilera (2004) La población rural en Catalunya: Entre el declive y la revitalización. In *Nuevas dinámicas territoriales en el medio rural de Cataluña*. Barcelona:Ministerio de Ciencia y Tecnología (BSO2002-02528).
Costa, M.T., A. Segarra and E. Viladecans (2000) Business dynamics and territorial flexibility. *Paper presented at the 40th European Congress of the Regional Science Association*, Barcelona.
Costa, M.T., A. Segarra and E. Viladecans (2004) The locationLocation of new firmsFirms and the life cycle of industries. *Small Business Economics* 22, 265–281.
Cotorruelo, R. and A. Vázquez (1997) Nuevas pautas de localización de las empresas industriales en España. In A. Vázquez, G. Garofoli and J.P. Gilly (eds.), *Gran Empresa y Desarrollo Económico*. Madrid: Síntesis, 171–214.
Drucker, P. (1984) Our entrepreneurial economy. *Harvard Business Review* 62(1), 59–64.
Drucker, P.F. (1985) *Innovation and Entrepreneurship*. New York: Harper and Row.
Dubini, P. (1989) The influence of motivations and environment on business start-ups: Some hints for public policies. *Journal of Business Venturing* 4(1), 11–26.
Egeln, J., S. Gottschalk and C. Rammer (2004) Location decisions of spin-offs from public research institutions. *Industry and Innovation* 11(3), 207–223.
European Commission (1997) Rural developments. *CAP2000 Working Document*, V/1117/97, July.
Felsenstein, D. (1996) High technologyTechnology firmsFirms and metropolitan locational choice in Israel: A look at the determinants. *Geografiska Annaler Series B Human Geography* 78(1), 43–58.
Figueiredo, O., P. Guimarães and D. Woodward (2002) Home-field advantage: Location decision of Portuguese entrepreneurs. *Journal of Urban Economics* 52, 341–361.
Galbraith, C.S. (1985) High-technology location and development: The case of Orange County. *California Management Review* 28(1), 98–109.
Grimes, S. (2000) Rural areas in the information society: Diminishing distance or increasing learning capacity? *Journal of Rural Studies* 16(1), 13–21.
Grinstein, A. and A. Goldman (2006) Characterizing the technology firm: An exploratory study. *Research Policy* 35, 121–143.
Hayter, R. (1997) The dynamics of industrial location: The factory, the firm and the production system. New York: Wiley.
Holl, A. (2004) Manufacturing location and impacts of road transport infrastructure: Empirical evidence from Spain. *Regional Science and Urban Economics* 34, 341–363.
Hoover, E. (1948) *The Location of Economic Activity*. New York:McGraw-Hill.
Jacobs, J. (1969) *The Economy of Cities*. New York: Vintage Books.
Johnson, P. and D. Cathcart (1979) New manufacturing firmsFirms and regional development: Some evidence from the Northern region. *Regional Studies* 13, 269–280.
Kent, C.A. (1982) Entrepreneurship in economic development. In C.A. Kent, D.L. Sexton and K.H. Vesper (eds.), *Encyclopedia of Entrepreneurship.* Englewood Cliffs, NJ: Prentice Hall, Chap. 12, 237–256.
Kirchhoff, B.A. and B.D. Phillips (1988) The effect of firm formation and growth on job creation in the United States. *Journal of Business Venturing* 3, 261–272.

Kirchhoff, B.A. and B.D. Phillips (1992) Research applications of the small business data base of the U.S. small business administration. In D.L. Sexton and J.D. Kasarda (eds.), *The State of the Art of Entrepreneurship* Boston, MA: PWS-KENT, Chap. 10, 243–267.

Klepper, S. (1996) Entry, exitExit, growth and innovation over the product life cycle. *American Economic Review* 86, 562–583.

Koberg, C.S., N. Uhlenbruck and Y. Sarason (1996) Facilitators of organizational innovation: The role of life-cycle stage. *Journal of Business Venturing* 11, 133–149.

Krugman, P. (1981) Trade, accumulation, and uneven development. *Journal of Development Economics* 8, 149–161.

Krugman, P. (1991) *Geography and Trade*. Leuven: Leuven University Press.

Lafuente, E., Y. Vaillant and J. Rialp (2007) Regional differences in the influence of role-models: Comparing the entrepreneurial process of rural Catalonia. *Regional Studies* 41, 1–17.

LöschLösch, A. (1954) *The Economics of Location*. Translated by W.H. Woglom and W.F. Stolper. New Haven, CT: Yale University.

Malecki, E.J. and S.L. Bradbury (1992) R&D facilities and professional labour: Labor force dynamics in high technology. *Regional Studies* 26(2), 123–136.

Marshall, A. (1920) *Principles of Economics*. London:Macmillan.

Meyer, M. (2003) Academic entrepreneurs or entrepreneurial academics? Research-based ventures and public support mechanisms. *R&D Management* 33, 107–115.

Muth, R.F. (1969) *Cities and Housing*. Chicago: The University of Chicago Press.

Myrdal, D. (1957) *Economic Theory and Underdeveloped Regions*. London: Duckworth.

NCOE (2001) Embracing innovation: Entrepreneurship and American economic growth. *National Commission on Entrepreneurship White Paper*, 1–11.

North, D., D. Smallbone and I. Vickers (2001) Public support policy for innovative SME's. *Small Business Economics* 16, 303–317.

OECD (1996) Territorial indicators of employment focusing on rural development. Paris: OECD.

OECD (2003) Classification of manufacturing industries based on technology. Paris: OECD.

OECD (2006) The new rural paradigm: Policy and governance. *Working Paper on Territorial Policy in Rural Areas*. Paris: OECD.

OECD (2007) *Rural Policy Review: Mexico*. Paris: OECD.

Ouwersloot, H. and P. Rietveld (2000) The geography of R&D: Tobit analysis and a Bayesian approach to mapping R&D activities in the Netherlands. *Environment and Planning* 32, 1673–1688.

Pavitt, K., M. Robson and J. Townsend (1987) The size distribution of innovating firms in the UK: 1945–1983. *The Journal of Industrial Economics* 35(3), 297–316.

Phelps, N.A., R.J. Falon and C.L. Williams (2001) Small firms, borrowed size and the urban–rural shift. *Regional Studies* 35(7), 613–624.

Roper, S. and Love, J.H. (2006) Innovation and regional absorptive capacity: The labour market dimension. *Annals of Regional Science* 40(2), 437–447.

Rosell, J. and L. Viladomiu (2001) Empresariado y Políticas de Apoyo a las Empresas en una Zona Rural con Tradición Industrial. *Paper presented at the 73rd EAAE Seminar*, Zaragoza, Spain.

Rosell, J., Y. Vaillant and L. Viladomiu (2006) Apoyo a las Empresas y Empresarios en las zonas rurales de Catalunya. *Revista de Estudios Regionales* 77, 153–178.

Rubin, H.J. and I.S. Rubin (1995) *Qualitative Interviewing: The Art of Hearing Data*. California: Sage Publications.

Schmenner, R.W. (1987) *Making Business Location Decisions.* New York: Prentice Hall.

Sexton, D.L. (1986) Role of entrepreneurship in economic development. In R.D. Hisrich (ed.), *1996*, *Entrepreneurship, Intrapreneurship, and Venture Capital* Massachusetts: D.C. Heath and Company, Chap. 2, 27–39.

Smallbone, D., D. North, R. Baldock and I. Ekanem (2002) *Encouraging and supporting enterprise in rural areas*. Report to the Small Business Service. Centre for Enterprise and Economic Development Research, Middlesex University Business School, UK.

Smith, A. (1776/1952) An inquiry into the nature and causes of the wealth of nations. London: Encyclopedia Britannica.

Smith, S.M. and D.L. Barkley (1991) Local input linkages of rural high-technologyTechnology manufacturers. *Land Economics* 67(4), 472–483.

Storey, D.J. (1982) Impact on the local economy. In D.J. Storey (ed.), *Entrepreneurship and the New Firm*. London: Croom Helm, Chap. 9, 167–180.

Storey, D.J. (1988) The role of small and medium-sized enterprises in European job creation: Key issues for policy and research. In M. Giaoutzi, P. Nijkamp and D.J. Storey (eds.) *Small and Medium Size Enterprises and Regional Development*. London: Routledge, Chap. 8, 140–160.

Storey, D.J. (1994) Employment. In D.J. Storey (ed.) *Understanding the Small Business Sector.* London: Routledge, Chap. 6, 160–203.

Timmons, J. (1998) *America's Entrepreneurial Revolution: The Demise of Brontosaurus Capitalism*. Babson Park, MA: Babson College, F.W. Olin Graduate School of Business.

Trullen, J. (2001) L'economia de Barcelona: Cap a un nou model de desenvolupament. *Revista Situació Catalunya* 2, 26–38.

Vaillant, Y. (2006) *Explaining the Exceptional Entrepreneurial Performance of Rural Catalonia*. Doctoral Dissertation. Barcelona: Universitat de Barcelona.

Vaillant, Y. and E. Lafuente (2007) Do different institutional frameworks condition the influence of local fear of failure and entrepreneurial examples over entrepreneurial activity? *Entrepreneurship and Regional Development* 19(4), 313–338.

Veciana, J.M., Y. Vaillant E. Genesca and D. Urbano (2004) *GEM*GEM-*Catalunya: Informe Anual 2003*. Barcelona: Departament d'Economia de l'Empresa, Universitat Autónoma de Barcelona.

Viladomiu, L., Y. Vaillant and J. Rosell (2004) *Empresas y Empresarios en las comarcas rurales de Catalonia*. Fundación Universidad Empresa. Barcelona: Universitat Autónoma de Barcelona.

Weber, A. (1909) *Theory of the Location of Industries*. Translated by C.J. Friedrich (1929). Chicago: The University of Chicago Press.

Wennekers, S. and R. Thurik (1999) Linking entrepreneurship and economic growth. *Small Business Economics* 13(1), 27–56.

White, S.B. and P.D. Reynolds (1996) Government programs and high growth new firms. *Frontiers of Entrepreneurship Research*. Massachusetts: Babson College.

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