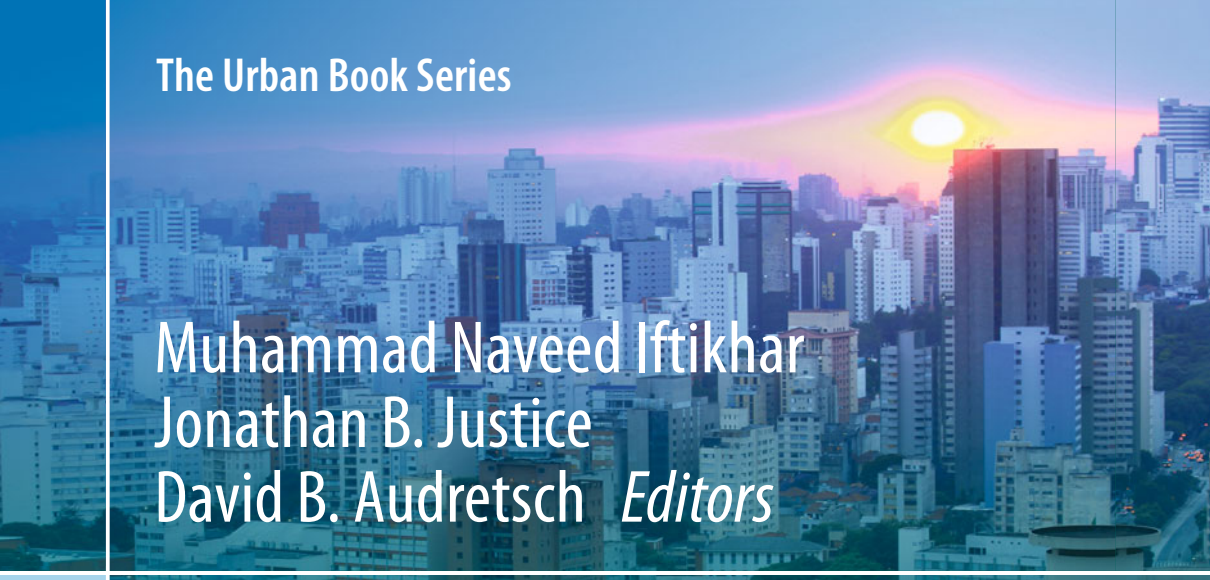

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Urban Studies and Entrepreneurship

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This volume is inspired by Benjaman Chinitz's challenge to economic orthodoxy of the time that presumed, *the supply schedule of entrepreneurship is identical at all locations*. The contributions in the present volume address head-on these questions at the intersection of urban studies, economic theory, and the practicalities of economic development and urban governance, in a genuinely global range of places and applications. We hope the volume will inform academics and policymakers to understand linkages between cities and entrepreneurship.

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Chapter 1
Introduction: Cities and Entrepreneurship

Muhammad Naveed Iftikhar, Jonathan B. Justice and David B. Audretsch

Abstract This chapter introduces the volume contributing to a stream of literature inspired by Chinitz's (Am Econ Rev 5(2):279–289, 1961) challenge to economic orthodoxy of the time that presumed, "*the supply schedule of entrepreneurship is identical at all locations*". The chapter explains various measurements of entrepreneurship, distinguishing traits of the entrepreneur and factors that spur or stifle innovation in urban settings. The agglomeration of talent, capital and firms is a catalyst for growth and gives rise to civilizations, revolutions and scientific developments. Considering the importance of cities to host these agglomerations, the chapter identifies key gaps for further research in the area of urban studies and entrepreneurship.

Keywords Urban policy · Job creation · Entrepreneurship · Local economic development · Urban economy · Urban research

1.1 Introduction

This volume contributes to a stream of literature inspired by Chinitz's (1961) challenge to economic orthodoxy of the time that presumed, "*the supply schedule of entrepreneurship is identical at all locations*". Chinitz continued, "*For a given size of area, the entrepreneurial supply curve is also a function of certain traditions and elements of the social structure which are heavily influenced by the character of the area's historic specializations*". Examining the U.S. regional economies of Pittsburgh, dominated by steel and related heavy industries, and New York City, with its

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diverse base of small-scale industries, Chinitz observed, "*My feeling is that you do not breed as many entrepreneurs per capita in families allied with steel as you do in families allied with apparel, using these two industries for illustrative purposes only*". The point was that the quality and quantity of entrepreneurial individuals, firms, and activities in a region are influenced to a significant degree by that region's entrepreneurial ecosystem: its particular mix of and linkages among cities, industrial organizations, and socioeconomic configurations.

Since that contribution, a considerable body of scholarship investigating the relationships of local economies and entrepreneurship has generated evidence to support Chinitz's "feeling", at least in general terms. Broadly, the quantity and quality of entrepreneurship appear to vary across places in ways attributable in significant part to local histories and the configurations of social and economic practices and infrastructure that constitute the entrepreneurial ecosystems which facilitate or hinder the process of transforming ideas into economic activity and thereby creating value. Cities are increasingly understood by researchers and policy makers as important contributors to the quality of entrepreneurial ecosystems. This confirmation, however, also raises a host of unanswered questions and unsolved research problems. What exactly is entrepreneurship, and how can it be measured? What are the most important variables of legal, economic, and social infrastructure that influence the supply of entrepreneurship, and what are their direct, indirect, and interactive effects on that supply? More precisely, what are the important varieties of entrepreneurship, how can they be observed and measured, and how does each variety emerge and operate under various conditions of infrastructure and opportunity?

Further, given the abiding importance of economic development and job creation to policy makers in economies at all income levels, how can knowledge of "entrepreneurship's causes and effects" be used to guide national as well as subnational policy making (Hart 2003; Qian 2018)? Which type(s) of entrepreneurship should a city prefer? What can cities do to stimulate desirable forms of entrepreneurship or should it be left as a spontaneous phenomenon? Why do policies that enhance entrepreneurship in some contexts seem instead to promote crony capitalism and rent-seeking in other settings? Should cities focus on cultivating their own entrepreneurs and entrepreneurial ventures or on luring them from other cities and countries? How can a collective action in a city promote (or hinder) entrepreneurship?

The contributions in the present volume address head-on these questions at the intersection of urban studies, economic theory, and the practicalities of economic development and urban governance, in a global range of places and applications. The chapters that follow this introduction articulate a wide variety of conceptual and operational measures of entrepreneurship and entrepreneurial actors and activities, and use a wide range of research strategies to develop theoretical and practical insights for scholars and policy makers. The book's contributions employ a variety of research designs and methods, ranging from abstract formal modeling to statistical/econometric analysis of large-scale secondary data to in-depth qualitative case studies. They examine the nature and policy implications of entrepreneurship and the linkages among entrepreneurship and local urban, social, and economic charac-

teristics in high-income as well as developing national economies on five continents: sub-Saharan Africa, eastern and western Asia, Europe, and North and South America.

The next sections of this chapter briefly summarize some major concepts and measures of entrepreneurship, including the identity of entrepreneurs themselves, with an emphasis on the definitions used by this book's contributors; and the factors found to enable or hinder entrepreneurship in urban settings. The chapter's concluding section provides an overview of the book's organization, its individual chapters, and the consequent policy implications and prescriptions.

1.2 Entrepreneurs and Entrepreneurship: Concepts and Measures

Consistent with its etymological roots in the French *entreprendre*, to begin or undertake—literally to take in hand—the language of entrepreneurs and entrepreneurship is used by English speakers to encompass a wide array of people, organizations, and behaviors that involve some combination of innovation, risk-taking, and decisive action. This might involve technical, economic, and/or social innovation; adaptation of previous innovations to new circumstances or applications; accepting material risks to property or reputation in pursuit of some valued objective; or simply taking on some nontrivial practical challenge or responsibility.

One classic formulation of entrepreneurship is Schumpeter's (1934) depiction of entrepreneurs as innovators whose novel economic insights and resulting actions to engage in genuinely innovative and unique economic activity contribute to non-incremental economic development, driven by periodic "swarms" of equilibrium-disturbing entrepreneurial activity. Such ventures can displace older firms and methods by means of novel combinations of productive factors and production goods. Entrepreneurs identify opportunities to create new products, markets, or innovative techniques to produce and sell goods and services that improve efficiency enough to disrupt the routine circular flow of economic activity and displace incumbent operators, often in "gales of creative destruction". In this extreme formulation, which Schumpeter argued is distinctive to and an inevitable normal feature of capitalism that promotes economic growth and mobility, entrepreneurship is defined by technological, organizational, and/or market *innovation* or transformation that leads to qualitative as well as quantitative economic development.

Yet it is also common to describe less cataclysmically innovative actors and activities as entrepreneurial. Entrepreneurship can also be defined simply as the "*process by which individuals—either on their own or within organizations—pursue opportunities*" (Stevenson and Jarillo 1990). Those who start or acquire existing small and medium-sized enterprises (SMEs) that operate within the confines of established markets and categories of goods and services are often termed entrepreneurs. While these forms of entrepreneurship may result in only incremental growth in employment and income, they still can contribute meaningfully to economic wellbeing at

local and national scales. Here, the conceptual kernel involves personal assumption of *risk* in the pursuit of rewards. The individual entrepreneur detects or creates business opportunities and tries to recruit potential backers (Reynolds 2005) while assuming responsibility for and shouldering the risks associated with the venture. Even individuals who become self-employed, sole proprietors of small enterprises more as a matter of necessity in the absence of employment opportunities might also be referred to as entrepreneurs in this sense, given that they assume analogous risks to invested capital and income. Such micro-enterprises might in fact be even more defined by personal assumption of risk and responsibility, since they rarely have external backers.

A form of entrepreneurship involving little or no personal financial risk but often a significant degree of innovation can be found at the corporate level, where large corporations are responsible for fostering new ideas and hence keeping the culture of innovation going (Álvaro Cuervo 2007). The resulting new products might then be launched under the same umbrella brand or spun off as offshoots of the original business. In other cases, the corporate inventor might start up an entirely new firm to exploit the innovation if the parent firm passes on the opportunity, coming full circle back to the idea of the individual entrepreneur as both innovator and risk taker.

Even in cases of new firms founded by individuals or small groups, especially those that are growing rapidly or are believed to have the potential to do so, risk and innovation may be separated. For example, the venture capital-backed startups that figure prominently in Florida, Adler, King, and Mellander's contribution to this volume have their origins in opportunity-driven innovations by proactive individuals or small teams but allocate most of the financial risk to their external investors.

Finally, creative and energetic work to identify and exploit opportunities or correct institutional failures in social or political rather than market contexts can also be termed entrepreneurship. *Policy entrepreneurs*, for example, spot contextual opportunities to advance their policy goals, or to overcome institutional obstacles that have heretofore prevented the pursuit of policy agendas (Kingdon 1984; Olson 1971). Public administration can also be the site of entrepreneurial work. Aaron Deslatte's contribution to this volume, for example, focuses on city managers as public entrepreneurs whose work displays the innovation, risk-taking, and proactivity that define entrepreneurship. Some recent popular and scholarly attention has also focused on the idea of *social entrepreneurship*, whether in the form of social enterprises that seek to do good as they do well or in the form of creative and energetic work to provide some type of collective good or service. An example of the latter are the social entrepreneurs who strive to make possible civic events on three continents, as reported in this volume by Krane, Ebdon, and Franklin. Risks for policy, public, and social entrepreneurs may be less prominently financial than they are for economic entrepreneurs but can often be greater in terms of risk to reputations, relationships, and other forms of social capital.

The diversity of conceptual applications of the language of entrepreneurship has a counterpart in the diversity of strategies used to define entrepreneurship in operational terms or to select adequate indicators or proxies of specific variants of the concept. One common approach recognizes entrepreneurship broadly as a process of

transforming ideas into economic activity. Thus, entrepreneurship is defined as new firm formation in many empirical studies, so it is generally measured as a quantity, using data on self-employment or the number of new firms (Delgado et al. 2010; Glaeser and Kerr 2009; but see also Bates 2003). Variations on this economic activity measurement strategy include counting firms that grow faster than a particular benchmark rate or achieve a benchmark size over a given period, counting new firms that survive for a given number of years, and simply counting SMEs regardless of age. Examples of this family of strategies in the present volume include the chapters by Stephens; Nakaizumi; Xie; and Choongo, Eijdenberg, Chabala, Lungu, and Taylor.

Measurement approaches that emphasize technological innovation as a requisite of entrepreneurship include counting firms in particular subsectors of an economy, defined by occupational or product-line classifications; firms that use particular types of (usually "high") technology; or patents (granted or applied for). In this volume, for example, Samad and Graff use patented inventions in three industries (agriculture, biotechnology, and environmental management) as indicators of innovation and entrepreneurship, and the chapter by Florida et al. uses venture capital investment as a proxy indicator of tech-firm startup activity.

1.3 Cities and Entrepreneurship: What Enables and/or Hinders Entrepreneurship?

1.3.1 City Size, Density, and Quality of Life

City size continues to hold importance in the research on cities and entrepreneurship. The work by Audretsch et al. (2015) in the case of European cities focuses on the impact of entrepreneurship on economic development. However, it reviews some important literature relating to city size and associated dynamics. As the market size of a city increases, it influences the overall environment of the city. Increased market size may bring positive changes the same way more technological advancements and knowledge sharing which encourage potential entrepreneurs to start a new business. This rise in shared knowledge and resources can transform a city into a specialized hub for certain products to compete globally (Krugman 1980). On the other hand, this spillover can have an adverse effect on the economy as well, causing increase in land prices, and wage rates, among others. For the market to become firm, the positives must outweigh the negatives (Sato 2012). Glaeser (2011) eloquently presents negative and positive spillovers as cities increase their size and density. He considers a capable city government important for minimizing negative externalities and maximizing positive externalities of city size and density. This setting is important for startups because exchange of creative ideas can only flow and go towards implementation when people feel comfortable in a location and are able to resolve problems and counter risks associated with doing business at a particular place (Florida 2002).

Urban density is a frequently used causal variable influencing entrepreneurship. The chapter by Florida et al. in this volume also finds evidence of correlation between size and density of metropolitan cities and venture capital based startups. We do understand that density can facilitate the flow of ideas, goods, and people that may contribute to entrepreneurship. However, we may still have little understanding whether density is a direct factor or mediating/moderating factor in promoting entrepreneurship. There are many cities in Europe which are famous for density but do not get much attention in terms of entrepreneurship. Napoli, Italy, for example, is one of the densest cities in the western world, but hardly known as a hotbed of entrepreneurial activity. Is it just an exception to the general rule? Or it may also be considered as an indication that the relationship is not monotonic? Or an indication that other variables, including history and institutional quality, are requisite?

Hasan's chapter in this book presents empirical evidence of the impact of the quality of urbanization and life in cities on female entrepreneurs in Pakistan. The results emphasize the importance of public transport and reduction in environmental pollution for female entrepreneurs. On a similar note, Bruzzi et al. in their contribution to this book present interesting results about the impact of social, cultural, and environmental configuration of cities on entrepreneurship through an extensive analysis of 60 cities in the EU. Richardson's chapter takes note of the contribution of Iranian-American entrepreneurs in the Silicon Valley. However, the question arises: why do so many immigrant entrepreneurs choose to operate and live in and around the Silicon Valley? Is it due to the quality of life or agglomeration of talent, capital, and firms? Part of this question will be discussed in the following subsection, but it does highlight the key unanswered question: why and how do entrepreneurs choose a certain place to live and operate?

Further research is needed on the spatial context for entrepreneurship, which in the future should be focused on different impacts of market size on entrepreneurship at different stages. Another aspect of it is insights into location effects, and what are the determining factors from an entrepreneur's view that make a business choose a certain location over others. The setup costs for varying market size is another research area to be focused upon.

1.3.2 Knowledge and Agglomeration

The role of a city as a platform for agglomeration of ideas, talents, goods, business services, firms, and human creativity is perhaps the most discussed area in the research on cities and entrepreneurship. After the rise of endogenous growth theory (Romer 1994) within economics, there is a renewed focus on the role of knowledge spillover as a key force and outcome of agglomeration. However, Bairoch (1991) documents the interplay of knowledge creation/diffusion in cities and industrial revolution in the 19th century. A rare aspect of agglomeration and cultural entrepreneurship has recently been presented by Mokyre (2016) which explains how agglomerations have been giving rise to civilizations, revolutions, and developments in science and knowl-

edge. The work of Jacobs (1969) has also inspired a great deal of urban scholarship exploring a city's role to produce new and diverse ideas and goods. Samad and Graff in this book provide evidence about the role of spatial proximity for patented inventions in select industries. Florida et al. state bluntly that "*cities have become the basic platforms for global innovation and economic growth, supplanting the corporation as the fundamental organizing unit of the contemporary economy*."

However, David Audretsch (one of the coauthors of this volume and chapter) and Zoltan Acs have extended the literature on knowledge spillover by focusing on its contribution towards new firms' creation as well. The Knowledge Spillover Theory of Entrepreneurship (KSTE) has inspired further research on the role of city agglomerations in fostering entrepreneurship. To do this, Research and Development (R&D) at the university level is imperative as it gives students a chance to explore opportunities for new products and services (Jaffe 1989), and opportunity-based entrepreneurship bears more fruits for economic advancement of a city than need-based entrepreneurship (Luthje and Franke 2002). Research indicates that graduates are more likely to indulge in opportunity-based entrepreneurship, as they are equipped with the skills needed to evolve new ideas into opportunities. However, graduates are also more in demand in the job market which highlights an interesting area of research in the field of urban studies and entrepreneurship.

According to Baumol (2004), while there is a need for basic education for all entrepreneurs, opportunity-based entrepreneurship is not entirely dependent on the level of education that has been acquired. He suggests that universities tend to give out information about the prevalent technologies and breakthroughs but do not necessarily prepare the students to think independently for out-of-the-box solutions. More students who have specialized knowledge end up in R&D departments of large conglomerates aiming to improve their existing products, rather than innovating new ones.

Most of the work on agglomeration and KSTE has focused on the developed world, especially northern America. The notion that developing countries may not have knowledge driven entrepreneurship needs further examination. Some of the chapters in this book and other research point towards the role of knowledge even in the informal economy. The channels and sources of knowledge may differ in developing countries, but that does not mean that firms are operating without sophisticated knowledge of products, markets, and production processes and technology. Further research on KSTE in developing economies and some qualitative insights into this phenomenon may enrich the research in this area. The presence of large firms may also have dual effects on entrepreneurship. KSTE posits that employees of large corporations often start their own firms based on skills and ideas learned from their employment experiences in large firms. On the other hand, the presence of large firms is also considered to suppress small-scale firms. There is also a need to examine which types of industrial structures and urban characteristics help small firms to become part of the value chain of large firms.

Operationalization of knowledge variables and capturing the knowledge spillover pose significant challenges to the research community. Research and development expenditures, education levels, patents, firm innovation and even the notions of Richard Florida's "creative class" frequently appear in literature on knowledge spillover. However the research on tacit knowledge, networks, and microlevel perspectives appear to be in infancy. Moreover, agglomeration might be more complicated than it seems at first: Is it population agglomeration, or the density of ideas that matters? Or is it both? Tech startups initially flourished in suburban settings, but perhaps they had a high density of ideas and talent. Thus, there is a need to examine different factors to be considered when operationalizing agglomeration as a causal variable in empirical and theoretical works.

1.3.3 City Governance, Collective Action, and Resilience

As pointed out earlier, city governance seems to hold key importance in maximizing benefits of density and agglomeration. The literature approaches this issue from different dimensions. This volume's contributors especially focus on this aspect, as some of the chapters explain the concepts of public entrepreneurialism (Deslatte), collaborative governance for civic capacity (Krane, Ebdon, and Franklin), adoption of green technologies (Mohazzam, Ali, and Ali), and China's local governance arrangements (Xie). A recent edited volume (Hughes et al. 2017) shares global evidence of how cities, through innovations in multilevel governance, are addressing challenges posed by climate change. There is a real need to explore further the role of such multilevel governance in fostering entrepreneurship in cities.

Gómez, Chawla, and Fransen in this book envision economies as a plurality of entrepreneurial ecosystems, whereby ecosystems combine institutions and actors across the formal–informal spectrum. This complexity of the entrepreneurial ecosystems in cities certainly merits in-depth examination, taking into consideration a city's capacity to undertake collective action for entrepreneurship. Deslatte's insights into entrepreneurialism for municipal executives in the Chicago metropolitan area suggests how such collaborative governance emerge: "*entrepreneurial strategic processes—problem framing, risk-taking and collaboration—likely occur concurrently in public organizations, as new problems arise, and old solutions move toward entropy*." On the other hand, Mohazzam, Ali, and Ali argue that the lack of urban action in Pakistan has led to the missed opportunity that green technology entrepreneurship could have brought. Krane, Ebdon, and Franklin's chapter provides some insights into the dynamics behind forging collaborative governance. Institutional design, inclusive processes and facilitative leadership all play important roles in such arrangements.

Katz and Bradley (2013) provide insights into the potential of metropolitan areas to forge apolitical coalitions and forums to address pressing local challenges. The potential of cities to utilize this form of governance is still little explored for promoting entrepreneurship. Moreover, the upsurge in entrepreneurship has also given

rise to more resilient cities. Resilience can be measured by a city's ability to bounce back or make a comeback after disruptions and shock, particularly to the economy (Foster 2007). Other factors that affect the resilience of a city include a skilled labor force, the presence of business associations, and knowledge spillovers (Pendall et al. 2010). The most important factor, however, is the responsiveness of the entrepreneurs (firms and individuals). How these businesses respond to any economic emergency or disruptions determines the resilience of any city. This is because for the economy to be able to survive, a certain degree of dynamism is essential. This dynamism is achieved when there are new businesses and entrepreneurs in the market, looking for innovative ways to respond to challenges (Simmie and Martin 2009). In traditional industrial areas, low levels of entrepreneurship can lead to weaker adaptation to challenges, leaving the city vulnerable to economic regression (Audretsch et al. 2015).

Both vertical and horizontal governance for entrepreneurship appear to present challenges for academics and practitioners alike. While importing urban policies to other cities, scholars may overlook the national context under which the cities operate. Thus, the challenge is to isolate the impact of urban policies on entrepreneurship. For example, city-level policy makers have little control over the financial system, especially credit markets. But how would luring equity players (such as venture capital firms) to cities work without well-functioning financial markets in the host countries? Some of the insights shared by Lerner (2015) about the pitfalls of entrepreneurship-supporting-actions by the public sector certainly need further examination. Lerner, for example, asserted that the "*public sector's pursuit of entrepreneurial growth is a massive casino where bets are made with few guarantees of good returns*". In such a context, policy experimentation and its outcomes will continue to hold significant consideration in the scholarship on cities and entrepreneurship.

1.3.4 Social Capital, Technology and Networks

Entrepreneurs have to test their ideas and need human resource to run their business successfully (Hansen 1995). To do this, they require a wide social network consisting of people and organizations which can help them access distribution channels, build support for their product and so on. These social networks are not fixed, and different people from this network can be utilized at different stages of the business (Burt 1992). The primary network for any entrepreneur includes immediate family members, close friends, and relatives (Rosenblatt et al. 1985). Contacts from the social network which help the entrepreneur in achieving success of any kind are termed as social capital (Burt 1992). This social capital is vital for reaching out to other people. It is also integral for positioning entrepreneurs in a way that the knowledge sharing pathway is shortened so as to get information faster and from more reliable sources (Granovetter 1973). The overlapping relationship structure of social capital is a basic unit for a successful entrepreneur, as it connects primary and secondary social capital

to each other, which then transforms into business opportunities or leads to acquiring more social capital.

Dividing the entrepreneurial experience into motivation, planning, and establishment, research argues that entrepreneurs utilize varying levels of social capital at each stage. At the motivation level, the entrepreneur is likely to only speak to close family and friends and share his/her ideas (Aldrich et al. 1990). However, at the planning stage, this group usually widens through networking, allowing an entrepreneur to utilize secondary relations who have access to knowledge that is valuable for setting up the business. At the establishment stage, the need for social capital decreases slightly while the actors involved also change. Time spent on socializing and networking also subsides at the establishment stage (Evans and McKee 2010).

The technology revolution of the twenty-first century and online platforms for networking have made access to social capital more efficient and easier than ever. These platforms provide access to the user base and present the business with unique ways to market their products (Kotler and Armstrong 2011). Social media and other tools of contemporary information and communication technology have also sped up the communication process so that feedback time for all business has been reduced drastically (Scott 1991). E-commerce is yet another dimension that has influenced cities. In the past, inhabitants of cities preferred to live in congested spaces to stay near the city center where services and products are easily available to them. One perspective is that this is changing now, as more businesses launch their online portals to be able to display their product to not only local, but also international, audiences (Mangold and Faulds 2009). "Urban technology," like Uber and online grocery delivery services, are arguably more about recreating suburban conveniences and private markets, more than they are about making cities more efficient.

However, Glaeser (2011) documents that technology is indeed making it easier for people to find and to stay in proximity to like-minded people and professional networks. This dual effect of technology has been gaining traction in research. The following chapter contributed by Florida et al. also provides evidence that technology and the sharing economy is indeed gluing people and firms together. But the advancement of smart cities and other technology-induced urban innovations are still rarely captured in the literature. Although there has been much research on the physical infrastructure needed to encourage entrepreneurship, many infrastructural needs have evolved over time and have been replaced by infrastructure necessities such as broadband connectivity. As technological advancements take place more regularly, the changing scenario presents an opportunity to delve more into research on rapidly changing infrastructure needs, and to examine the extent to which physical infrastructure matters as opposed to knowledge infrastructure. Again, in a rapidly transforming world, the skill sets needed for new jobs and businesses are also changing. Researchers can invest their time investigating which skills are needed, and how they are prioritized by the potential individual entrepreneur as well as organizations.

Entrepreneurship research has remained more focused on quantitative approaches which have limitations in capturing the serendipitous nature of entrepreneurial phenomena and the dynamics of social capital. There is still a lack of understanding about diverse approaches to study entrepreneurship. Behavioral insights and thick

description of relationships within and across actors and networks may also help to push the frontiers of knowledge in this area of research.

1.4 About the Book

Glaeser et al. (2010) rightly emphasized that entrepreneurship has attracted less attention generally in economics and especially in urban economics: "*modern urban economics has paid relatively little attention to entrepreneurs*." This book, hence, attempts to advance critical knowledge and practices for fostering a variety of entrepreneurship at the city level. Glaeser and Joshi-Ghani (2015) address a range of questions and issues surrounding cities and entrepreneurship. However, many dimensions of entrepreneurship such as social entrepreneurship, bureaucratic entrepreneurialism, and green entrepreneurship remain to be examined further in the urban context. This book incorporates literature and contributions from diverse perspectives and disciplines.

The book aims to connect scholarship and policy practice in two disciplines: Urban Studies and Entrepreneurship. The book has included contributions from developed, emerging, and developing countries. The following 14 chapters are organized into five main sections: I. Startups and Entrepreneurial Opportunities, II. Knowledge Spillover, III. Social and Bureaucratic Entrepreneurialism, IV. Demography and Informal Entrepreneurs, V. Perspectives from Emerging and Developing Economies. There are two distinct features of this book that readers can benefit from. The first is its inclusion of diverse international contributions and discussion on entrepreneurship in different parts of the world. The second is that it includes contributions that examine a range of topics in the field of urban studies and entrepreneurship. A brief description of the following chapters and consequent policy implications and prescriptions are presented below.

1.4.1 Part-I: Startups and Entrepreneurial Opportunities

Chapter 2 by Richard Florida, Patrick Adler, Karen King, and Charlotta Mellander is titled, The City as Startup Machine: The Urban Underpinnings of Modern Entrepreneurship. The chapter discusses the role and character of cities as startup machines. The main objective of this chapter is to lay out the connection between urbanism and entrepreneurship. Through a detailed analysis of venture capital-based startups and ranking of global metropolitan cities the authors argue that if startup activity was once clustered in suburban areas, it is now highly concentrated in large global cities and in denser urban neighborhoods. The chapter suggests cities need to be considered as centers of growth and innovation. The authors consider sprawl as a discouraging factor for entrepreneurial activity and recommend cities pursue density promoting policies associated with educational institutions in proximity.

Chapter 3 by Melodena Stephens explores the concept of cities as custodians for entrepreneurial opportunity (EO). The author argues that while EO is normally applied at the individual level, it is important also at a collective, urban level, and presents a conceptual model of pull factors. Stephens provides several policy recommendations. EO takes time, so policy interventions need to be sustained. Safety and security are vital for spurring creativity and business growth. Moreover, cities need to decide the type of new firms they want to encourage. It is important that cities ascertain their respective cultural niche. Cities need to provide supportive infrastructure and spaces for resources (business and personal), relationship development (networking), and quality of life (personal and business). These spaces should encourage creativity and be dynamic, reflecting work trends.

1.4.2 Part-II: Knowledge Spillover

Chapter 4 by Carolina Bruzzi, Enrico Ivaldi, Enrico Musso, and Lara Penco aims to answer the following research questions: (i) is the knowledge city environment a stimulus for entrepreneurship? (ii) which profiles of knowledge cities stimulate entrepreneurship the most? The research is carried out for a sample including 60 cities in the EU. The chapter is poised to ignite much needed dialogue on capturing knowledge and entrepreneurial activities in empirical studies. The authors suggest cities are operating in a competitive environment to attract investment, business, inhabitants, and tourists and improving citizens' satisfaction. Cities may use different tools: *strategic planning, marketing strategies, city branding, etc.*

Chapter 5 by Takuya Nakaizumi presents theoretical work on human capital and entrepreneurship. The author has developed an endogenous training choice model based on incomplete contract theory and derives the conditions for which either general or specific training is chosen by the employer. The chapter provides important theoretical insights for developing entrepreneurship in urban centers. The author recommends "*promoting knowledge spillovers in an industrial agglomeration of start-ups within an urban economy is important for developing entrepreneurship as well as for urban development*." Moreover, mobility between employers and employees should be encouraged. This is a rarely discussed topic in entrepreneurship scholarship.

Chapter 6 by Ghulam Samad and Gregory D. Graff draws on detailed data on inventor addresses from about 34,000 patented inventions as indicators of innovation and entrepreneurship in three closely related industries: (1) agriculture, (2) bioenergy, and (3) environmental management. The authors find that inventions have been spatially concentrated in about 30 major metropolitan clusters, and that spatial distribution has remained remarkably stable over time. The authors suggest that "*state and regional policymakers, economic development officials, agriculture officials, and strategic partners in industry need to consider collective action for fostering urban entrepreneurship for largely rural industries and creating linkages between them*."

1.4.3 Part-III: Social and Bureaucratic Entrepreneurialism

Chapter 7 by Dale Krane, Carol Ebdon, and Aimee L. Franklin elaborates the role of civic events in social entrepreneurship and the challenge of collaborative governance comparing the three countries Brazil, Korea, and the United States. The authors argue that civic events pose significant administrative, financial, logistical, and political challenges to the host community. The analysis of the three civic events is based on five factors common in models of collaborative governance. Two research questions guided the study. First, how robust are the five collaboration factors in explaining civic event processes and outcomes? Second, are there other factors in the operation of these civic events that are underdeveloped or omitted? The authors suggest "*cross-sectorial governance of civic events can be altered by political changes of the public partners as well as by changes in the type of private partners*."

Chapter 8 by Aaron Deslatte revisits the thesis posited by Teske and Schneider (1994) which states that public entrepreneurs emerge to "help propel dynamic policy change in their community," and applies it in a contemporary urban governance context. The chapter's goal is to understand better how public organizations cultivate and utilize an entrepreneurial orientation for value creation, and to articulate a more general application of these entrepreneurial activities. To do so, this chapter examines data from in-depth, semi-structured interviews with city managers in 20 local governments located in the Chicago, Illinois metropolitan area. The findings of the chapter suggest that "*internal and external organizational environments, institutions, and structure affect how city managers frame and engage in entrepreneurial activity (innovation, risk-taking, and proactivity) . . . . Cultivating public entrepreneurialism can help managers, in overly constrained environments, begin to think about ways to transform their organizations*."

1.4.4 Part IV: Demography and Informal Entrepreneurship

Chapter 9 by Syed M. Hasan attempts to determine if the social norms and economic opportunities prevalent in the urban regions of Pakistan are conducive to the growth of female entrepreneurship. The chapter finds that urban centers ease out the constraints faced by female entrepreneurs. Despite the extremely limited economic opportunities in rural areas, rural women still face many hurdles in their migration decisions. The author suggests that a minimum of 10 years of education must be imparted to women in order to promote female entrepreneurship. The chapter also recommends improving public transport and reducing environmental pollution in cities in order to promote female entrepreneurship.

Chapter 10 by Georgina M. Gomez, Suthida Chawla, and Jan Eransen addresses the question of how ambitious entrepreneurs find the support to further innovation in entrepreneurial ecosystems characterized by pervasive informality. The authors contribute an analytical framework that accommodates the diversity of entrepreneurs

as they deal with and maintain varying levels of formality and informality in infinite combinations that are compatible and conducive to business growth. The chapter suggests informality in some aspects need not hinder business growth. Moreover, "*informality is not an impediment, and processes of formalization based on a dualistic approach may hamper instead of foster local economic development in cities*".

Chapter 11 by Kathrine Richardson has attempted to shed light on an elusive, yet important, group of entrepreneurial Americans, namely highly skilled Iranian Americans. Drawing from 20 semi-structured interviews as a primary methodology, the study attempts to uncover the various types of highly skilled Iranian Americans and their entrepreneurial and/or professional contributions to Silicon Valley through two lenses. The first focuses on elements of self-motivation; the second includes a better understanding of regional conditions that may have supported such success. The study finds "*Iranian Americas have made serious and important contributions to the growth and success of what is known as Silicon Valley and the great San Francisco Bay area*". This chapter contributes to an important strand of scholarship that deals with the immigrant entrepreneurs in the US.

1.4.5 Part-V: Perspectives from Emerging and Developing Economies

Chapter 12 by Sardar Mohazzam, Ayesha Ali, and Saleem H. Ali assesses the effectiveness of macro factors such as institutions, policies and regulations, and micro factors such as access to finance, inputs, and infrastructure, in shaping Pakistan's private sector decisions about investing in renewable and green technologies for providing energy. The authors propose "*the importance of integrated planning coupled with decentralization of policy implementation to the local city or district level, a stable policy and regulatory framework that would mitigate investor risk. We also emphasize that private sector entrepreneurship will thrive with the provision of enabling goods such as smart infrastructure, financing, and addressing gaps in the research and development ecosystem*".

Chapter 13 by Progress Choongo, Emiel L. Eijdenberg, Mwansa Chabala, John Lungu, and Thomas K. Taylor discusses the sociopolitical factors that have shaped the entrepreneurial landscape of Zambia, and the status quo of entrepreneurial activities in four main urban and large cities in the country. The chapter provides an empirical showcase of factors influencing the location decision of entrepreneurs in one of the urban cities, Kitwe. The authors find "*historical events in the urban, institutional environment, deliberate, personal choices for establishing firms in certain urban locations, primarily driven by the attitude towards avoiding tax, perceived levels of institutional corruption, size of the informal business activities, and the overall satisfaction and comfort of the entrepreneur in having the business in the residential areas where they reside*".

Chapter 14 by Liou Xie reviews and summarizes the driving forces of urban entrepreneurship in China in the post-reform era. The chapter also informs about the future trends of entrepreneurship of China as shaped by some recent shifts in both domestic and global circumstances. The chapter describes how state-led financial support and interventions, and state-owned enterprises (SOEs) have propelled entrepreneurial momentum. The question arises, can other developing countries afford and are they capable enough to follow the same path?

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Part I
Startups and Entrepreneurial Opportunities

Chapter 2
The City as Startup Machine: The Urban Underpinnings of Modern Entrepreneurship

Richard Florida, Patrick Adler, Karen King and Charlotta Mellander

Abstract This chapter lays out the connection between urbanism and entrepreneurship. For decades, it was thought that startup activity tended to cluster in suburban office parks or "nerdistans" like those of California's Silicon Valley. We argue that tech startups are increasingly clustered in large global cities and metro areas and in denser urban neighborhoods or districts within those cities. In effect, the city stands as the organizing unit platform for entrepreneurial activity, bringing together the talent, knowledge, capital, and other assets required for it to occur. To advance this argument, the chapter marries the literatures on entrepreneurship going back to the seminal contributions of Joseph Schumpeter to the theories of urban clustering and dynamic cities associated with Jane Jacobs, Alfred Marshall, and their disciples. It then arrays a variety of empirical evidence on the location of high-tech startup activity to make this case, including data on the concentration of venture capital investment in high-tech startups in large global cities and in dense urban neighborhoods within those large cities. It also discusses the rise of a new segment of high-technology industry, urban tech, which spans new sectors like ride hailing, co-living, co-working, real estate technology, construction technology, and smart city technology, which has made the city not just the platform for but the object of entrepreneurial startup activity.

Keywords Entrepreneurship · Startups · Venture capital · Cities · Urban

Florida and Adler contributed to conceptualization and composition; King and Mellander contributed to data analysis.

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2.1 Introduction

"For all its power, Silicon Valley has a great weakness," the venture capitalist Paul Graham wrote back in 2006. "Silicon Valley proper is soul-crushing suburban sprawl. It has fabulous weather, which makes it significantly better than the soul-crushing sprawl of most other American cities. But a competitor that managed to avoid sprawl would have real leverage. All a city needs is to be the kind of place the next traitorous eight look at and say 'I want to stay here,' and that would be enough to get the chain reaction started." (Graham 2006).

A dozen years later it has. After decades of being organized in office parks and suburban "nerdistans" of the Silicon Valley entrepreneurship has returned to cities. The central organizing thesis of this chapter is as simple as it is basic. The city has emerged, or more accurately put, it has reemerged as the central organizing unit or platform for entrepreneurial activity. Our aim is to put place and space front and center in the process entrepreneurship, and to put cities at the focal point of that effort.

In advancing this argument, we draw from and build upon the original theory of the city as the entrepreneurial platform originally advanced by Jacobs (1969, 1984). Jacobs first suggested that cities function to bring together and organize the key inputs required for the processes of innovation—a diverse array of talent and human skill; a wide range of firms that take on varied roles as customers, suppliers, and end-users; a diverse knowledge and set of knowledge institutions and other key inputs. The Nobel-prize winning economist Lucas (1988) later noted that Jacobs' insights into the human capital externalities that drive from place-based clustering provide fundamental insight into the basic mechanisms of innovation and economic growth clustered and concentrated in space and organized by spatially delimited and embedded systems of skill, networks, and institutions. This rest of this chapter proceeds as follows: we begin by reviewing the relevant literatures on entrepreneurship and its connection to cities. We then turn to empirical evidence of the connection between entrepreneurship and cities. The third section uses data on the geography of global venture capital investment in startups to show the clustering of entrepreneurial startup activity in global cities. The fourth section looks at the geography of venture capital backed startups in dense urban neighborhoods within these large cities. The fifth examines the rise of the city not just as the place that startups are propagated and clustered, but as the focal unit of the innovation process. It focusses on the rise of so-called "urban-tech" spanning ride hailing, co-living and co-working, construction technology and real estate technology as a major sector for startup activity. The concluding section highlights our key takeaways on the connection between entrepreneurship and cities.

2.2 Conceptualizing Entrepreneurship and Cities

Marx (orig. 1867, 2012) and Schumpeter (1934a, b, 1954) provide the original spur to the theory of entrepreneurship. While Marx did not consider entrepreneurship per se, he saw capitalism as a dynamic and highly innovative mode of production driven by the constant quest for capital accumulation. In *The Grundrisse* (orig. 1861, 1993), he noted the role of science and knowledge as direct forces of production.

Schumpeter's early work (1934a, b) built upon and attempted revise Marx by considering the role of entrepreneurs and entrepreneurship in transforming capitalism and enabling it to overcome its own tendency toward stagnation. Where Marx saw class struggle as the means of resetting economic systems, Schumpeter focused on the role of entrepreneurs in setting in motion the gales of creative destruction that reset industries and the economy writ large. For him, entrepreneurs are motivated by more than just profit, but by a desire for independence, distinction, and accomplishment. The entrepreneur does not take as given production technology but instead seeks to bend it to his or her favor by inventing products and organizational forms that simply do the same work better. The entrepreneur's partner in this innovative enterprise is a new kind of financier who underwrites these entrepreneurial endeavors.

An extensive literature on entrepreneurship has evolved in light of Schumpeter's seminal contribution. In the main, these theories see firms as the main agents of entrepreneurial activity. Firms are at the center of Solow's (1956) theory of technological change and economic growth. Griliches (1957) and Schmookler (1966) also empirically link firm inventiveness to growth. Arrow (1971) and Nelson (1996) advanced the basic theory of how firms undertake to internalize R&D. Aghion and Howitt (1992) and Grossman and Helpman (1993) model growth as an outcome of firm innovations. Klein (1977), Klepper (1996) and Vernon (1966) link fluctuation in the growth rate to firm and industry innovation cycles. Nelson and Winter (1982) describe firms as dominant actors in the evolutionary processes of innovation and economic growth imagining firms as the key technological actors. Similarly, Levinthal and March (1993) and Cohen and Levinthal (1990) show that the ability of a firm to innovate depends on its routines and prior level of knowledge. Others show that firms acquire new capabilities by recombining current assets (Kogut and Zander 1992).

There is a long tradition in economics, dating back to Marshall (1890) that suggests that innovative and entrepreneurial activity tends to cluster geographically. Marshall's canonical studies of Midland industrial districts were among the first to suggest that firms can do better by locating near their competitors (see Belussi and Caldari 2008 for an intellectual history). A century of research, neatly summarized by Duranton and Puga (2004), formalizes his initial intuition that there are three types of benefits to the localization of activity: greater sharing of inputs, better matching of firms to inputs, and greater knowledge spillovers.

Jacobs (1969) was the first to argue that cities are the nexus of entrepreneurial activity which she distinguished from growth. In an interview she gave later in her life, she summarized her contribution this way:

> If I were to be remembered as a really important thinker of the century, the most important thing I've contributed is, 'What makes economic expansion happen?' This is something that has puzzled people always. I think I've figured out what it is, and expansion and development are two different things. Development is differentiation—new differentiation of what already existed. Practically every new thing that happens is a differentiation of a previous thing. Just about everything—from a new shoe sole to changes in legal codes—all of those things are differentiations. Expansion is an actual growth in size or volume of activity. That is a different thing (7) (Stiegerwald 2001).

More formal work inspired by Jacobs identifies how the city has come to be a platform for making new and different things. The geographic clustering of innovative and entrepreneurial activities are premised on the ability for knowledge to spillover between and among firms. Knowledge is not fully excludable and is subject to increasing returns in the aggregate (Lucas 1988; Romer 1990). Knowledge also has a tacit dimension, so that only the most codified knowledge can be instantaneously transmitted across distance without incurring significant transactions costs. In this environment, clustering is required to mobilize this knowledge between and among firms.

Both Jacobs and Marshall thought of innovation and entrepreneurship occurring at a much smaller, fine-grained scale of the district or neighborhood level. Ellison and Glaeser (1997) note that the tendency of firms and networks to bunch themselves within urban regions may lead some observers to exaggerate the benefits of regional agglomeration. Rosenthal and Strange (2008) show that human capital spillovers tend to decay after just five miles. High-tech sectors like software tend to exhibit even greater sensitivity to such clustering (Rosenthal and Strange 2004). Significant information spillovers among advertising agencies in New York appear to be limited to roughly a kilometer (Arzaghi and Henderson 2008). The San Francisco Bay Area technology complex has been found to be made up of several distinctive technology spillover zones which only somewhat overlap (Kerr and Kominers 2015). Guzman and Stern (2015) find high-quality entrepreneurial activity to be highly clustered and increasingly concentrated in urban districts in San Francisco and Boston, two areas with among the highest innovation and entrepreneurial activity. Experimental research finds clear evidence that productive collaboration is much more fruitful when participants are within 30 m of one another (see Olson and Olson 2003).

Our central argument developed in light of this theory is that cities are analytically central to modern innovation. We suggest that cities reflect and shape entrepreneurial activity at two key scales. At a more macro scale, entrepreneurial startup activity would be increasingly based in a small roster of large global cities. But it is further concentrated by distinct neighborhood-level micro within those large metros in the kinds of districts that Alfred Marshall might recognize. The next few sections present empirical evidence in support of these claims.

2.3 The Role of Large Cities in Entrepreneurial Startup Activity

Recall the quote by the venture capitalist, Paul Graham that opened this chapter. For decades, high-tech startup activity was organized in lower density suburban office parks like those of Silicon Valley or the Route 128 beltway outside of Boston. Today, the preponderance of high-tech startup activity occurs in large global cities or metro areas. To get at this, we use data on the location of venture capital from Florida and Hathaway (2018) which captures venture capital at the level of each deal, and has been re-coded at the metropolitan (i.e., CBSA for American regions).

Table 2.1 shows the ten leading global cities for venture capital investment in startup activity, their level of investment, share of global investment, and population size. Just the six leading global cities account for more than half of all global investment in venture capital backed startups. We see a clear bias in the geography of venture capital toward large urban regions. Four of the ten leading global metros have populations in excess of 20 million people and three more have populations of between 10 and 15 million. The remaining three are cities of between 7 and 8 million people.

Table 2.2 shows the results of a correlation analysis of the factors associated with venture capital investment across US metros based on an analysis by Florida and Mellander (2016). Venture capital investment in startups is positively and significantly associated with both population size (0.607) and density (0.522). The only factor more closely associated with venture capital backed startups than population size is

Table 2.1 Venture capital investment by global metro

Rank	Metro	Venture capital investment[a]	Share of venture capital investment (%)	Population[b]
1	San Francisco Bay Area	$27.3	16.0	7.8
2	Beijing	$24.3	14.2	21.3
3	New York	$11.2	6.6	21.6
4	San Jose	$8.3	4.9	7.8
5	Boston	$8.2	4.8	7.3
6	Shanghai	$7.9	4.7	24.1
7	Los Angeles	$5.8	3.4	15.6
8	London	$5.2	3.1	14.0
9	Hangzhou	$3.8	2.2	21.9
10	Bangalore	$3.5	2.1	10.9

Note Venture capital investment is an annual average for 2015–2017
[a]Billions of U.S. dollars
[b]Millions

Table 2.2 Factors associated with venture capital investment across US metros

Variable	Correlation coefficient[a]
High-tech industry concentration (log)	0.695
Population (log)	0.607
Density (log of population-weighted density)	0.552
Wages	0.601
Innovation (patents per capita)	0.429
Car commuters	−0.453

[a]All correlation coefficients are significant at the 0.01 level

high-tech industry concentration which forms the base demand for venture capital investment. And the only other factor more closely associated than density is wages. Population size and density are more closely associated with venture capital innovation than the level of innovation. The share of workers who commute by car—an indicator of sprawl—is negatively associated with venture capital investment.

2.4 The Clustering of Entrepreneurial Activity in Urban Neighborhoods

We also compare the locations of venture capital investment to two measures of urbanity—household density and commute to work. While these measures are complementary, we use both to measure the level of urbanity. Urbanity is measured categorically as urban, suburban, or rural with household density. We classify zip codes using household density based on a methodology devised by Kolko (2015) which classifies urban areas as those with 2,213.2 households per square mile; suburban areas have between 101.6 and 2,213.2 households per square mile and rural areas have less than 101.6 households per square mile.

Entrepreneurial startup activity further clusters in distinct neighborhoods or districts within global cities. Using data from Florida and King (2016), we chart the location of venture capital backed startups in three large metro areas: the San Francisco Bay Area, Boston-Cambridge and Greater New York. The data track startup activity by zip code. Across the United States, the majority of venture capital investment and venture capital backed startup activity takes place in urban areas with urban zip codes accounting for 54% of venture capital investment versus 45% going to suburban zip codes.

But these shares are even higher in leading cities for startup activity and venture capital investment. In the Bay Area, which spans both greater San Francisco and Silicon Valley, more than 60% (63.3%) of venture capital investment is located in urban zip codes compared to 36.3% in suburban areas. Of the top 10 zip codes,

Table 2.3 Top 10 neighborhoods for venture capital investment in the San Francisco Bay Area

Zip code	Neighborhood	Venture capital investment[a]	Urban versus suburban	Density[b]
94103	South of Market/Mission District	$1,063	Urban	9,659
94105	Rincon Hill	$1,004	Urban	9,718
94301	Palo Alto	$998	Urban	3,194
94107	Potrero Hill/Dogpatch/South Beach	$885	Urban	7,665
94080	South San Francisco	$501	Suburban	2,049
94104	Financial District	$481	Urban	2,654
94025	Menlo Park	$430	Suburban	1,309
94043	Mountain View	$416	Suburban	1,158
94041	Old Mountain View	$392	Urban	3,899
94063	Redwood City	$378	Urban	1,281

[a]Millions of U.S. dollars
[b]Households per square mile

seven are urban, while just three are suburban (Table 2.3). Three of the top ten have densities greater than 5,000 households per square mile. The two leading neighborhoods—South of Market and Rincon Hill—each of which attracts more than a billion dollars in venture capital investment have densities of almost 10,000 households per square mile. The third neighborhood, also urban, attracted close to a billion dollars of venture capital investment.

Turning to the Boston metro area, more than half (54%) of all investment is located in urban zip codes compared to 46% in suburban neighborhoods. Among startups receiving venture capital investment 61.0% are located in urban zip codes compared to 39.0% in the suburbs. Of the top 10 neighborhoods, seven are located in urban areas while three are located in suburban locations (Table 2.4). These urban neighborhoods are located in downtown Boston or in Cambridge, near MIT and Harvard. Four of the top 10 neighborhoods have densities that exceed 5,000 households per square mile. The neighborhood of Back Bay had the highest density among the top 10 we over 17,000 households per square mile with either highest amount of venture capital investment. The suburban neighborhood of Waltham had the largest venture capital investment in Boston-Cambridge with close to half a billion dollars. The university neighborhood of Cambridge/MIT had the second highest among of venture capital investment at $377 million and the second highest density among the top ten at 9,331 households per density.

The urban share is even greater in the Greater New York where 83% of investment dollars and 84% of startup companies are located in urban areas. All of the top ten venture capital neighborhoods in Greater New York are located in Lower Manhattan

Table 2.4 Top 10 neighborhoods for venture capital investment in the Boston-Cambridge metro

Zip code	Neighborhood	Venture capital investment[a]	Urban versus suburban	Density[b]
2451	Waltham	$484	Suburban	1,359
2139	Cambridge/MIT	$377	Urban	9,331
2142	MIT	$320	Urban	5,300
2421	Lexington	$149	Suburban	657
2210	Seaport District	$143	Urban	1,231
2472	Watertown	$126	Urban	3,658
1730	Bedford	$125	Suburban	375
2116	Back Bay	$108	Urban	17,502
2140	North Cambridge	$95	Urban	7,139
2453	Brandeis/Waltham	$94	Urban	3,251

[a]Millions of U.S. dollars
[b]Households per square mile

Table 2.5 Top 10 neighborhoods for venture capital investment greater New York

Zip code	Neighborhood	Venture capital investment[a]	Urban versus suburban	Density[b]
10012	SOHO/NYU	$310	Urban	41,294
10013	Tribeca/Houston Square	$267	Urban	21,913
10010	Gramercy Park	$261	Urban	42,343
10001	Chelsea	$244	Urban	17,763
10011	Chelsea	$198	Urban	46,040
10016	Kips Bay/Murray Hill	$197	Urban	60,476
10014	West Village	$194	Urban	34,780
10036	Hell's Kitchen/Theatre District	$178	Urban	34,273
10003	Gramercy Park/East Village	$167	Urban	49,582
10018	Garment District	$133	Urban	9,519

[a]Millions of U.S. dollars
[b]Households per square mile

which is one of the densest areas in the metro and the United States (Table 2.5). With the exception of the Garment District, the other nine neighborhoods have densities of greater than 10,000 households per square mile and seven of them have densities greater than 30,000 households per square mile. SOHO/NYU neighborhood had the largest amount of venture capital investment followed by the Tribeca/Houston Square neighborhood with $267 million. Among the top ten venture capital neighborhoods, the Kips Bay/Murray Hill neighborhood had the highest density at 60,476 households per square mile.

2.5 The Rise of Urban-Tech

But cities and urban neighborhoods are not only where startup activity is propagated and clusters, they are the subject and object of such entrepreneurial activity. When we think of entrepreneurial startup activity, we usually think of high-tech industries like software, biotech, social media, or artificial intelligence, but urban tech—comprises of fields like ride hailing, co-living and co-working, construction technology and real estate technology—has emerged as massive new sector of entrepreneurial startups.

Indeed, urban-tech startups attracted more than $75 billion on venture capital investment over the 3-year period from 2016 to 2018, representing roughly 17% of all global venture-capital investment (Table 2.6). In the 3-year period, urban-tech investment more than doubled—as its share of global venture investment surged from 13 to 22%. Urban tech may well be the largest sector for venture capital investment, attracting considerably more funding than pharmaceuticals and biotech ($16 billion in 2017) or artificial intelligence ($12 billion in 2017). The largest sector of urban tech is mobile tech, which includes behemoths like Uber, Lyft, and Didi Chuxing, and has generated more than $40 billion in venture investment between 2016 and 2018—more than 60% of all urban-tech investment.

Table 2.7 shows the ten leading global cities for urban-tech investment. Again, large global cities predominate. Four of the top ten have populations of more than 20 million; three more have populations between 10 and 15 million; and the three others have populations between 5.9 and 6.5 million people.

The rise of urban tech reflects the growing role of cities and urbanism in the global economy. As the previous analysis suggests cities have become the basic platforms for global innovation and economic growth, supplanting the corporation as the fundamental organizing unit of the contemporary economy. Startups agglomerate among and within very large metropolitan areas due to the agglomerative benefits that come with such clustering.

All the same cities remain terribly inefficient, in the sense that congestion is not fully priced (and won't be for political reasons), and urban labor is not fully specialized. As urbanization continues apace in the high-density areas of the world's largest and wealthiest cities, a new sector has emerged to solve problems that attend this problem. Urban tech as a sector is devoted to solving the congestion problems that attend urbanization and agglomeration, and its promise lies in being able to make the very cities that host entrepreneurialism and innovation, better able to cope with

Table 2.6 Investment in urban technology by year

Year	Venture capital investment[a]	Share of venture capital investment (%)
2018	$27.2	20.9
2017	$44.1	41.6
2016	$18.8	37.5

[a]Billions of U.S. dollars

Table 2.7 Top ten global metros for urban-tech investment

Rank	Metro	Venture capital investment[a]	Share of venture capital investment (%)	Population[b]
1	San Francisco	$23.1	30.1	6.5
2	Beijing	$19.9	25.9	21.2
3	New York	$7.7	10.1	21.6
4	Shanghai	$5.2	6.8	24.1
5	Singapore	$4.5	5.9	5.9
6	Bangalore	$3.1	4.0	10.9
7	Los Angeles	$1.8	2.3	15.6
8	Berlin	$1.5	2.0	6.0
9	London	$1.3	1.7	14.0
10	Seoul	$0.7	0.9	24.2

[a]Billions of U.S. dollars
[b]Millions

the higher costs and congestion that attend those processes. Even a function like food delivery, which might strike some as a simple luxury, is a response to conditions in the modern city. The opportunity costs of delivering or preparing your own food are much higher in cities, where that time will be even more productively used in some traded activity.

2.6 Discussion and Conclusion

We started from the basic contention that the city has emerged as a key organizing unit for entrepreneurial activity. To do so, we sought to marry the seminal contributions of Schumpeter on entrepreneurship with those of Alfred Marshall on clustering and Jane Jacobs on the role cities in bringing together talent and spurring innovation and entrepreneurship. To support these contentions, we turned to data on venture capital investments in startup activity across global cities and metro areas and within them. If entrepreneurial in startup activity was once clustered in suburban areas, it is now highly concentrated in large global cities and in denser urban neighborhoods. We also find startups to be concentrated dense urban neighborhoods in San Francisco, Boston, and New York City. We also provided evidence that urban tech, one of the newest areas of the economy and the area devoted to making the city more efficient, is itself clustered in large global cities.

These trends can be put in broader historical perspective. In the agricultural age, the farm was the basic organizing unit. In 1900, more than half of U.S. workers worked in agriculture. The farm was the basic economic organizing unit. Today, after huge

leaps in agricultural technology and management, less than 1% of the workforce does. Farms have become incredibly efficient enterprises, with advanced technology and self-driving tractors. Likewise, with the rise of the industrial economy, the corporation became the fundamental organizing unit of the economy. In 1950, more than half of the workforce of the advanced nations labored in large corporate manufacturing plants, and even the economy's innovative workforce was more likely to be employed in a corporate setting like Bell Labs. Now only about 5 or 6% of the workforce is engaged in a direct production occupation. Factories are highly automated, managed on the principles of lean production, and can run 24-7 with little waste; while much more innovation occurs in the new startups at the center of the previous analysis.

The rise of the city as platform for innovative and entrepreneurial activity is bound up with a third great economic transformation, the shift to a knowledge economy. Despite their innovativeness and increased role in generating high-tech startups, cities remain terribly inefficient production systems at this moment in time. They are indeed the last great frontier of inefficiency in capitalism. Offices and homes sit vacant much of the time, where cars sit idle, and where congestion is rampant. Just as farms and factories of previous epochs were optimized for efficiency, the offices, apartments, cars, and other elements of cities that sit unused much of the time will be adapted for greater productivity.

Ultimately, our findings suggest that the city is a key factor in the organization of entrepreneurial activity. Indeed, it is time to put the city—and *the urban*—at the center of research on innovation and entrepreneurship. That said, our research is just a start. We encourage further research to look at the centrality of the urban to entrepreneurial activity and the ways that different scales of geography act on and condition it. In particular, we encourage more research into the neighborhood-level clustering of entrepreneurial activity focusing on the factors and mechanisms that stand behind and shape this tight clustering at the micro-geographic scale.

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Chapter 3
Cities as Custodians for Entrepreneurial Opportunity

Melodena Stephens

Abstract The purpose of this chapter is to explore the concept of cities as custodians for entrepreneurial opportunity (EO). While EO is normally applied at the individual level, the aim of this paper is to show its importance at a collective, urban level and present a conceptual model of pull factors. The three key pull factors identified are (1) city configuration, (2) city connectivity, and (3) city culture. This paper highlights some examples of cities and their efforts in creating EO. Based on the theoretical discussion and the frameworks presented, a policy roadmap for strengthening EO in urban places, to gain economic competitiveness, is suggested.

Keywords Entrepreneurial opportunity · Cities · Economic competitiveness

3.1 Introduction

Entrepreneurial opportunities (EO) are defined as "*those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their costs of production… … (the) opportunity refers to the environmental conditions that are necessary for the conversion of a goal or intention into actual behavior*" (McMullen et al. 2007: 273, 279). EO is the discovery, creation, and exploitation of future goods and services in the absence of current markets for them (Venkataraman 1997: 120). EO should ideally lead to startup survival and an economic and competitive advantage, which are all necessary conditions for a healthy economy. Surprisingly, for such an important topic, EO studies have largely been focused on either defining the "entrepreneurship" part of EO or the "opportunities" part, but rarely both together. Hansen et al. (2011) studied definitions of EO over 10 years, and after looking at 56 articles, concluded that there was considerable fragmentation across the conceptual and operational elements of the "opportunity aspect" of EO.

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The opportunity part of EO has normally been applied at the level of the individual, the entrepreneur (Short et al. 2010). These studies focus on (1) EO being objective, hence endogenous—so it depends on the entrepreneur and the way the individual processes information available to seize opportunities present in the ecosystem, and (2) EO being subjective, hence exogenous and is based on the individual's ability to take advantage of networks (Suddaby et al. 2015). As early as 1997, Venkatraman (1997: 122) states that, "*One of the most neglected questions in the entrepreneurship literature is where opportunities to create goods and services in the future come from. Although this question should form the core of the field, none of the journals contain articles that mention this issue*." An exogenous perspective of EO needs an understanding of the context and in this case, it is the urban setting (Short et al. 2010).

With urban population in 2018 accounting for 54.7% of the total global population, cities are growing in numbers and in size (World Bank 2018). Most cities are chaotic engines of growth and entrepreneurship happens by accident and not design. Though EO should ideally lead to economic competitiveness at a global level for entrepreneurial cities (Jessop and Sum 2000: 2289), we are observing that cities can die, the so-called "shrinking cities". It was found that since mid-century, worldwide, over 450 cities of population sizes of 100,000 people, lost at least 10% of their population for many reasons—the key being economic downturn and poor city planning response (Hollander et al. 2009; Oswalt and Reinitz 2006). Cities need to pursue explicit strategies to encourage EO. Studies like that by Glaeser and Kerr (2010) find that economic growth and employment is highly correlated to small firms (in our case—startups) versus larger more mature firms. Greater insight is still needed on how you can design a city to become more entrepreneurial.

Entrepreneurship studies often look at push and pull factors as necessity versus opportunity entrepreneurship (Reynolds et al. 2001), however the reality is that EO needs to look at factors outside human agency (Shane et al. 2003). This paper focuses on pull factors as they have been found to be more important than push factors in the study of EO (Eijdenberg and Masurel 2013). Giacomin et al. (2011) distinguish between three types of pull motivations: market opportunity, social status, and profit. Market opportunity includes innovation and financial success (Carter et al. 2003). Social status includes approval, recognition, having a role model, improved welfare and wealth (Birley and Westhead 1994; Carter et al. 2003; Scheinberg and MacMillan 1988). Profits are highlighted in a study in Vietnam, which tested recession push versus prosperity pull. It finds that prosperity pull rather than recession push, was a significant indicator for entrepreneurship (Brünjes and Diez 2013). All the three pull factors need to be embedded into city planning if EO is to be encouraged or maintained. Thurik et al. (2010) find living in a metropolitan area as an important pull factor by itself.

This paper is conceptual in nature and looks at the role of cities in developing EO. It takes the perspective that planned spaces or city configuration, city connectivity, and city culture can facilitate EO and acts as pull factors. Each pull factor is discussed and this is followed by recommended policy interventions.

3.2 Entrepreneurial Opportunity: A City Lens

Cities are becoming increasingly more important from a policy point of view. Urban areas are associated with higher entrepreneurship and with EO rather than necessity-based entrepreneurship (Beaudry and Schiffauerova 2009; Bosma and Sternberg 2014; de Groot et al. 2009). The superior performance of Silicon Valley has been linked to the promotion of entrepreneurship (Saxenian 1994). Audretsch et al. (2015) looked at the impact of entrepreneurship on a panel of 127 European cities between the period of 1994 to 2009. They find that new business formation has the potential to improve economic development in cities. Entrepreneurship provides cities with the resilience to protect itself from shocks (Williams et al. 2013). Often cities have an entrepreneurial advantage over nations, with some exceptions, like those cities where governments reside (Ács et al. 2008).

At a city level, to develop a strong EO framework, the city itself should embed qualities of proactiveness, followed by innovativeness and risk-taking (Kreiser et al. 2002; Jessop and Sum 2000: 2289). This is reflected in people and policies. The development of global cities is often associated with informal capitalism, which is unplanned, or evolves from crises (Robinson 2002: 540, 547–8), implying that cities often pursue strategies of responsiveness rather than proactiveness. City policy makers often limit the development of urban space to the built environment and physical amenities, instead on the facilitation of human capacities or livelihoods (Roy 2005). However, a city context level of planning needs to understand that there are layers to EO—the individual, the firm, the industry and the overall context (infrastructure, setting, existing policies) (Covin and Slevin 1989; Lumpkin and Dess 1996: 136; Rauch et al. 2009). All of these factors must be considered to encourage individuals, institutions, and markets to pursue or support entrepreneurship.

Because cities evolve, the past context (social, cultural, political, historical, infrastructure) may imprint on future entrepreneurial ecosystem and can become a barrier for opportunities (Suddaby et al. 2015). City heritage may lead to islands of cultural, social and economic activity, that can act as a negative influence on EO. In these cases, the city must work on redesign or revitalization of spaces. This can be achieved by focusing on three key pull factors: (re) configuration of spaces, facilitating connectivity and encouraging a supportive culture (see Exhibit 3.1), leading to a competitive advantage with other cities at the national, regional or global level, or at the very least, an economic advantage. Since cities are open systems, one of the challenges is that change is inevitable and strategy intervention needs to be constant.

3.3 Push Factor 1: City Configuration

City configuration is the designing or carving out of city spaces to facilitate cross-purpose and cross-border interaction, enhance infrastructure, improve quality of life for business (and personal) success, and encourage the pollination of ideas. This type of city configuration is seen through projects like the revitalization of East End

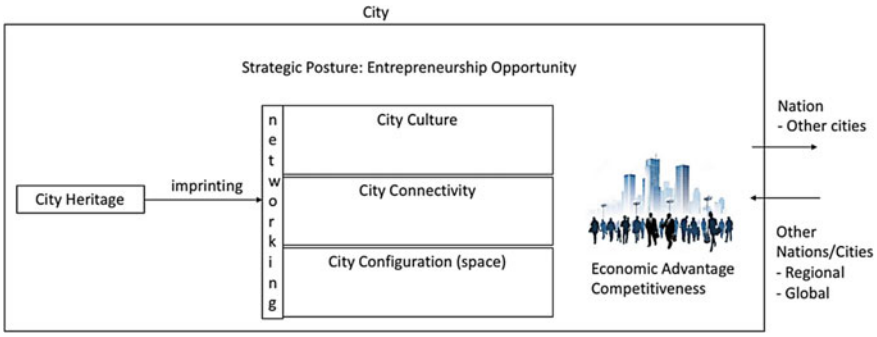

Exhibit 3.1 City strategies for entrepreneurial orientation development. *Source* Author

during London Olympics, the Guggenheim in Bilbao, Spain, which used flagship architecture (see Case 1). Such projects require patience and time.

Case 1: City of Bilbao, Spain

The city of Bilbao was economically declining in the late 1980s when the steel, iron and shipbuilding industry faced recession. Crime and unemployment were at 25%. Frank Gehry designed the Guggenheim, and it was approved by the local politicians, who reasoned that the cost of investment was less than the price of one kilometer of highway. It was built at a cost of US$ 230 million and opened to the public in 1997. The city with 350,000 inhabitants was soon attracting 20 million visitors per annum to the museum from around the world. Some of the early challenges associated with this project was changing the traditional Basque culture to become more open to the opportunity being presented. A stream of initiatives were undertaken at the local, regional, and global level. It is estimated that by 2016, the project contributed to 424.6 million euros to the Bilbao's GDP, 65.8 million euros in terms of tax revenue, and in terms of employment, created over nine thousand jobs. Of the total revenues, 6.64% comes from inside the museum (tickets, guided tours, store, special events, etc.), with the rest coming from the hospitality industry (lodging and catering), which accounts for 72% of the revenues. New companies are emerging in services and technology. According to the 2018 Blink Startup ranking, Bilbao's startup ecosystem ranks 6 in Spain and 346 globally.

Source Compiled by Author

One of the benefits of using space to spur EO is that the entrepreneurs tend to work in and for the community, leading to a secondary effect of realigning the meanings and attributes of within cities. Entrepreneurs tend to cluster, or are co-located. Andersson and Larsson (2014) find that when a residential neighborhood is shared with established entrepreneurs, it encourages more people to pursue entrepreneurship. When basic research or integrated incumbents are embedded in cities, it encourages

entrepreneurial activity (Audretsch et al. 2011).[1] This kinetic energy from clustering is showcased in examples like that of Fairchild Semiconductor and the birth of Silicon Valley (Saxenian 1994). Detroit, after being a city that filed for bankruptcy, is currently reinventing itself from being a car manufacturing hub[2] to a technology hub.

While policy makers prefer large companies or startups with the potential to scale, the reality is that micro-entrepreneurship and small businesses contribute a significant part of many economies. This will increasingly be more likely with the growth of the gig economy. Data from World Trade Organization (2016) shows that firms with 250 employees or less represent 78% of exporters in developed countries and 34% of exports, while micro firms (less than 10 employees) are more active in the service sector representing 68% of total exports and 83% of total imports. In the case of Brasília, Brasil, newest businesses are government services and in the case of Tsukuba, Japan, many of its startups move to Tokyo for greater access to resources though it is clear it is highly innovative based on the number of patents (see Case 2). When cities plan their future, they should decide if they want to leverage competitiveness through clusters of allied businesses or if they want to be diffused in terms of core competencies (perhaps the domain of mega cities).

Case 2: Brasília, Brasil versus The Tsukuba Science City, Japan

Brasília was created as the new capital of Brasil in 1960 and at that time just had 140,000 residents. Though the migration to Brasília was slow, the city was built for expansion and it is forecast that by 2030, the population will reach just below the 5 million mark. Its GDP per capita now is the highest in Brazil and 90% of its GDP is dominated by services (mostly government services), which is the major employer. Brasília was ranked 5th as a startup city in 2014 according to the Index of Entrepreneurial Cities.

The Tsukuba Science City in Japan was planned around research in the 1960s. The population of the city remains small (around 223,000) and it is essentially a university city coordinated and supported with public funding (50% of Japan's R&D budget is spent in Tsukuba). While the focus is R&D, and R&D is related to innovation, entrepreneurship leads to new firms, is not necessarily encouraged, especially if the entrepreneurship ecosystem is underdeveloped. The proximity to Tokyo (funding, services, market and connectivity to other markets and resources) may be responsible for the low number of startups being based in Tsukuba. City planners need to be aware of satellite cities and towns and work on collaborative strategies.

Source Compiled by Author

[1] But a caution to this study was that industrial agglomerations, or headquarters agglomerations with only administrative functions and the service sectors do not encourage entrepreneurship.

[2] In 2013, Detroit filed for the largest municipal bankruptcy case in the history of USA, previously in 2009, the Obama government had bailed out Detroit based automobile manufacturers—General Motors and Chrysler.

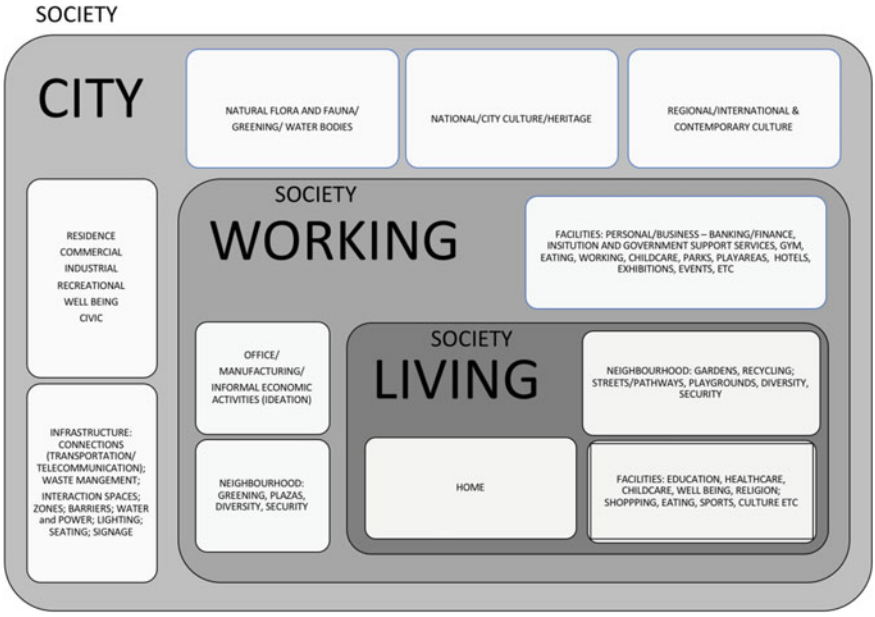

Exhibit 3.2 City configuration (Space). *Source* Author

Regulations that reduce or put distance between the private and public sector affect cities. Space configurations using free trade zones is one way to manage this challenge. For example, regulations have been shown to have a positive direct impact on new firm registrations, especially when there is a reduction in procedures, cost, or delays (Klapper and Love 2016). The South Korean city of Songdo, a smart city, is an example of urban entrepreneurialism, and benefits from being a part of the Incheon Free Economic Zone. However, its proximity to Seoul and the lack of diversity (it is still considered elitist) make it difficult to sustain entrepreneurship (Shin 2016). The cities of Yujiapu and Lingang in China show that it can take more than a decade in some cases for these planned cities to get a natural vibrancy present in most organically grown cities. Dholera, in Gujarat, India, was a pilot for smart cities and suffers from ethnographic limitations though it was designed to be "*a city where knowledge, power and wealth are redistributed through the help of digital technology*" (Datta 2015: 47). City configuration must consider a wide number of factors to create vibrant EO-supportive societies, as is illustrated in Exhibit 3.2. The design of spaces should lead to the next pull factor—city connectivity. Space is not always physical in today's world, and virtual spaces can be designed to compensate for the lack in diversity and innovation (see Kera 2011 or Jessop and Sum 2000).

3.4 Push Factor 2: City Connectivity

City connectivity is more than transportation, telecommunications, and logistics infrastructure. The purpose of creating city connectivity is to facilitate quality of life, impulses for innovation, networking, and the movement of people, resources and ideas, both within the city and outside the city (Beaverstock et al. 2002; Jessop and Sum 2000). Global service firms often use networked key cities as anchors (Taylor et al. 2002). Cities need to become vibrant hubs that encourage knowledge spillovers by creating both physical and virtual proximity (Bottazzi and Peri 2003; Breschi and Lissoni 2009; Devriendt et al. 2010). The development of a knowledge economy, so vital for scalable high impact entrepreneurship, requires a large number of firms delivering specialized services for supporting other firms (Hall and Pain 2006: 4; Sassen 2001: 90). This may differ from city to city, based on its core competencies and resource advantages. For example, Silicon Valley entrepreneurs had access to high-quality professional services, university resources, and venture capital; while Japanese entrepreneurs had more access to diverse financing resources including bank loans and government financing (Suzuki et al. 2002).

The economic performance of firms is more dependent on local capacities to build global connections, which are complemented by the local resource base, than on local networking and clustering (Lagendijk and Lorentzen 2007). The ability to attract foreign firms is an advantage. A study by Pusterla and Resmini (2007) finds that MNCs prefer to go where there is an industry cluster, abundant and cheap manpower, higher market potential and good connectivity to surrounding markets. The bidding for Amazon's HQ2 was fierce (238 cities bid for that opportunity), in the hope that it would encourage jobs and positively contribute to economy. Connectivity between spaces is also important for global supply chains (Castells 1996; Beaverstock 2004; OECD 2008: 10).

Entrepreneurship studies have looked at connectivity through the network effects. Social diversity has a direct impact on innovation (Jacobs 2002) and new firm formation (Lee et al. 2004). Cities have the potential to facilitate a diversity of networks and give access to a diversity of resources. From a planning point of view—geographic clusters of interconnected firms and associated institutions impact entrepreneurship, but industry agglomeration (clusters without networks) do not (Rocha and Sternberg 2005). To be able to facilitate a diversity of networks, the social fabric of the city must be accommodating to cross pollinations of naturally occurring agglomeration of segments based on income, business, ethnicity, language, interests, etc. Social ties (both strong and weak) need to be optimized by (a) density (strength and number of ties), (b) reachability (distance/intermediaries between people), and (c) centrality (how many super-connectors do you have) (for more on this topic read Granovetter 1973; Freeman 1978; Aldrich and Zimmer 1986). An interesting example is China's Belt and Road initiative (see Case 3).

Case 3: China's Belt and Road Initiative

China's ambitious Belt and Road Initiative focuses on soft and hard infrastructure connectivity to reduce the time traveled between places to China and hence to encourage trade, and in some cases soft power. First proposed in 2013, by Chinese President Xi Jinping, this US$ 1 trillion[3] infrastructure development project plan aims to focus on "*Cooperation (which) helps to promote efficiency in the flow of elements and in-depth integration of markets, to achieve diversified, independent, balanced and sustainable development. It aims to promote regional development, prosperity and stability, and expand dialogue and mutual learning between civilizations in-depth integration of markets, to achieve diversified, independent, balanced and sustainable development*" (Office of the Leading Group for the Belt and Road Initiative 2017: 4–5). As of 2016, over 100 countries expressed interest and support. As of March 17, 2017, the UN Security Council unanimously adopted Resolution 2344: 34, urging the international community to strengthen regional economic cooperation through projects like the Belt and Road Initiative, among others. A report titled "*The Silk Road: EU-China Rail Connections*" finds that the expected benefits for EU states will be highest for places that host logistics centers of hubs supporting EU-China rail connections. As of 2016, China had opened 39 China-EU rail routes to 14 cities in 9 EU countries with 3000 trains in operation (Office of the Leading Group for the Belt and Road Initiative 2017). Some cities took advantage of the opportunities provided by connectivity. The city of Łódź in Poland, services around 25% of trains traveling between China to the EU, accounting for around 7% of the value of transported goods (Jakóbowski et al. 2018). Duisburg, Germany acts as a logistics "hub" for Germany, Benelux and northern France with the EU-China rail accounting for around 25% of trains and 75% of the value of goods of rail trans-shipment operations (Jakóbowski et al. 2018). It was estimated that based on the potential of the Belt and Road project, firms of Chinese origin had invested US$ 18.5 billion in 56 economic and trade cooperation zones under construction in 20 countries. By the end of 2016, China had signed 53 bilateral investment treaties with countries along the Belt and Road Initiative (Office of the Leading Group for the Belt and Road Initiative 2017). Of course, loans, currency swaps, de-regulation are all other added economic benefits. The potential of the initiative, for cities to tap into, is immense—as it will connect 65% of the world's population, harness 1/3 of global GDP, by hence tap into 25% of all the goods and services the world moves (McKinsey 2016). While the infrastructural challenges of cost still remain, the soft factors including receptivity of the idea and concept and the ability to make it work should not be ignored.

Source Compiled by Author

Knowledge flow between and in firms happens at three levels—synthetic, analytical and symbolic[4]—at different geographical scales, all important for EO (Cooke et al. 2007). Connectivity needs to be between the physical and digital worlds to facilitate a "flow" of information and knowledge necessary for economic productivity (Castells 1996). The concept of virtual cities is still not developed, except in the gaming world (Dimopoulos 2018). A study of the residents of the online community, Virtual Life, finds that the virtual world provided opportunities leading to entrepreneurial acts in that world, which then created entrepreneurial acts in the "real" world (Chandra and Leenders 2012). The country of Estonia and especially the city of Tallin, is spearheading the virtual community and new business formation through their e-Estonia residency platform. This highlights the fact that cities should be more mindful of the intersection of these two worlds, to encourage EO.

Digital flows need to be calculated from three viewpoints: supply, demand and public–private partnerships. In the supply side (infrastructure investment)—for example, besides smart city infrastructure, it is important to consider how global the city is. Singapore holds 50% of Southeast Asia's data center capacity, and with 19 cable systems connecting the city state directly to more than 33 countries, it becomes a major Asia-Pacific hub for submarine cables. From the demand-side, cities need to access market and citizen readiness and usage to encourage innovation (adaptation and new products). China as a country is experimenting with smart cities pilots in over 500 cities, but the cumulative market size of the country is more vast than any other country (except India). This allows the growth of businesses, especially when they can find market readiness and connectivity in their home city to allow them to leverage the city network effect. In terms of partnerships, cities need to encourage local and international institutions (business, cooperation, regulations, law), to create an enabling environment where you protect consumer and business rights and data. Networks that support entrepreneurship are often trust-based, suggesting that cities need to create a vibrant and supporting culture (see for example Neergaard and Ulhøi 2006; Smith and Lohrke 2008; Welter 2012). This brings us to push factor 3. While culture maybe inherited, cities can modify and change their culture if they have key strategies in place.

[3]There are conflicting figures for this investment amount. Read the article by Hillman, J. 2018. How Big is China's Belt and Road, enter for Strategic and International Studies. Available: https://www.csis.org/analysis/how-big-chinas-belt-and-road.

[4]Analytical knowledge refers to activities where scientific knowledge based on formal models and codification is highly important; synthetic knowledge refers to economic activities, where innovation mainly takes place through the application of novel combinations of existing knowledge; and symbolic knowledge is related to the aesthetic attributes of products involving the creation of designs and images in order to create economic value from cultural artifacts (Cooke et al. 2007: 57).

3.5 Push Factor 3: City Culture

City success has been correlated with entrepreneurship (Glaeser 2007; Van Praag and Versloot 2007). With the organic nature of cities, culture constantly evolves. To quote Sarasvathy et al. (2003: 159), "*Ergo, the lags (temporal and otherwise) between any invention and the creation of new economic welfare enabled by it, require not only the ability and alertness to recognize, and the perception and perseverance to discover opportunities for the achievement of pre-determined goals such as increasing profits and larger market shares, but also necessitate decisions and actions based often only on human imagination and human aspirations, that may or may not, in time lead to new products, firms and markets*." Human ambition and city growth are tied together with the culture that can support or impede entrepreneurship. There has been no systematic research on perceived culture of a city and the characteristics associated with it.

Inspiring human imagination and endeavor are critical for economic activity. Since existing socially constructed assumptions can exist, and act as inertia, there is a need to create a jolt in both cultural and institutional logic, to spearhead entrepreneurship (Sine and David 2003). Baron's (2006) concept of opportunity recognition suggests that the ability to "connect the dots" for entrepreneurs is important. Ardichvili and Cardozo (2000) find that entrepreneurial opportunities are discovered through recognition rather than purposeful search, which they feel does not require prior market knowledge or an exceptional level of creativity. Edvinsson (2006: 75) highlights this by saying, "*The open space in between intelligence (what we know) and ignorance (what we do not know that we do not know) might be seen as the opportunity space for knowledge navigation of the knowledge city of tomorrow*."

So what can cities do? Often the existing culture (historical and lead organization anchored within the city) can influence EO (Aoyama 2009). One way to create change is through incentives. Drucker (1985), Buchanan and Vanberg (1991) and Sarasvathy et al. (2003); for example, find that the market has an allocative process, which responds to the structure of incentives. The city Emirate of Dubai has used incentives like free trade zones, infrastructure, lifestyle, resident diversity and its strategic position to encourage business. This has resulted in an explosion in population from 18,000 in 1930 to 2.6 million in 2018. In addition, Dubai airports handle 90 million passengers and connect 240 locations through 100 airlines (see Stephens Balakrishnan et al. 2017, for the history of Dubai).

Diversity of population is related to growth of cities (Edvinsson 2006; Eraydin et al. 2010). Though studies are not sure how ethnic diversity plays into EO, the existing evidence does support the need for diversity. A German and UK study found that regions with a high level of knowledge and cultural diversity brought about by the diversity of its people, encouraged new technology oriented startups (Audretsch et al. 2010; Bishop 2012). Another study found that diversity (foreign born and ethnicity) among highly skilled workers (rather than unskilled workers) impacts the formation of potential high growth startups, more than overall cultural diversity and skill composition (Rodríguez-Pose and Hardy 2015). In London, for example,

migrants not only positively relate to new firm formation, but knowledge-intensive migrant firms (where owners and founders are foreign born) are 1.31 times more likely than other migrant firms to introduce new products/services, and this effect is significant at one percent (Nathan and Lee 2013). Cities need to be attractive to migrants and if possible encourage knowledge entrepreneurs. But this alone is not enough.

From previous studies, knowledge transfer only happens through trust (see Adler 2001) and sharing of tacit knowledge (Saxenian 2002). Cities need to develop strategies for assimilation of diverse groups, where assimilation has more to do with the blurring of boundaries among groups, than with one group adapting to another (Qian and Lichter 2007). This means they need to facilitate a network of relations (Granovetter 1990: 98) across diverse groups—economic, ethnic, educational, social, and even generations. A study of 1st and 2nd generation entrepreneurs in the Dutch economy finds that first generation entrepreneurs who are less educated and embedded in society, depend on informal networks, while 2nd generation entrepreneurs who are better educated and more integrated in society, are embedded in formal or mixed networks and are active in a mainstream market (Rusinovic 2010).

For high technology firm formation, a great example is Silicon Valley (though it is technically not a city). Saxenian (2002) argues for policy level intervention and support of immigrants looking at the success of Indian and Chinese immigrants in Silicon Valley. Saxenian (1999: 108–9) highlights the need for this interconnectedness, "*It is precisely the openness, multiplicity and diversity of interconnections in Silicon Valley that allows economic actors to continually scan the environment for new opportunities and to invest in novel technologies, markets and applications with unprecedented speed.*"

Even when things seem hopeless, change is possible. Edi Rama, the mayor of Tirana, Albania, took a novel approach to changing spaces and hence culture through painting older building and installing street lights. People took pride in their city, started feeling safe, and crime decreased.[5] New York post 9-11 is another great example of a mega-city that was able to reinvent itself (albeit through a crisis)—see Case study 4.

Case 4: New York

New York had a cultural transformation post 9-11 through the revitalization of Lower Manhattan and other boroughs.[6] The event of 9-11 not only was tragic from the loss of life, the emotional damage, but also the loss of jobs and tourism. The economic damage was valued at US$ 83 billion (New York City Partnership and Chamber of Commerce 2001). At that time, GDP of the city metropolitan areas was US$975.63 billion a year. Under Mayor Michael Bloomberg's vision, the city rebranded and reinvented itself. Through partner-

[5]Watch the TEdX talks: Edi Rama (2012), Take back you city with paint: Available here https://www.ted.com/talks/edi_rama_take_back_your_city_with_paint.

ships between local community, government, and the private and not-for-profit sectors, population in Lower Manhattan has since doubled between 2000 and 2014 with 77% being younger than 45 years, due to business and education (Luttrel 2016). Industrial and underused areas were turned into vibrant public spaces like the Hudson Yards or High Line, an elevated park built on a disused elevated railway track. In 2011, NYC was using 200 digital channels to engage over 25 million people a year and had developed a NYC digital strategy (Bloomberg 2011). Employment and business opportunities have increased. From a focus on Manhattan, effort was deflected to revitalize other boroughs like Brooklyn, Queens, the Bronx and Staten Island. Currently, gross economic output of NYC is around US$1.65 trillion.

Source Compiled by Author

EO needs a mix of both socially supportive cultures and performance-based cultures. A study of 40 nations found that socially supportive cultures are found to benefit the supply-side variable of entrepreneurship (self-efficacy and social support and collaboration), while performance-based culture supports the demand-side variables (opportunity existence and the quality of formal institutions) (Stephan and Uhlaner 2010). One important criterion for city culture that should not be forgotten is the size of its "underground entrepreneurship", the informal economy, which often acts as a rich testing ground for ideas and which governments want to regulate (Williams and Nadin 2010). New, less skilled immigrants survive in host cities as micro-businesses via social capital and should not be discounted, as these types of businesses sustain economic activity in volatile economic situations (Eraydin et al. 2010). Hence culture that is open and inspiring is critical for EO.

3.6 Policy Recommendations

While organic growth of cities is inevitable, it is imperative that cities introduce policies to support EO. Here are some recommended guidelines.

1. EO takes time, so policy interventions need to be sustained. A study examining the relationship between entrepreneurship and economic development, using a panel of 127 European cities between the period 1994 and 2009, finds that the direct effect of entrepreneurship on economic development may depend on the type of entrepreneurship activity and sector, and that the indirect effect needs a critical mass of entrepreneurs and takes up to three years to make itself felt for large cities and up to seven years for small cities (Audretsch et al. 2015). Most terms for city mayors is around 4 years (Moulder 2008), suggesting that, either

[6]For more on New York City read Greenberg (2008) or Sagalyn (2016) or Rangan et al. (2006).

there is a need for overlap between terms for continuity, or that benefits accrued (or negative effects), which are lagged, are understood by the voters.

2. Cities need to provide supportive infrastructure and spaces for resources (business and personal), relationship development (networking) and quality of life (personal and business). These spaces should encourage creativity and be dynamic, reflecting work trends. This will help entrepreneurs "connect the dots" to find new opportunities in the market place (Baron 2006). While all of the supportive infrastructure and spaces don't need to be hosted by the city (for example, research, education, media projection, public lectures, etc.), they should be encouraged. Cities can act as beta markets or the main market. In a study by García (2014), it was found that city size, self-employment, and tertiary education have a significant and positive impact on the number of new businesses registered in cities. Entrepreneurship policy must look beyond the business angle, at education, research, immigration, and living.
3. Safety and security are vital for spurring creativity and business growth. Creativity in culture is found to have a positive relationship with new firm formation through innovation and patent production (Lee et al. 2004). Often, entrepreneurs test their ideas in an informal way and such businesses may lie in the realm of the informal economy. While cities need to encourage the self-regulatory focus of new business boundaries looking at both opportunities and risks of such endeavors (Brockner et al. 2004), this is not an easy path as it comes down to citizen trust (rather than fear). Policy makers must work together to create trust in regulations, especially in new disruptive technologies.
4. Cities need to decide the type of new firms they want to encourage. Small firms should not be ignored, but in addition, they need to find a mix of firms. As seen with the Silicon Valley example, supportive high-quality services are critical to firm growth. Cities should be able to identify scalable firms and support high growth firms as they contribute to nation wealth (Shane 2009).
5. Focusing on opportunity motivation requires cities to address the types of opportunities available. Hansen et al. (2011) find 14 types of opportunities: (1) new product to market at a profit, (2) new means-end framework, (3) idea developed to a business form, (4) feasibility of idea to achieve benefits, (5) create a solution to a problem, (6) serve customer differently and better, (7) need perception, (8) development/transformation, (9) scanning or alertness, (10) matching, (11) creation of new alternatives, (12) problem solving, (13) business possibility, and (14) social construction. Initially, from a policy point of view, city officials may chose certain areas to focus on through the setup of policy councils that act as future foresight think tanks. They will then need to invest in education, mentorship, incentives, and finance in these new areas.
6. Cities need to decide how they will be connected to the outside world (physical infrastructure, digital infrastructure, legally and culturally) and at what scale. Logistics and free trade zones have been one policy method to attract high growth firms and hence encourage startups in allied business services and manufacturing sectors. Today's world is virtual and smart, which clearly indicates that policy makers need to invest in a digital strategy and in telecommunications.

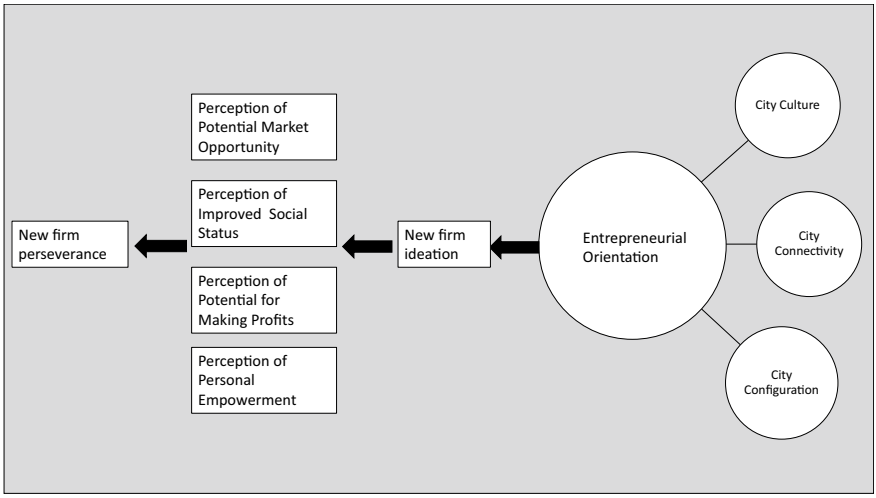

Exhibit 3.3 Reaching critical mass of impactful entrepreneurship. *Source* Author

7. City culture needs to be defined. If New York is the city that never sleeps (not coined by city councilors)—what is the theme of the city that will give it a competitive advantage in the market place? Can it live up to its tag line? This is key in attracting talent and encouraging EO. Cities need to live up to their promise and more importantly ensure that the talent they want to attract finds that the city is affordable to live and invest in.

In the end, developing EO for cities or want-to-be cities is a complex process where city officials must look at the macro and micro perspective of opportunities available both within and outside of the city. Ideally, a strong city foundation can help the city encourage EO but in line with the organic growth of cities, policy makers must be able to seize opportunities as they find them. What is most important is how city officials can relate to the prospective entrepreneur (see Exhibit 3.3). By encouraging firm perseverance and a critical mass of supporting entrepreneurs, you can change the ecosystem to become more enabling of entrepreneurship (Feld 2012). This logic is apparent in existing theories like the activity theory (Engeström 1987, 2008; Vygotsky 1978) and Bourdieu's elements of habitus, field and doxa (1977, 1998), which explores the cultural elements of social order, its way of internalization, the domains of practice and the unwritten boundary and rules of operation. Whatever the approach, EO is a complex topic for academics and policy makers and requires a continuous strategy that adapts to market and city contexts.

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Part II
Knowledge Spillover

Chapter 4
The Role of Knowledge City Features in Nurturing Entrepreneurship: Evidence from EU Cities

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Abstract The present paper aims to answer the following research questions: (i) is the knowledge city environment a stimulus for entrepreneurship? (ii) which profiles of knowledge cities stimulate entrepreneurship most? In order to answer the aforementioned research questions, two multidimensional indexes have been created: Knowledge-Based City Developing Entrepreneurship (KBCDE) and Entrepreneurship (ENT). The sample includes all capital cities in the EU28. The presence of cities from EU28 countries is important to foster the entrepreneurship attitude in each European Country. We have also included 32 non-capital cities in the EU that are important hubs, thus creating a sample formed of 60 cities. Our work tries to contribute to the debate on urban economic development and entrepreneurship, providing a stimulus for academics and urban policymakers. The empirical results show that the social and cultural environment may significantly improve entrepreneurship in EU cities, more than other factors that are usually connected to economic development.

Keywords Entrepreneurship · Knowledge economy · Knowledge city · Key factors · Statistical index

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4.1 Introduction

Economic and managerial studies addressing both the determinants and the effects of entrepreneurship on economic development are characterized by a national or regional perspective (e.g., Audretsch and Fritsch 2002; Crescenzi et al. 2007; Glaeser et al. 2010; Ács et al. 2014).

New political and academic issues on entrepreneurship, however, highlight the need to focus on the aforementioned topics at the city level. In recent years European Urban Policy has encouraged urban policymakers to create the supportive conditions to incentivize the creation, development and maintenance of entrepreneurship (e.g., "The State of European Cities Report, 2016—Cities leading the way to a better future"; https://ec.europa.eu/futurium/en/urban-agenda). The economic literature on entrepreneurship at the city level is still scarce: the main studies on the effects of entrepreneurship in cities tend to focus on cities in North America or in emerging economies (Glaeser et al. 1992, 2010, 2014; Florida 2002; Florida et al. 2008), while few academic contributions address the economic and social effects of entrepreneurship (Audretsch et al. 2015) and the drivers of the creation of an entrepreneurship ecosystem in European cities (Audretsch and Belitski 2017).

In this vein, the present paper focuses on the role of the urban environment in promoting entrepreneurship from a knowledge economy perspective.

It is commonly recognized that in the knowledge economy, cities are characterized by a growing proportion of knowledge workers and by the service-orientation of economic activities; moreover, the role of large cities tends to be reinforced, as they become centers of governance in global networks (Sassen 1991, 1994a, b; Hendriks 1999; Madon and Sahay 2001; Clark 2003; Glaeser and Gottlieb 2006; Turok 2008; Glaser et al. 2010).

At the EU level, Lever (2002) has found a positive correlation between economic development and the knowledge "attitude" in European cities. From this perspective, urban policies and governance should be oriented to nurture a strong "people climate" in order to attract and retain talent in urban areas to form analytical, synthetic, and symbolic knowledge bases (Florida 2002).

Knight (1995, 2008), Perry (2008) and Yigitcanlar (2011) have defined the concept of the Knowledge-Based Urban Development—KBUD as the new development paradigm of the global knowledge economy aimed at creating economic prosperity, socioeconomic order, sustainability and good governance in cities. The goal is to construct a knowledge city (Carrillo et al. 2014), i.e., one that is focused on knowledge-based development, by continuously encouraging Knowledge Management processes. In accordance with this perspective, the literature has defined the prevailing characteristics of the knowledge city (Ergazakis et al. 2004; Carrillo et al. 2014; Yigitcanlar and Bulu 2015; Penco 2015; Edvardsson et al. 2016).

In this approach, the relationship between the paradigms characterizing the global "knowledge city" and their effects on entrepreneurship do not explicitly emerge; therefore, the impact of the knowledge economy basis in urban development and the creation of "new entrepreneurship" is an understudied topic.

In light of these considerations, the present contribution aims to answer the following research questions: (i) is the knowledge city environment a stimulus for entrepreneurship? (ii) Which profiles of knowledge cities stimulate entrepreneurship most?

The research is carried out on a sample including all capital cities in the EU28. The presence of cities from every EU28 Country is important to foster the entrepreneurship attitude in each European Country. We have also included 32 non-capital cities in the EU that are important hubs, thus increasing the sample to a total of 60 cities.

Following the established KBUD model (Yigitcanlar and Lönnqvist 2013; Yigitcanlar 2014; Yigitcanlar et al. 2015), we have proposed a new framework. We have decided to create an innovative multidimensional index (KBCDE—Knowledge-Based City Developing Entrepreneurship) in order to better explain the different dimensions of "Knowledge cities" (Nardo et al. 2005; Ivaldi et al. 2016a), which define different stages in order to develop a composite indicator.

We have completed the KBCDE index for each dimension, as well as for the aggregate global indicator of knowledge (Ivaldi et al. 2016b). We used the same methodology to create the Entrepreneurship (ENT) index using three variables: New-business density, Absence of negative perception of entrepreneurship (% of the population) and History of highly successful digital companies (per capita).

The paper is organized as follows: Sect. 4.2 reviews extant literature on knowledge cities and entrepreneurship; Sect. 4.3 explains the research design and method, describing the construction of the indicators and shows the major empirical findings; Sect. 4.4 discusses the outcomes, while Sect. 4.5 gives the implications for academics and practitioners, before concluding.

4.2 Theoretical Background: Knowledge Cities and Entrepreneurship

4.2.1 Entrepreneurship and Urban System Factors

In the field of economic and regional studies, there is abundant literature focused on the territorial dimension of the entrepreneurship phenomenon, in particular on the determinants and impact of entrepreneurship on the economy and territory development (Ács et al. 2014; Glaeser et al. 2010, 2014; Andersson 2011; Stam et al. 2014).

It is commonly recognized that most studies are focused on countries or regions (e.g., Audretsch and Fritsch 2002; Stam et al. 2014; Crescenzi et al. 2007; Glaeser et al. 2010, 2014; Ács et al. 2014). The recently developed Global Entrepreneurship and Development Index (GEDI) (Ács et al. 2014) and the REDI index (Szerb et al. 2013) are aimed at capturing the interaction between individuals and the economic–structural environment at the national and regional levels.

The recent trend in entrepreneurship policy (e.g., "The State of European Cities Report, 2016—Cities leading the way to a better future"; https://ec.europa.eu/futurium/en/urban-agenda) and academic research (Glaeser et al. 2014; Mason and Brown 2014) has increased attention not only on the national and regional prospective to study entrepreneurship, but also on the local-urban perspective.

Cities are considered an appropriate environment for nurturing entrepreneurship (Szerb et al. 2013), providing a relevant socioeconomic and institutional context within the entrepreneurial ecosystem (Audretsch and Belitski 2017).

The most important appeal of large metropolitan areas that are able to affect the development and settlement of entrepreneurship is linked to agglomeration economies (Glaeser et al. 2014), which enable higher externalities and spillovers (Audretsch et al. 2006; Ghio et al. 2015), economies of scale and incentives to innovation and growth (Audretsch 2007; Szerb et al. 2013). Unlike Marshallian economies in industrial districts, urban agglomeration economies are "knowledge agglomerations": they produce synergy due to the closed transmission of knowledge between: (i) knowledge-intensive firms; (ii) higher education, research, and development (universities); (iii) complementary knowledge-intensive business services; financial intermediation, national and international public institutions, and telecommunication networks that are placed in large metropolitan areas. One essential tool is the presence of research centers and training centers that strengthen innovative and entrepreneurial support. Specific policies and interventions aimed at developing entrepreneurship are pursued at the city level (e.g., venture capital, incubators, specific financial grants).

Cities provide amenities and infrastructure that are attractive to their high human capital residents (Glaeser et al. 2001), stimulating the retention of talent for the development of entrepreneurship (Florida 2002).

Physical conditions such as infrastructure and amenities (green spaces, theaters, museums, cinemas, coffee shops, and art galleries) increase social life and a perceived improvement in the quality of life. In cities, downtown areas become places of consumption (accommodating multinational malls or megastores that replicate their servuction in the main cities), increasingly populated by service companies and people who prefer to "live in the city but work in the suburbs" (Glaeser and Gottlieb 2006; Warnaby and Davies 1997; McKee and McKee 2004; Bennison et al. 2007; Turok 2008).

Transport links either foster or constrain interaction between the agents of the entrepreneurial ecosystem: urban mobility (needed to connect major points of production services downtown, new office buildings, residential areas, etc.), logistic accessibility to/from other international hubs; the presence of airports with multiple connections, high-speed rail tracks and a developed highway infrastructure network are important. In general, the bigger the city, the better the access firms have to a bigger labor pool, a larger customer base, more choice of shared services and suppliers, and better external connections (Turok 2008; Audretsch et al. 2015).

Moreover, higher and faster internet connectivity at home and in neighborhoods could be the ideal catalyst to make the most of the huge potential of digital technologies in Europe, which facilitate start-ups and high growth. The main studies on the effects of entrepreneurship in cities tend to focus on cities in North America or in emerging economies (Glaeser et al. 1992, 2010, 2014; Florida 2002; Florida et al. 2008; Andersson 2011). The contemporary European urban context (Dijkstra et al. 2013) has been studied but to a lesser extent (see Ács et al. 2014; Bosma and Sternberg 2014). Moreover, the entrepreneurship phenomenon in the knowledge city context is not directly studied even though it is commonly recognized that the knowledge development context is one of the most important features in entrepreneurship development.

4.2.2 Entrepreneurship and the Knowledge City

Drawing from the previous premises, cities are becoming the natural environment for the development of entrepreneurship, especially because of the increasing role of cities in the process of creating and diffusing knowledge. In a knowledge economy perspective, the role of large cities tends to be reinforced, as they become centers of governance in global networks (Sassen 1991, 1994a, b; Hendriks 1999; Madon and Sahay 2001; Clark 2003; Glaeser and Gottlieb 2006; Turok 2008; Glaeser et al. 2010).

In recent years, academic studies have found the relevance of the leading role cities play in creating a positive "people climate", able to attract and retain talent to form analytical, synthetic, and symbolic knowledge bases (Florida 2002), which are some of the most important premises in fostering entrepreneurship.

Considering the relevance of knowledge in the modern economy, Carrillo (2004) coined the concept of "knowledge cities" to identify metropolitan areas that—similar to a production system—are able to facilitate the creation of knowledge. A knowledge city "is a city that aims at knowledge-based development, by continuously encouraging KM (knowledge management) processes. This can be achieved through the continuous interaction between its knowledge agents themselves and at the same time between them and other cities' knowledge agents. The city's appropriate design, ICT networks and infrastructures support these interactions" (Ergazakis et al. 2004).

The literature has stated that knowledge cities are the most capable of producing sustainable economic growth. Cities, where relationships between people are more extensive, provide the most natural environment in which to look for evidence of the knowledge spillovers so emphasized by the endogenous growth theory. Unlike the concepts of Smart city, Digital City; Virtual City, Information City, Wired City, Ubiquitous City, and Intelligent City, knowledge cities are focused in particular on the human dimension, i.e., people, education, learning and knowledge (Cocchia 2014). The concept of the knowledge city is intimately linked to the knowledge economy: in other words, a knowledge city is a "learning city" and it is linked to the "knowledge

economy", "innovation", IT networks, and infrastructures supporting interactions among citizens.

The literature has defined a framework and indicators aimed at measuring the development of an urban context into a knowledge city.

Knight (1995, 2008), Perry (2008) and the Yigitcanlar (2011) have defined the concept of KBUD as new development paradigms of the global knowledge economy aimed at creating economic prosperity, socioeconomic order, sustainability, and good governance in cities. KBUD is, therefore, considered a vision/strategy to accompany the transformation of cities into knowledge cities and their economies into knowledge economies. KBUD includes 4 four main dimensions (Yigitcanlar et al. 2008b), each comprised of two separate, but interlinking subcategories. These dimensions and subcategories include the following perspectives (Yigitcanlar 2011; Yigitcanlar and Lönnqvist 2013; Yigitcanlar et al. 2015): 1. Economic development: (a) macroeconomic foundations (gross domestic product (GDP) and foreign direct investments (FDI); (b) knowledge economy foundations: research and development (R&D) expenditures and number of patents; 2. Sociocultural (or societal) development: (a) human and social capital: public spending on education, educational attainment, and university rankings; (b) diversity and independency: ratio of people born abroad, unemployment and dependency ratios; 3. Enviro-urban (or spatial) development: (a) quality of life and place: cost of living and crimes against life and health; (b) environmental sustainability: CO_2 emissions; 4. Institutional development: (a) governance and planning: electronic governance and city branding; (b) leadership (or support) and partnership: public grants for R&D and number of sister city cooperation agreements. The operationalization of these variables is present "mutatis mutandis" in several empirical studies.

The KBUD is a useful policy framework for the transformation of knowledge resources into local development that provides a basis for sustainable development and it is for this reason that several capital cities have applied these principles in order to foster and accomplish urban development or the renewal of the urban economy.

Following the KBUD, Garcia (2012) has illustrated that the MAKCi (Most Admired Knowledge City) framework is basically a knowledge economy model, which involves an assessment of the value base on which the future development of a city is made possible. The Framework includes eight knowledge capital dimensions: 1. Identity capital; 2. Intelligence capital; 3. Financial capital; 4. Relational capital; 5. Human individual capital; 6. Human collective capital; 7. Instrumental-material capital; and 8. Instrumental-knowledge capital.

In studying the cities in the knowledge economy, Méndez and Moral (2011) have identified the key components of a knowledge city. On the basis of 12 quantitative indicators divided into 4 dimensions (human capital; economic city specialization in the knowledge economy, features of the local innovation system; digital network system), the authors analyzed the most important municipalities in Spain.

López-Ruiz et al. (2014) started by analyzing the most important indicators used to assess and rank cities. They evaluated the strengths and weaknesses of the most important urban indicators (e.g., General or growth city indices City Development Index (CDI); Global Cities Index (GCI); Global Economic Power Index (GEPI);

Global Power City Index (GPCI); Global City Competitiveness; Index (GCCI); Knowledge-Based Urban Development Assessment Model (KBUD/AM); Human development city indices; Well-Being Index (WI); The Wealth Report (WR); Quality of living reports (QOL); Sustainability city indices; The Green City Index (GrCI); City Prosperity Index (CPI), and the Ecological Footprint for Cities). They studied the intellectual capital approach in order to understand the ability to transform knowledge and intangible resources into sustainable long-term wealth. The adopted Knowledge City Indicator (KCI) is aimed at assessing not only sustainability and social well-being, but also intangible factors such as human development, economic structure, trade, image, and innovation. In this vein, the KCI is formed of 19 dimensions with 73 different indicators.

In the aforementioned framework, the relationship between the paradigms of the global knowledge city and the effect on the level of entrepreneurship does not explicitly emerge. Even though case histories of entrepreneurship in cities are common (e.g., Rosenthal and Strange 2004; Bosma and Sternberg 2014), the factors and mechanisms that stimulate entrepreneurship in urban areas remain under-examined (Beaudry and Schiffauerova 2009). Nevertheless, European Urban Policy has encouraged urban policymakers to create the supportive conditions to incentivize the creation, development, and maintenance of entrepreneurship.

On the basis of the previously mentioned premises and the literature gap regarding the relationship between entrepreneurial development and knowledge city framework conditions, our work follows the KBUD framework (Yigitcanlar 2011; Yigitcanlar and Lönnqvist 2013; Yigitcanlar et al. 2015) and entrepreneurship research (Isenberg 2010; Szerb et al. 2013; Levie et al. 2014), connecting and extending their works in three important ways. First, we have created four domains of "entrepreneurship oriented" knowledge cities. Second, we have created an innovative index for measuring entrepreneurial action at the city level. Third, we explain the relationship between each dimension of the knowledge city at an entrepreneurship level, trying to identify bottlenecks and policy implications (Levie et al. 2014).

4.3 Method: Identification of Cities, Index Constructions, Ranking, and Correlation Analysis

The sample includes all capital cities in the EU28. The presence of cities from every EU28 Country is important to foster the entrepreneurship attitude in each European Country. We also include 32 non-capital cities in the EU that are important hubs, thus culminating in a sample of 60 cities (Bannerjee et al. 2016).

We decided to create an innovative multidimensional index (KBCDE—Knowledge-Based City Developing Entrepreneurship) in order to better explain the different dimensions of "knowledge cities" following a consolidated methodology (Nardo et al. 2005; Ivaldi et al. 2016a), which defines different stages in order to develop a composite indicator. We have considered it appropriate

to construct an index based on currently available data, coming directly from certified sources. They do not require ad hoc surveys, with the double benefit of avoiding additional costs and the ability to update the data easily and continuously (Jarman 1983; Ivaldi and Testi 2011; Ivaldi et al. 2016a; Santagata et al. 2017; Landi et al. 2017). The analysis of the literature offers several ways to determine a priori which variables are the most suitable for the index (Yigitcanlar 2011; Yigitcanlar and Lönnqvist 2013; Yigitcanlar et al. 2015), even though the choice is conditioned, of course, both by the availability of data and the purpose of the index itself. We decided to consider 28 indicators grouped into 4 dimensions (Table 4.1).

The first dimension, Social and Talent-Cultural perspective (STC), is focused on the social aspect, following the approach of Florida (2002). The second dimension (Economy and context economy perspective—ECE) identifies the economic conditions that can affect the development of entrepreneurship, also taking into account some profiles that help the construction of a knowledge economy. The third dimension, Environmental and Infrastructural perspective (ENI), regards soft infrastructure (the level of digitalization of the city) and hard infrastructure (transport, efficacy of connection infrastructure in term of commuting), according to Turok (2008) and Audretsch et al. (2015).

Lastly, the fourth component, the urban innovation system perspective (UIS), contains 8 indicators of the innovative effort of the urban innovation system, in terms of institutions and resources (Méndez and Moral 2011).

The indices are currently based on available data, coming directly from certified sources (Gordon and Pantazis 1997; Ivaldi et al. 2016b). Data was drawn from composite sources: Nesta, European Venture Capital Association, Crowdsurfer, World Bank, Cushman & Wakefield, Ookla, ITU, European Statistical System: CensusHub2, GHTorrent, Eurobarometer, GP Bullhound, CB Insights, QS University Rankings, Numbeo, DG Regio, Teleport, Global Enterpreneurship Monitor, Eurostat, Meetup.com, Gust, Open Axel, Seed DB, and European Business Angels Network.

Variables containing outliers were treated so that the largest/smallest value was transformed to have the same value as the second largest/smallest until the skewness and kurtosis fell within acceptable limits: 2 and 3.5, respectively (Bannerjee et al. 2016). All the variables were normalized to within an identical [0, 1] range by subtracting the minimum value and then dividing by the entire range of values for that indicator using the Min-Max normalization method (Han et al. 2012).

About 95% of the data was complete and missing data was replaced with the mean of the other variables in that theme obtained for that city. This means that for those cities containing missing values, the theme scores obtained using imputed data were the same as those that would have been obtained had the variables containing missing values been excluded from the Index (Bannerjee et al. 2016). When the variables are expressed in different units of measurement, as in this case, it is necessary before making the sum to proceed with standardization in order to prevent some variables having a greater weight than others (Jarman 1983; Ivaldi and Testi 2011). Standardization is the most commonly used method because it converts all indicators to a

Table 4.1 Dimensions and variables used

Dimensions (and variables)			
Social and talent-cultural perspective (STC)	Economy and context economy perspective (ECE)	Environmental and infrastructural perspective (ENI)	Urban innovation system perspective (UIS)
Multicultural diversity (Percentage of population that are foreign born)	Online collaboration (Number of GitHub Users within the last 12 months)	Internet download/upload speed (Broadband speed (MB/s))	Availability of early stage funding in PPP (Amount of seed and start-up funding raised (€ thousands))
Access to graduates (Percentage of population aged 25–64 with tertiary (level 5–8) education attainment)	Labor costs[a] (Average salary for: software developers, web designers, web developers, business developers, content marketing, sales managers, + customer support (€ per annum))	Cost of broad band[a] (Fixed broadband subscription charge ($/Month)	Availability of late stage funding in PPP (Amount of later stage funding raised (€ thousands))
English language skills (Percentage of city's population who can communicate in English)	Access to ICT employees (Number of employees in ICT sector/working population)	Mobile internet download/upload speed (Speed of mobile internet (MB/s))	Availability of BA investment in PPP
Quality of research institutions (Number of research intuitions in top 200)	Access to support employees (Number of employees in: legal and accounting activities; advertising and market research; office administrative, office support and other business support activities/working pop.)	The standard of living (Quality of life index score)	Availability of crowd-funding (Amount pledged to successful campaigns through any model)
Size of potential mobile-based market (Number of active mobile-broadband subscriptions per 100 inhabitants)	Ease of doing business (Time and cost associated with doing business; distance to Frontier score)	Commute (Average travel time and distance to work)	Networking and mentoring events (Number of meet-up events in the last year per capita)

(continued)

Table 4.1 (continued)

Dimensions (and variables)			
Social and talent-cultural perspective (STC)	Economy and context economy perspective (ECE)	Environmental and infrastructural perspective (ENI)	Urban innovation system perspective (UIS)
Culture and recreation (Average scores attributed to diverse cultural facilities)	Cost of office space (Average rental cost or price of the commercial property (€/Sqm/Year))	Train connectivity (Total population that can be reached within 3 h of train travel)	Access to accelerators (Number of accelerators per capita)
	Research and development intensity (Expenditure on R&D—thousands of PPS)	Airport connectivity (Score based on the number of flights from local airports)	Availability of early stage assistance (Number of Business Angels per capita)
			Public sector information (Public sector information score)

[a]Inverted variables
Source Our calculations

common scale with an average of zero and standard deviation of one. The average of zero means that it avoids introducing aggregation distortions stemming from differences in indicators. The scaling factor is the standard deviation of the indicators across countries.

$$Z_i = \frac{x_i - \mu_{x_i}}{x_i}$$

In the absence of dominance of one dimension over all others, some combination or aggregation is necessary in order to make "Knowledge" inter-individually comparable. The weighting of the relevant life domains is deemed a crucial, but very difficult issue and we have opted for equal weighting for three reasons. First of all, the theoretical scheme attaches to each indicator the same adequacy in defining the variable to measure; second it does not allow for hypotheses consistently derived from differential weightings, and statistical and empirical knowledge is not sufficient for defining weights; finally there is no agreement about the application of alternative procedures (Maggino 2009; Ivaldi et al. 2016b; Munda and Nardo 2005). Indeed, even though it would be desirable to assign different weights to the various domains considered, there is no reliable basis for doing so and in any case this does not mean there is no weighting, because equal weighting does imply an implicit judgment on the weights being equal (Nardo et al. 2005).

The robustness and sensitivity analysis checked the effect of removing each variable in turn from the Index to ascertain whether it has an excessive influence on the remaining variables and the composite Index as a whole (Nardo et al. 2005).

One of the major problems in constructing synthetic measures of "knowledge" is determining an appropriate aggregation method to incorporate multidimensional variables into an overall index. Clustering the items in a limited number of dimensions or highlighting any different pattern of the "knowledge" in different cities can be useful to simplify the interpretation of the information available in the list of variables. In order to do so, different techniques can be implemented.

Each dimension was then obtained by adding the contributions and calculating the corresponding *z-scores* (Ivaldi and Testi 2011).

$$W_i = 1/N \sum_{i=1}^{n} (Z_i)$$

And the final index was then calculated in an additive way, by summing up the contributions by calculating the corresponding *z-scores*.

$$I_1 = \frac{w_1 - \mu_{w_1}}{w_1};\ I_2 = \frac{w_2 - \mu_{w_2}}{w_2};\ I_3 = \frac{w_3 - \mu_{w_3}}{w_3};\ I_4 = \frac{w_4 - \mu_{w_4}}{w_4}$$

$$KNI = 1/N \sum_{j=1}^{6} (I_i)$$

We used the same methodology to create the index of Entrepreneurship (ENT) using three variables: New-business density, Absence of negative perception of entrepreneurship (% of the population) and History of highly successful digital companies (per capita) as a proxy of the attitude towards innovative entrepreneurship.

A sensitivity analysis of the aggregation method was performed to confirm the strength of the proposed index. The index was recalculated with the Pena distance method (D2P) (Pena 1977; Somarriba and Pena 2009; Nayak and Mishra 2012). The results were compared using the Spearman *rho* correlation to verify if the use of a different aggregation method involved a substantial change in the ranking order of the index. The value of the coefficient (0.96) confirmed the substantial robustness of the index net of the method used.

4.4 Results and Discussion

On the basis of the dimensions identified here, London ranks as the best performer, in terms of the Social and Talent-cultural perspective (1st; STC = 3.21), the Urban innovation system perspective (1st UIS = 2.92) and then on the basis of "KBCDE—Knowledge-Based City Developing Entrepreneurship synthetic

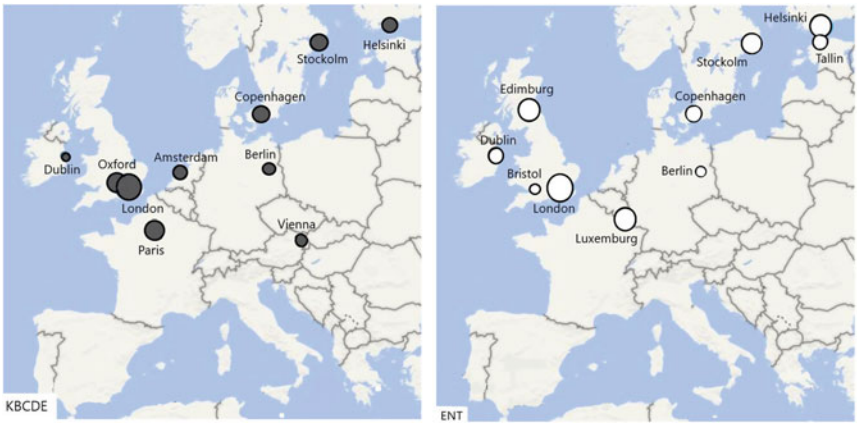

Fig. 4.1 KBCDE index and ENT index: top 10 positions. *Source* Our calculations

measures (1st; 1.84). These profiles stimulate the leading position in the Entrepreneurship index (1st; ENT = 2.45), confirming previous academic contributions (Yigitcanlar et al. 2008a; Carrillo 2006) (Table 4.2).

In line with the main literature (Ergazakis et al. 2004; Edvinsson 2006), Stockholm follows London in KBCDE (2nd; 1.35), due to its good position in the social aspect (2nd; 2.15) and in the creation of a good innovative system (6th; UIS = 1.78). London and Stockholm are followed by Oxford, Paris, Amsterdam, Copenhagen, and Helsinki. The city of Valletta, which ranks last on KBCDE (−1.49) and the other dimensions is far behind other knowledge cities, yet surprisingly, the attitude of Valletta toward entrepreneurship is not low (12th; 0.86).

Figure 4.1 shows the top 10 positions for KBCDE and ENT.

It is not a coincidence that London—which is ranked higher as a knowledge city than all other EU cities—has recently implemented dictated policies, making the city's government activities more coherent. The city, which produces/works towards precise dictated policies to enhance its role as a center of advanced services and a destination for tourism/cultural consumption–is committed to "ensuring London sustains its success as UK's only global city" (Turok 2008). The city of Stockholm is conducting a strategy to develop Stockholm as a knowledge city. A significant amount of the overall city budget supports this strategy. In particular, strategic actions are aimed at developing high-tech businesses, attracting a highly educated and skilled workforce and providing high-quality everyday life. Some of these cities have implemented explicit policies in order to earn these "statuses". These policies aim to enhance the competitiveness of these cities and the national system in which they are located, as well as to realize a harmonious development with other neighboring towns.

In the contemporary economy, in fact, cities are in competition with each other in attracting investment, business, inhabitants, and tourists and improving citizens' satisfaction. In order to deal with this competition, cities use different tools: strategic planning, marketing strategies, city branding, etc. In particular, having dictated

Table 4.2 KBCDE index (with its subdimensions) and ENT Index: top 10 positions

Social and talent-cultural perspective (STC)		Economy and context economy perspective (ECE)		Environmental and infrastructural perspective (ENI)		Urban innovation system perspective (UIS)		Knowledge-Based cities development entrepreneurship (KBCDE)		Entrepreneurship (ENT)	
London	3.21	Bratislava	2.3	Oxford	2.21	London	2.92	London	1.84	London	2.45
Stockholm	2.15	Copenhagen	2.2	Bucharest	1.63	Berlin	2.52	Stockholm	1.35	Helsinki	2.15
Paris	1.93	Oxford	2	Eindhoven	1.59	Paris	2.33	Oxford	1.33	Luxembourg	2.06
Copenhagen	1.71	Lisbon	1.9	Riga	1.54	Dublin	2	Paris	1.27	Edinburgh	2.04
Helsinki	1.7	Stockholm	1.7	Utrecht	1.53	Amsterdam	1.89	Amsterdam	1.06	Stockholm	1.89
Dublin	1.55	Hamburg	1.2	Birmingham	1.49	Stockholm	1.78	Copenhagen	1.06	Copenhagen	1.67
Amsterdam	1.18	Munich	1.2	Amsterdam	1.37	Helsinki	1.64	Helsinki	1.03	Dublin	1.52
Brussels	1	Madrid	1.1	Paris	1.24	Barcelona	1.46	Berlin	0.86	Tallinn	1.47
Edinburgh	0.95	Helsinki	1	The Hague	1.13	Vienna	1.21	Vienna	0.8	Bristol	1.13
Oxford	0.9	Berlin	1	Lille	0.97	Madrid	0.94	Dublin	0.68	Berlin	1.02

Source Our calculations

policies brings the following value to cities: increased competitiveness resulting in a positive impact on investment, jobs, inhabitants, visitors, and events; higher returns on investment in real estate, infrastructure and events; coherent city development, as the physical, social, economic and cultural aspects combine to deliver the brand promise; pride in the city as the inhabitants, businesses and institutions experience a new sense of purpose and direction.

The results confirm that the top cities are located in Northern Europe. Policies aimed at enhancing the level of quality in social, economic and environmental sustainability and in supportive interventions for new firms have stimulated the creation of a knowledge-based context. Barcelona is a Mediterranean city that scores in the "top ten" in the Urban innovation system (UIS) perspective. Grounding on its eight universities, the City Authority of Barcelona has adopted a Strategic Metropolitan Business Plan in which the concept of Knowledge Cities is a dominant characteristic, and has stimulated R&D and technology centers and a scientific park network specialized in Technology and Engineering. Madrid has implemented strategies aimed at enhancing bases of knowledge (Méndez and Moral 2011). Dictated policies are important for gaining an emerging knowledge environment (Penco 2015). The "low achievers" cities are mainly located in the Southern or in Eastern Europe: the culture toward the concept of "city planning" and "city management" is more recent than in the North European cities.

In addition, the choice was made to compare KBCDE with the Entrepreneurship index through the Pearson correlation coefficient. Pearson's correlation is moderately good (0.458) and significant at the 0.01 level (2-tailed). The findings demonstrate that a high score in KBCDE is a valuable predictor of ENT attitude at the city level, confirming that a knowledge city environment is a stimulus for the development of entrepreneurship.

In order to understand which profiles of knowledge cities stimulate entrepreneurship most, the components that are most correlated with ENT are described by STC (0.637) and UIS (0.460) (Table 4.3).

As the Social and Talent-Cultural perspective (STC) helps to attract and retain talent, the empirical outcomes corroborate the positive association between a good social environment and entrepreneurship attitude at the city level. Moreover, the outcomes test the relevant role of the creation of interventions and measures aimed at developing an Urban Innovation System perspective (UIS) in shaping entrepreneurship.

The Economy and Context Economy perspective (ECE) and the Environmental and Infrastructural perspective (ENI) are not significant for the development of entrepreneurship because they represent some economic conditions that are a precondition of "doing business" at the city level.

Table 4.3 Correlation between entrepreneurship and dimensions

Dimensions		Social and talent-cultural perspective (STC)	Economy and context economy perspective (ECE)	Environmental and infrastructural perspective (ENI)	Urban innovation system perspective (UIS)	Knowledge-based cities development entrepreneurship (KBCDE)	Entrepreneurship (ENT)
Social and talent-cultural perspective (STC)	Pearson correlation	1	0.264[a]	0.327[a]	0.724[b]	0.822[b]	0.637[b]
	Sig. (2-tailed)		0.042	0.011	0	0	0
Economy and context economy perspective (ECE)	Pearson correlation	0.264[a]	1	0.071	0.342[b]	0.595[b]	−0.054
	Sig. (2-tailed)	0.042		0.588	0.008	0	0.684
Environmental and infrastructural perspective (ENI)	Pearson correlation	0.327[a]	0.071	1	0.24	0.581[b]	0.247
	Sig. (2-tailed)	0.011	0.588		0.065	0	0.057
Urban innovation system perspective (UIS)	Pearson correlation	0.724[b]	0.342[b]	0.24	1	0.818[b]	0.460[b]
	Sig. (2-tailed)	0	0.008	0.065		0	0

(continued)

Table 4.3 (continued)

Dimensions		Social and talent-cultural perspective (STC)	Economy and context economy perspective (ECE)	Environmental and infrastructural perspective (ENI)	Urban innovation system perspective (UIS)	Knowledge-based cities development entrepreneurship (KBCDE)	Entrepreneurship (ENT)
Knowledge-based cities development enterpreneurship (KBCDE)	Pearson correlation	0.822[b]	0.595[b]	0.581[b]	0.818[b]	1	0.458[b]
	Sig. (2-tailed)	0	0	0	0		0
Entrepreneurship (ENT)	Pearson correlation	0.637[b]	−0.054	0.247	0.460[b]	0.458[b]	1
	Sig. (2-tailed)	0	0.684	0.057	0	0	

[a]Correlation is significant at the 0.05 level (2-tailed)
[b]Correlation is significant at the 0.01 level (2-tailed)

4.5 Discussion, Conclusion and Further Research

The present study examined how specific variables (an STC perspective; EKE context perspective; ENI perspective; and UIS perspective), related to the concept of a knowledge-based city, may affect urban-level entrepreneurship attitudes. The analysis was performed on a sample of 60 cities, including all capital cities in the EU28 and 32 non-capital EU cities that are important hubs.

The findings reveal that a high KCBED score is a valuable predictor of ENT attitude at the city level, confirming that a knowledge city environment is a stimulus for entrepreneurship development.

We demonstrated by means of a correlation analysis which profiles of knowledge cities helped to enhance the knowledge attitude level. The STC and the UIS dimensions are considered significant in constructing a high level of knowledge-based urban environment; these dimensions stimulate entrepreneurship most.

Our work tries to contribute to the debate on urban economic development and entrepreneurship, providing implications for academics and urban policymakers. The empirical results show that the social and cultural environment may significantly improve entrepreneurship in EU cities, more than other factors that are usually connected to economic development. Other factors related to the economic context and environmental and infrastructural facilities are considered a "pre-requisite", and do not significantly affect the development of an entrepreneurial environment.

This contribution presents some inherent limitations, which might be challenged in future research. First, the investigation is performed only on EU cities; further studies are therefore required to enlarge the sample of cities, including other urban areas and to make a comparison with other relevant countries (e.g., Emerging Economies/Advanced Economies). In addition, the number of variables and attributes referred to each dimension might be expanded to include additional perspectives, which could reasonably contribute to achieving a better understanding of the determinants affecting the development of entrepreneurship at the city level. Finally, it could be interesting to investigate the causation from ENT to the KBCDE and its components in order to understand if a high entrepreneurial attitude is the premise for the creation of the Knowledge-Based Environment.

Appendix

Social and talent-cultural perspective (STC)		Economy and context economy perspective (ECE)		Environmental and infrastructural perspective (ENI)		Urban innovation system perspective (UIS)		Knowledge-based cities development entrepreneur-ship KBCDE		Entrepreneurship (ENT)	
London	3.21	Bratislava	2.33	Oxford	2.21	London	2.92	London	1.84	London	2.45
Stockholm	2.15	Copenhagen	2.15	Bucharest	1.63	Berlin	2.52	Stockholm	1.35	Helsinki	2.15
Paris	1.93	Oxford	1.97	Eindhoven	1.59	Paris	2.33	Oxford	1.33	Luxembourg	2.06
Copenhagen	1.71	Lisbon	1.92	Riga	1.54	Dublin	2	Paris	1.27	Edinburgh	2.04
Helsinki	1.7	Stockholm	1.69	Utrecht	1.53	Amsterdam	1.89	Amsterdam	1.06	Stockholm	1.89
Dublin	1.55	Hamburg	1.24	Birmingham	1.49	Stockholm	1.78	Copenhagen	1.06	Copenhagen	1.67
Amsterdam	1.18	Munich	1.22	Amsterdam	1.37	Helsinki	1.64	Helsinki	1.03	Dublin	1.52
Brussels	1	Madrid	1.07	Paris	1.24	Barcelona	1.46	Berlin	0.86	Tallinn	1.47
Edinburgh	0.95	Helsinki	1.04	The Hague	1.13	Vienna	1.21	Vienna	0.8	Bristol	1.13
Oxford	0.9	Berlin	1.04	Lille	0.97	Madrid	0.94	Dublin	0.68	Berlin	1.02
Vienna	0.83	Cambridge	0.87	Malmo	0.88	Munich	0.86	Munich	0.63	Aarhus	0.9
Gothenburg	0.71	Bucharest	0.84	Luxembourg	0.85	Cambridge	0.84	Cambridge	0.61	Valletta	0.86
Munich	0.65	Cologne	0.79	Vienna	0.85	Copenhagen	0.57	Madrid	0.53	Bordeaux	0.74
Manchester	0.62	Karlsruhe	0.78	Cambridge	0.84	Bristol	0.48	Bristol	0.44	Manchester	0.61

(continued)

(continued)

Social and talent-cultural perspective (STC)		Economy and context economy perspective (ECE)		Environmental and infrastructural perspective (ENI)		Urban innovation system perspective (UIS)		Knowledge-based cities development entrepreneur-ship KBCDE		Entrepreneurship (ENT)	
Birmingham	0.61	Sofia	0.77	Vilnius	0.75	Lyon	0.29	Utrecht	0.4	Birmingham	0.44
Berlin	0.61	Prague	0.64	London	0.73	Manchester	0.27	Edinburgh	0.38	Lille	0.43
Bristol	0.56	Stuttgart	0.58	Brussels	0.67	Oxford	0.25	Brussels	0.35	Paris	0.43
Luxembourg	0.48	Budapest	0.58	Manchester	0.65	Lisbon	0.24	Bratislava	0.32	Amsterdam	0.38
Glasgow	0.47	Ljubljana	0.56	Edinburgh	0.61	Tallinn	0.17	Tallinn	0.31	Cardiff	0.34
Malmo	0.39	London	0.5	Bratislava	0.51	Budapest	0.11	Manchester	0.26	Utrecht	0.28
Utrecht	0.37	Tallinn	0.42	Aarhus	0.5	Hamburg	0.08	Lisbon	0.23	Oxford	0.25
Cardiff	0.35	Bristol	0.35	Uppsala	0.5	Toulouse	0.07	Barcelona	0.23	Toulouse	0.23
Tallinn	0.31	Vienna	0.32	Lyon	0.44	Edinburgh	−0.02	Birmingham	0.21	Cambridge	0.22
Madrid	0.22	Uppsala	0.22	Bristol	0.38	Birmingham	−0.04	Eindhoven	0.17	Glasgow	0.14
Barcelona	0.21	Riga	0.18	Tallinn	0.35	Eindhoven	−0.08	Bucharest	0.16	Nicosia	0.12
Uppsala	0.2	Dublin	0.08	Bordeaux	0.19	Valencia	−0.13	Riga	0.1	Uppsala	−0.01
Aarhus	0.12	Warsaw	0.07	Cardiff	0.16	Frankfurt	−0.16	The Hague	0.04	Madrid	−0.01
Nicosia	0.09	Utrecht	0.07	Budapest	0.03	Bordeaux	−0.19	Malmo	0.03	Barcelona	−0.03
The Hague	0	Brussels	0.01	Frankfurt	−0.02	The Hague	−0.24	Uppsala	0.01	Athens	−0.09
Hamburg	−0.02	Frankfurt	0	Prague	−0.04	Brussels	−0.28	Hamburg	−0.02	Bucharest	−0.13

(continued)

(continued)

Social and talent-cultural perspective (STC)		Economy and context economy perspective (ECE)		Environmental and infrastructural perspective (ENI)		Urban innovation system perspective (UIS)		Knowledge-based cities development entrepreneur-ship KBCDE		Entrepreneurship (ENT)	
Cambridge	−0.11	Edinburgh	−0.04	Dusseldorf	−0.06	Cardiff	−0.29	Vilnius	−0.07	Eindhoven	−0.24
Frankfurt	−0.16	Krakow	−0.05	Madrid	−0.13	Cologne	−0.31	Aarhus	−0.09	The Hague	−0.25
Riga	−0.19	Vilnius	−0.15	Valencia	−0.14	Glasgow	−0.34	Frankfurt	−0.09	Malmo	−0.25
Eindhoven	−0.21	Amsterdam	−0.18	Munich	−0.2	Krakow	−0.35	Budapest	−0.09	Riga	−0.28
Stuttgart	−0.33	Aarhus	−0.41	Barcelona	−0.21	Lille	−0.35	Cologne	−0.1	Valencia	−0.29
Karlsruhe	−0.34	Toulouse	−0.41	Copenhagen	−0.21	Utrecht	−0.37	Cardiff	−0.13	Milan	−0.31
Lyon	−0.4	Paris	−0.43	Stockholm	−0.23	Ljubljana	−0.38	Lyon	−0.15	Sofia	−0.36
Vilnius	−0.41	Rome	−0.47	Helsinki	−0.27	Karlsruhe	−0.41	Prague	−0.2	Stuttgart	−0.38
Athens	−0.45	Malmo	−0.49	Cologne	−0.28	Warsaw	−0.44	Karlsruhe	−0.34	Munich	−0.48
Cologne	−0.6	Manchester	−0.49	Lisbon	−0.35	Vilnius	−0.45	Luxembourg	−0.37	Turin	−0.55
Prague	−0.62	Barcelona	−0.56	Warsaw	−0.35	Bratislava	−0.56	Glasgow	−0.39	Vilnius	−0.58
Valencia	−0.74	Zagreb	−0.61	Toulouse	−0.36	Aarhus	−0.56	Toulouse	−0.4	Lyon	−0.59
Ljubljana	−0.77	Gothenburg	−0.63	Glasgow	−0.53	Dusseldorf	−0.61	Warsaw	−0.42	Rome	−0.59
Dusseldorf	−0.77	Eindhoven	−0.63	Milan	−0.58	Malmo	−0.66	Gothenburg	−0.42	Frankfurt	−0.6
Sofia	−0.82	Dresden	−0.66	Berlin	−0.73	Gothenburg	−0.67	Stuttgart	−0.45	Cologne	−0.73

(continued)

(continued)

Social and talent-cultural perspective (STC)		Economy and context economy perspective (ECE)		Environmental and infrastructural perspective (ENI)		Urban innovation system perspective (UIS)		Knowledge-based cities development entrepreneur-ship KBCDE		Entrepreneurship (ENT)	
Milan	−0.83	Athens	−0.7	Sofia	−0.85	Milan	−0.67	Sofia	−0.5	Dusseldorf	−0.73
Lisbon	−0.88	The Hague	−0.72	Krakow	−0.88	Luxembourg	−0.73	Ljubljana	−0.51	Lisbon	−0.82
Toulouse	−0.9	Dusseldorf	−0.74	Dublin	−0.9	Prague	−0.78	Dusseldorf	−0.55	Warsaw	−0.87
Bucharest	−0.94	Cardiff	−0.75	Valletta	−1.04	Uppsala	−0.87	Bordeaux	−0.56	Brussels	−0.89
Warsaw	−0.95	Turin	−0.93	Stuttgart	−1.04	Nicosia	−0.88	Lille	−0.63	Prague	−0.92
Rome	−0.95	Lyon	−0.95	Zagreb	−1.09	Bucharest	−0.9	Valencia	−0.67	Dresden	−0.94
Zagreb	−1.01	Milan	−1.13	Gothenburg	−1.1	Rome	−0.95	Krakow	−0.76	Gothenburg	−0.99
Bratislava	−1.01	Glasgow	−1.16	Athens	−1.3	Stuttgart	−1	Milan	−0.8	Karlsruhe	−1.03
Bordeaux	−1.07	Bordeaux	−1.17	Karlsruhe	−1.38	Dresden	−1.04	Athens	−0.87	Hamburg	−1.05
Budapest	−1.07	Birmingham	−1.22	Hamburg	−1.4	Athens	−1.05	Rome	−0.98	Zagreb	−1.21
Dresden	−1.25	Nicosia	−1.39	Ljubljana	−1.46	Turin	−1.06	Zagreb	−0.99	Vienna	−1.23
Valletta	−1.41	Lille	−1.6	Rome	−1.54	Sofia	−1.12	Nicosia	−1.13	Krakow	−1.28
Lille	−1.55	Valencia	−1.66	Dresden	−1.76	Riga	−1.12	Dresden	−1.18	Bratislava	−1.49
Turin	−1.58	Valletta	−1.9	Turin	−1.86	Zagreb	−1.28	Turin	−1.35	Ljubljana	−1.53
Krakow	−1.76	Luxembourg	−2.08	Nicosia	−2.33	Valletta	−1.62	Valletta	−1.49	Budapest	−2.06

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Chapter 5
Acquisition of General Human Capital for Developing Entrepreneurship

Takuya Nakaizumi

Abstract We explore a model of the choice to provide firm-specific or general skills in an incomplete contract situation. Although general human capital is crucial for developing start-ups, firms and employers have strong incentives to provide their employees with firm-specific skills, as Becker (Human capital: a theoretical and empirical analysis, with special reference to education, Columbia University, New York, 1964) pointed out. In this study, we derive the conditions for which general training is provided. Specifically, if employers have no chance of becoming employees, then they always choose to provide firm-specific training. If employers face the possibility of becoming employees if the firm fails, however, they have an incentive to provide general human capital to increase their bargaining power by improving the outside option in which general training may be required outside the firm. Thus, the potential for mobility between the employer and employee roles is essential for providing general training.

Keywords Endogenous training choice · Firm-specific training · General training · Hold-up problem · Start-up · Industrial agglomeration

5.1 Introduction

Promoting knowledge spillovers in an industrial agglomeration of start-ups within an urban economy is important for developing entrepreneurship as well as for urban development. Saxenian (1996) argues that the openness of Silicon Valley is its key advantage for entrepreneurship and explains why Silicon Valley developed more than Route 128, which was established before Silicon Valley, did.

Route 128, the first high-tech manufacturing region in the USA, is located near Boston, Massachusetts. Its decline happened concurrently with the emergence of California's Silicon Valley, which is based on a completely different business model.

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It is suggested that both the decline and the later resurgence of Route 128 can be explained by the emergence of a new competitive advantage. This advantage is based on the principle of systems integration, according to which the original vertical integration model has been transcended by an open system of specialist firms. Integral systems are maintained by inner firm transactions, whereas in open systems, intra-firm exchanges are more important. The former systems utilize firm-specific human capital, and the latter systems utilize general human capital. In a twenty-first-century urban economy with many start-ups, general human capital and training are more important, as the development of Silicon Valley shows.

Nevertheless, the most important knowledge and skills remain secret within firms and among entrepreneurs, and transferring this information across firms might be difficult. The movement of highly skilled workers or entrepreneurs is easier to facilitate than direct communication or information transfers are, and thus, human capital may be another channel that spreads knowledge across firms. The mobility of highly skilled workers can be an effective means of knowledge transfer, especially in a concentrated urban economy; these workers move their human capital across companies and provide knowledge and skills essential for entrepreneurship if they have general skills.

Despite the development of information technology, face-to-face communication is still important, not as a means of directly transmitting information, but for providing momentum to recruit professionals from other companies. In general, an urban economy provides a platform for such mobility, which is one of the driving forces for developing urban areas. Although cyberspace may help provide information for labor mobility, it is not a perfect substitute for face-to-face communication, and mobility within an urban economy is still important for the development of start-ups. We focus on the mobility of workers and entrepreneurs with human capital in the urban economy. In this case, general or firm-specific skills are crucial.

When Becker (1964) first developed the theory of human capital, he also explored training choice theory, in which either firm-specific or general training is selected by employers. "Firm-specific training" refers to the acquired skills that are only available in an ongoing relationship with the training firm, whereas "general training" refers to the acquired skills that increase the productivity of a worker outside the firm in which the skill is obtained.

Becker's conclusion is as follows: employers do not invest in their employees' general skills only if employers incur the costs of investing in their employees' training in a competitive labor market, owing to their inability to collect the returns from such investments. Thus, workers must pay the full cost of any necessary general training. If an employee faces liquidity constraints and cannot bear the cost of training, the only way he can receive training is if the employer provides firm-specific training.

Drawing on incomplete contract theory Nakaizumi (2018), pointed out that facing contractual incompleteness and employees' liquidity constraints, firm-specific human capital is justified to mitigate the hold-up problem. In the face of contractual incompleteness, it is more difficult to provide adequate training because of the hold-up problem, as is first pointed out by Grossman et al. (1986). This study, like that of Nakaizumi (2018), primarily focuses on this issue, as we explain in detail

in Sect. 5.2. If the hold-up problem is severe, then the employer may provide no training at all.

Even if the training cost is lower, general training is more difficult to provide because it reduces the employer's reward more than firm-specific training does. If an employee quits the firm after receiving general training, he can quit as a skilled worker, increasing his bargaining power. Firm-specific training, in contrast, provides more bargaining power to firms or employers and more profit from providing the training, whereas workers' bargaining power declines, and their wages decrease. Companies can recover their training expenses more easily with firm-specific training than with general training, and thus, can more easily avoid the hold-up problem. Firm-specific training is therefore effective in the sense that it mitigates the hold-up problem.

This result coincides with Koike's (1988, 1991), proposition, which emphasizes the importance of firm-specific human capital to the 1960s miracle development of the Japanese economy, during which employees faced liquidity constraints. Only firms or employers provided training for employees in the face of the hold-up problem. Thus, firm-specific human capital is the second-best way for an employee to obtain human capital.

Koike's (1988, 1991) applies this conjecture to the industries or economies of large firms in the twentieth century, in which knowledge is accumulated within large firms with very low probabilities of bankruptcy. In the twenty-first century and in the context of industry 4.0, however, urban economies with many start-ups are substantially more important than is the mass production of the twentieth century, for which knowledge spillovers are more crucial. Despite the importance of spillovers, however, firm-specific skills cannot be transmitted between firms. Thus, labor mobility is meaningless because of the low productivity of workers' skills outside their firms. In urban economies with many start-ups, general skills are more important for knowledge spillovers and growth of the economy based on the agglomeration of entrepreneurship.

Because firm-specific training tends to prevail, it is important to understand the conditions for which general training prevails. Incomplete contract theory applies to both large firms and start-ups if the economy is in the developing stage, and contractual incompleteness and liquidity constraints are substantial issues. We, therefore, focus on an economy with many start-ups in which general training is more important, and we assume that only entrepreneurs and employers can provide training to their employees (workers) owing to liquidity constraints. We use the terms "entrepreneur" and "employer" and the terms "worker" and "employee" interchangeably.

In the agglomeration of start-ups, not only can workers become entrepreneurs, but entrepreneurs can become workers if an ongoing start-up does not succeed. Thus, it is natural to consider mobility between the entrepreneur and worker roles, which provides workers and employees with strong incentives to obtain general skills. It is a natural extension that both employees and employers obtain skills together during on-the-job training sessions within small start-ups.

In this study, we derive the conditions for employers to provide general training using a simple partial equilibrium model of employer-provided training based on

incomplete contract theory. Mobility between employers' and employees' roles is the key factor in providing general training. We show that an employer chooses general training if employees may become employers and if employers may become employees.

Interestingly, even if an employer may become an employee, the employer does not provide general skills if the employee has no chance of becoming an employer. Thus, both the chance that an employer may become an employee and the chance that an employee may become an employer are necessary conditions for an employer to provide general training. This result arises because the bargaining power within a renegotiation is not strong enough if an employer can become an employee but the reverse does not occur. Thus, the chance that employees may become employers is essential for the development of a start-up market and the agglomeration of start-ups within an urban economy.

We consider a more straightforward and important condition for which general training can be provided within a start-up. If the employer may become an employee and employees may become employers after their start-up is not successful, then employers have an incentive to acquire general skills for vocational change. We consider this phenomenon and derive the conditions for employers to provide and acquire general skills.

Section 5.2 briefly reviews the literature and incomplete contract theory. In Sect. 5.3, we present the benchmark model, and we provide the results in Sect. 5.4. In Sect. 5.5, we extend the model to include mobility between the employer and employee roles and derive the conditions under which employers provide general training. Section 5.6 presents concluding remarks.

5.2 Brief Summary of Incomplete Contract Theory and Literature Review

Our research is based on incomplete contract theory, introduced by Grossman, Hart, and Moore's seminal works such as (Grossman et al. 1986; Hart et al. 1990) on the property rights approach.[1] It is argued that, in practice, contracts cannot specify actions for every possible contingency. At the time of contracting, future contingencies may not even be describable. Moreover, neither party can commit to never engage in mutually beneficial renegotiations later on in their relationship. Because the parties can renegotiate their contractual arrangements later on, they have insufficient incentives to make relationship-specific investments ex-ante (in this study, training for employees is an example of such investments), as one party's investment returns partially accrue to the other party in the case of renegotiations. We call this issue the hold-up problem. Search model is first developed by Diamond (1980, 1982). Our model is based on the famous labour search models of (Mortensen et al. 1994; Pissarides 1990) are, in fact, based on incomplete contract theory. In these models,

[1] See Hart (1995).

the surplus is divided based on renegotiations after employers and employees match and produce a good or service. In our model, training investment is assumed to be non-contractible ex-ante. Thus, the hold-up problem occurs, and bargaining power is crucial for dividing the surplus.

This study is closely related to those of (Kessler et al. 2006; MacLeod and Malcomson 1993a, b, 1995; Malcomson 1995). They show that a firm has an incentive to provide general training in an incomplete contract situation. Kessler et al. (2006) define the outside options such that they act as a lower bound to a party's payoffs in negotiations but otherwise do not affect the outcome, in contrast to threat points. Their bargaining procedure is too simple to consider the effects of outside options. Although we simplify the market conditions as exogenous, we use partial equilibrium analysis to understand the ongoing relationship between employers and employees using more complicated bargaining procedures and to derive the conditions under which employers provide general skills training.

Some other studies have suggested different reasons that firms provide general training. One primary explanation is the asymmetric information between the training firm and potential future employers. Katz and Ziderman (1990) study a model in which a worker's training level is unobserved by the market (see also Chiang and Chiang 1990; Chang and Wang 1995). In Acemoglu (1997) and Acemoglu and Pischke (1998, 1999) model, the training firm obtains superior information regarding the worker's ability during the training period. A similar situation arises if general skills are only valuable in imperfect competition, as in the models of Stevens (1994), Gersbach and Schmutzler (2003).

5.3 Model and Optimal Choice of Training

First, we develop a simple partial equilibrium model of wage bargaining with an outside option and demonstrate the difficulty firms or employers face in providing general skills training. We call training for general skills "general training" and training for firm-specific skills "firm-specific training." There are two risk neutral agents, the employer and employee, and we assume no discounting for simplicity.

In the first stage, the employer decides to prepare a training for either general or firm-specific skills. An important assumption is that the type of skill is unverifiable (uncontractible ex-ante), as is standard in incomplete contract theory. Thus, the parties cannot write enforceable contracts and even if the employee asks the employer to provide general training at any expense, there is no guarantee that an employer will provide such training. Then, the training type, which is also unverifiable ex-ante, is realized. At that point, the parties renegotiate the ex-post surplus that is contractible in the second stage, that is, the wages of employees and the profits of employers are determined by the second-stage renegotiation in which the outside option is the default point. After this renegotiation, production takes place, and outputs are realized.

In the model, we assume the output of a skilled employee is y_2, whereas a worker with no training produces only y_1. Without loss of generality, we assume that $y_1 = 0$ and $y_2 = y > 0$.

We make the simplification that both general and firm-specific training have the same cost c, $y > c$. Thus, the only difference between the two types of training is their availability to other firms. General training provides y to all firms, whereas firm-specific training provides $y_2 = 0$ to all other firms.

We could extend the unemployment period and cost using (Pissarides 1990) search model. However, for now, we use a simplified partial equilibrium model with the outside option as the exogenous parameter. We consider that other firms' strategies depend on whether the focal firm chooses general or firm-specific training, but we assume that all the firms in the market use identical strategies. The belief $beta$ is defined as the fraction of employers in the market who choose general training. Its fraction is based on other firms' strategies and is derived consistently in the equilibrium strategy. We assume that the employer's profit is defined as the bargaining surplus minus the training cost.

In the case of firm-specific training, the outside option is zero. In the case of general training, however, the outside option is assumed to be greater than 0, and it might be y if the employee can find another employer immediately. However, it is natural to think that employer matches are difficult to find immediately and that some matches may fail to occur. Furthermore, other matches might also fail. These factors tend to discount the value of the outside option. Thus, we assume that in the outside option, agents fail to produce at a rate of $1 - \alpha(\alpha < 1)$. Thus, the outside option value is discounted by αy.

The bargaining procedure is 50:50 Nash bargaining with the outside option as a default. The employee and employer can freely end the relationship, but they only do so when their renegotiations break down.

If the renegotiations break down, the employer and employee find other partners and produce using their human capital. After renegotiations, no more time remains for training. Thus, the outcomes are decided by friction and the possibility that renegotiations may fail again, given by α, and whether general or firm-specific training prevails in the market, given by the fraction of employees receiving general training, β, as defined previously. We derive the fulfilling conditions for which each employer's choice of training is consistent with the market conditions. If renegotiations end successfully and the surplus is divided between the employer and employee, the wage of an employee with firm-specific human capital is defined to be w_f, and the employer's profit is defined as π_f. The wage of an employee with general human capital is w_g, and the corresponding employer's profit is π_g. The timeline is given as follows.

- First stage: an employer and employee match, and the employer provides either general or firm-specific training to the employee.
- Second stage: renegotiations take place. If the renegotiations break down, the relationship is over, and both parties search for a new opportunity.

- Third stage: if renegotiations succeed, production takes place within the match, and the surplus is divided according to the results of renegotiation; if they break down, the employer and employee search for other matches. If either party successfully finds a new match and makes an agreement, production takes place, and that party and the new match divide the surplus; if neither party finds a new match, the surplus is assumed to be zero.

5.4 Optimal Choice of Training with No Mobility Between the Employer and Employee Roles

In this section, we derive the partial equilibrium outcome of a simple model in which only employers provide training. First, we derive the bargaining outcome.

Proposition 1 *If an employer provides general training, we use the fraction of employees with general training within the market, β ($0 \geq \beta \geq 1$) and the Nash bargaining procedure*[2] *to derive each party's renegotiation surplus as follows.*

$$w_g = \frac{1}{2}y + \frac{1}{4}(1-\beta)\alpha y \tag{5.1}$$

$$\pi_g = \frac{1}{2}y - \frac{1}{4}(1-\beta)\alpha y \tag{5.2}$$

If the employer provides firm-specific training, then the bargaining outcome is as follows:

$$w_f = \frac{1}{2}y - \frac{1}{4}\alpha\beta y \tag{5.3}$$

$$\pi_f = \frac{1}{2}y + \frac{1}{4}\alpha\beta y \tag{5.4}$$

Proof The employer and employee divide the total surplus y based on Nash bargaining with the default point as the outside option in the model. First, in the case of general training, the employer's outside option is to hire another employee from the market, and thus, the outside option value is $\beta\alpha\frac{y}{2}$. The probability of hiring a worker with general training is β, which is exogenous to the employer. The employee's outside option is $\alpha\frac{y}{2}$ because he received general training. They divide the surplus based on each default point, as in Fig. 5.1.

[2]Many studies consider noncooperative bargaining theory, as summarized by Mutoo (1999). In particular, the role of the outside option in noncooperative bargaining theory is developed by Binmore et al. (1986).

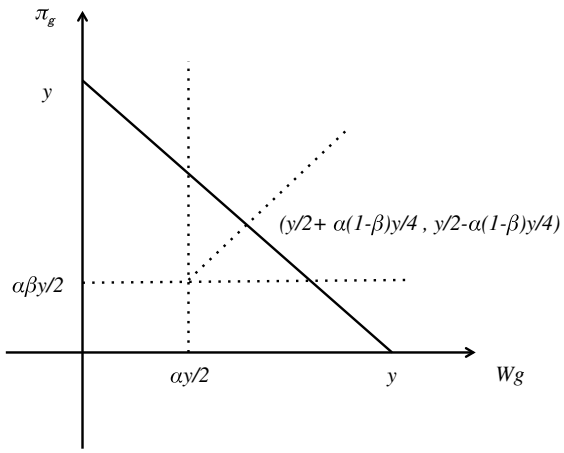

Fig. 5.1 Bargaining Surplus in the case of general training

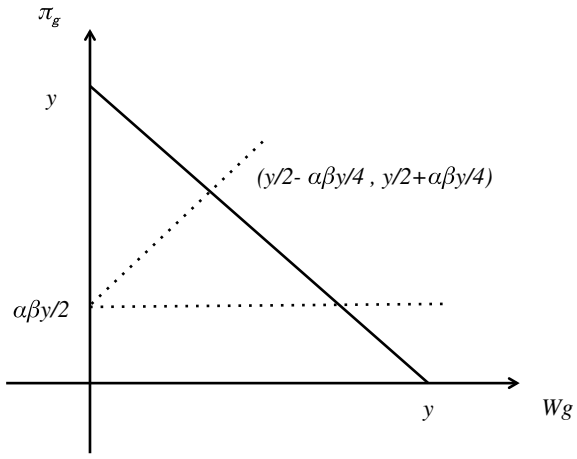

Fig. 5.2 Bargaining Surplus of firm Specific training

Next, we turn to the case of an employee with firm-specific training. The employer's outside option is to hire another employee from the market, and thus, the outside option value is $\beta\alpha\frac{y}{2}$, as in the case of general training. However, the employee's outside option is 0 because he has no human capital available outside the firm. Thus, the employer and employee divide the surplus based on each default point, as shown in Fig. 5.2.

Next, based on Proposition 1, we derive the following proposition for the choice of training (Figs. 5.1 and 5.2).

Proposition 2 *For any β, the employer's dominant strategy is to provide firm-specific training.*

Proof

$$\pi_f - \pi_g = \frac{1}{2}y + \frac{1}{4}\alpha\beta y - \frac{1}{2}y + \frac{1}{4}(1-\beta)\alpha y = \frac{1}{4}\alpha y \geq 0 \tag{5.5}$$

This inequality holds for any $beta$. Thus, firms choose firm-specific training.

A consistent conjecture regarding the market conditions of the model is that $\beta = 0$. In other words, no employer provides general training. Based on these results, we derive the following proposition regarding the training choice of the employer in the first stage.

Proposition 3 *As $\beta = 0$, employers provide only firm-specific training if and only if $\frac{1}{2}y - c > 0$*

Without the hold-up problem, employers receive a reward of at most y. Thus, even if $y > c > y/2$, training is provided. As a result, the provision of training is socially inefficient. This issue is the so-called hold-up problem.[3]

In this model, we assume that only employers can provide training. However, if employees can obtain their own training, they always choose general training, as can be proved straightforwardly using the same logic as in the previous proposition. Thus, if there is any possibility that employees can acquire training themselves, general training prevails. In practice, however, employees face liquidity constraints and have difficulty paying for the training. For this reason, among others, only firms provide training in Japan, and firm-specific training prevails.

For start-ups, however, general training is preferable. In the next section, we derive the conditions for acquiring general skills in a start-up environment.

5.5 Acquiring General Training

In this section, we consider the possibility of providing general human capital. Even if general training is preferable for an employer in the outside option or on the outside market, the employer has a strong incentive to provide firm-specific training to obtain a higher profit by decreasing the employee's outside option.

Thus, the necessary condition for general training is that both employers may become employees and employees may become employers if their start-ups are not successful. Then, employers have an incentive to provide general skills. We derive the necessary and sufficient conditions for the incentive to provide general skills in this section (Figs. 5.3 and 5.4).

We change the model such that (1) employers also need training because they may become employees if their start-ups are unsuccessful, (2) employers and employees jointly receive the same kinds of training and either general or firm-specific training

[3]We can extend easily the model to include asymmetric bargaining power between employers and employees.

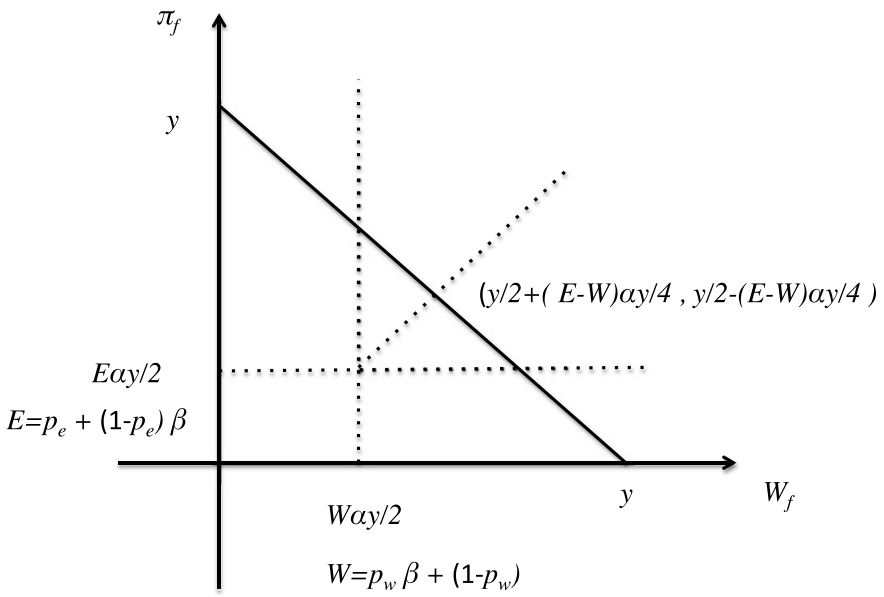

Fig. 5.3 Bargaining Surplus of general training with turn over

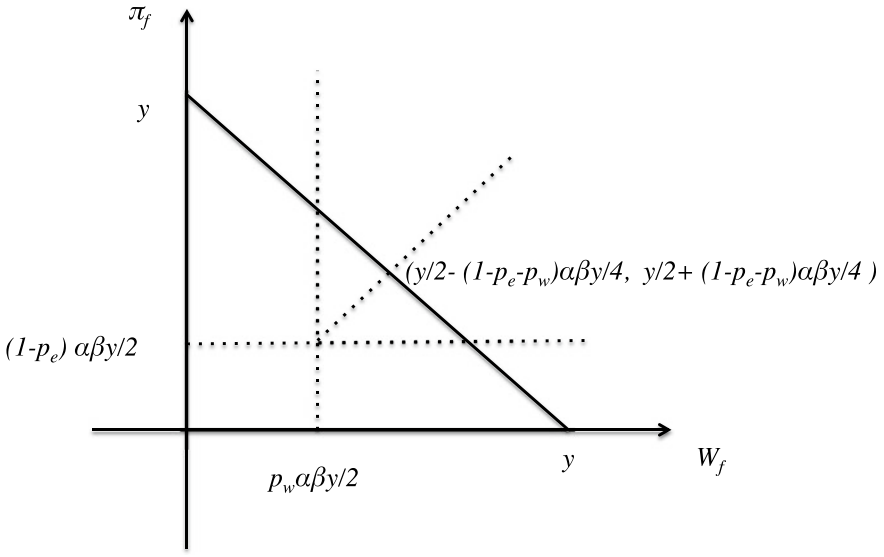

Fig. 5.4 Bargaining Surplus of firm specific training with turn over

is selected within the firm, and (3) after a break down, employers become employees outside the firm. The probability that an employer becomes an employee is assumed to be p_e, and that of an employee becoming an employer is assumed to be p_w.

The difference between the model in Sects. 5.2 and 5.3 and that in Sect. 5.4 is the outside option that serves as the default point. We derive the following lemma.

Lemma 1 *If the employer provides general training,*

$$w_g = \frac{1}{2}y + \frac{1}{4}(W - E)\alpha y \tag{5.6}$$

$$\pi_g = \frac{1}{2}y + \frac{1}{4}(E - W)\alpha y, \tag{5.7}$$

where $W = \beta p_w + (1 - p_w)$ *and* $E = p_e + \beta(1 - p_e)$. *If the employer provides firm-specific training, then*

$$w_f = \frac{1}{2}y - (1 - p_e - p_w)\frac{\alpha\beta y}{4} \tag{5.8}$$

$$\pi_f = \frac{1}{2}y + (1 - p_e - p_w)\frac{\alpha\beta y}{4}. \tag{5.9}$$

Proof When the employer chooses general training, the employer's outside option is

$$\frac{(1 - p_e)\alpha\beta y}{2} + \frac{p_e\alpha y}{2}, \tag{5.10}$$

and the employee's outside option is

$$\frac{(1 - p_w)\alpha y}{2} + \frac{p_w\beta\alpha y}{2}. \tag{5.11}$$

Thus, the bargaining outcome is as mentioned.

When the employer chooses firm-specific training, the employer's outside option is $(1 - p_e)\frac{\alpha\beta y}{2}$ and the employee's outside option is $p_w\frac{\beta\alpha y}{2}$. Thus, the bargaining outcome is as mentioned.

Next, we derive the conditions for which an employer chooses to provide general training. We derive the generalized results of the previous proposition.

Proposition 4 *The employer provides general training if and only if* $p_e + p_w > 1$.

Proof

$$\pi_g - \pi_f = \frac{1}{2}y + \frac{1}{4}(E - W)\alpha y - \frac{1}{2}y - (1 - p_e - p_w)\frac{\alpha\beta y}{4} \tag{5.12}$$

$$= (p_e + \beta(1 - p_e) - (\beta p_w + (1 - p_w)))\frac{\alpha y}{4} - (1 - p_e - p_w)\frac{\alpha\beta y}{4} \tag{5.13}$$

$$= (p_e + p_w - 1)\frac{\alpha y}{4} \tag{5.14}$$

This proposition shows that both the possibility that an employee may become an employer and the possibility that an employer may become an employee are necessary conditions for providing general training. Then, we obtain the following corollary.

Corollary 1 *Even if an employer may become an employee, if employees have no chance of becoming employers, employers choose firm-specific training.*

Proof If $p_w = 0$, if the employer provides firm-specific training, the employer's surplus is

$$\pi_g = \frac{1}{2}y + \frac{1}{4}(p_e + \beta(1 - p_e) - 1)\alpha y \tag{5.15}$$

$$= \frac{1}{2}y + \frac{p_e(1-\beta)\alpha y}{4} - \frac{(1-\beta)\alpha y}{4} \tag{5.16}$$

$$= \frac{1}{2}y - \frac{(1-p_e)(1-\beta)\alpha y}{4}, \tag{5.17}$$

where $W = \beta p_w + (1 - p_w)$ and $E = p_e + \beta(1 - p_e)$.

If the employer provides firm-specific training,

$$\pi_f = \frac{1}{2}y + (1 - p_e))\frac{\alpha\beta y}{4}. \tag{5.18}$$

Thus, $\pi_f - \pi_g = (1 - p_e)\frac{\alpha\beta y}{4} + \frac{(1-p_e)(1-\beta)\alpha y}{4} = (1 - p_e)\frac{\alpha y}{4} \geq 0$, implying that the employer always chooses firm-specific training.

This finding leads to the important result that even if employees have a chance of becoming employers, if there is no possibility that an employer may become an employee (i.e., $p_e = 0$), general training is never adopted. We summarize this result in the following corollary.

Corollary 2 *Even if an employee may become an employer, if employers have no chance of becoming employees, general training is never adopted.*

Next, we present the final proposition, in which employers may provide general training.

Proposition 5 *Employers provide general training if and only if* $p_e + p_w > 1$ *and* $\pi_g = \frac{y}{2} - c$.

Proof If $p_e + p_w > 1$, all employers choose general training, and $\beta = 1$. Thus, if $\pi_g = \frac{y}{2}$ and $\frac{y}{2} - c > 0$, employers provide general training.

Thus, if the possibility that both the employee becomes an employer and the employer becomes an employee, $p_e + p_w > 1$, is sufficiently large, general training is provided. Thus, mobility between the employer and employee roles is quite important for the growth of the agglomeration of start-ups.

5.6 Concluding Remarks

In this study, we develop an endogenous training choice model based on incomplete contract theory and derive the conditions for which either general or firm-specific training is chosen by the employer. We derive the conditions for which employers provide general training. Mobility between the employers' and employees' roles is the key factor for providing general training. Employers choose general training if and only if both employees (workers) have the chance to become employers (entrepreneurs) and employers (entrepreneurs) have the chance to become employees (workers).

In the urban economy, where many start-ups are concentrated, general skills are more important for knowledge spillovers and the growth of the economy based on the agglomeration of entrepreneurship. The scrap-and-build process occurs so frequently for start-ups that it is very common not only for workers to become entrepreneurs but for entrepreneurs to become employees after ongoing start-ups fail. Thus, it is natural to consider the mobility between the roles of employers (entrepreneurs) and employees (workers) in an urban economy with many start-ups. Fortunately, such mobility caused by the frequent scrap-and-build process means that general training prevails in the market despite contractual incompleteness and liquidity constraints.

From the viewpoint of policy analysis, we should consider the conditions for maintaining this mobility so that general training can prevail. The chances that both employees can become employers and that employers can become employees are essential for the development and agglomeration of start-ups within an urban economy. Thus, providing the infrastructure to promote labor mobility is the first priority. More importantly, entrepreneurs must be given chances to become either employers or employees, even after they fail. If it is easy for failing entrepreneurs to become employees in their next start-ups, they will try to provide general training, and the urban economy of start-ups will grow.

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Chapter 6
The Urban Concentration of Innovation and Entrepreneurship in Agricultural and Natural Resource Industries

Ghulam Samad and Gregory D. Graff

Abstract This study draws on detailed information on inventor address from 34,196 patented biotechnology inventions, made in the United States between 1970 and 2010, as indicators of innovation and entrepreneurship in three largely rural industries—(1) agriculture, (2) bioenergy, and (3) environment. Three approaches (mapping, Moran I, and negative binomial panel regression analysis) are used to analyze the spatial distribution of patented inventions by region, to identify the density of inventions overall as well as the space–time dynamics of invention cumulativeness. We find these inventions have been spatially concentrated in about 30 major metropolitan clusters, and that spatial distribution has remained remarkably stable over time. Factors of population and earnings are unsurprisingly correlated with invention counts. However, farm proprietor income is also positively related to the number of invention counts, suggesting that more linkages and spillovers within the industry lead to more opportunity for inventions. Significant policy implications include the distribution of public research funding, technology transfer strategies, regional collective action for fostering (largely urban) entrepreneurship for (largely

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rural) industries, and the actual roles and impacts of (again urban) innovation in these industries on commonly held policy objectives for rural economic development. There are also important implications from the extent to which (urban) innovators and (rural) producers in these industries are not intimately colocated.

Keywords Patent · Agriculture · Environment · Biotechnology · Innovation · Agglomeration · Urban · Rural

6.1 Introduction

Governments around the world have long invested public funds directly in research and development (R&D) and have created state and national policies to support commercial R&D to improve the productivity and sustainability of agriculture. In the United States, the Land-Grant university system was developed in the nineteenth century to address the needs for innovation in this geographically diffused and relatively rural industry. Successive waves of mechanical, chemical, biological, and information technology innovations have transformed agriculture into the high technology industry that it is today. In particular, the rapid growth in genetics and molecular biology has led to a boom in biotechnologies, with wide scope for application in agriculture, as well as in related resource-intensive industries. These have been part of what has been collectively identified as "agbiotech" innovations from the 1980 and 1990s, followed by the "biofuels" and "clean tech" innovations of the 2000s. Advances in genetics and molecular biology applied in resource-intensive industries are considered an important factor for food security, economic development, and increasingly for environmental sustainability, including climate change adaptation and mitigation. Inventions in these fields help meet growing demand for food and energy given increasing populations, demand which is putting unprecedented pressure on agriculture and natural resource systems. Physiological stressors—such as drought, degraded soils, and extreme temperatures—limit productivity, profitability, and sustainability. Increasing productivity and reducing waste are core strategies for food security in the face of resource constraints and climate change which can be achieved directly by the application of genetics and molecular biology to improve farming practices and natural resource systems (Foley et al. 2011). Much of the economic analysis of research spending and technology policy in agriculture and natural resources has taken a decidedly neoclassical perspective. The presumption appears to be that, given the right mix of spending and policy incentives, new knowledge and technologies arise stochastically from R&D activities across national innovation systems, and then disseminate quickly and broadly, often as global public goods, unless some form of intellectual property protection hinders their otherwise free path to widespread utilization. Where there is a regional aspect to innovation, it is assumed to play a role in capturing and adapting these globally available R&D outputs to local agroecological and market conditions. Agricultural and resource economists have given less regard to the internal, regional dynamics of the creation of innova-

tions, having paid less attention to the burgeoning literature on the economies of agglomeration or "clustering" in driving commercial innovation.

Yet, if the geographic clustering of innovation activities is generally important for driving commercial innovation, and if such clustering tends to accompany agglomeration of other factors of production, it stands to reason that such clustering may be less prevalent for agriculture and natural resource industries, for which production activities are widely dispersed geographically and predominantly rural. Then, to what extent can and do innovation activities for these industries tend to cluster? And where?

This study addresses several interrelated research questions. (1) How have biological inventions for use in primary resource-intensive industries—such as agriculture, energy, and natural resources—been spatially distributed across the United States, and, in particular, to what degree have they been geographically concentrated. And, if so, do they tend to occur in rural regions where the main production activities are located? Or, are they in urban areas associated with upstream input manufacturing or downstream output processing industries? Can we identify primary innovation clusters in the U.S. for these industries? (2) What are the space–time dynamics of biological inventions for these industries? To what extent does the concentration of previous inventions effect where new inventions arise? What other factors are associated with the growth of clusters? And, (3) based on these insights, what implications can be drawn for U.S. R&D policies?

Marshall's (1890, 1920) theories of industrial agglomeration have provided the basis for the analysis of geographic and spatial concentration of economic activity for a century. Krugman (1991) rearticulated Marshall's basic theories and introduced elements of international trade and economic development. Audretsch and Feldman (1996) show how new knowledge production and spillovers (industry R&D, university R&D, and skilled labor) drive geographic clustering of innovation and entrepreneurship. According to Acs (2001) some of this too follows from conventional economic factors such as economies of scale, transportation, and market demand. Ellison et al. (2010) advance that increasingly one of the main reasons firms choose locations so as to form clusters is to speed the flow of information and ideas. Saxenian (1996) goes beyond just tangible economic factors, arguing that the decentralized and cooperative culture of a region's innovation system also plays important role in industrial clustering.

To the extent that colocation creates advantage and drives innovation, this has important policy implications. Policies need to take into account the structure and dynamic nature of clustering in order to support and encourage innovation. For agriculture, these policy implications have an additional twist. To the extent that the natural constituencies and political base for agricultural industry tend to be rural, they may be less attuned or sympathetic to funding and supporting innovation activities that will tend to agglomerate, which generally means they will locate in urban rather than rural areas.

This study utilizes detailed information from inventor address data from patent publications that make up patent families, as an indicator of the location of invention. We draw upon the International Science and Technology Policy and Practice

(InSTePP) Global Genetics Database, developed at the University of Minnesota from Thomson Innovation (TI) patent data, covering years 1970–2010. While the InSTePP database covers all fields of biotechnology, this present analysis is focused on biological inventions applied in the three closely related industries of (1) agriculture, (2) bioenergy and bioresources, and (3) environmental technologies, as based on Derwent World Patent Index (DWPI) Manual Code Classifications. Lead inventor zip code, city, state, and country are extracted from the InSTePP data and then analyzed at the level of Metropolitan Statistical Areas and the more rural Micropolitan Statistical Areas, to explore the degree and dynamics of spatial concentration, as well as the extent to which innovation is associated with the basic factors of population, level of economic activity, and level of agricultural production.

Findings indicate that innovation in genetics and biotechnology for these industries is quite concentrated in a handful of urban areas, and the degree of concentration has remained remarkably consistent throughout the course of the development of the technology, even as the overall number of inventions exponentially increased from 1980 to 2000. Results also show that degree of innovation is strongly associated at the regional level with measures of population and economic activity. In a twist, however, innovation in these biotechnologies for agriculture are also positively correlated with farm income, even though the major metropolitan areas that lead in biotech innovation, such as San Francisco and New York, have essentially zero farm income within their respective MSAs. It appears that smaller metropolitan areas closely colocated with highly concentrated agricultural production—and anchored by major Land-Grant universities, major agricultural input firms, and the presence of entrepreneurial biotechnology firms—are particularly significant innovation clusters, generating high numbers of inventions.

This paper is organized as follows. The next section briefly reviews the literature on agricultural innovation, clustering, and utilization of inventor address data from patents. We then describe the unique data set and an exploratory analysis of patenting across the United States. We then lay out the methodology and present results of our regression analysis, exploring both the dynamics and "cumulativeness" of cluster formation as well as the association of those clusters with exogenous factors. We then compare our results with data on the location of entrepreneurial biotechnology firms developing applications for the agricultural, bioenergy, and environmental industries, finding remarkable degrees of colocation. We close with discussion and conclusions, including thoughts on policy implications for publicly funded agricultural research, the intrinsic dilemma faced by the agricultural industry, and possible paths forward.

6.2 Background

Given what we know from the literature, what should we expect about the urban versus rural distribution of innovation for agriculture? Agriculture was one of the earliest industries for which an innovation system was established in the United States. Amidst the chaos of the Civil War, the Morrill Act of 1862 funded the estab-

lishment of Land-Grant colleges by each state, with a charter "*to teach such branches of learning as are related to agriculture and the mechanic arts.*" While the Land-Grant colleges were initially focused on education, they were intentionally dispersed across what were largely rural and agricultural regions throughout the United States. The research component of the system was only added 25 years later, by the Hatch Act of 1887, which established funding to support an agricultural experiment station in each state. Most states chose to integrate their state agricultural experiment station with their Land-Grant college, thereby creating a broad network of agricultural research institutions across largely rural regions of the country (Huffman and Evenson 2006). These Land-Grant colleges and other related technical institutions (the polytechnics and the Schools of Mines) expanded their mission from agriculture and "the mechanical arts" to other natural resource industries, and only much later, to resource management and conservation.

Policy-makers in the United States were grappling with how to manage policies to encourage innovation and economic development in the face of what still appears to be a paradox: How to realize the advantages that arise from economies of agglomeration in an industry in which the human capital and production processes are necessarily geographically dispersed? The form of the Land-Grant system appears to have adapted to the realities of the industry, providing a diffused research and development network for a diffused industry. Agricultural production has always been geographically diffused, largely due to heavy dependence upon natural capital, including land and water resources. Even with agricultural production today in the United States at $396 billion, it is still very dispersed. It contributes to the economy of all 50 states, in 40 states it accounts for more than $1 billion, and in 13 states it accounts for more than $10 billion. The largest concentration by value is in California, which, at $48 billion, still only accounts for 12% of U.S. gross receipts (USDA Economic Research Service 2018).

An empirical line of work tracking patterns of innovation in patent data seeks to distinguish the spatial patterns of growth of innovative activities, building upon the classic distinction between Schumpeterian Mark 1 (widening and diffused growth in innovation) versus Schumpeterian Mark II (deepening and concentrated growth in innovation) initially dubbed by Nelson and Winter (1982). In these results, agriculture is consistently identified with the Schumpeterian Mark 1 camp, with low concentration of innovative activities, relatively small size of innovating firms, low stability in the hierarchy of innovating firms, and high rates of new innovators in the patent data (Malerba and Orsenigo 1996). Agriculture is one of the sectors that does not show signs of spatial agglomeration and is assumed that spatial proximity does not play a role in innovation (Breschi 2010).

In addition to "agriculture", these studies also included, separately, some of the agriculture input sectors. Malerba and Orsenigo (1996) find mixed evidence for "agricultural chemicals," but they squarely place "organic chemicals" and "bio- and genetic engineering" in the Schumpeter Mark II camp exhibiting more concentrated innovation activity. In Breschi et al. (2000), update of the analysis "agricultural chemicals" had earned its placement in the Schumpeter Mark II camp as well. In fact, an entire literature has recognized and analyzed the dynamics of clustering in

biotechnology (Audretsch and Stephan 1996; Zucker and Darby 1996; and many others citing these), while such clustering has been explored for the subset of the biotechnology industry that applies to agriculture and natural resources (Ryan and Phillips 2004); however, these trends have not been thoroughly documented and empirically analyzed.

The burgeoning literature in economic geography, regional science, and urban economics mainly builds on Marshall (1890, 1920) and Krugman (1991). Ellison et al. (2010) explain Marshall's theories of industrial agglomeration, identifying the following Marshallian forces: (a) proximity to customers and suppliers, (b) labor market pooling, and (c) intellectual or technology spillovers. Ellison et al. argue firms cluster to speed the flow of ideas. As workers learn new skills, and researchers make new discoveries, by colocating, researchers and managers of a firm are able to gain access to less-formal or localized information exchanges gaining at least a temporal advantage. Audretsch and Feldman (1996) posit that it is the spatial limitation of spillovers of new economic knowledge that drives the concentration of innovation activities. Level of economic activity measured by regional income is related to inventive activity (Usai 2011). Glaeser and Resseger (2010) mention urban population density is important because proximity spreads knowledge and skills, making workers more productive and entrepreneurs more successful. Their results suggest a strong complementarity between city size, learning, and skills, with agglomeration effects stronger for cities with more skills.

It appears that the policy-makers of the mid-nineteenth century grappled with a crucial characteristic of agriculture as they debated and created the diffused structure of the Land-Grant system. To the extent that the causes and virtues of agglomeration that we see today hold true, agriculture is stuck in something of a dilemma. Innovation activities that arise from agricultural production activities, whether described as learning by doing (Arrow 1971) or user-led innovation (Von Hippel 1988), are necessarily linked to a resource base and thereby a skilled labor pool which is geographically diffused. Innovators in the field, as it were, cannot easily benefit from the virtuous cycling of knowledge spillovers that occurs within a cluster, which naturally gravitates to the high population density of urban centers. Conversely, when innovations that are potentially useful for agriculture do arise within the vortex of an urban innovation cluster, they are handicapped by virtue of being distant from the community of producer–practitioners of skilled labor that otherwise would contribute to development, iteration, and refinement. The urban-based innovators for agriculture are also less connected through input–output linkages and thus less routinely engaged with suppliers and buyers in idea exchange, in the fortuitous recombination of existing ideas, and discovery through experimentation.

While we cannot resolve this dilemma in a single analysis, we can begin to shed some light on it through empirical analysis of innovation patterns in one key area of technology, one that seems, in fact, to accentuate the features of this apparent dilemma. Innovation in genetic resources for agriculture and biotechnologies for energy and resource applications have a vast geographic scope of utilization in pro-

duction. Yet, the innovation clusters of the biotechnology industry overall have been very concentrated. Which pattern has genetic and biotechnological innovation for agriculture followed?

6.3 Data

Patents have long been considered a useful indicator of innovation activities (Schmookler 1954; Griliches 1990; Hall et al. 2001; Acs et al. 2002). Of course there are well-documented limitations to the use of patents, including the fact that they typically represent early-stage technologies, before they are translated into commercial applications, the resulting difficulties in attribution to specific industries as well as the high degree of variation in value or importance. Yet, among the alternative indicators of innovation activities, they provide a comprehensive view across various parts of the innovation system, including academic, entrepreneurial, and corporate firm R&D outputs. We compare our results based upon patent data with a preliminary dataset on entrepreneurial biotechnology firms, as a second indicator of economic activity to provide additional perspective and validation.

We use a novel dataset and methodology for mapping the spatial distribution of inventions, exploiting inventor address data from patent filings. The InSTePP Global Genetics Patent Database is a comprehensive compilation of all patent documents that contain biological sequence information—including nucleotide sequences and protein or amino acid sequences—and related filings, thus targeting with a high degree of accuracy inventions across the full range of biotechnology and genetics. The collection identifies 1,093,038 inventions, from 1970–2010, represented by patent families with filings in 94 countries (Graff et al. 2013). The data are organized by patent family, to prevent double counting of inventions when compiling patent information from different patent offices and helps to neutralize biases that may arise when patent data are taken from a single patent office (Martínez 2010).

For this study, we select those biotechnology and genetics inventions identified by Derwent World Patent Index (DWPI) Manual Code designations to be associated with industrial applications in agriculture, energy, environment, and natural resources.[1] This resulted in an initial set of 210,057 patent families (inventions), consisting of 1,241,911 patent publications across 94 different patent offices, and representing just over 20% of the total inventions in the InSTePP Global Genetics Patent Database.

Of those 210,057 agricultural, energy, and environmental biotech patent families, only 127,410 contain information on inventor address. Even these required extensive cleaning to resolve ambiguities between country and state codes, and matching of city names across countries. To resolve problem of allocation of inventions with multiple

[1] The InSTePP Global Genetics Patent Database utilizes Thomson Innovation's proprietary Derwent World Patent Index (DWPI) Manual Code classifications to assign each patent to one or more of eight high-level industries: (1) pharmaceuticals, (2) chemicals, (3) veterinary, (4) agriculture, (5) energy, (6) environment and natural resources, (7) food and beverage, and (8) pulp and paper.

Table 6.1 Characterizing availability of inventor address information for U.S. inventions

Lead inventor address data in priority filing	Patent family counts
Country only	14,497
Country + city/state	29,217
Country + city/state + zip	4,979
Total	*48,693*

inventors that live in different locations, we utilize the address of the lead inventor on the earliest (i.e., priority) patent document for each patent family to designate a primary location of invention for that patent family. Of the 127,401 inventions for which we have inventor address data, the primary location of invention of 48,693 was in the United States.

For these 48,693 U.S. inventions, available inventor address information was mixed, especially for inventions prior to the 1990s. For 14,497 of these, inventor address data indicates simply the inventor's country of residence, with no other information. For another 29,217, city and state is provided in addition to country. Another 4,979 also contain inventor zip codes. Table 6.1 summarizes the available address data types for U.S. lead inventors by patent family.

Geographic coordinates were assigned to each invention by batch algorithm, using information on city, state, and/or zip code of the lead inventor. For those that were not recognized, further cleaning, correction of misspellings, and assignment of geographic coordinates were undertaken by hand, as needed, in an effort to ensure that minor cities and towns (more typically in rural areas) were not underrepresented the final dataset. Complete city names and geographic coordinates were thus assigned for 34,196 inventions.

6.4 Exploratory Analysis of U.S. Biotech Inventions for Agriculture, Bioenergy, and the Environment

These 34,196 patent families (inventions), with geocoded location of a U.S. lead inventor, identified at the city or the zip-code level, make up our sample of inventions. Table 6.2 shows how many belong to one (or more) of the three industries for which we selected, as based on DWPI Manual Code assignments.

The annual count of inventions grew at an increasing rate from 1970 through 2000. After peaking in 2001, the annual number of inventions stabilized at between 1,500 and 2,000 per year. After 2008 truncation begins to affect these data (See Fig. 6.1). Factors which drive the exponential growth phase of biotech inventions in the United States include the emergence of strong intellectual property (IP) rights in biological inventions following the Supreme Court decision in Diamond V. Chakrabarty in 1980, the Bayh-Dole Act of 1980s, the role of public–private partnership (Graff

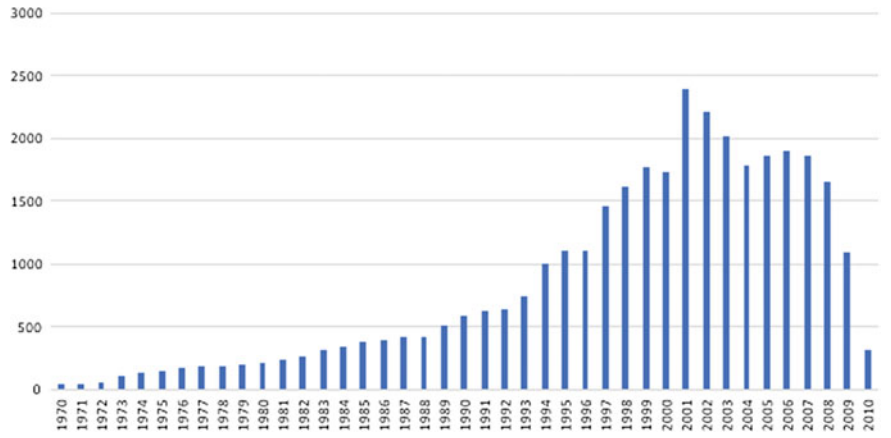

Fig. 6.1 Growth in U.S. biological inventions with applications in agriculture, energy, and environment (N = 34,196 patent families with a lead inventor address in United States and identified at the city or zip-code level)

et al. 2013). These trends are consistent with earlier studies of patenting trends in agbiotechnology (Graff et al. 2003). They are also consistent with studies of invention in biofuels, which in the U.S. grew most rapidly between 2005 and 2009, but never amounted to more than about 300 per year (Albers et al. 2016).

The geographic distribution of inventions during each of the four decades separately from 1970 to 2010 (Fig. 6.2, panels a–d) visually suggests spatial cumulativeness (Breschi 2010), with an increasing number of new inventions in later decades where there was a concentration of previous inventions in earlier decades. The spatial distribution of all inventions over the entire period of 1970–2010 (Fig. 6.3) suggests that invention activity was largely concentrated in more populated areas. We also see, in contrast, less intense areas with few inventions, corresponding to less populated areas. This is the first suggestion we observe of a rural–urban division of inventions.

Table 6.2 Cross table of inventions categorized by industry of application based on DWPI manual codes, for the 34,196 inventions with a U.S. lead inventor, including inventions assigned to multiple categories

Agriculture	17,145 (50.7%)		
Energy	840 (2.5%)	5,174 (15.3%)	
Environment	1,434 (4.2%)	1,547 (4.6%)	7,658 (22.7%)
	Agriculture	Energy	Environment

398 (1.2%) inventions are categorized in all three industries

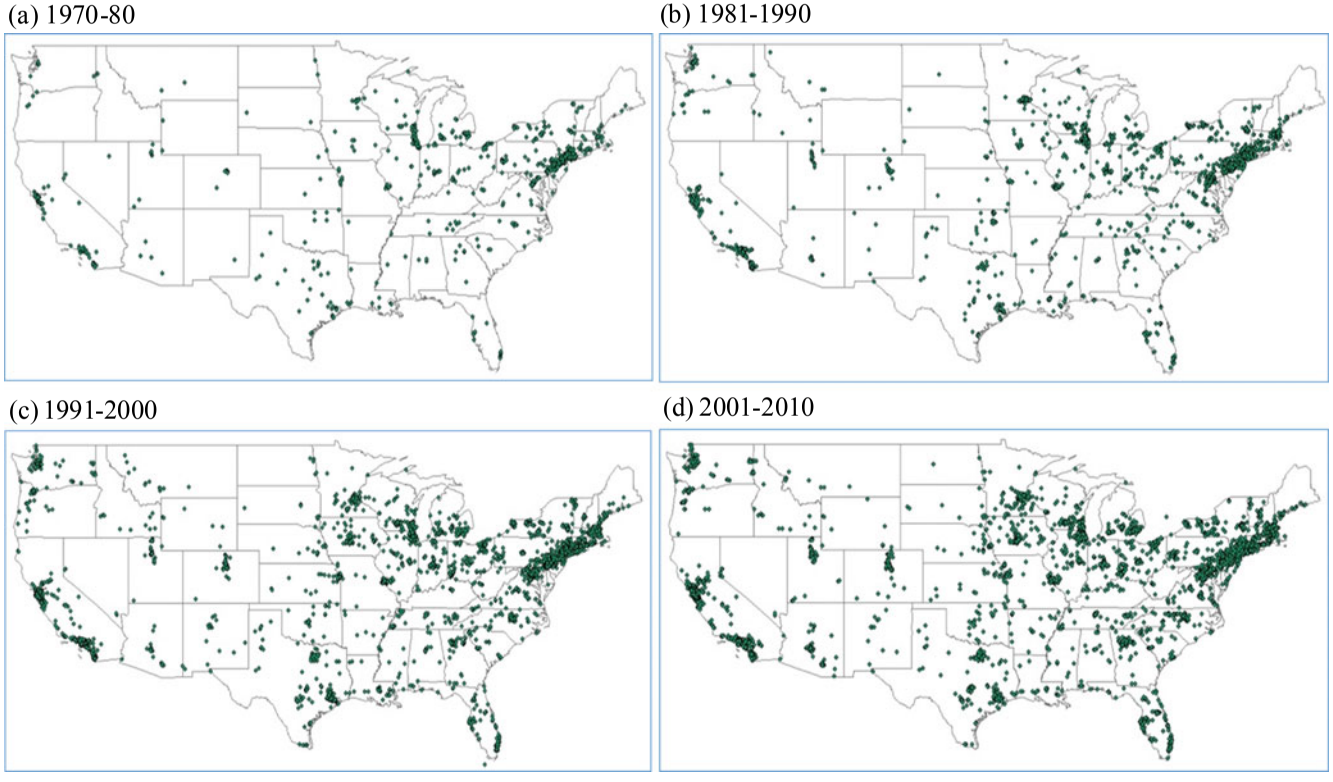

Fig. 6.2 Spatial distribution of inventions over time, by decade, of the 34,196 patent families (inventions) by address of lead inventor identified at the city or the zip-code level

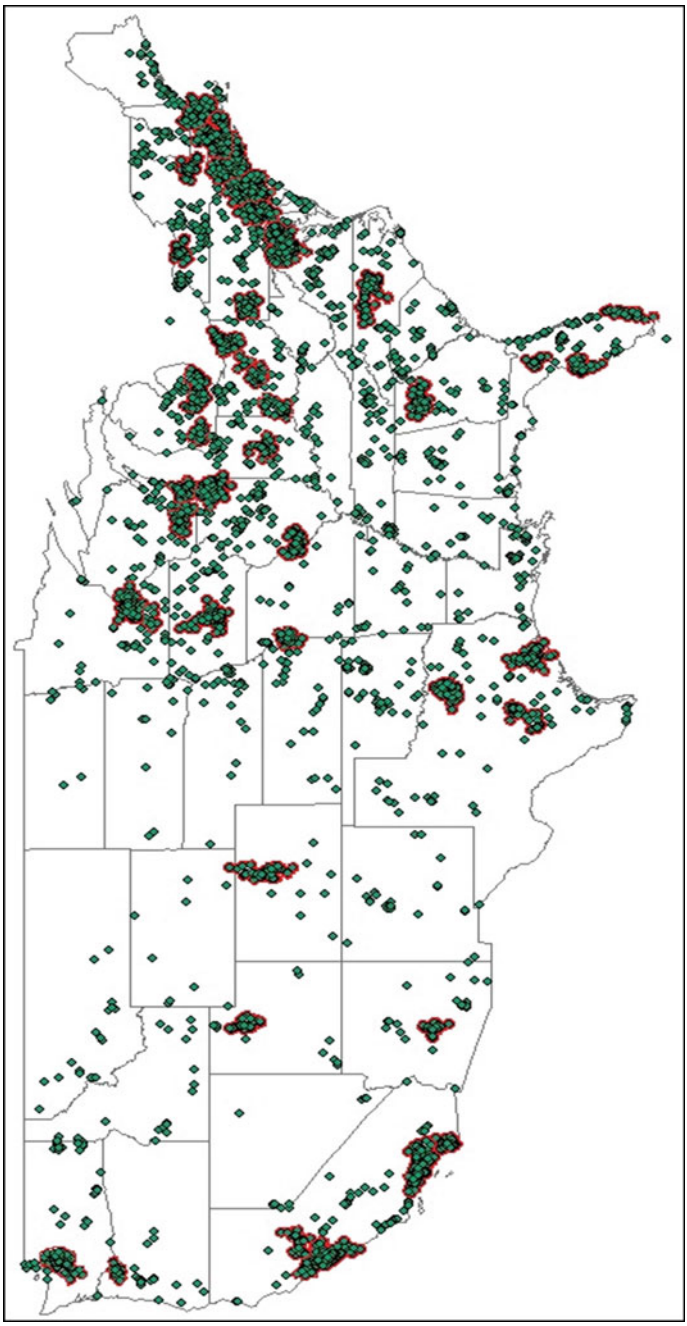

Fig. 6.3 Spatial distribution of all 34,196 inventions, 1970–2010, by address of lead inventor identified at the city or the zip-code level, with the 30 largest clusters outlined

6.5 Identification of Regions for Statistical Analysis

Acs et al. (2002) raise the question regarding the proper unit of analysis for innovation systems. To explore the urban versus rural nature of biological innovation for agricultural and natural resource industries, ideally we wish to identify each relevant geographic region that serves as a contiguous home to such innovations, or what many describe more loosely as a "cluster". We then want to compare those regions with clusters with similarly sized geographic regions that exhibit variation in degrees of innovation, including regions even that have no evidence of having produced patented inventions.

All of the regions of analysis must also have available data on associated explanatory factors or "covariates" to the observed innovation. While our patent family data are consistently denominated at the geographical level of the city, we find that availability of data for associated explanatory factors or "covariates" is available for the entire period of 1970–2010 for the 929 metropolitan and micropolitan statistical areas (MSAs and μSAs) in the United States, as delineated by the United States Office of Management and Budget (OMB). MSAs primarily represent urban areas, and μSAs, relatively rural areas. MSAs consist of a core county or set of adjacent counties in which lies an urban area having a population of at least 50,000. MicroSAs consist of a core county, having a population of 10,000–50,000, with possible adjacent counties. The adjacent counties and core counties have a high degree of social and economic integration through economic flows and commuting ties (United States Bureau of Economic Analysis).

To preserve the integrity of the primary clusters of inventions as our units of analysis, we traced polygons in ArcGIS around the highest density regions of mapped inventions (outlined in Fig. 6.3). We then compared these traced polygons to the boundaries of MSAs, and found that 20 of these invention clusters spanned more than one MSA. For each of these, we combined the two or more MSAs that encompassed, as closely as possible, the high-density portions of the observed invention clusters to create a custom statistical area. These combinations reduced the 929 official MSA and μSAs to 897 statistical areas, consisting of our 20 custom statistical areas together with 877 remaining unmodified MSAs and μSAs.

The resulting 30 largest (and largely urban) clusters account for 58% of total inventions in the dataset (Table 6.3). Moreover, this share has remained remarkably stable since the early 1980s, varying within just a few percentage points of this average for 30 years. The five largest clusters are the San Francisco Bay Area (incl. Silicon Valley, San Francisco, and Oakland), New York–Newark, Washington–Baltimore, San Diego, and Boston. This largely aligns with other lists of the major biotechnology clusters identified in the literature (Audretsch and Stephan 1996; Zucker and Darby 1996) and in industry analyzes (DeVol et al. 2004). The San Francisco Bay Area is an outlier, as it often is in such analyzes, with more than twice the number of inventions as the second largest cluster, the New York City metro area.

However, there are clusters high on the list that consist of significantly smaller cities, such as Des Moines, Iowa, which ranks between Houston and Philadelphia,

Table 6.3 The 30 largest clusters of biological inventions in agriculture, energy, and environment in the U.S., based on cumulative count of inventions 1970–2010

	Cluster name	State(s)	Count of inventions	% of total inventions	Cumulative % of inventions	Moran I optimized hotspot
1	San Francisco Bay Area (incl. Silicon Valley)	CA	3,020	9.62	9.67	*
2	New York–Newark	NY, NJ	1,211	3.86	13.53	*
3	Washington–Baltimore	DC, MD, VA	1,187	3.78	17.31	*
4	San Diego	CA	1,135	3.62	20.92	*
5	Boston	MA	1,017	3.24	24.16	*
6	Los Angeles	CA	939	2.99	27.15	*
7	Houston	TX	924	2.94	30.10	*
8	Des Moines–Ames	IA	882	2.81	32.91	*
9	Philadelphia–Camden–Wilmington–Trenton	PA, NJ, DE	811	2.58	35.49	*
10	Chicago	IL	713	2.27	37.76	*
11	Madison	WI	544	1.73	39.50	*
12	Seattle	WA	516	1.64	41.14	*
13	Raleigh–Durham–Chapel Hill	NC	449	1.43	42.57	*
14	Cleveland–Akron–Canton	OH	420	1.34	43.91	
15	Detroit–Ann Arbor–Lansing	MI	420	1.34	45.24	
16	St Louis–Columbia	MO, IL	415	1.32	46.57	
17	Minneapolis–St Paul	MN	409	1.30	47.87	*
18	Denver–Boulder–Ft Collins	CO	376	1.20	49.07	

(continued)

Table 6.3 (continued)

	Cluster name	State(s)	Count of inventions	% of total inventions	Cumulative % of inventions	Moran I optimized hotspot
19	Sacramento–Davis–Woodland	CA	344	1.10	50.16	
20	Atlanta–Athens	GA	296	0.94	51.11	
21	Cincinnati	OH	270	0.86	51.97	
22	Indianapolis	IN	255	0.81	52.78	*
23	Dallas	TX	233	0.74	53.52	
24	Salt Lake City	UT	227	0.72	54.24	
25	Philadelphia–Camden	PA, NJ	215	0.68	54.93	
26	Portland region–Corvallis–Eugene	OR, WA	183	0.58	55.51	
27	Rochester	NY	172	0.55	56.06	
28	Princeton–New Brunswick	NJ	170	0.54	56.60	
29	Kalamazoo	MI	167	0.53	57.13	
30	Omaha–Lincoln	NE	149	0.47	57.61	

Table 6.4 Summary statistics of inventions and selected covariates, 1970–2010

Variables	Obs.	Groups	Mean	Std. dev	Min	Max
Inventions (count)	36,777	897	0.7316	5.8479	0	279
Population (million)	36,777	897	0.2618	1.0162	0	20.52
Earnings by Place of Work (million)	36,777	897	4.4463	24.4164	0	851.03
Farm Proprietors' Income (million)	36,777	897	0.0206	0.0472	−0.12	0.98

and Madison, Wisconsin, which ranks between Chicago and Seattle. Within our customized MSA for Des Moines is Ames, Iowa—the location of Iowa State University, the Land-Grant institution for the state of Iowa—and Johnstown, Iowa—with the headquarters and R&D center for Pioneer–DuPont, the largest corn seed company in the world and one of the most prolific applicants for gene patents overall (Graff et al. 2013). Madison, Wisconsin, is the location of University of Wisconsin, the Land-Grant institution for the state of Wisconsin and one of the largest agricultural research universities in the United States. In fact, of the 30 clusters on the list, half of the regions host a Land-Grant university with significant agricultural research capacities.

Table 6.4 provides summary statistics for the resulting 897 statistical areas, with total of 36,777 observations for the entire time period of 1970–2010. For the empirical analysis, we select from Bureau of Economic Analysis data on MSAs and μSAs the variables of population, earning by place of work, and farm proprietor income. We checked multi-collinearity to assure us of their relative independence. The geographic coverage of the 897 statistical areas included in the analysis is illustrated in Fig. 6.4. The remaining rural areas are not included in this analysis, as the data did not extend to the rest of the state outside of the MSAs and μSAs.

- **Population** is fundamentally a size variable. The number of people relates to both the overall level of economic activity (and is thus highly correlated with regional gross product) and the size of the labor pool, including the skilled. We have seen from the literature that, regionally, the size of the pool of skilled human capital is highly correlated with population. Since the geographic area of the region is, if anything smaller in urban regions (see Fig. 6.4) higher population also indicates higher population density, another factor implicated in theories on innovation clustering (Glaeser and Resseger 2010). Our hypothesis is that inventions are positively related to population.
- **Earning by place of work** includes wages and salaries together with supplements to wages and salaries. We include it as our measure of relative level of economic development or economic activity as well as the quality of the workforce, as highly trained scientists and engineers will be expected to earn more than low-skilled labor. We expect rates of invention to be positively related to regional earnings.
- **Farm proprietor income** counts the net income (receipts net of expenses) for sole proprietor and partnership farms, which make up over 90% of agricultural

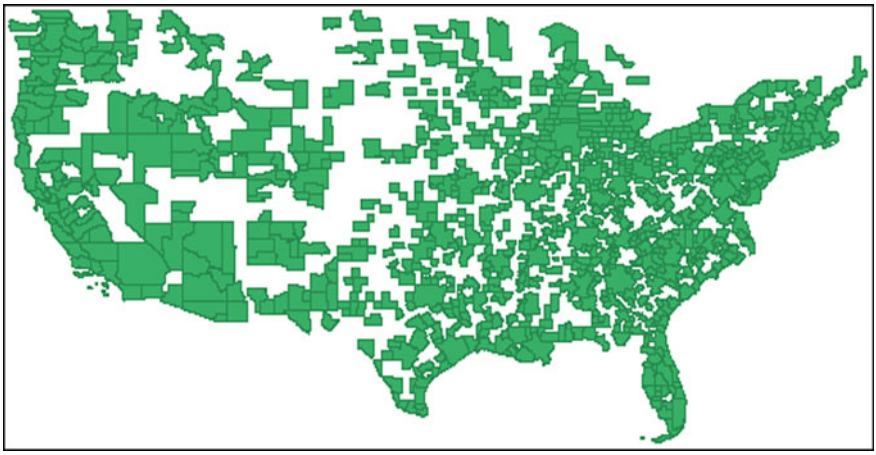

Fig. 6.4 The geographic coverage of Metropolitan Statistical Areas (MSAs) and Micropolitan Statistical Areas (μSAs). *Source* United states Census Bureau

operations in the United States. We observe that farm income is, not surprisingly, very small in major metropolitan areas. The MSAs surrounding smaller urban centers, as well as many of the more rural μSAs, have significant farm incomes. On the one hand, we expect that, as a measure of relative rural regions, farm income is likely to be negatively related to the number of inventions. However, among similarly sized regions that do have some inventive activity, we expect that those with higher farm income will have more linkages and spillovers within the industry and therefore more opportunity for inventions.

6.6 Methods

The dependent variable (inventions) is count data, consisting of nonnegative integers values like {0, 1, 2, 3, … 279}. The literature has widely discussed the use of Poisson and negative binomial maximum likelihood regression models for this type of data (Hausman et al. 1984). The difference between the two is in their distribution functions, where the Poisson distribution assumes that the mean and variance for the data are similar (equal dispersion property), and the negative binomial distribution allows for over-dispersion in the data. The negative binomial distribution has one more parameter than the Poisson distribution, a dispersion parameter to adjust variance to mean. Most of the literature calls the Poisson distribution a special case of the negative binomial distribution, where the mean and variance are constrained to be equal. To adjust automatically for over-dispersion, we choose the more general negative binomial distribution.

The log-likelihood equation for probability of invention at a particular point in space and time is

$$l(\lambda; U) = \sum_{i=1}^{n} log\lambda(s_i, t_i) - \iint_{A0}^{T} \lambda(s,t)dtds - log(n!) \tag{1}$$

where U is a 987 × 41 matrix with rows containing locations $\boldsymbol{s_i}$ and time $\boldsymbol{t_i}$ (1970, 1971, … 2010). A is the two-dimensional study area, and 0-T is the time period for these observations.

The above equation becomes

$$l(\lambda; U) = \sum_{i=1}^{34196} log\lambda(SA_i, 1970) - \iint_{U.S.1970}^{2010} \lambda(SA)dtds - log(34196!) \tag{2}$$

Integrated intensity function $\lambda(s,t)$ indicates we are only interested in areas in the USA from 1970 to 2010:

$$\bar{\lambda} = \iint_{\mathbf{USA1970}}^{\mathbf{2010}} \lambda(\boldsymbol{area}, \boldsymbol{time})\boldsymbol{dtds} \tag{3}$$

This equation describes points that occur at a particular area at a particular time. We can derive the integrated intensity function. In this model, SA is the two-dimensional statistical area. The s_i shows the invention distribution at a given SA, and t_i shows the invention distribution at a specific time. The total number of statistical areas is 897 and of inventions is 34,196.

We also know that

$$\lambda(\boldsymbol{s}, \boldsymbol{t}) = \mathbf{X}(\boldsymbol{s}, \boldsymbol{t})'\boldsymbol{\beta} \tag{4}$$

where $\mathbf{X}(\boldsymbol{s}, \boldsymbol{t})'$ is a $P \times 1$ vector having covariates at a specific location at a specific time within the study area, and β is $P \times 1$ vector of regression coefficients. The point process model is represented by the following equation. The right-hand side of this equation is $\mathbf{X}(\boldsymbol{s}, \boldsymbol{t})'\boldsymbol{\beta}$.

$$\begin{aligned} Inventions_{it} = {} & Population_{it} + FarmPIncome_{it} \\ & + EarningPlce_{it} + \alpha_i + \delta_t + \mu_{it} \end{aligned} \tag{5}$$

where

α_i is the fixed or individual effect,
δ_t is a time specific intercept, and
μ_{it} is an error term.

In addition, we can analyze the cumulative nature of inventions by area with equations

$$Inventions_{it} = \beta_i + \beta_1 Invenitonlag1_{it} + \beta_2 Invenitonlag2_{it} + \beta_3 Inventionlag3_{it} + \mu_{it} \quad (6)$$

where the ***Invenitonlag*** variables represent the counts of inventions at different respective lags, and

$$Inventions_{it} = \beta_i + \beta_1 CumulativeInv_{it} \quad (7)$$

where *CumulativeInv* is the cumulative sum of prior inventions at time *t* in statistical area *i*.

6.7 Results

Two general approaches are taken to analyze the patterns of invention as well as factors associated with those patterns. First, we seek to test hypotheses of cumulativeness in inventions within our identified regions. We have visually noted an apparent tendency for inventions to accumulate in specific regions based upon our preliminary mapping. We now seek stronger systemic evidence that inventions are indeed concentrated in those areas. Second, we seek systematic evidence of regional urban characteristics versus rural or agricultural characteristics being associated with higher levels of invention in these technologies.

6.8 Cluster Growth

To analyze spatial cumulativeness of biotechnology inventions for agriculture and resource applications, we test how the presence (or absence) of inventions within a given region affect the probability of subsequent inventions arising in that region. We regress invention counts on lags of invention counts for each region in each year (Table 6.5). The time series optimal lag length criteria (AIC/BIC) are not appropriate for these panel estimation techniques, but an optimal lag length in panel data can be determined manually by starting from a lag of 1 year, then 2 years, and so on, stopping when the coefficient of lagged explanatory variable becomes negative.

To validate the overall significance of a region's previous invention activity on current inventions, we also construct a cumulative prior invention count variable, defined as the sum of inventions from year *0* to year *t-1*. We regress invention current year counts on the cumulative sum of prior inventions for each region for each year (Table 6.6).

Table 6.5 Fixed effects regression of lagged invention counts

Variables	Coef.	St. Err	t	p > |t|
Inventions 1st lag	0.7218	0.0053	135.82	0.0000
Inventions 2nd lag	0.1946	0.0064	29.98	0.0000
Inventions 3rd lag	0.0508	0.0065	7.74	0.0000
Inventions 4th lag	0.0942	0.0065	14.37	0.0000
Inventions 5th lag	−0.0807	0.0064	−19.77	0.0000
Inventions 6th lag	−0.0807	0.0052	−15.46	0.0000
Constant	0.1079	0.0106	10.09	0.0000
F(896,35868) = 1.62 Prob > F = 0.0000				

Table 6.6 Fixed effects regression of cumulative invention counts

Variables	Coef.	St. Err	t	p > |t|
Cumulative inventions	0.5232	0.0002	178.71	0.0000
Constant	−848.2288	4.7504	−178.56	0.0000
F(896,35879) = 103.74 Prob > F = 0.0000				

We find that both lagged invention counts and the cumulative sum of prior inventions show positive and significant effects on current invention counts. Lagged invention counts have a significant relationship for up to 4 years (i.e., inventions in year *t* are positively related to inventions in years *t-1*, *t-2*, *t-3*, and *t-4*). More recent past activity has greater ability to explain current rate of inventions: as the lag increases beyond 4 years, the effect disappears. Yet, the relationship between the cumulative sum of past inventions and current inventions is also positive and significant, confirming that these biological inventions for agriculture and natural resource applications exhibit spatial cumulativeness and therefore remain relatively concentrated spatially.

6.9 Factors Associated with Cluster Growth

While we are not trying to explore all of cluster formation theory, we are seeking to test indications whether greater invention is observed in urban areas relative to rural and agriculturally intensive areas. As such we regress only a handful of independent variables on our counts of inventions, by region.

The most common panel estimation techniques are fixed and random effects models. Results of these two models are shown in Table 6.7. In the fixed effects model, any unobservable factors left out of the set of explanatory variables are considered time-invariant, and, thereby, the fixed effects model help to remove bias in the estimator created by omitted variables. They are captured in α_i, e.g., the individual

effects. In contrast, the random effects model assumes that unobservable variables are correlated with the variables in the model; while there may be smaller standard errors, coefficients may be biased due to the omitted unobservable variables. There is no straightforward answer to selecting between the fixed effects or random effects model, although theory suggests the Hausman test to choose between these two techniques. Selection between these two techniques depends on choice of variables in the model, the nature of omitted variables, whether those omitted variables are correlated with the variables included in the model, and variability across time.

There are indeed a number of factors—such as R&D expenditures or invention and trade policy—which the literature has established are important for formation and growth of innovation clusters. However, without R&D expenditure data available at the regional level and without appropriate indicators of innovation and trade policy that would be meaningful at the regional level, these and other such factors are inevitably excluded from the equation. Therefore, it is important to control for unobservable factors in order to have unbiased estimators. The Hausman test in Table 6.8 also suggests the fixed effects model. The significant P value recommends to reject the null that the unobservable variables affecting the inventions are uncorrelated with the observable variables and to accept the alternative hypothesis that such unobservable variables affecting the inventions are correlated with the observable variables. Together, this suggests that the fixed effects model is the more appropriate for interpretation of results.

All the parameter estimates of covariates are positive and significant in the fixed effects model in Table 6.7. Highly significant coefficient value of population indicates that inventions in a particular area are highly dependent on the size of its population. Therefore, we confirm our expectations that the preponderances of biological inventions for agricultural and natural resource industries have been made in more urban areas. The significant positive coefficient on earnings, while not as large as the coefficient on population, shows that it is also correlated with number of inventions indicating that the level of economic activity as well as the quality of human capital is related to invention activity. Interestingly, the strongly positive coefficient on

Table 6.7 Combined panel regression on counts of inventions by U.S. region and year, 1970–2010

Variables	Fixed effects	Random effects
Population	3.5768[a]	0.3346[a]
Farm proprietor income	2.2132[a]	4.0914[a]
Earning by place of work	0.1103[a]	0.1348[a]
Cons	−0.7414	−0.7414
F-Statistic	F(896,35877) = 29.56 Prob > F = 0.0000	Wald chi2 (3) = 9819.59 Prob > chi2 = 0.0000
R-Square	Within = 0.2120 Between = 0.3349 Overall = 0.2340	Within = 0.2073 Between = 0.3519 Overall = 0.2707

[a]Significant at 1%

Table 6.8 Hausman test of null hypothesis that unobservable variables affecting the inventions are uncorrelated with the observable variables

Variables	Coef.		St. Err	Sqrt (diag(V_b − V_B)	
	Fixed (b)	Random (B)	Difference (b − B)	S.E.	
Population	3.5768	0.3346	0.1134	0.0030	0.0030
Farm proprietor income	2.2132	4.0914	0.7490	0.0000	0.0000
Earning by place of work	0.1103	0.1348	0.0019	0.0000	0.1310
Chi(2) = (b − B)' [V_b − V_B)^(−1)](b − B) = 278.29					
Prob > chi2 = 0.0000					

farm proprietor earnings indicates that, all else being equal, those regions with more agricultural production also have greater rates of innovation for the industry.

6.10 Entrepreneurial Biotechnology Firms

To enrich our discussion and extend some of the preceding analysis, which was largely based on patent data, we assemble a dataset of entrepreneurial biotechnology firms backed by venture capital and private equity and focused on developing applications in agriculture, energy, and natural resources. We queried PitchBook, a proprietary venture investment database, for firms in identified "agtech" and "biofuel" verticals, and further filtered them to include just those that working in biotechnology, genetics, or the life sciences. What resulted is 294 firms founded between 1977 and 2017.

The firms are engaged in a wide range of applications of biotechnology. Only a handful, mostly founded in the early 1980s, were engaged in developing genetically modified crops, and virtually all of those were later acquired by major corporations in the 1990s. For example, among these are firms that produce bioinsecticides, soil supplements, biologics for animal health, or detection and control of microbial contaminants for food safety. Some are engaged in aquaculture or hydroponics. Some are engaged in fermentation or biomass conversion for biofuels. Others provide biotechnology research services.

The trends in firm startups (in Fig. 6.5) have notable similarities to the trends in invention activity (in Fig. 6.1). Beginning with lower levels of activity in the 1970s and 1980s, there is a local maximum in 2002, coinciding with the observed peak in patenting activity in 2001. The timeframe on startups runs a bit longer and reveals a decided upturn in new firm starts after 2005, a time that coincided with high commodity prices and strong growth in bioenergy.

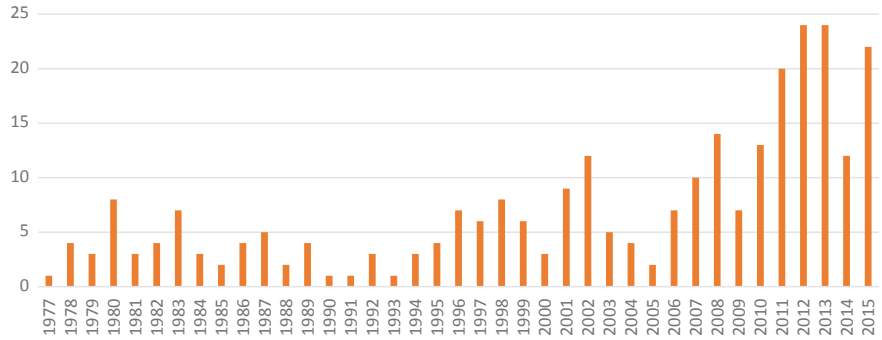

Fig. 6.5 New entrepreneurial biotechnology firms in agriculture, bioenergy, and natural resources

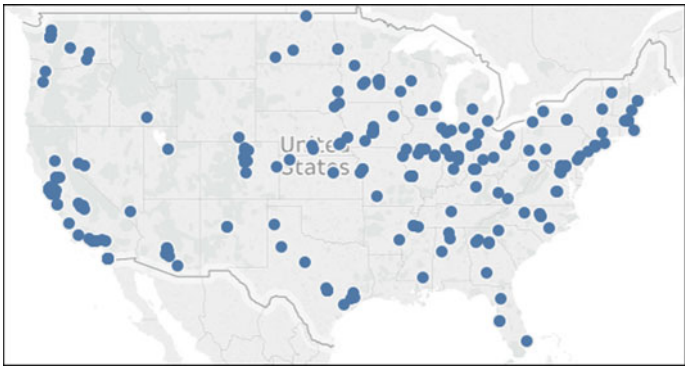

Fig. 6.6 The location of new biotechnology firms developing applications in agriculture, energy, and environment

Using address data reported for each firm, we map the location of startups across the United States and note broad similarities in their geographic distribution in Fig. 6.6 to the geographic distribution of inventions in Fig. 6.3. Of the total of 294 entrepreneurial firms, 156, or 53%, occur within one of the 30 largest clusters. This share is very close to the 56% of total inventions that occur within one of the 30 largest clusters (Table 6.3).

6.11 Discussion and Conclusions

This study has used a unique dataset of the locations of biological inventions, identified by inventor addresses in patent data, to answer questions regarding how biological inventions for use in primary resource-intensive industries—such as agriculture, energy, and natural resources—have been spatially distributed across the United States. By tracing the geographic footprint in ArcGIS of inventions in the 30 largest

clusters and then ascertaining the counts of inventions contained within each, we confirm that 56% of the inventions in the dataset were made in just these 30 largely urban regions, which correspond to the primary biotech clusters identified in other studies, including most of the very largest cities in the United States, including San Francisco Bay Area, New York, Boston, and San Diego, along with Los Angeles, Chicago, and Houston. However, we also find some clusters in secondary urban areas located near areas of high agricultural production, and we note that half of the 30 largest clusters include a Land-Grant university with significant agricultural research capacity.

We also explore the space–time dynamics of biological inventions for these industries, such as cumulativeness, the extent to which previous inventions in a given region increase the probability of new inventions arising in that region. We find positive and significant relationship between past numbers of inventions and the numbers of new inventions by region. These biological inventions for agriculture and natural resource applications exhibit spatial cumulativeness, remaining relatively concentrated spatially over time, following general empirical trends observed in the literature (Malerba and Orsenigo 1990,1996; Breschi et al. 2000; Breschi 2010).

We look into the relationship of invention counts with other broad characteristics of the regions. We show that numbers of inventions are positively related to population, confirming that these inventions do tend to be made in more urban areas. Inventions are also related to workplace earnings, an indicator of the level of economic activity as well as the quality of human capital. And, all else being equal, those regions with more agricultural production also have greater rates of invention as described by Usai (2011), Tan et al. (2017), and Wang et al. (2016).

We expect that, as a measure of relatively rural regions, farm income is likely to be negatively related to the number of inventions. However, innovation in these biotechnologies for agriculture is positively correlated with farm income, even though the major metropolitan areas that lead in biotech innovations have essentially zero farm income within their respective MSAs. We expected that these technologies might not show signs of spatial agglomeration and assumed that spatial proximity might not play a role in innovation (Breschi 2010). However, for these technologies, spatial agglomeration does exit. It means spatial proximity does play a role in innovation.

Finally, we explore the rate of founding and the locations of new entrepreneurial biotechnology firms developing technologies for agriculture, energy, and the environment. Trends of startups concur with trends we observed in inventions, both over time and distributed across space. Indeed, a strikingly similar share of startups is observed to occur within our 30 largest clusters.

Based on these results, we can draw a few implications for U.S. agricultural innovation policies.

- First, policies that seek to encourage biotech innovation and its commercialization in agriculture and other resource-intensive rural industries need to recognize that the preponderance of inventions is being made in urban areas. This is a normal pattern.

- Commonly held policy objectives for rural economic development in agricultural communities is not likely to succeed by seeking to supplant or compete with urban-based innovation clusters. But such efforts may find some opportunities by seeking to nudge, shift, or complement existing innovation clusters on the margin.
- There is a dual market failure at play when spillovers are hindered due to dispersion, or the lack of agglomeration. Not only is there private underinvestment in the underlying (R&D) activity that generates those positive externalities. But there is even failure of those positive externalities that are generated to have as much beneficial impact on third parties as they might have due to high search costs, travel costs, and other transaction costs.
- The relevance of the Land-Grant system and concomitant public investments in applied R&D at these intuitions continues for creating new human capital, networking existing human capital, and facilitating knowledge spillovers across the clusters and the peripheries of these geographically dispersed industries, both from urban to rural and from rural to urban.
- Technology transfer and commercialization strategies need to recognize that potential partners for further development of new biotechnologies are likely to be found in one of a handful of major clusters around the country.
- State and regional policy-makers, economic development officials, agriculture officials, and strategic partners in industry need to consider collective action for fostering largely urban entrepreneurship for largely rural industries, and creating linkages between them.
- Recognize and seek ways to address the extent to which (urban) innovators and (rural) producers in these industries are not intimately colocated.

The biotechnology industry in the United States has been such a powerful force for innovation and economic development largely due to long-sighted R&D policies. Significant investments in basic research by the National Institutes of Health, the National Science Foundation, Department of Energy, and the U.S. Department of Agriculture, along with strong but transparent intellectual property and regulatory policies. What has not been acknowledged to the extent that it has likely made a difference is the strategic development of biotechnology clusters for agriculture. The importance of colocation and economies of agglomeration has been significant for the growth of the industry. However, it is important to recognize that, outside of human therapeutics and manufacturing-based industrial applications, the virtues of these economies of agglomeration may begin to break down. The dual dilemma of agriculture appears to be the user-led innovations are necessarily diffused, while cluster-born innovations are isolated from the community of skilled users. Urban-based innovators and rural users are distant from one another. One of the crucial and most promising interventions is the Land-Grant system, holding the innovation system together and facilitation what spillovers do occur, even contributing to the formation and growth of many of the major innovation clusters that we observe today.

The importance of future innovations in these technologies is immense—in terms of assuring food security, economic development, and sustainability of agriculture, energy, and resources. An understanding of what are effectively the ecosystems that

sustain and drive such innovation is essential to sustaining it for the challenges faced ahead.

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Part III
Social and Bureaucratic Entrepreneurialism

Chapter 7
Social Entrepreneurship and the Challenge of Collaborative Governance of Civic Events: Brazil, Korea, and the United States

Dale Krane, Carol Ebdon and Aimee L. Franklin

Abstract Civic events are held in cities around the world. These activities add substantial value to the host community, but also pose significant management challenges, due to the substantial collaboration required. These events represent a unique form of organization since they require the collaboration of organizations from all sectors. However, they also have varying levels of regime formality and a reliance on voluntary action to achieve economic and social capital goals similar to hybrid organizations found in the social entrepreneurship literature. We use comparative case analysis of Brazil, Korea, and the U.S., to test the degree to which these events fit with existing models of collaborative governance and social entrepreneurship. We find a good fit, but also identify several factors of these events that are underdeveloped by or omitted from the models.

Keywords Social entrepreneurship · Collaborative governance · Civic events

7.1 Introduction

Most cities host one or more festivals or special cultural events (hereafter civic events) because they add value to the community—culturally, economically, politically, and socially (Angiola et al. 2013). Gibson and Stevenson (2004, p. 1) found "over the last twenty years, one of the central developments in the local governance of urban spaces and populations is the general acceptance of the notion that provision of, access to, and consumption of 'cultural' resources is a central plank in successful urban development strategies." Civic events often change the local governance process to

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obtain the needed commitment and mobilization of public and private resources, and they can also disrupt the routines of daily life for one or more segments of the community. Since civic events operate on a time schedule, the decision process cannot be stalled by prolonged conflict (Cabral and Krane 2018). Consequently, the inter-sectorial arrangements that are a key component of civic events require a collaborative style of governance.

Research analyzing inter-organizational collaboration has grown rapidly in the last two decades (O'Leary and Vij 2012). Collaboration, it is argued, becomes necessary when the goals and actions required to achieve goals cannot be accomplished without the cooperation of a diverse set of individuals and organizations from different societal sectors. But the emergence of collaboration is not guaranteed (Krane and Lu 2012). Several models of collaboration identify factors hypothesized to foster collaborative governance (Bryson et al. 2006; Ansell and Gash 2008; Emerson et al. 2012). Surprisingly, civic events are largely ignored in the study of collaboration, even though this widespread type of community activity depends heavily on cooperation among many diverse actors across sectors.

Our research seeks to answer the question: how robustly do institutional and process factors commonly found in models of collaboration and social entrepreneurship explain the cross-sectorial decision-making and management of large-scale civic events? The first section reviews the literature on civic events. Shared key attributes of collaborative governance and social entrepreneurship models are then described. Three large-scale civic events cases in three countries are comparatively analyzed—-Carnival in Brazil, the Hi Seoul (Korea) Festival, and the U.S. Mens' College World Series. Instead of the "how-to-do-it" approach of event planning manuals or the economic impact studies of tourism and development studies, we analyze the nature of inter-sectorial collaboration at civic events in three nations to determine how well existing models anticipate the contingencies of management and reveal factors downplayed, or not included, in models of social entrepreneurship and collaboration.

7.2 Civic Events

Civic events occur around the world. One recent report found over 4,000 festivals/events in just 21 large cities (BOP Consulting 2013). Another study (Janiskee 1994) found over 20,000 civic events in the USA with at least 1,000 added each year. Civic events can produce tangible benefits for their communities. They boost the local economy by attracting visitors, outside money, and new residents. Miles and Paddison (2005, p. 833) assert "the idea that culture can be employed as a driver for urban economic growth has become part of the new orthodoxy by which cities seek to enhance their competitive position." Social outcomes of civic events are as important as their economic outcomes: affirming a sense of place identity, maintaining local tradition, fostering community among diverse residents, diffusing knowledge, promoting the community image, and building social capital and increasing citizen

participation in collective activities (Jago and Shaw 1998; Getz 2008; Reverte and Izard 2011).

Successful civic events, gained through the collaboration of entrepreneurs representing the government, for-profit and not-for-profit sectors, can improve the reputation of public officials and fix their place in local history. The conceptual label of entrepreneur suffers from a lack of clarity. It has been defined through a variety of labels including (but not limited to): commercial, social, urban, environmental, political, etc. Muñoz and Cohen (2016) tackle the conceptual confusion in this observation: "Urban entrepreneurship creates solutions [to public or private goods failures] resulting in economic and noneconomic gains for the urban ecosystem, the public and private sectors, and the entrepreneur." (p. 72).

Concerning this research, urban entrepreneurs, like social entrepreneurs, are concerned about community problems and operate with limited resources. Both urban and social entrepreneurs have a focus on economic empowerment, often through the development of individuals alongside development of the community. The emphasis on economic development through commercial organizations as an avenue for community impacts is typically stronger for urban entrepreneurs (Muñoz and Cohen 2016). Our focus is the inclusion of a wide range of actors in community-based civic events; we use the umbrella term "social entrepreneurs" to describe those invested in social and economic impacts.

Similarly, the terms festival, special event, event, civic event, hallmark event, and mega-event are all used by scholars, but their usage has not been consistent. For example, Jago and Shaw (1998, pp. 28–29) treat events as one type of special event that has a theme and a celebration, while Falassi (1987, p. 2) defines events as "a sacred or profane time of celebration, marked by special observances." This lack of definitional consensus notwithstanding, civic events "…occupy a special place in society and culture, and their management presents a number of unique challenges" (Getz et al. 2010, p. 30). Nonprofit organizations and public authorities "own" most civic events (Getz et al. 2010, p. 39). We consider any periodic, community-enriching activity to be a "civic event" if it requires public authority, facilities, funding, management, oversight, planning, or services.

Urban studies journals have devoted some attention to mega-events such as the Olympics. Event management studies typically analyze planning and operation from a business perspective, focusing on how to produce the event and how to insure its success (Jago et al. 2010; Gotham 2011). Few analyses examine the complex interactions among public, for-profit, nonprofit entities, and the general public that are necessary for event operation and success (Getz 2002; Andersson and Getz 2008). Sometimes these studies suggest collaboration is an important element of management (Savage et al. 1991) arising from an awareness that conjoint action can provide enhanced local outcomes (Dutta 2016). Social entrepreneurship literature provides extensive evidence that hybrid organizations are uniquely suited to simultaneously achieving both economic and social purposes in novel collaboration structures (Doherty et al. 2014). However, the questions of how collaboration occurs and how obstacles are surmounted seldom are addressed systematically. Civic events in multiple nations

offer a unique venue to gain a better understanding of and to test the explanatory utility and external generalizability of theoretical models of collaborative and social entrepreneurial processes.

7.3 Civic Events and Collaborative Governance

Civic events pose administrative, financial, logistical, and political challenges to the host community. They require a high degree of planning and resource mobilization between public, private and nonprofit organizations, and voluntary groups. Networks must be established across sectors. Traditional hierarchical decision-making will most likely not be effective in multi-organizational arrangements—collaborative governance is required (Krane and Lu 2012).

The case for collaborative governance derives from expectations of positive effects. Alter and Hage (1993, pp. 36–37) identify eighteen benefits, which have been repeated by subsequent authors. For example, O'Leary and Bingham (2009, p. 7) describe potential benefits of inter-organizational cooperation as: "achievements in both organizational effectiveness and efficiency, such as the ability to buffer external uncertainties, share risks, achieve competitive advantages, generate cost savings, improve organizational learning, and produce high-quality services. Inter-sectorial alliances also have the potential to achieve greater public accountability by meeting public expectations for results."

Social entrepreneurship scholarship also considers the characteristics that matter when governing a hybrid organization requiring collaboration (Doherty et al. 2014). The entrepreneurship term connotes a special, innate ability to sense and act on opportunity, combining out-of-the-box thinking with a unique brand of determination to create or bring about something new (Martin and Osberg 2007). Civic events provide a contextual example of the kind of entrepreneurship occurring at the intersection of the motivation of making money and the drive for altruism (Peredo and McLean 2006). Many characteristics necessary for hybrid organizations to succeed in social entrepreneurship overlap with those attributed to successful collaborative governance (Bryson et al. 2006; Ansell and Gash 2008; Emerson et al. 2012).

The study of collaborative governance is characterized by a multiplicity of theories. For example, early scholars introduced two concepts related to cross-sectoral collaboration that entail collective action with the purpose of empowering the community through a focus on increasing the efficacy of residents. One is civic capacity, which can be characterized as an antecedent variable that contributes to or supports collaborative governance since the aim is to give power to citizens (de Souza Briggs 2008, pp. 10–19), often through education (Stone 2001) *vis a vis* the machinery of governance. The second is more of an outcome variable measuring the product of collaboration in terms of strengthening social capital (Putnam 2000), meaning individuals, alone or as members of a group, demonstrate civic efficacy via public engagement.

"Over the past two decades, these diverse lines of theory have been converging into a relatively similar set of core components and relationships…" (Krane and Lu 2012) which has produced a small set of models (Thomson and Perry 2006; Bryson et al. 2006; Ansell and Gash 2008; de Leon and Varda 2009; Emerson et al. 2012). Johnston et al. (2011, p. 701) assert that the Ansell and Gash model, developed from a literature review of 137 cases mostly in Western Europe and the USA, "is, perhaps, the most sophisticated account of the complex conditions necessary to initiate and sustain collaboration to date." Ansell and Gash (p. 544) begin with a relatively strict definition of collaborative governance: "a governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets."

Collaborations, they hypothesize, are influenced by five sets of factors (1) *Starting Conditions* composed of power-resource-knowledge asymmetries, incentives and constraints on participation, and the prehistory of cooperation/conflict; (2) *Institutional Design* incorporating inclusiveness, forum exclusiveness, clear ground rules, transparency; (3) *Collaborative Process* encompassing dialogue, trust-building, commitment to process, shared understanding, intermediate outcomes; (4) *Facilitative Leadership* including empowerment; and (5) *Outcomes*, which are process based. Each of these five factors will provide the basis for evaluating each of the three civic event cases to answer Research Question #1: "How robust are the five factors of a hybrid model of collaboration in explaining civic event processes and outcomes?"

The core of Ansell and Gash's (2008) model is "the collaborative process." Unlike some previous models, Ansell and Gash assert that successful collaboration emerges from an iterative process which goes through multiple cycles of face-to-face dialogue that depend on "good faith" negotiations to overcome lack of trust. This dialogue, they argue, is a necessary but not sufficient condition for joint action. The level of commitment to the process is also important because the cycles of negotiations and trust building are costly. Commitment can be present when there is a shared purpose for collective action to pursue social and economic goals (Borzaga and Defourny 2001; Laville and Nyssens 2001; Peattie and Morley 2008). Starting from a social purpose, such as the community building associated with a civic event, provides a priori legitimacy capital (Pache and Santos 2013) to establish trust among multi-sector actors and varying interests.

As dialogue proceeds, decision-making is expected to shift from individual organizations to a forum of committed parties who can leverage community embeddedness and relational ties with stakeholders to secure resources (Dacin et al. 2011; Dart 2004; Minkoff 2002). They become "owners" of the process who are responsible for arriving at a "shared understanding of what they can collectively achieve" (Ansell and Gash 2008 p. 560) which includes a common definition of the problem, a clear mission for joint action, and the identification of common values. Success in early joint activities (Cornforth and Spear 2010) plus achieving intermediate outcomes ("small wins") move the process along toward a continuing collaboration.

Also critical are the antecedent factors that provide a basis for beginning the dialogue or impeding its progress. In particular, "incentives to participate (in a dialogue) are low," according to Ansell and Gash (p. 552), "when stakeholders can achieve their goals unilaterally or through alternative means." Social entrepreneurship literature recognizes the importance of incentives in situations, such as civic events that feature a heavy reliance on nonmarket wage human resources (Bridgstock et al. 2010) and the presence of nonfinancial incentives for organizational and individual stakeholder motivation (Austin et al. 2006; Dees 1998; Battilana and Dorado 2010; Haugh 2007; Membretti 2007; Thompson et al. 2000).

Civic events are expected to enhance a community's environment (Getz 2008) and to create social value by integrating the socially excluded (and disadvantaged) (Borzaga and Defourny 2001; Eikenberry and Kluver 2004), a highly valued characteristic for hybrid organizations with cross-sectorial collaboration. Novel governance structures (McCarthy 2012; Membretti 2007) can increase flexibility (Pontikes 2012) and legitimacy (Minkoff 2002; Tracey et al. 2011). Hybrid organizations are also valued for their ability to assist in financial resource acquisition from cross-sectorial sources (Chertok et al. 2008).

Leaders who facilitate dialogue by their ability to mediate especially when power imbalances and/or antagonistic perceptions exist are crucial to bringing about "shared understanding." Institutional arrangements can shape the emergence of collaboration through establishment of "basic protocols and ground rules for collaboration," which affect "the degree of system stability and resource munificence" and the type of governance structure (Ansell and Gash 2008, p. 555). Leaders with an entrepreneurial style are common in hybrid organizations that must manage the demands of multiple stakeholders (Bridgstock et al. 2010) and build strong relationships with key stakeholders (Mair and Martì 2006).

Hybrid organizations emerge when social entrepreneurs look beyond traditional sectoral boundaries and recognize that economic and social gains can be achieved by innovative structures and collaborations (Alvord et al. 2004; Weerawardena and Mort 2006). Through normative isomorphism actors form strategic collaborative alliances for economic and social outcomes (Pache and Santos 2012; Aurini 2006). This breakthrough thinking stimulates innovation through the reconfiguration of existing products and services (Osborne et al. 2008; Austin et al. 2006; Amin 2009) to simultaneously provide financial and economic development gains while contributing high community impact (Bacchiega and Borzaga 2001).

Enthusiasm for collaboration as *the* solution to the bureaucracy problem sometimes glosses over its challenges. Conflict rather than cooperation may result (O'Leary and Bingham 2009, pp. 259–264). Tensions can arise when attempting to maximize both economic and social goals (Battilana and Dorado 2010; Zahra et al. 2009) and to meet the disparate needs for retention of stakeholders (Borzaga and Defourny 2001; Royce 2007; Liu and Ko 2012). There are substantial obstacles to collaboration (Jennings and Krane 1994; Margerum 2007). Literature on bureaucracy devotes considerable space to the prevalence of factors that lead to behaviors such as "agency imperialism," protection of the "status quo," and "turf wars." The scholarship on social entrepreneurship recognizes similar

challenges due to the presence of diverse boards (Mason 2010; Smith and Teasdale 2012) that make different claims on the expected financial and social performance of hybrid organizations and cautions about the need to guard against attempts to force organizations in one sector to adopt the strategies of the other (Brandsen and Karré 2011; Eikenberry and Kluver 2004; Austin et al. 2006). These factors increase the complexity of governance structure and accountability (Doherty et al. 2009).

Collaboration studies must consider these barriers. The actions to foster collaboration are important, but so also are their sequence and timing, as well as the type of network (Rethemeyer and Hatmaker 2008). Likewise, the complexity of the joint activity can be a formidable obstacle. For hybrid organizations that rely heavily on collaboration, there must be balance between internally competing institutional logics that envision economic or social gains (Santos 2012).

Research to determine which hypothesized factors are necessary to collaboration has yielded contradictory findings (e.g., Daley 2009; Smith 2009; Waugh 2009). Most of this work has been limited to USA and Western Europe cases. McCaffrey, Faerman, and Hart (1995, pp. 621–622) explain: "A key task in developing theory [of collaboration] is studying how common, important factors play out in different settings…" and they recommend that an "…*intentionally comparative study would be a valuable way to extend the themes raised in this paper*" [italics in the original]. The second question that we pose addresses the presence of contradictory findings and the lack of comparative analysis. Thus Research Question #2 is "Are there factors in the operation of these civic events that are underdeveloped or omitted from the Ansell and Gash model?" This study follows the McCaffrey et al. advice by exploring three unique civic events in very different nations. Cross-national variation provides a strong test of the generalizability of the Ansell and Gash model.

7.4 Civic Events in Brazil, Korea, and the USA

To illustrate the complexity of managing civic events and their challenge to collaborative governance, we focus on three cases of large-scale civic events in Brazil, Korea, and the USA.

7.4.1 Carnival in Salvador, Brazil

Salvador is the capital of the State of Bahia, and is Brazil's third largest city, with a population of almost three million. The primarily Afro-descendent population created a form of Carnival different from other Brazilian cities. Over 1.5 million people join the celebration (Magenta 2011), with more than 650,000 revelers per day (Miguez and Loiola 2011). Organizing this annual six-day festival requires enormous efforts by public, private, and voluntary agencies, who work in concert to manage multiple

activities across the city as well as maintain order while permitting the sale and consumption of alcoholic beverages on the streets during the revelry.

Originally, the festival featured processions of families and friends (*blocos)*. The hallmark of Salvador's Carnival, *trios elétricos* (flatbed trucks with bands), were invented in the 1950s, and evolved into huge trucks with stages. Revelers can purchase access to an area around the trucks and accompany the *trio* along the procession route. Professionalization expanded after the city approved commercial sponsorships in the 1980s. Some *trios* are free of charge with costs supported by public and/or private entities, but others operate as a business. The number of performers and support staff often exceeds 1,000 (A Tarde 2011). Ticket sales, advertising, and sponsorships cover the *trio*'s costs, which can be up to US$1 million (Cabral and Krane 2013).

Entrepreneurs rent or sell space for those who wish to observe the processions from private spaces offering services from food and drink to security and sanitation. Carnival attracts customers for hotels, restaurants, and other tourist industries as well as mass media, health care, private security, and transport. The festival generates more than $250 million (Infocultura 2007) and accounts for more than 100,000 temporary jobs (Miguez and Loiola 2009).

The Salvador municipal government is primarily responsible for festival management. The Municipal Council of Carnival (COMCAR) is the main institution for making decisions; it is composed of 26 public and private stakeholders. COMCAR works with public agencies and groups such as artistic associations, entrepreneurs, and unions (Cabral and Krane 2018). There are claims that COMCAR's decisions are biased toward the interests of politicians and business leaders and against others such as cultural and neighborhood associations (Miguez 2011).

Carnival requires support services such as security, health, mass transportation, parking, sanitation, and street vendor regulation. Municipal authorities must cooperate with state agencies for some services which leads to some conflicts, especially when different coalitions control city and state governments (Hupsel Filho 2011). The lack of state-local cooperation must be put aside (Barbosa and Souza 1997; Jose 2011). An Office of Integrated Management brings together city and state officials to make Carnival decisions (e.g., where to locate more police or health teams). Public agencies with missions to protect the region's historic culture also grapple with demands of commercial sponsors and television stations. For example, certain hours and routes are more popular with the street crowds and with the national television audience (Jacobina 2011). Newer Afro-heritage groups have demanded their own new route or venue. Given the difficulty of collective action, the production of this collaborative event with diverse organizations and different interests is surprising.

7.4.2 Hi Seoul Festival in Seoul, South Korea

The capital of South Korea, Seoul is a city of over 10 million inhabitants. The *Hi Seoul Festival* has been celebrated continuously since 1994 when it was established as Seoul Citizen's Day to mark the anniversary of the city's selection as the national

capital by the Joseon dynasty. The festival has exhibited several changes in name, content, and size during its 20-year history. It started as a small local ceremony, but soon became a city-wide sports competition; later it was changed to a citizen-oriented event to save money (Seoul Citizens' Day Festival Planning Committee 1998). After the success of the 2002 event, which highlighted the city's triumph in hosting the FIFA World Cup, city officials changed the name and used it as a means to boost Korean culture and the city brand (Shin and Sohn 2005). Professional and amateur shows characterized the 2003–2007 events, and in 2008 and 2009 the name changed to the Palace Festival reflecting a thematic shift to Korean history. Despite the high quality of these two years, city budget shortfalls forced a return to the citizen participatory performing arts festival of the 2003–2007 years. The event transformed again in 2013 into a street-art festival (Kim 2012).

Planning and management of the Hi Seoul festival have also undergone changes. The city government launched the event, but they created a citizens' committee—the Seoul Citizens' Day Festival Promoting Committee (SCDFPC)—to be the official host. When the current name was adopted, the Korean Tourist Organization (KTO) and the Sejong Center Foundation (SCF) became participants in the festival decision-making, with the SCF serving as event supervisor in 2003 and 2004. The Center was replaced as event director in 2005 when the city contracted management to the Seoul Foundation for Arts and Culture (SFAC). This arrangement lasted 2 years until the city contracted with a citizen's advisory group that produced an award-winning event in 2008. After the 2009 festival, the advisory committee was eliminated, and the SFAC operated it for three years. In 2013, a twelve-member organizational committee was added to create a more diversified and representative decision-making body; the committee included an art director, an arts professor, a city official, a SFAC official, an artist, and seven prominent persons in cultural affairs (Cho 2014).

This brief history reveals that the management of the Hi Seoul Festival has not been one of continuous collaborative governance. The city government contracted the event's operation to a single organization for half of the years from 2003 to 2013, and given the on-again, off-again incorporation of a citizen advisory group and/or arts and cultural organizations, there is little guarantee of collaborative governance in future years. Some of the shifts in management and in content have been due to evaluative studies, while others have been prompted by critics outside of city government, budget shortfalls, and mayoral elections. Since the Hi Seoul Festival is, by comparative standards, a relatively new event, the frequent changes indicate the event has yet to be sufficiently institutionalized to sustain collaborative governance.

7.4.3 College World Series (CWS) in Omaha, Nebraska

The U.S. Mens' College World Series (CWS) baseball championship has been held in Omaha, Nebraska, annually since 1950. The best eight teams in the country play over approximately eleven days, after preliminary rounds of the tournament at other sites. Total attendance grew from 17,805 in 1950 to 341,484 in 2013. The CWS is

viewed as an important economic driver for the community, with many fans from out-of-town. The CWS economic impact is estimated at about $41 million per year (Goss and Associates 2008). In addition, the championship is broadcast nationally on cable television by ESPN, which provides visibility and enhances Omaha's reputation for its quality of life, economic vitality, and for tourism.

The CWS is "owned" by the National Collegiate Athletic Association (NCAA), an organization of universities which governs collegiate sports. The NCAA emphasizes the local importance of its events: "…..we put on championships first and foremost to ensure student-athletes have a memorable experience. But we're also committed to quality events for everyone involved, from the coaches to the fans and the broadcasters. It's important to us that our championships have a positive impact on the communities that host them" (www.NCAA.org).

The Omaha host organization for the CWS is College World Series of Omaha, Inc. (CWS, Inc.) This entity developed from an early group of volunteers who convinced the NCAA to move the championship to Omaha. CWS, Inc. is a year-round organization that coordinates and plans the annual event, through a contract with the NCAA. An Executive Director is responsible for day-to-day operations, overseen by a governing board (www.cwsomaha.com).

Until 2011, the CWS was held at a stadium in South Omaha, pursuant to the 3–5-year contracts between the NCAA and CWS, Inc. The city participated in negotiations because they owned and operated the stadium and provided services such as traffic enforcement. Omaha philanthropists became involved in the most recent negotiations which resulted in a new $128 million stadium in downtown Omaha and an unprecedented 25-year contract with the NCAA. The new stadium is owned by the city but is operated by the Metropolitan Entertainment and Convention Authority (MECA), a special authority that operates the city-owned convention center/arena across the street from the new stadium. The contract's agreements detail the financing, including distribution of revenues (the NCAA receives the vast majority of the profits, and is guaranteed a certain amount of revenue each year) (Landow and Ebdon 2012).

The major actors in the CWS event, aside from the athletes and fans, are the NCAA, CWS, Inc., and MECA. The City of Omaha is also extensively involved, both as the owner of the stadium and as the provider of services from various departments. Many other organizations are also integral to the event. Companies are sponsors and hold activities in tents outside the stadium. Hotels and restaurants are busy during the event. In addition, a number of service clubs (e.g., Kiwanis and Rotary) are involved in "hosting" teams and putting on activities for them.

These case descriptions of civic events on three different continents provide a unique opportunity to add a comparative perspective to the development of collaborative governance theory. We use the setting of civic events to confirm the salience of the concepts present in Ansell and Gash's model and to explore new theoretical directions.

7.5 Methodology

The analysis of the three civic events is based on five factors common in models of collaborative governance. This framework is useful because it attempts to encompass the variety of complex factors necessary for collaboration. Two research questions guided the study. First, how robust are the five collaboration factors in explaining civic event processes and outcomes? Second, are there other factors in the operation of these civic events that are underdeveloped or omitted?

Because this is exploratory research about events compared in an international context, we use a qualitative case study approach (Yin 2003). The three civic events were selected using the logic of "most different" analysis, a common form of comparative research. Instead of selecting cases based on how "similar as possible in all respects" they are to each other, most different analysis "is the reverse image" in which "variation on X values is prized, and variation on Y eschewed" (Gerring 2001, p. 210 and p. 212). Most different analysis is especially useful in cross-national research because it "eliminates factors differentiating social systems by formulating statements that are valid regardless of the systems within which observations are made" (Przeworski and Teune 1970, p. 39). By selecting cases from very different places, if the Ansell and Gash model's contingent factors associated with collaborative governance are found to be operative in the three cases, then differences across the three nations do not affect applicability of the model to civic events. It also allows us to understand the cross-cultural emergence of hybrid institutional logics in social enterprise (Kerlin 2010).

Interviews were the primary method utilized to gain insights into the views of those highly involved in these events. The interview questions were designed around the five components of the Ansell and Gash model. Members of the research team, who were fluent in the native language, conducted interviews with key stakeholders in each city where the civic events were held. Anonymity was guaranteed to encourage frankness in responses.

Each member of the research team transcribed the interviews into English and prepared a description of the civic event in the country in which they collected the case data. Then, each researcher conducted an analysis of the civic event using the five factors in the Ansell and Gash model. The research team then discussed the findings across the three nations and queried the results in each case to make sure the evidence was similar to justify the analytical conclusions.

In addition to the interviews, information was also gathered from additional sources as appropriate. These primarily included documents related to the event, newspaper stories, and websites. These data were used to enhance our knowledge of the events and to triangulate our findings. While our study has limitations in that we may not have obtained fully representative opinions from the select group of interviewees and documentation analyzed, we believe that we identified and spoke with primary participants in the management of these events.

7.6 Findings

The *first research question* asks how well the three events fit hybrid organization collaboration models. Table 7.1 (see Appendix) highlights our findings along the five factors of the Ansell and Gash model. We find that these events are aligned fairly well and that there are similarities. However, there are also distinctions across the factors and between the cases.

Starting Conditions. All three events have a long history of collaboration, although HSF is the newcomer at 20 years. Recent changes involve new stakeholders. The Salvador mayor's office negotiated an exclusive beer sales arrangement and corporate sponsorships, which will relieve the city of its Carnival expenses (Pitombo 2013). A new Omaha stadium was built for the CWS partly with private donations and MECA became the stadium manager. In Korea, a transition occurred in 2002, reflecting the movement toward a more democratic government. Conflict has also played a role historically. With Carnival, conflict has ensued between levels of government, between the mayor and city council, and over routes and fees. Conflict in the HSF led to changes in event organizers and hosting organizations, due to quality and management concerns, and politicized decision-making. CWS conflicts have ranged from street closing details to the location of the new stadium, stadium management and ticket sales, and revenue sharing.

Resources and power are diffused with Carnival between and within city and state, and private partners (artists, cultural and ethnic groups, and neighborhoods). HSF has had significant partner changes, such as the repeated elimination and reinstatement of the citizen committee. The role of the mayor and the importance of city funds suggest power and resource asymmetries. There are also power imbalances with the CWS, due to the NCAA's event ownership, seen in the profit distribution and building a new stadium to keep the event in Omaha. On the other hand, the 25-year contract has dissipated concerns about losing the event.

Stakeholder motivations differ across cases, but incentives are important. Carnival artists and businesses have financial incentives, and revenues help governments. CWS corporate sponsors, the NCAA, and governments benefit from the economic boost. There are also less-tangible incentives. Carnival participants want to protect and disseminate their culture. Seoul wants to preserve its history while developing tourism and projecting itself as a global city. Omaha enjoys the national CWS television coverage that helps to build visibility for the city's reputation. Benefits are understood by all partners to be at risk if each does not collaborate.

Institutional Design. There is a shared trend toward the professionalization of event management in these cases. The Municipal Council for Carnival is the primary entity in Salvador, along with the Office of Integrated Management during the event itself. CWS, Inc. is the lead coordinator for the CWS. Responsibility for the HSF is contractually established by the City of Seoul and has cycled through multiple organizations to get diverse partners.

Inclusiveness is the very nature of these events. The HSF and Carnival events are open to everyone, and there are "fan-fest" areas outside the CWS stadium that are free and open to people not attending the games. The inclusiveness in decision-making varies, though. Partner participation in HSF is by invitation, partly because the City controls the event budget, and citizen involvement has varied over time. With Carnival, decision-making has become more broadly inclusive; COMCAR brings together the various stakeholders and works with the elected officials, who cannot afford politically to keep important groups out of the decision process. The 25-year CWS contract has affected how decisions are made in this case. Negotiations over the new stadium expanded involvement of private donors, but there was substantial public anger at the lack of citizen input. While the role of CWS, Inc. has broadened, and the event structure has become more formalized with a more representative board, the contract largely means that major decisions are still made rather exclusively by the NCAA, CWS, Inc., and MECA.

Collaborative Process. The iterative nature of collaborative governance is seen in each event, in both short and long-term. All three events occur annually at one point in time, allowing for evaluations that can lead to changes for the next year. Table 7.2 (see Appendix) compares two kinds of actors; those formally involved in planning and conducting the events and those whose involvement is primarily as participants during the event. The only consistencies across the three events are the involvement of city officials in the planning and operations phases of the event and an influx of a group of performers whose interests directly align with the main purpose of the event to the city, including musicians, athletes, artistic performers along with fans who residing in the city as well as national and international tourists.

Data is collected and reviewed during and after the event, such as the daily incident reports during Carnival, and CWS surveys of athletes and coaches. Issues are discussed through face-to-face dialogue in a regularized process. This process is based on the contract terms in the CWS, while in the other cases it appears to be based more on an understanding of the need to work together toward success, with shared ownership. There is a notable difference for HSF due to critical evaluations by external actors. This may partly explain the changes in partners over time.

Over the long run, the iterative nature of collaboration for improvement is even more noticeable. Each event has had significant changes in the organization and process. Carnival has evolved from small neighborhood parades to one that involves over 200 entities while maintaining a commitment to inclusive dialogue. The HSF transitioned from a smaller festival to a larger, professionally managed event with changes in its governing arrangements. CWS has new stadium management and increased formality in the operation of CWS, Inc.

There is a shared understanding of the overall mission, but variation in the participant objectives. For example, the local CWS partners care about the community, while the NCAA is more interested in financial outcomes and maximizing the fan and athlete experiences. This can lead to issues, such as control exercised over the "outside the stadium" activities.

Carnival has experienced an evolving process of bargaining over the details of each year's event. The commitment to negotiate produces the "small wins" that Ansell and Gash (2008) hypothesize sustains collaboration. The focus with the CWS appears to be longer term, with the 25-year contract; negative financial and political consequences would be incurred if the event lost popularity, so participants are committed to planning for continued success. Contractual control is not the only means for forcing collaborative behavior. Both the Carnival and HSF cases suggest that inclusive representation can be persuasive in avoiding negative consequences.

Facilitative Leadership. Governments play leadership roles in the Carnival and HSF cases. The Mayor's role in establishing the mission is noticeable in the HSF. Carnival interviews identified several facilitative leaders, such as the head of the municipal tourism office and a former Carnival coordinator. With CWS, government is involved in stadium ownership and provision of essential services, but ongoing leadership is primarily by individuals in the NCAA and CWS, Inc. Leadership also changes over time. HSF changes have occurred with mayoral transitions, while corporate sponsorships for Carnival added a totally new set of partners. Individual mayors have been important in CWS' history, such as negotiation of the new stadium and contract, and other actors such as donors played key leadership roles at that time as well.

Another nuance that emerged was the role of specific individuals who provide institutional memory and are perceived as altruistic stewards of the event. Interviewees gave examples of how informal leaders facilitated negotiations when the dialogue was faltering, or a new activity or process was needed. The information gathering and informal evaluation–reaction process fostered by these leaders appears necessary for continuously improving event quality and increasing the likelihood of future success and paves the way for continued collaboration.

One notable difference in leadership characteristics is the focus on CWS succession planning. The NCAA official who oversaw the event for 26 years recently retired, and CWS, Inc. has been led for decades by a father and son. The passion of these individuals, along with their institutional memories, was noted by a number of interviewees.

Outcomes. A collaborative governing process has led to three successful civic events. Participants largely measure success as event growth. Carnival and CWS grew from small activities into nationally recognized events. The HSF has not been in existence for as long and its espoused purpose has changed, so it has not had the chance for this transformation. Continued growth is not as clear. Carnival's main routes are too crowded, but demand to participate is high, and the government wants to continue attracting tourists. The CWS has a finite number of seats, although activities outside the stadium can continue to grow and the NCAA could change the tournament structure (e.g., adding teams). By offering multiple locations within Seoul and supporting multiple events during the year, the HSF appears to have solid growth potential.

Economics has become a significant factor in the events. Grassroots activities have turned into commercialized mega-events, with a substantial community impact: over $200 million in Salvador and over $41 million in Omaha. However, challenges have arisen. Afro-descendent groups in Salvador push to highlight their contributions to regional culture and demand the festival not be transformed into an industrialized event, as many complain has happened in Rio. Likewise, the presence of temporary vendors and an "adult"—not family friendly—tailgating atmosphere created resistance at the new CWS stadium. For HSF, the tension between historical, cultural, tourism and economic purposes is suggested by the continual rotation of partners. The duel between desires for an economically successful, commercial entertainment event and an event that also fosters cultural and social values can be seen in all three civic events.

Overall, the events fit well on four of the five factors in the hybrid model of collaborative governance. Carnival and CWS meet theoretical expectations for the collaborative process, but HSF falls short. There are minor cross-case variations for other factors in the model. Whether these are idiosyncratic differences based on case selection or suggestive of more nuanced factors embedded in the model is considered in the Conclusion section.

The *second research question* asks whether Ansell and Gash's model underplays or omits factors that fostered or hindered collaboration in the three cases. Five notable factors were identified that are worthy of discussion and possible refinement of the model: "restarts" of the events, geographic location of the partners, infrastructure investments, the importance of evaluative data, and the efficacy and necessity of trust as the *sine qua non* of collaboration.

First, the model highlights the iterative process, but there have been significant changes to the starting conditions in each of these cases. These critical junctures are more like a "restart" of the collaboration and can have substantial effects on process and design. The "restarts" are associated with changes in the collaboration context such as demands for inclusion, economic downturns, or political upheaval. Collaborative "forums" are not immune to outside influences which can alter the participants as well as the interests negotiated within the forum.

Second, the HSF and Carnival are primarily local collaborations, but the CWS is "owned" by the NCAA (headquartered in another state) and nationally televised. The Omaha-based partners are more interested in building community and the local economy, while the NCAA and media are more interested in their national brand and finances. The NCAA has the upper hand in negotiations because of an implicit threat that the event could be moved to another city, which was why the city agreed to invest in a new stadium. Similarly, as national television in Brazil and corporate Carnival sponsorships have grown, nonlocal interests now compete with local goals.

Third, the events differ in resources and planning styles necessary for success. The CWS requires significant infrastructure investment for a stadium and space for crowd activities and parking, which require long-term planning. Carnival depends primarily on human resources to produce the entertainment and serve the revelers; each Carnival poses new challenges and conflicts, with some outcomes that must

be negotiated each year. The HSF is dependent on public funding which contributes directly to the shifts in governance the event has experienced.

Fourth, the use of evaluative data was emphasized. Almost every CWS interviewee mentioned the annual survey of athletes and coaches. The Carnival daily incident reports are supplemented with a formal evaluation. Technical information is sought not just for future planning but is viewed as a means of fostering collaboration. This evaluative process is not a noticeable part of the Ansell and Gash model but is critical in these cases to the collaboration.

Fifth, the literature emphasizes that dialogue provides the means to build trust, so stakeholders will commit to collaboration, but the CWS and Carnival cases offer evidence that trust is not crucial to collaboration (Hill and Lynn Jr. 2003; Vangen and Huxham 2003). Surprisingly, informants frequently mentioned mutual respect, commitment to the process, and shared understanding, but not trust. This contradicts literature on collaboration (e.g., Bardach 1998; Huxham 2003; Bryson et al. 2006; O'Leary and Vij 2012). If trust is one of the "three core contingencies" of Ansell and Gash's model (p. 562), how do civic events function without the presence of a factor deemed absolutely necessary to collaborative governance?

Cross-sectorial governance brings together partners who are motivated by different institutional logics but do not necessarily have to trust each other to work together. Emerson et al. (2012, p. 14) differentiate between shared and mutual understanding by noting the latter refers to "the ability to understand and respect others' positions and interests even when one might not agree." Mutual understanding among partners with different logics can sustain collaboration that yields benefits that help achieve the varying goals of the partners.

Trust may be less important to collaborative success than the "…'delicate balancing act of bringing together individuals and organizations with both similar and different goals' (Connelly et al. 2008) and careful management of the conflicts that arise out of the different goals and expectations that partners bring…" (Vangen and Huxham 2012, p. 757). In the absence of trust, the repeated nature of many civic events may induce the collaboration to a point where failing to collaborate would result in failure. Collaborative governance, as seen in these cases, may be as much about avoiding mutually assured destruction (to borrow from International Relations theorists) as it is about collaborating on the basis of trust relationships.

7.7 Conclusion

The purpose of this comparative case analysis was to determine how well models of collaboration and social entrepreneurship explain the cross-sectorial decision-making and operation of large-scale civic events in three nations. This is an important topic because civic events are held around the world, in communities of all sizes. They are vital activities culturally, economically, politically and socially, yet they pose significant management challenges. The study contributes to scholarship by testing

the collaborative governance model in a comparative case analysis of a previously unexamined policy area, civic events. In addition, we identified underdeveloped or omitted factors suggesting enhancement to theories of collaboration and social entrepreneurship. To have external validity and generalizability, a theory must be fairly equally applicable to a wide range of cases. By selecting cases with national and cultural differences, we are able to offer conclusions about the robustness of collaborative theories.

Our research focus related to the degree to which a model of five factors for collaborative government "fits" three civic event cases. The model focuses on starting conditions, institutional design, collaborative process, facilitative leadership, and outcomes. The analysis found that these factors undergirding collaborative governance were features of the three civic events.

We also found factors that are underdeveloped or omitted from the model. Some, like a shared sense of purpose or the necessity of geographic co-location, may not have the right degree of specificity, while others may not have universal applicability. Examples are the varying kinds of evaluative data and partner resources. Cross-sectorial governance of civic events can be altered by political changes of the public partners as well as by changes in the type of private partners. Collaborative governance of the Hi Seoul Festival, for example, is less institutionalized compared to Carnival and the College World Series because of frequent turnover of local political leaders. Furthermore, collaborative governance of a civic event may evolve through "critical junctures" prompted by a significant change in the composition of partners or institutional design, rather than in the iterative and incremental fashion hypothesized by Ansell and Gash.

More nuanced aspects of the model were also found, especially in the area of trust. Although many scholars hold trust is essential to collaboration, it may not be as critical to civic events. Key here is not necessarily trust, but the "careful management of the conflicts" among the partners (Vangen and Huxham 2012, p. 757). Dialogue and mutual understanding can lead to shared understanding and trust, but mutually supportive benefits can be attained through negotiation among partners even if they do not trust each other (Tang and Tang 2014). Future research can confirm the role of parallel goals and their related financial, economic, political, cultural and/or historical incentives in binding partners to the overarching purpose of the event.

Admittedly, these cases were chosen because of their success, enabling them to continue and grow over a number of years. There are marked differences in the size of the host cities; however, the selection of cases can provide a check on the influence of size when applying collaborative governance theories. These kinds of cases can be informative for analyzing critical success factors. Future research could explore what happens when critical success factors are absent. Does their absence necessarily predict failed events? This exploratory study offers insights that can be researched in more depth across a range of cases of civic events.

Appendix

Table 7.1 Findings related to the hybrid logic collaborative governance model

	Carnival—Salvador, Brazil	Hi Seoul Festival—Seoul, Korea	College World Series—Omaha, Nebraska, USA
Starting conditions	Long history of cooperation and conflict, but some new players	Long history of cooperation	Long history of cooperation and conflict, but some new players
	Resources diffused, power shared	City of Seoul is the initiator and provides financial resources	Resources diffused, Power tilted to NCAA
	Cultural, economic and political incentives	Cultural, economic and political incentives	Economic, community image incentives
Institutional design	Formal entities	Formal entities	Formal entities
	Professional administration	Professional administration by contract	Professional administration by contract
	Broadly inclusive	Invited participation to be representative and diverse	Inclusive participation
	Blend of rules with participative decision-making forums	Inclusive by invitation since city provides budget	Long-term contract. Commitment to follow contract rules
Collaborative process	Iterative in short-run and long-run	Iterative in short-run	Iterative in short-run and long-run. Focus on long-term planning
	Use of daily and end of event data for evaluation and CQI changes	Externally produced evaluation data can be critical and cause partner/process changes	Use of daily and end of event data for evaluation and CQI changes
	Shared mission understanding, but differing objectives	Mayor establishes the mission/purpose	Shared understanding of overall mission, but differing objectives
	Small wins are important	Deliberative partners change over time (in response to critics)	

(continued)

Table 7.1 (continued)

	Carnival—Salvador, Brazil	Hi Seoul Festival—Seoul, Korea	College World Series—Omaha, Nebraska, USA
Facilitative leadership	Primary role for government	Primary role for government	Government leadership has varied over time. Currently CWS, Inc., and NCAA
	Informal actors provide institutional memory and partner negotiation assistance	Mayoral transitions are important to purpose and partners	Informal actors provide institutional memory and partner negotiation assistance
			Focus on succession planning
Outcomes	Growth of participants and tourists	Growth in number and locations for event	Growth of revenues
	Economic impact	City branding for tourism and economic impact	Economic impact
	Challenge: Commercial entertainment venues versus Afro-ethnic groups promoting culture separate routes	Creating a best practice example for other cities	Challenge: increased commercialization and formality of the CWS experience for athletes and fans versus tailgating versus family-friendly entertainment
		No challenges beyond critical external evaluations identified	Temporary vendors versus established businesses

See Tables 7.1 and 7.2.

Table 7.2 Comparison of stakeholders and their roles during civic events

	Carnival—Salvador, Brazil	Hi Seoul Festival—Seoul, Korea	College World Series—Omaha, Nebraska, USA
Stakeholders with formal roles: planning and conducting the civic event	City leaders and staff	City leaders and staff	City leaders and staff
	Municipal Council	Citizen's commission, then advisory group then organizational committee	Profit seeking organizations: NCAA, ESPN, MECA
	State government	Foundations	Not-for-profit: CSW, Inc.
	Parade-side entrepreneurs and beverage vendors	Cultural affairs experts	Community philanthropists
Stakeholders with informal participation roles during the civic event	Revelers—families, friends, heritage groups, *trios* (commercial or free [un/sponsored])	Professional and amateur performers: athletes, professional and amateur performers, street-festival artists	Professional: college athletes, corporate sponsors, hotels/restaurants
		Citizens and tourists	Fans
			Community service clubs

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Chapter 8
Revisiting Bureaucratic Entrepreneurialism in the Age of Urban Austerity: Framing Issues, Taking Risks, and Building Collaborative Capacity

Aaron Deslatte

Abstract More than two decades ago, Schneider et al. (2011) posited that city mayors and managers were emerging as "public entrepreneurs," helping to advance dynamic policy change in the face of growing external environmental challenges. Their focus on municipal executive entrepreneurship coincided with a larger effort to develop a normative theory of entrepreneurial public management in democratic governance (Bellone and Goerl 1992; Hood 1991; Moore 1995; Osborne and Gaebler 1992). This article revisits the thesis posited by Teske and Schneider (1994, 331) that public entrepreneurs emerge to "help propel dynamic policy change in their community," and applies it in a contemporary urban governance context. The goal is to better understand how public organizations cultivate and utilize an Entrepreneurial Orientation (EO) for value creation and to articulate a more general application of these entrepreneurial activities. To do so, this chapter examines data come from in-depth, semi-structured interviews with city managers in 20 local governments located in the Chicago, Illinois metropolitan area. The findings suggest that entrepreneurial strategic processes—problem framing, risk-taking, and collaboration—likely occur concurrently in public organizations, as new problems arise and old solutions move toward entropy. The findings help illuminate the theoretical bases for understanding public entrepreneurialism and the organizational conditions and strategies which sustain this culture.

Keywords Entrepreneurial orientation · Local governments · Public organizations · Strategic management · Urban sustainability

8.1 Introduction

More than two decades ago, Schneider et al. (2011) posited that city managers were emerging as "public entrepreneurs," helping to advance dynamic policy change in the face of growing fiscal and environmental challenges (Schneider et al. 2011).

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Their focus on municipal executive entrepreneurship coincided with a larger effort to develop a normative theory of entrepreneurial public management in democratic governance (Hood 1991; Bellone and Goerl 1992; Moore 1995; Osborne and Gaebler 1992). One of their conclusions was that entrepreneurial managers were a product of necessity. That is, entrepreneurial managers likely emerged in the absence of entrepreneurial political leadership.

Today, the problems confronting cities have never appeared more daunting—from political and social stratification, sustainability, and inequity, to policy preemption, outsourcing, and austerity (Deslatte et al. 2018; Deslatte and Stokan 2017). Local government managers continue to play an often underappreciated role in responding to problems such as suburban sprawl, pollution, poverty concentration, and infrastructure decline. Yet, the extent to which entrepreneurial management is or has emerged to meet these challenges remains an open question. This chapter revisits the thesis posited by Teske and Schneider (1994, 331) that public entrepreneurs emerge to "help propel dynamic policy change in their community," and applies it in a contemporary urban governance context. The goal is to better understand how public organizations cultivate and utilize an Entrepreneurial Orientation (EO) for value creation and to articulate a more general application of these entrepreneurial activities.

To disentangle political and administrative roles, Teske and Schneider (1994) applied an institutional perspective to their analysis and found city managers were more likely to surface in the absence of entrepreneurial mayors. Among the differences in their institutional roles within the city, managers and mayors exhibited different orientations to entrepreneurialism: mayors were more likely to be broader in their approach and pursue untried entrepreneurial actions, whereas managers were more likely to focus narrowly and be more cautious in advancing innovations deemed professionally legitimate. Orientations aside, Schneider and colleagues argued all entrepreneurial executives engaged in three key functions: favorably framing issues or opportunities, assessing and assigning the risk of failure, and overcoming collective action problems to build organizational capacity (Schneider et al. 2011). This chapter explores these functions of urban entrepreneurial managers through in-depth, semi-structured interviews with city managers in 20 local governments located in the Chicago, Illinois metropolitan area. The findings suggest that entrepreneurial managers remain a rarity in the current politically and fiscally balkanized governance environment. However, managers who have created an entrepreneurial orientation have learned to proactively engage stakeholders, successfully frame priorities, and build organizational capacities through collaborations.

8.2 Entrepreneurial Functions: Framing Issues, Bearing Risk, and Forging Collective Action

Schneider et al. (2011) suggest that *all* entrepreneurship involves three functions. First, entrepreneurs discover and frame opportunities. In the public sector, this means recognizing unfulfilled service delivery needs as well as the contextual nature of such needs. In some cases, public entrepreneurs address established problems; in other cases, they offer a new frame or definition for a problem and couple this with a policy solution (Kingdon and Thurber 1984), especially in cases where problems are intractable or open-ended enough to be considered "wicked" (Head and Alford 2015).

Schneider and colleagues argue that public entrepreneurial activity falls along a spectrum of more radical innovation to less radical arbitrage and adaptation. The riskiest efforts, when successful, result in "innovation," or the creation of new institutions (or combinations of existing institutions) to fulfill unmet or undiscovered needs. However, these endeavors have the greatest likelihood of failure. Along the middle of the continuum lies "leadership," or maximizing the efficient use of existing resources through entrepreneurial management and rhetorical skills. The least risky activities are "adaptation," or the borrowing and integration of existing ideas into new settings, and "arbitrage," or the advocacy, brokering, and negotiation of policy solutions between constituencies with different preferences.

The second function of entrepreneurship is bearing risk in pursuing actions with uncertain outcomes. Schneider et al. (2011) label public entrepreneurs "residual claimants" on the benefits of risk-taking, assuming ultimate liability for failures. They propose that risk is proportionate to the degree that policy change deviates from the status quo. Risk-taking at the organizational level depends upon manager—subordinate relations and expectations that high performance will be rewarded rather than punished (Bozeman and Kingsley 1998). However, public managers' tolerance for risk has been shown to be impacted by performance gaps. Managers are more likely to take risks if they are failing to meet or surpassing pre-established performance targets, and they are less likely to take risks when their organizations are just meeting targets (Nicholson-Crotty et al. 2017).

The third function is coordinating resources and organizations for change. Schneider et al. (2011) suggest that this requires overcoming collective action problems in which rational actors are incentivized to shirk or free ride on the efforts of others. They argue that collective action is more likely achieved when public entrepreneurs target contributors with selective benefits, minimize transactions costs, and utilize their social networks to facilitate knowledge sharing and promote trust among actors. Subsequent research has explored how public organizations can overcome collective action barriers (LeRoux et al. 2010; Feiock et al. 2009), facilitate public service and managerial innovations (Albury 2005; Damanpour and Schneider 2006), and develop capacity to absorb external information and utilize it for performance improvement (Hardy et al. 2003). In particular, our understanding of institutional collective action (ICA) problems at the urban scale has developed considerably since this formulation,

thanks to a broader exploration of the role of collaboration risks (Feiock 2013), problems associated with political homophily (Gerber et al. 2013), functional collective action dilemmas within organizations (Feiock et al. 2017), and the limits of attention and participation when problems arise in multiple venues (Lubell 2013; Lubell et al. 2017).

Of course, context is critical for the emergence and success of public entrepreneurs. Researchers have explored determinants for how public organizations at many levels cultivate and institutionalize an Entrepreneurial Orientation (EO), including organizational formalization, hierarchy, autonomy, and size (Kearney et al. 2000; Kim 2010; Meynhardt and Diefenbach 2012), mission-oriented culture (Moon 1999), performance rewards (Kim 2010), managerial attitudes toward reform (Kearney et al. 2000), and the degree of "localism" or desire to fulfill local needs (Meynhardt and Diefenbach 2012). These studies tend to treat the level of government transparently, despite considerable evidence that local governments face unique fiscal constraints, conflicts, and opportunities for innovation. Understanding the drivers and barriers to entrepreneurialism in an urban context remains an underexplored avenue for developing insights for scholarship and practice.

8.3 Austerity and Opportunity: The Case of Chicago Area Local Governments

Cities are thought to have entered an era of "urban austerity" due to recessionary budget cutbacks, devolution of federal and state policies to locals, and the relentless push for privatizing many of the service obligations and back-office functions of local governments (Donald et al. 2014; Kim and Warner 2016). In the U.S. context, local governance has also become heavily fragmented with service delivery divided between a plethora of municipalities, townships, special taxing districts, and other subunits of government (Deslatte et al. 2017).

Several coalescing environmental and institutional factors make the Chicago metropolitan region an excellent testbed for exploring barriers to urban entrepreneurialism. First, the Chicago metropolitan area is highly suburbanized and governmentally fragmented with a large number of local units of government (Hendrick and Shi 2014), reflecting a fiscally dispersed and economically competitive environment analogous to many U.S. cities. Second, while core central cities such as Chicago, Los Angeles, and New York are often seen as the primary incubators of local government innovation, Teske and Schneider (1994) recognized that suburban governments are where a majority of the U.S. population resides. These regions have absorbed waves of demographic and fiscal disruptions which can alternatively inhibit and incentivize the emergence of entrepreneurial bureaucrats. From reductions in intergovernmental aid in the 1980s to tax revolts and population stratification fueling inequities, the worsening fiscal and political climate for local governments in recent decades has placed a premium on the abilities of suburban local managers to "reinvent" public

organizational processes and products (Osborne and Gaebler 1992; Teske and Schneider 1994).

This insight is particularly salient in the present context as cities have strived to achieve greater economic, social and environmental sustainability, while grappling with the prolonged fiscal hangover stemming from the housing bubble and credit crisis of 2007–2009 (Kim and Warner 2016), and continued reductions in federal support (Wang and Pagano 2017). Such fiscal and economic challenges are exacerbated in metropolitan areas with high degrees of fragmentation, where individual local governments—either working alone or collaboratively—are ill-prepared to confront common "spillover" dilemmas of pollution, traffic congestion, wasteful jobs competition, and poverty concentration (Feiock et al. 2009). While Illinois displays all these problems in abundance, local governments endured a further exogenous shock due to a 2-year state budget standoff from 2015 to 2017, which imperiled state aid to local governments (Walstrum et al. 2016). As a result, suburban Chicago local governments found themselves laying off personnel, delaying infrastructure needs and facing intensified competition for a dwindling number of jobs, while many other parts of the U.S. were rebounding from the Great Recession. Thus, Chicagoland typifies the new urban austerity and the opportunities borne from necessity.

To explore managerial perceptions in this environment, I conducted in-depth, semi-structured interviews with city managers and administrators in 20 suburban local governments in the Chicago metropolitan area in 2016. Because Chicago is highly fragmented with approximately 300 municipalities, a purposive, snowball sampling procedure was utilized to include innovative localities while remaining representative of the suburban area's racial/ethnic, income, and political profile (mean population = 43,839). The interviewees included city administrators in mayor-council cities (n = 7) and managers in council-manager governments (n = 13).

An interview questionnaire was designed which attempted to capture how internal and external organizational environments, institutions, and structure affect how city managers frame and engage in an entrepreneurial activity (innovation, risk-taking, and proactivity). Following the EO literature, "innovation" was defined as an organization's willingness to support new ideas and creativity. "Risk-taking" is the commitment of resources to project with uncertain outcomes. And "proactiveness" was defined as the anticipation and implementation of innovations ahead of others (Kearney and Meynhardt 2016). Each interview was approximately 60 min in length. Interviews were recorded and transcribed before being coded in NVivo 11.

A descriptive coding approach was used to identify passages of data by topical codes (Miles and Huberman 1994; Saldana 2015). Passages were identified by cognitive drivers/barriers of EO such as "autonomy," "competition," "management support," "NIMBYism" (Not In My Back Yard), "political support," "reputation," "rewards," and "stakeholder support." Following Miles and Huberman, a second-cycle, pattern coding process was used to "identify an emergent theme, configuration, or explanation" from the interviews associated with entrepreneurial actions (Miles and Huberman 1994, 69). In this pattern coding, the codes or collections of text referencing specific themes were organized into the three categories of entrepreneurial functions: "framing opportunities," "assigning risk," and "forging collective action."

What emerged was a mosaic of risk aversion and administrative myopia, but with a clear ordering of municipalities considered to be on the bleeding edge of entrepreneurship. Interviewees were asked to identify anecdotes of innovativeness, risk-taking, and proactiveness that led to improvements in service delivery. The innovations reported primarily fell into the lower risk "adaptation" range of the scale of innovation, and included buying downtown buildings to foster redevelopment, smart metering, database integration across departments, tree replanting efforts in response to Emerald ash borer, flood control, and using beet juice for street deicing.

Predominantly, local government managers reported less willingness to take risks or be proactive than to utilize innovations which had proven successful elsewhere. "Kind of our guiding principle is that we never want to be first, but we never want to be last," one city manager said. The next section expounds upon the insights of interviewees on the drivers and barriers of innovation, risk-taking, and proactivity, and categorizes roles within the template outlined by Schneider et al. (2011) for problem framing, risk assignment, and collective organizational action.

8.4 Framing, Risk, and Collective Action

Public value creation is an iterative activity (Yang 2016). Much like representations of the policy process which display categories of agenda formulation/adoption, implementation, and evaluation, it is helpful to think about an organization similarly moving through "stages" of entrepreneurialism, through problem identification and framing, risk assessment and assignment, and building organizational capacities through collective action.

A simplified representation of these stages and the players involved is displayed in Table 8.1. It should be noted that entrepreneurial framing, risk bearing, and collective action likely occur in public organizations in a concurrent or overlapping fashion, as new problems arise and old solutions move toward entropy. This means managers are never free to solely consider solutions to one problem in a vacuum. Nevertheless, this simplified representation of the roles associated with these functions helps clarify the ideal activities for entrepreneurialism to emerge.

Entrepreneurial Framing. Governments at all levels often appear to identify and respond to problems haphazardly. Problem identification involves environmental scanning and problem prioritization, and is a central process in both the strategic management (Bryson and Crosby 2014) and agenda-setting literature (Baumgartner and Jones 2015). Issue framing is the presentation of a problem by highlighting specific considerations or minimizing the importance of others (Chong and Druckman 2007). Past research suggests elected and appointed executives both identify and frame issues distinctly as a result of their unique institutional roles and career objectives. For instance, city managers are often thought of as more "lower powered" problem-solvers, spending longer periods of time in the same organization and focused on distant issues which may be lying in wait a decade or more (Deslatte et al. 2016). Local sustainability is one such example, reflecting a trend over the

Table 8.1 Roles of actors in entrepreneurial functions of value creation

	Problem identification and framing	Risk assessment and assignment	Capacity building/collective action
Representative actors and institutions	Constituent services; ideology/partisan positioning; allocating access	Vision for community; electoral ambitions	Policy networks; community preservation; delegating authority
City Manager/Administrator/CEO	Strategic planning; stakeholder engagement; mission-centered culture	Delegation of responsibility; risk bearing/aversion; career mobility	Professional networks; intergovernmental coordination/collaboration; personnel development
Subordinate administrative actors in the hierarchy	Street-level bureaucracy; localism	Autonomy; responsibility; career advancement	Contract management; vendor oversight; competition
Public actors, interest groups, civic organizations	Citizen participation; service user input/satisfaction; lobbying	Information processing; bayesian updating of prior beliefs	Community characteristics; unique service needs

last two decades in which local governments have begun to recognize the value of balancing economic development efforts with the need for social equity and preservation of environmental assets (Deslatte et al. 2018). By contrast, elected mayors are often focused on more immediate political considerations which are more salient to their constituencies and supporters (Feiock et al. 2003; Frant 1996). The structure of local governmental institutions—such as district versus at-large elections, council-manager form of government, etc.—can also influence which community actors and types of problems elected officials and managers decide to elevate. And job mobility is another factor to consider. Entrepreneurial managers in a national, bureaucratic labor market identify such institutional arrangements and seek out work environments in which they have greater resources and autonomy (Teodoro 2011; Teske and Schneider 1994). This bureaucratic job mobility has policy ramifications. Recent evidence suggests empowered city managers are more likely to adhere to the professional norms espoused by membership organizations such the International City/County Management Association, by emphasizing strategic planning, attention to fairness or equity in resource distribution, and pursuing certain policy innovations (Deslatte et al. 2017; Teodoro 2009). However, scant attention has been paid to *how* these managers frame the issues they have prioritized.

Three decades of behavioral research into framing effects has demonstrated that citizen opinions are molded by the strength of the messages communicated by policymakers interested in emphasizing specific considerations about an issue (e.g.,

affordable housing is "good" because it encourages workforce diversity, or "bad" because of increased crime and deflated home values). However, citizen attitudes and beliefs are quick to congeal around early frames (Druckman et al. 2012). They can be less responsive to counterframing depending on the strength of their attitudes (Chong and Druckman 2013), and partisan-motivated reasoning can bias citizen assessments of new information (Taber and Lodge 2006). Moreover, government transparency efforts aimed at providing performance information can backfire when pursued too aggressively (Cucciniello et al. 2017). So, while all managers may be capable of identifying future problems, entrepreneurial leadership involves both prioritizing problems and offering a compelling justification for action which circumvents intransigent political or organizational biases. This is far easier said than operationalized.

The analysis yielded three codes related to entrepreneurial problem identification and framing: proactivity, stakeholder engagement, and localism. These codes represent complementary information processing heuristics demonstrated through environmental scanning, information exchanges with stakeholder groups, and the development over time of a heightened awareness of and responsibility for local needs and concerns. The more entrepreneurially oriented the organization, the more these learning heuristics are indoctrinated into operations.

Proactivity was described by managers as an effort to break up organizational inertia or reactive problem-solving. More entrepreneurial organizations devote greater amounts of time and resources to anticipating future needs, prioritizing them according to established evaluative criteria, such as environmental, economic and social sustainability, and searching for novel solutions. Managers described the need to be proactive regarding resource necessities such as future water supplies, affordable housing, economic development opportunities through purchases of vacant buildings and municipal annexation, and strategic planning for infrastructure repair and vehicle fleet replacement.

Despite near unanimous support for proactivity, evidence of its effectiveness was scant. Innovations which were identified were those on the lower risk side of the Schneider et al. scale, and involved adapting practices deemed successful in other jurisdictions. Instead, what emerged from the interviews was a common managerial practice of sub-setting the range of possible issues by what was deemed most pressing and politically feasible (or permissible), engaging stakeholders generally to educate rather than advocate, and re-prioritizing organizational objectives in line with dwindling resources. For example, a criticism of strategic planning was the tendency for long-range planning to devolve into merely the aggregation of "wish lists" for politicians or "garbage-can" agglomerations of problems with no clear ranking of threats proportionate to their risks (Cohen et al. 1972). When problem identification accompanies only symbolic efforts at prioritization, there is no evidence of a rational prioritization of problems by managers and no clear pathway to offer for policymakers or the public.

"When you put it in the context of a threat, seeing the threat and then responding to it, gets into what I consider some of the failures of a lot of strategic planning," said one manager. "They do their SWOT [Strengths, Weakness, Opportunities, Threats]

analysis, but it still just ends up being a bunch of projects listed by theme, as opposed to deep understanding of threat."

Stakeholder engagement was one method identified by managers for building community awareness of threats and opportunities. Stakeholder engagement can involve individuals or groups affected by governmental decisions. Managers reported a range of efforts to more effectively transmit information to the public: increased use of social media; interactive, online applications for development projects; requirements for developers to hold public hearings on their project proposals; and classroom style education courses for residents, among other outreach efforts. In practice, these efforts were largely one-way information provision, with little effort to target specific audiences or positively frame potentially controversial or high-risk innovations.

Localism plays a role in the ability of entrepreneurial public managers to frame policies and convince key stakeholders. Meynhardt and Diefenbach (2012) define localism as the willingness and ability of a public manager to meet local needs, and find evidence at the federal level that this connectedness to a local community positively relates to EO. At an urban scale, localism involves not just providing information, but actively seeking to better demonstrate cross-cultural awareness, and to understand the needs and expectations both across and within specific community groups. While the stereotype of suburban governments as bleached white enclaves may no longer be accurate, human beings are limited information processors and managers can still take mental shortcuts in ascertaining a deeper understanding of minority needs in their communities. Overcoming such cognitive limits requires repeated interactions, and more ethnic, income, and ideologically diverse communities place a greater priority on ascertaining a wider range of inputs into their decisions. Thus, localism can be conceptualized as the willingness to ascertain a wider range of information from groups with disparate access or influence over governmental actions, and local managers reported varying processes for ascertaining community support thresholds as they implemented policy changes.

Yet, there were mixed sentiments among managers over efforts to directly engage and influence public attitudes. This reluctance is consistent with the historical tension within the city management profession and academia over the proper role of administrators in the policy process (Svara 1998). Stakeholder engagement poses potential tradeoffs when it creates or exacerbates a divide between groups who disagree over governance decisions. Advocacy can also run the risk of eroding confidence in the city manager as a politically neutral, professional executor of the public will (Svara 2001). Managers reported a tension within their profession between those who prefer to remain insularly focused on organizational processes and those who seek to be active in the community and to identify potential partners in other governments and the private sector. For instance, one insular city manager described a preference for ascertaining stakeholder attitudes only when they have been filtered through elected officials.

"We're not taking risk for the sake of taking risk. We take risk to improve something," the manager said. "And the way our system works—and here it works pretty effectively—is the board hears from the public, and if the board hears positive things

from the public, they tell me. That's a self-perpetuating cycle, and we'll continue to do what we're doing."

The literature suggests entrepreneurial activities require framing problems and convincing political leaders and community members to overcome intransigence. While it is evident that most of the Chicago area managers interviewed engaged in varying degrees of stakeholder engagement for information provision, they were also reluctant to engage in entrepreneurial levels of proactivity, which involves prioritizing inter-generational or long-term problems and marshalling support through effective framing. Identifying a problem and taking action to ameliorate it are two different levels of commitment, and they depend on a manager's comfort with risk.

"You have to be aware of what your tolerance level is in your community for risk," explained one manager. "I think we are a very, very fiscally conservative community, so if we are doing big, splashy things that they think are frivolous, that would certainly not be tolerated."

Assignment of Risk. Confronted with fewer resources and increased demands, city managers understand they must assume some personal risk to avoid organizational stagnancy or decline. While the EO literature tends to treat risk-taking as one dimension, reputational and professional risks borne by managers are distinctive from the political risks of elected officials. Risks are assessed when managers evaluate whether a course of action poses a threat to themselves, their subordinates, or their public wards or elected supervisors. Risk is assigned when responsibility for responding to a problem—along with the potential accolades and liabilities—is handed over to another. Thus, managers sit in a fulcrum position of sorts, deciding how much to shield subordinates from blame or unwanted public attention, how much to minimize the political fallout for their elected officials, and how much they should effort to avoid damaging their own reputations and careers. Risk assessment and assignment emerged in the interview data through three codes: risk aversion, autonomy, and delegation.

Managers have shown a risk aversion when performance is just meeting expectations. This is explained by the relative risk aversion model (Nicholson-Crotty et al. 2017), which suggests that managers whose performance is significantly below expectations have little to lose by gambling on an innovative solution, while those in high-performing organizations have more flexibility to experiment. In both scenarios, the manager is more tolerant of higher risk. But when an organization is just getting by performance-wise, managers have the most to lose. In this sense, entrepreneurial managers can appear to be a product of their environment. Ambitious bureaucrats who are more mobile on the job market may be more willing to take risks when the payoff holds the promise of advancing their own careers (Teodoro 2011). However, even the entrepreneurial manager willing to assume greater personal and professional risks must balance career ambitions with the need to insulate their organization from political or public backlash. Public entrepreneurialism in this sense involves building the tolerance within their organization for failure in order to spur creative thinking or venturing into new products or services. Most of the managers interviewed described an aversion to taking risks which could run afoul of public attitudes or embarrass or damage the political careers of their counselors and mayors.

"The public doesn't like risk. They say they do, but if you fail, you're in big trouble and the board is in big trouble, and that's a problem," said one manager. "We've got a lot of innovations, but I don't want to pretend that we take big risks, because we don't. Because the board doesn't like it, the public doesn't like it, no matter what they say."

Building autonomy is one way to marginally increase the risk tolerance benefit the organization overall. Managers in any environment have a well-understood incentive to establish greater autonomy and for elected officials to take a "hands-off" approach to routine government operations. Establishing autonomy can be an ongoing, incremental process. Risks which pay off produce trust in the professional judgment of a manager and more confidence that future opportunities will also be correctly evaluated. Risks which fail can prompt elected officials and citizens to second-guess what were rudimentary decisions. Such a correspondence suggests managers attempt to strike a balance between risk-taking and preserving or expanding managerial autonomy. Entrepreneurial managers have the added benefit of their career mobility when they assess risks. If a risky opportunity does not pan out, there is always the potential to move on to another organization, provided their reputation is unscathed. This type of risk tolerance—while prevalent among private sector entrepreneurs who expect to move from firm to firm over their careers—was rare among public managers. Rather, a frequent preference expressed by interviewees was for avoiding risks which held the potential to damage reputations, reduce trust, and weaken autonomy.

"You have all this autonomy because the board trusts you, and so they trust you not to take some risk that would alarm them or the community without them knowing about it and talking about it and agreeing to it," said one manager. "So if a manager uses that autonomy in ways that are out there, then he or she has no business having that job, because they have exhibited poor judgment."

Entrepreneurial managers also need to install or develop a workforce which shares their tolerance for risks. Managers consistently reported a desire to delegate responsibility to subordinates while also shielding them from political interference. Delegating routine decisions to lower levels of an organization, for instance, frees top management to focus on strategic issues, the larger problems or opportunities that can enhance an EO and performance. The management philosophy of "hire a good person and let them do their job" was a widely shared view. "If I've got to be looking over your shoulder 24/7, there's one too many of us," said one manager.

Managers generally reported that when subordinates saw opportunities for advancement within their organizations, they had more motivation to pursue innovations. Conversely, managers at later stages of their careers or with fewer avenues for advancement within their organizations deferred to staid processes. Analysis of the interview data helps explain how management support, tenure, and career advancement shapes the ability of a local government to build an organizational EO. Managers reported a desire to provide support for developing skills that enable them to delegate decision-making to lower levels and improve the speed of regulatory processes such as development permitting, engineering, or transportation planning.

While it is possible that greater attention to creating autonomy and delegating responsibilities to motivate workers can lead to a more risk tolerant organizational culture, this sentiment was rarely advocated by interviewees.

Building Collaborative Capacity. Consistent with the risk aversion literature, exceptions were found among managers whose local governments were perceived to be high-performing or exceptional in some aspects of service delivery. These managers also showed a proclivity to identify resources and partners in their external environments to augment their own capacities.

One example of entrepreneurial management which emerged was the Northern Illinois Municipal Partnering Initiative (MPI), formed in 2010 by a collection of 18 localities in Cook and Lake Counties to collaboratively bid projects and purchases.[1] Spawned by the Great Recession, the collaborative partnership was christened with no clear projections of cost savings but quickly began achieving economies of scale through joint purchases of services and commodities such as crack sealing, water line leak detection, sewer lining, resurfacing, and concrete purchases. By 2016, the Partnership had grown to 30 communities and had saved approximately $2.6 million in tax dollars.[2]

The case demonstrates adaptation as innovations spread across multiple organizations when the likelihood of creating public value is enhanced via experience and demonstrated successes. Collaboration requires overcoming several types of transaction costs, including the time and resources required to negotiate contracts, the division of costs and benefits fairly between all parties, and enforcement of agreements to prevent shirking or opportunism. In the case of the MPI, partnering managers had to review bid specifications, individual service-level needs, current contracts, and negotiate new bid specifications. Division of costs—in this case, the personnel commitments—was spread among all the partnering organizations by forming individual committees to write bid specifications for service areas like construction and public works. A second reported obstacle was political concern over joint contracts which may not recognize the unique needs or desires of individual localities. These defection costs were overcoming by specifying up-front that communities could opt out of specific contracts without jeopardizing the overall partnership.

As an added benefit, managers reported innovations beyond the actual contracted services through information sharing such as "best practices" which allowed for preserving service levels or achieving efficiencies, including contracting for emergency dispatches, joint purchasing, and other internal management processes. As one manager explained the amelioration of risk: "If you've tried it and it works, I'm more than happy to steal your idea."

While many councils of governments around the U.S. and elsewhere have attempted to create joint purchasing initiatives, they typically encounter common challenges: fear of the process, reluctance to commit resources for a product that is not tailored to their community, waning interest from managers and politicians,

[1]ICMA 2012 Annual Awards Program: https://icma.org/sites/default/files/304199_Glenview-Lake%20Forest-Municipal%20Partnering%20Initiative.pdf.

[2]Daily Herald: http://www.dailyherald.com/article/20170129/news/170128737/.

and a lack of substantive focus. The Northern Illinois MPI was spearheaded by the Village of Glenview, an affluent, 47,000-population community 13 miles north of Chicago. Then, Village Manager Todd Hileman reported the groundwork for overcoming internal intransigence to change began in 2005 when he began replacing most senior management in city departments "who were kind of living in the 1980's," implementing an "aggressive managed competition approach" between vendors and departments which has resulting in outsourcing Glenview's IT, finance, engineering and building services departments, and retraining employees in project management and accounting. Once the Great Recession had peaked, Hileman said a requisite "culture of innovation" was in place to experiment with joint partnerships.

Despite the success of the MPI, Hileman said the business models his group of partners had developed had been slow to diffuse beyond their own members, in large part because the local government management profession faced few professional consequences for not engaging in more entrepreneurial approaches. "To me, it's just like we've got this profession that doesn't always value how you become more innovative, how you change the culture," he said. "They don't even think about it, because it's hard."

An alternative perspective comes from institutional collective action research on political homophily which suggests communities which share ideological beliefs, geographic borders and similar racial or demographic characteristics will be more likely to collaborate, in part because their service demands are similar and easier to negotiate (Gerber et al. 2013). Indeed, several managers which noted Glenview's success in cutting costs also suggested they would not be suitable partners with the city because of their differing "values" for social inclusion, fair wages, business diversity, and environmental sustainability. "All Glenview cares about is the bottom line," one manager said. In this instance, consideration of both internal, organizational values and external, environmental constraints appears to factor into such decisions. Communities which might otherwise benefit from an innovation were more likely to discount whether it would be appropriate for them. The types of problems themselves may also differ across these jurisdictions, with communities prioritizing environmental or social concerns being less interested in a "bottom line" only partnership. Research on institutional collective action has found that collaborative mechanisms such as regional authorities, multilateral partnerships, and functional or political consolidation may be required to tackle such spillover problems (Feiock 2013). The transaction costs of coordinating activities, equitably dividing the benefits, and enforcement of service contracts often associated with such collaborative arrangements can often preclude higher risk alternatives in favor of those which deliver more tangible or dependable benefits.

The possibility of two alternative processes emerges from the analysis. Figure 8.1 represents a negative and positive feedback loop model for fostering an organizational EO. Traditional public managers (left cycle) represented the majority of those interviewed and expressed views of the management literature might consider mainstream: an insular focus on organizational processes, procedures, planning, and incrementalist problem-solving. Managers appeared to adhere to this cycle to preserve their relationships, prestige within the organization and autonomy. Conversely,

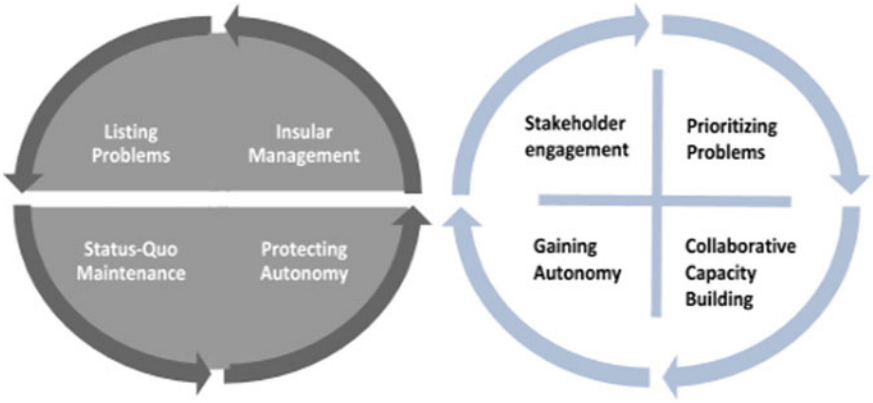

Fig. 8.1 Negative and positive feedback loops of EO

entrepreneurial managers did not silo internal and external management practices. They were more interested in engaging the public in authentic, helpful ways that generated actionable intelligence for governmental decision-making. They recognized the dependence upon the external environment for the resources, expertise, and experience they would need to radically change their organizations and improve services, and they were uniformly interested in gaining greater autonomy over their organizations. The simple depiction of this cycle in Fig. 8.1 conveys that this process is cyclical and feedbacks on itself. Managers intent on preserving the status quo are less likely to proactively engage with longer term community problems or display entrepreneurial tendencies in a meaningful way for their organizations. But managers interested in reversing this flow can begin through better public engagement efforts, and through developing collaborative governance capacities.

8.5 Conclusion

Entrepreneurial public management has appeared under many monikers, yet it remains a critical and largely underdeveloped theoretical and empirical terrain. Several propositions can be drawn from this analysis. The first is that managers working within high-EO organizations are not passive or reactive respondents to stakeholders but rather actively engaging with them to prepare for future threats or opportunities. Proactive public managers are more likely to "manage outward" to involve external groups, rally support for causes, and successfully frame needs more around long-term goals. Stakeholder support for policy goals and initiatives is not fixed.

Entrepreneurial managers understand how to develop and harness such support to achieve their policy and programmatic aims. Ascertaining thresholds of community support is thus an important process which subsets the range of innovative actions a manager may consider. This framing process is also influenced by personal and community perceptions of risk, and subsequent analysis should further explore the behavioral linkages between managerial risk perception and entrepreneurial framing.

A second proposition is that political and bureaucratic entrepreneurship may not be mutually exclusive. Schneider et al. (2011) defined innovation as inversely related to the degree of deviation from the status quo. By that definition, investment in so-called "disruptive innovation" remains rare. The majority of risks public managers identified were aimed at preserving status quo service delivery levels. Managers balance risk-taking with preserving or building autonomy for themselves and their subordinates, treating autonomy as a form of capital which can be exhausted. So, while entrepreneurial managers and mayors may be substitutes, they may also be compliments given the need for managerial autonomy to successfully innovate and a fluid national labor market for managers (Teodoro 2011). Put another way, managers who take chances need politicians who take chances, or are at least comfortable with risk. While public administration research on EO has downplayed the importance of autonomy (Meynhardt and Dienfenbach 2012), the Chicagoland context suggests that autonomy is a shared normative value of public managers and critical ingredient for entrepreneurialism. Managerial decisions and innovations are a function of the level of autonomy that managers possess, and the amount of responsibility they are willing to delegate to subordinates.

Finally, capacity building is a cyclical approach which appears to allow local governments more flexibility to pursue broader organizational objectives such as sustainability. When organizations have lower capacity, they tend to seek collaborative opportunities to build it. By developing technical expertise and delegating decision-making to subordinates, senior managers can free more of their own time, energy, and mental capacities to tackling longer term goals or seeking out new ways to be entrepreneurial. This theorized cycle of capacity and EO is consistent with recent work on building organizational capabilities (Andrews et al. 2016), suggesting more organizations should cultivate an EO appropriate for their context. Prescriptively, these suggestions can help managers in overly constrained environments begin to think about ways to transform their organizations.

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Part IV
Demography and Informal Entrepreneurship

Chapter 9
Female Entrepreneurship: Do Urban Centers Ease Out the Challenge? An Analysis for Pakistan

Syed M. Hasan

Abstract Treading on a business venture with the aim to be either self-employed or an employer is a daunting task in a developing economy. The challenges become yet more formidable if you do not belong to the gender that globally dominates the markets. The commonly identified obstacles encountered by female entrepreneurs are wide ranging. Social norms established through culture or beliefs, whereby women often have preassigned roles leave a limited choice for entrepreneurial pursuits. Enterprising women who somehow cross this barrier have yet more challenges to face. Female entrepreneurs usually do not find support from the business networks; it is hard to find mentors or professional support who can guide in the business decision-making process. Also, frequently, women are constrained on account of access to information and credit. The key question here is to find out the policy framework which can make these constraints less binding for female entrepreneurs. Specifically, this chapter attempts to determine if the social norms and economic opportunities prevalent in an urban economy are conducive to the growth of female entrepreneurship. Urban centers, relative to rural areas, offer better educational, training, and financial facilities. Besides, cities are the hub of employment opportunities due to scale and agglomeration economies and provide market linkages necessary for business growth. On the other hand, the high density of economic activity spurs congestion costs which along with greater factor demand may deter entrepreneurship. To empirically test the hypothesis that urban economies facilitate women entrepreneurs, we use data from the Labor Force Survey of Pakistan. As the female entrepreneurial decision is subject to self-selection, we use the Heckman correction in estimation. Statistics and regression results indicate that the proportion of female entrepreneurs is higher in urban parts of districts while controlling for individual and district-specific characteristics. Besides, women entrepreneurs in urban areas earn higher profits. Consequently, a rural-to-urban migration results in welfare improvement of the female entrepreneur.

Keywords Female entrepreneurship · Pakistan · Urbanization

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9.1 Introduction

Urbanization is arguably the most consequential phenomenon impacting millions of people across the globe. The United Nations estimated that the share of the world's population living in cities will double from 30% in 1950 to 60% in 2030 (Kahn 2009). Having swept across the developed world in the early twentieth century, urbanization is going on in the developing world at an unprecedented pace over the past few decades. As urbanization results from the spatial concentration of economic activities, the proximity factor is believed to generate Marshallian externalities commonly referred to as agglomeration economies. However, the concentration of economic activity also results in congestion and strain on local resources. As such, the potential benefits may get overshadowed in an environment of poor governance and weak regulations resulting in "messy" urbanization (Ellis and Roberts 2015). Hence, it is reasonable to say that urban benefits associated with the notion portraying cities as engines of economic growth may not ensue directly. The available literature indicates that entrepreneurial activity is one of the major agents that helps reap the real benefits from the positive spillovers of cities—the agglomeration economies—which build up to a certain extent on knowledge spillovers (Porter 1990). The focus of this chapter is on urbanization and female entrepreneurship in Pakistan. Pakistan is not only the sixth most populated country in the world, but it has the highest population growth rate and level of urbanization among all South Asian countries.

The economics literature takes a careful approach in interpreting the direction of causality between economic growth in cities and entrepreneurial activities. Whereas, it is evident that economic growth creates business opportunities that lead to commercialization of innovative ideas through the creation of successful start-ups, it can be reasonably argued that knowledge spillovers by the new enterprises may spur economic growth and hence result in the formation of larger urban areas. The idea is somewhat similar to circular causation and market linkages as mentioned in Krugman (1991). Entrepreneurship, therefore, can be conceptualized as both the cause and the effect of urban economic growth. Aside from this debate, there is no denying the fact that cities are the places that house a large number of educational and training institutions, make banking and financial establishments accessible, provide public services such as health and transportation, are administered by defined laws and rules, and provide employment opportunities with an expectation of high income. In the current context, our aim is to determine if such diverse features associated with cities create the necessary environment to support female entrepreneurship.

To find an answer to this, it is important to study the constraints faced by women entrepreneurs. Focusing on the developing world and South Asia in general and on Pakistan in particular, we observe that there are systemic discriminations that hurdle the growth of women entrepreneurs. It is observed that such discriminations are spread across social, economic, and financial domains. It is important to understand how the urban economic system is formulated and what are its essential features. As asserted by Glaeser et al. (2010), urban centers are open economies that place less restrictions on factor and intellectual mobility. Besides, cities have entrepreneurship

capital, which is defined as the collection of social networks that are conducive to the start of new firms. The urban institutional framework-educational, financial, and regulatory—is hypothesized to ease out the constraints faced by women entrepreneurs. To have a quantifiable measure that may help test this hypothesis, we estimate the Mincer wage function for women entrepreneurs. While correcting for potential biases due to heterogeneity, endogeneity, and selectivity issues, we empirically test our hypothesis for two main explanatory variables: spatial extent of urbanization and rural–urban migration.

The empirical analysis is based on three recent rounds of the Labor Force Survey for Pakistan conducted during the years 2012–2013 and 2014–2015 (PBS 2015). The findings from the model estimations show that controlling for educational qualification, and experience, the extent of urbanization in a district and rural–urban migration have positive and statistically significant impact on earnings of female entrepreneurs. A final point which is important to mention here is how we define entrepreneurs. We observe that there exist considerable differences in the empirical literature when it comes to measuring entrepreneurship as an economic variable. According to Glaeser et al. (2010), there is a consensus among urban economists to include some of the following aspects of entrepreneurship in the empirical model: self-employment, startups, market entry, business ownership, and innovative approach. Keeping these in consideration, we categorize all females who reported to be either self-employed or employers as women entrepreneurs.

The chapter is structured as follows. Section 9.2 reviews the constraints faced by the women entrepreneurs in South Asian countries including Pakistan. Section 9.3 explains how an urban economy generates the right environment that supports women entrepreneurs and states our set of hypotheses. Section 9.4 deals with possible sources of bias in the estimation of female wage equation and discusses recommended solutions to handle them. Finally, Sect. 9.5 presents the empirical analysis and discussion of important results before we conclude the chapter.

9.2 Constraints Faced by Female Entrepreneurs

In developing countries, the regulatory framework governing entrepreneurial laws similar to those in the developed world does not discriminate on the basis of gender, yet the actual business environment determining entrepreneurial progression is not completely gender blind. Overall, in developing economies, due to resource constraints, procedural complexities, and prevalence of corrupt practices, the society faces inefficiencies and low level of competitiveness. In this environment, the less empowered segments of the society, of which women are a significant proportion, face a larger brunt. In practice, women face several constraints which either restrict them from pursuing entrepreneurial ventures or restrain them from realizing their full market potential. The definition of entrepreneurship as presented above necessarily implies an independence to choose and the ability to exercise discretion, both in terms of picking up the business sector and the specific nature of the work. The freedom

of choice and the consequent social and economic independence is something that developing societies have denied their women.

Such hindrances are somewhat inherent in the overall work environment of developing countries. It also needs to be emphasized that apart from gender-specific issues, women in the developing countries usually operate in informal sectors that neither get full regulatory support nor due recognition in the national economy. Focusing on the South Asian region, we observe that a complex interplay of diverse factors—educational, economic, social, and religious reasons—contribute to the disadvantaged status of women. According to Sinha (2005), the situation regarding constraints faced by women is more critical in South Asia in comparison with other parts of Asia, hence, it needs specific attention. For country-specific studies, see Prasad (1998) for India, Goheer (2003) for Pakistan, and Pal (2001) for Bangladesh. In another report, Acharya et al. (1999) elaborate problems faced by women entrepreneurs in Nepal. According to this report, access to credit, market entry, risk-bearing capacity, personal security and sexual harassment, and social and cultural barriers such as exclusive responsibility for household work and restrictions on mobility are some of the major issues faced by women.

In the case of Pakistan, according to Roomi (2006), most of the difficulties and challenges faced by women entrepreneurs are because of the inferior status accorded to them by the society. Women are not considered capable enough to have any economic role. Besides, there is gender bias embedded in the overall rural, tribal, and dominantly feudal culture. In terms of infrastructure support, inadequate public transport proves to be a major hurdle in the mobility of women in Pakistan—there are religious and cultural reasons for this as well. The public transport facilities such as buses and vans have segregated seating arrangements for men and women (Shabbir 1995) where women's share is minimal. Common observation confirms that even where there is seat segregation, a lot of times male passengers occupy that space as well that is allocated for women. Building on this, other studies such as Shabbir and Di Gregorio (1996) point out that the major reason behind the challenges women face is based on the perceived vulnerability of women's honor and reputation.

In a later study on Pakistan, Roomi and Parrot (2008) establish that women entrepreneurs face discriminatory treatment on account of deep-rooted social standards and cultural traditions. The social system so developed thus limits the economic potential of female entrepreneurs in a systemic manner. Women generally do not hold title to the property and other assets and hence have limited access to financial resources. Besides, the intrinsic norms of a patriarchal society create widely accepted perceptions of male dominance in decision-making. Consequently, women often encounter discouragement for an enterprising aptitude from male family members who can influence family decisions. Above all, the lack of social network, whereby they could exchange ideas at peer level and find some mentorship adversely affects women's role in business enterprises. The same study suggests that in order to empower women, a multipronged intervention is required. This requires that media managers, educational policy makers, and government agencies join hands to provide the requisite support to women through improved access to business development services and by building a spatially hierarchical chain of entrepreneurial networks.

This would help the integration of women entrepreneurs into the mainstream economy. Based on the discussion on constraints faced by women in Pakistan, we raise the proposition that business environment of urban areas in comparison to rural regions provides a better support system needed for increased participation of women in entrepreneurial ventures.

Summarizing the findings of extant literature in this context, the low proportion of women entrepreneurs in developing countries can be attributed to four main factors. First, the low level of investment in human capital through education and training limits opportunities for work for women. This is particularly recognized for the female population of rural regions and small towns. Gender discrimination in the education system arises from several directions. In the first instance, the concerned family may not be willing to invest in female education. This is because, unlike men, women after marriage move out to live with their husbands, and as such, they are not considered as financially beneficial to their own families in the long run. On the other hand, the state inaction adds to the issue where either the number of high schools and colleges for women is inadequate, or they are located far from their homes. Girls in the rural areas are not permitted to attend school outside their villages and therefore often cannot continue education beyond the primary level. For women living in rural areas, there are still many social, cultural, and religious taboos that prevent them from formally enrolling in higher education programs. Many parents living in rural areas still have the orthodox approach that limits the right to higher education for men alone. Resultantly, illiteracy rate for women is still higher than men, and the gap between men and women is usually higher in rural areas as can be seen from the 2017 census figures of Pakistan.

Second, male-defined cultural norms and misconstrued religious restrictions limit the extent to which women can exercise their priorities in life and realize their potentials. In rural areas, somewhat isolated from large cities, cultural norms have stronger influence on the daily lives of women. This makes female behavior or attitude in rural areas restricted than that of male inhabitants. In such a society, women must fully comply with their primary duty as housewives, a duty centered along doing house chores and child rearing. Usually, they are not allowed to start their own businesses or to do jobs that involve dealing with men, and do not have permission to commute alone. Even if women do have their own businesses, the male members of their family have control over provision of raw material, making deals with buyers, and doing monetary transactions. For all practical purposes, such women are working as unpaid employees of their family men. However, recently in rural areas located in proximity to urban centers with reliable transportation and communication links, changes in social attitudes in terms of enrolling in higher education and taking employment have been observed in Pakistan.

Third, women entrepreneurs suffer on account of lack of access to financial institutions and bank credit. This is indeed a universal concern of women business owners across several developing countries in Asia. Due to the limited number of financial institutions in rural areas, this issue hits more acutely the women in these regions. A major cause of this constraint is the lack of asset ownership rights in the name

of women. As men often have the assets in their name, this deprives women of the ability to offer the type of collateral usually required for access to bank loans.

Finally, a few words about the importance of social capital. As pointed out by Ming-Yen et al. (2007), women entrepreneurs in Malaysia face a lack of peer support networks compared to those available for men. This is despite the fact that there are various women entrepreneurs' and industry associations. Such organizations have a comprehensive mandate and generally act as a forum to connect women entrepreneurs with business networks and enable them to exchange information. The usual approach of these organizations is to conduct training programs and hold seminars and workshops on work motivation. According to the study, the nonparticipation or inactive role by women in these associations is because they are already too occupied with business and family responsibilities. This limits the women entrepreneurs' ability to seek informal advice and peer financing as well as the necessary information needed for survival and growth.

9.3 How Cities Are Helpful in Supporting Entrepreneurship

As briefly mentioned in the introduction, entrepreneurship has a spatial dimension. To analyze this, recent research has placed much of its attention on the spatial aspect of entrepreneurial activities and the associated regional economic impact (Bosma and Sternberg 2014). The studies to measure the regional economic effects of entrepreneurial activities are dominantly empirical in nature. Fritsch (2013a, b) provides an overview of the relevant literature. The findings from these studies unanimously suggest that there are significant spatial variations in entrepreneurial activities across subnational regions. Hence, the spatial component cannot be ignored in the analysis. To quantify the urbanization extent the usual approach is to use population density as a proxy to identify the urban–rural divide. However, it needs to be emphasized that in the case of developing countries, the choice of variables may be restricted due to problems in data availability.

According to Bosma and Sternberg (2014), geographical analysis of entrepreneurship can be done at four different spatial levels: supranational (for example, a group of countries such as the GCC or the European Union), national (country), regional (rural or urban area), and local (city, district, or county). As this chapter focuses on regions of Pakistan, it only considers the two spatial levels that are relevant—emphasizing the regional level, but also considering the national level in the descriptive analysis. However, the empirical analysis is on the microlevel of the individual entrepreneur.

Recent research on the spatial dimension of entrepreneurship research has been dominated by empirical work. This is largely due to the fact that the significance of spatial content was established through availability of geographical data and empirical work done on the basis of those data. In fact, this is true for most of the areas of associated disciplines such as urban and regional economics. Although this is an

academic achievement, there is a need to ground this empirical work in a robust theoretical foundation (Shane and Venkataraman 2000). This is especially true for theories that intend to explain entrepreneurship processes at the regional level. Generally, theoretical studies on entrepreneurship simply ignore the spatial level, assuming that theory shall not be affected by either space or location. However, this does not imply a complete absence of theory. There are some related theories (Davidsson 2006) that, while they were originally not developed for entrepreneurship research, have been modified for this purpose and can be used accordingly. To mention just a few: Marshall's agglomeration theories based on localization economies, Jacob's urbanization economies, regional growth theory, network theory, Krugman's new economic geography models, Richard Florida's creative class idea, Porter's competitive cluster theory, etc. Thus, in the absence of one comprehensive theory on the regional aspect of urban entrepreneurship, hypotheses are usually developed by modifying the available material from the related literature. We now discuss the two main ways in which the urban economy influences entrepreneurial behavior. The two types can be understood as pull and push forces as well.

Types of Entrepreneurship: While examining entrepreneurship it is important to understand the underlying motivation for its formation. The two broad categories, based on the differences in motivation, are opportunity and necessity entrepreneurships.

Opportunity Entrepreneurship: According to Global Entrepreneurship Monitor terminology, this phenomenon takes place when the prospects of opportunity pull entrepreneurs into this domain. The prospects of opportunity can be demand or supply-driven pure market forces such as demand for products or some policy-based incentives. Mostly, entrepreneurs desire greater independence in their work choice and seek to increase their income. From a regional perspective, entrepreneurship pursuit based on the idea of the opportunity motivation depends, among other determinants, on characteristics of the regional economy—business environment, market linkages, etc. A useful proxy for quantifying the agglomeration effects could be the size of the urban area which is expected to be positively correlated with the potential for entrepreneurial opportunities.

Empirical studies (Rosenthal and Strange 2004) show that entrepreneurial activities are supported by urbanization processes on several accounts, some of which are mentioned below. First, large heterogeneous and diversified urban economies provide start-up opportunities for potential entrepreneurs. The latter may benefit from information spillover that occurs in large urban areas, but definitely not in rural regions in the same country. Second, while high entry costs, due to greater factor demand in large urban centers, may have a negative influence, the potential large of market size helps and therefore the scale economies can improve the entrepreneur's profitability. Third, in a large urban center, employers may benefit by saving on the labor search cost and benefit from the diversity in skill capital. In simpler terms, the supporting mechanism and the influence of large urban centers include close proximity to input and output markets, lower transaction costs on account of information availability

and improved communication, and their significance in policy making due to their presence in decision-making power corridors.

Based on the above arguments, we now start developing the hypotheses to be tested in the empirical part. If we focus on the constraints faced by female entrepreneurs, we find that urban centers provide them a diverse set of opportunities: educational facilities of all levels including professional institutions, vocational training, access to financial institutions, diverse customer preferences that raise demand for their products, easy access to raw materials, and the possibility of innovative marketing using technology, etc. Besides, urban centers are less orthodox, have greater social acceptance for women in business, and are more tolerant—all of this supports innovation and creativity. Thus, our first hypothesis is that urban areas have higher proportions of female entrepreneurs.

As discussed earlier, regional economic growth may not only be an important effect of entrepreneurial activities, but also a cause thereof (Fritsch 2013a, b). This is generally true when the focus is on opportunity-driven entrepreneurship. For women entrepreneurs, this in fact holds specifically. Women entrepreneurs aim to target economic environments that support their entrepreneurial pursuits. A growing urban economy offers diverse opportunities, not only for the incumbent firms but also for the new entrants in the market. It is also characterized by increasing demand for products, services and, very often, by an increasing population. As these entrepreneurial supporting conditions give out positive signals to potential entrepreneurs about the existence of a market for their future products and services, promising entrepreneurs may more easily recognize such business opportunities and may be willing to move to urban centers. Some empirical studies confirm this and show how regional economic growth in the recent past has had a positive impact on entrepreneurial activities in the immediate future. Consequently, it is plausible to assume that urban areas with such characteristics show higher in-migration rates. This inference is in line with management literature that points out opportunity recognition as the first of the key steps of entrepreneurship (Shane and Venkataraman 2000). We, therefore, setup our second hypothesis which states that migration to urban centers is positively correlated with higher earnings of female entrepreneurs.

Necessity Entrepreneurship: Although opportunity entrepreneurship provides the most frequent type of motivation, there is another drive which is highly relevant for individuals and regions belonging to low-income category. It is called necessity entrepreneurship and necessity entrepreneurs are defined as people pushed into setting a startup because they have either no other employment opportunities or they want to improve their income. Poverty and unemployment are prime reasons for such push-driven entrepreneurship, but others are also possible. In principle, necessity entrepreneurship is influenced by the same characteristics of the regional environment as opportunity entrepreneurship. In view of the above definition of necessity entrepreneurship, we setup our third hypothesis which gives poverty and unemployment as reasons of migration by female entrepreneurship.

To sum up, the urbanization economies notion may help find answers to two of the empirical research aspects. First, cities gain from urbanization economies since the

latter emerge only in case of agglomerations and areas of high economic density. The extent of this urban agglomeration is proportional to the size of the city. Consequently, urban entrepreneurs are expected to earn higher levels of earnings compared to those located in the rural areas. Opportunity entrepreneurship is caused by the pull of business opportunities; absolute market scale and the potential of a high skill match by employers. Hence, the entrepreneurial advantages of urban areas are expected to manifest particularly in terms of opportunity-driven entrepreneurship. Similarly, necessity-driven entrepreneurship shall act as a drive to push entrepreneurs to urban centers. Our fourth hypothesis is to test if systemic differences in earnings of female entrepreneurs exist between urban and rural regions. We use empirical analysis to test if the impact of urbanization on the earnings of female entrepreneurs is positive and statistically significant. Formally, the hypotheses are stated below along with some ready insights from the data used for the analysis.

Hypotheses

Hypothesis 1 Urban areas have higher female entrepreneurship rates (compared with rural regions) due to higher opportunity related motivation.

From the statistics in the dataset, we observe that 69% of all female entrepreneurs are placed in urban regions.

Hypothesis 2 Higher levels of opportunity recognition for startups are associated with higher migration rates to urban areas by female entrepreneurs compared to other females on the workforce.

The labor force dataset shows that urban migration by female entrepreneurs occurs at twice the rate than all other working females.

Hypothesis 3 The rural–urban migration of female entrepreneurs should be out of necessity. That is, female entrepreneurs heading to urban centers should be pursuing an economic agenda; an attempt to break away from the poverty trap or unemployment or to escape from the social and cultural taboos.

The data, however, show that the most cited reasons for migration by female entrepreneurs were either marriage or decisions to move by their families or husbands.

Hypothesis 4 The earnings of female entrepreneurs are positively affected by urbanization while we control the migration decisions.

This hypothesis shall be tested through an empirical analysis given in Sect. 9.5.

9.4 Main Sources of Bias in Women's Wage Model

As mentioned in the introduction, in this chapter we estimate the determinants of earnings made by female entrepreneurs using Mincer's wage function. Such estimation is likely to suffer from biases on several accounts. In this section, we shall

discuss each category of the bias and its possible econometric solution. Extant literature on women's wage equations has considered three main sources of potential bias in the model estimation: heterogeneity bias, endogeneity bias, and selectivity bias. We start the estimation by assuming that wages/earnings are influenced by a set of characteristics that indicate: (a) human capital investment (number of years of schooling, vocational training, and professional experience), (b) time allocation decisions (marital status and number of children), and (c) wage-amenity differentials (as in Roback (1982) discussing wages and amenities in reference to quality of life). The basic wage equation we are interested in estimating takes the general form

$$w_i = X_i + U_j + M_i + e_i \tag{9.1}$$

where w is the log income of the entrepreneur, X is a vector of individual-specific variables, U is vector of district-specific variables to quantify the extent and quality of urbanization, M is the rural-to-urban migration decision of the entrepreneur, and e is a stochastic and normally distributed error term assumed to be *i.i.d*. The last two variables are to gauge the impact of urbanization on entrepreneur's earnings.

Heterogeneity bias may arise if the true wage equation also includes a variable, correlated with any of the explanatory variables, which is unobserved by the econometrician and hence ignored in the model specification. Assuming that such variable represents some unobserved characteristics that potentially increases the entrepreneur's market profitability compared to her home productivity. The entrepreneur, because of this unobserved trait, may prefer to work more for earnings instead of any alternate time allocation; for instance, any home-based task. Similarly, spatial attributes of a district may induce a bias on this account. As this situation violates the assumptions required to obtain unbiased estimates, it needs to be corrected. A standard approach to remedy this is to use the fixed-effects method which controls for such idiosyncratic heterogeneity. Econometrically, this involves adding an individual-specific dummy variable to control for the missing unobservable characteristics whose absence in the model may cause the regression analysis to yield inconsistent estimates. We confirmed the robustness of our results by using the fixed-effects method in our OLS estimates.

Endogeneity bias can occur because of the possible correlation between any of the explanatory variables and the error term. Thus, in the case of entrepreneurs, econometric estimate of income determinants can suffer from the endogeneity bias caused by either some measurement error or due to an omitted variable or the simultaneity issue. In the third situation, endogeneity issue may arise if any of the individual or spatial characteristic is simultaneously determined along with income. Gibbons and Katz (1992) present an insightful discussion of this issue in the framework developed for estimating the industry wage differentials and where labor quality is unobserved. A possible correction for this type of bias is to use an instrumental variable approach in conjunction with two-stage least squares regression. We used the head of household's income as an instrument for quality of education and validated our OLS estimates.

Finally, there is some discussion on the selectivity bias. Analysis of the earnings and other socioeconomic achievements of women are potentially affected by their nonrandom selection into the labor market. The expected rewards from undertaking entrepreneurial work affects women's propensity to enter the labor force. Outcomes such as earnings from work and occupational status are jointly determined with labor force participation. Now, if the econometric model estimation ignores the process of labor force participation, it shall be subjected to potential selection bias as the sample is not randomly picked. Many studies in economics (e.g., Gronau 1974; Heckman 1979) and other disciplines such as sociology use models that explain the simultaneity of women's labor force participation and the market rewards that they receive.

For selectivity bias, it is useful to provide an intuitive discussion of the issue. We start by considering a framework in which the issue of selectivity bias in the estimation of the determinants of wages and labor supply behavior of females can be studied (Gronau 1974; Heckman 1974). Here, among the population of women, only a subsample is on the workforce and report their wages. An econometrician interested in identifying the determinants of the wages observes just these working women. Utilizing this subsample data, s/he reports the determinants of wages for all women. Now, if there is some systemic difference between the characteristics of workers and nonworkers, there is cause for selection bias. To ascertain if such selection issue is present, a simple method can be applied. We characterize each working woman by her endowments of observable and unobservable characteristics. If the working women subsample is chosen randomly from the population and has similar endowments of characteristics as the nonworking subsample, there is no issue of selectivity. In this case, the random selection requirement of drawing samples is satisfied.

Conversely, where the decision to work is no longer random and consequently, the working and nonworking samples have different characteristics, the sample does not fulfill the random selection requirement. Sample selection bias arises when some factor behind the work decision is relevant to the wage determining process. That is, when some of the determinants of the work decision are also influencing the wage, a bias will be induced in the estimates. A suggested approach to correct for the selection bias is described as Heckman correction. In general, the correction procedure amounts to including an extra term in the wage equation, the control function. Identification under the control function approach requires an exclusion restriction, namely an instrument that shifts employment but is unrelated to wages. In our empirical analysis, we shall describe the actual model used to control the selection bias.

9.5 Empirical Analysis

9.5.1 Data and Related Insights

The data used for the empirical analysis is from two main sources. First, we use three recent rounds of the Labor Force Survey (LFS) conducted during the period 2012–2015. This is a national survey conducted by the Pakistan Bureau of Statistics on an annual basis across all the urban and rural regions of Pakistan. The survey provides comprehensive microlevel information that can be used to develop employment trends, interprovincial and rural–urban migration patterns, and industrial composition of the labor force. Although the term "entrepreneur" is not defined in the survey, we follow our definition mentioned before and include all female respondents outside the farm sector who are either self-employed or employers in this category. The second major source of data is the Household Integrate Economic Survey (HIES) PBS (2016) conducted biennially by the same agency. This dataset is used to generate the variables that quantify the quality of urbanization. Two such district level variables used in the analysis are the per-capita expenditure on public transportation and the per-capita carbon emission. The first variable shall be used as a proxy for ease of mobility in the district and the second one as a measure of urban diseconomies due to poor air quality. Summary statistics for the relevant variables are given in Table 9.1.

Table 9.1 Summary statistics

Variable	Mean	Standard deviation
Age	22.9	17.8
Proportion of female entrepreneurs	0.013	0.114
Proportion of respondents (Matric)	0.057	0.233
Proportion of respondents (Intermediate)	0.029	0.169
Proportion of professionally qualified	0.008	0.934
Proportion of single women	0.614	0.486
Per-capita carbon emissions (kgs)	728.754	211.771
Number of observation	353.456	

Data Source LFS and HIES PBS (2015, 2016)

9.5.2 Empirical Model

We begin by using household level microdata from three recent rounds of labor force survey to estimate the determinants of female entrepreneur's income. As females self-select to become entrepreneurs, therefore, to correct for the potential sorting bias in estimation of income determinants, we use Heckman two-step estimator. The female work decision is contingent upon their age, marital status, and age of the youngest child so these variables are included in the selection equation of the Heckman model. As such, in the first stage we estimate a probit model of the following form:

$$\begin{aligned} Prob(Log\_Income) = f(&\beta_1 * Age + \beta_2 * Age^2 \\ &+ \beta_3 * Educational\ Level + \beta_4 * Youngest\ Kid\ Age \\ &+ \beta_5 * Marital\ Status(Relevant\ Exclusion\ Restriction) + u \end{aligned} \quad (9.2)$$

We then proceed to estimate the wage equation for the female entrepreneurs. Besides the personal characteristics of the entrepreneurs such as age and educational levels, we control for district level variables such as region (rural/urban), quality of urbanization measured through per-capita carbon emissions, and per-capita expense on public transportation. Following the dichotomous choice likelihood estimation of (9.2), in the second stage, we estimate the regression model given as

$$\begin{aligned} &Log(Income|Female\ Entrepreneur > 0) \\ &= \alpha_1 * Age + \alpha_2 * Age^2 + \alpha_3 * Educational\ Level \\ &\quad + \alpha_4 * Work\ Region(Urban/Rural) \\ &\quad + \alpha_5 * Per\ Capita\ Carbon\ Emissions \\ &\quad + \alpha_6 * Per\ Capita\ Public\ Transport\ Expenditure \\ &\quad + \alpha_7 * Migration + e \end{aligned} \quad (9.3)$$

9.5.3 Results

The regression results based on Heckman selection are reported in Table 9.2. The estimates show the expected results on age and education variables. Focusing on the selection equation (column 2), we see a sharp cutoff between 8 and 10 years of education. Thus, female educational facilities must impart a minimum of 10 years of education to support entrepreneurial talent. The social and cultural taboos are also clearly evident from the results. Women in single status presently, whether unmarried or divorced, as opposed to (currently) married women are more likely to undertake entrepreneurship. Similarly, the age of the youngest child is important in the work decision. Married women are more likely to undertake any business when their youngest child is more mature. The significance of public transportation as a measure of ease of mobility is also observed. Although the dataset does not indicate transport

availability, we proxy that through per-capita expenditure on public transportation in the district. A higher expenditure implies greater availability of public transport and higher frequency of its use. This in view of the mobility constraints discussed earlier plays an important role in the work decision of women. The exclusion restriction used here is the marital status of women. Married women, due to their responsibilities toward their husbands and families, are less like to join the labor force.

The results for the main regression Eq. (9.3) are reported in column (3) of Table 9.2. The age variable is positive and significant and the square of age is added to control for the nonlinear behavior of this variable with wages or earnings. The education variable

Table 9.2 Regression results

(1)	(2)	(3)
Model	Probit	Heckman
Dependent variable		Wages (Log)
Entrepreneur age	0.123*** (0.004)	0.112*** (0.021)
Entrepreneur age (*square*)	−0.0016*** (0.0001)	−0.0003*** (0.00025)
Education		
Primary (*Grade 5*)	−0.190*** (0.036)	−0.273 (0.183)
Middle (*Grade 8*)	−0.172*** (0.041)	−0.001 (0.207)
Matric (*Grade 10*)	0.191*** (0.027)	0.428*** (0.127)
Intermediate (*Grade 12*)	0.306*** (0.031)	0.560*** (0.143)
Professional (*Medical*, etc.)	0.899*** (0.036)	0.804*** (0.201)
Per capita emissions (*log*)		−0.734*** (0.211)
Per capita transport expenditure (*log*)	0.100*** (0.007)	0.383*** (0.058)
Exclusion restriction		
Single	0.494*** (0.025)	
Age of youngest child	0.008*** (0.001)	
Rural region		−0.744*** (0.0911)
Migration (*Rural to Urban*)		0.458*** (0.102)

(continued)

Table 9.2 (continued)

(1)	(2)	(3)
Model	Probit	Heckman
Dependent variable		Wages (Log)
Constant	−4.963*** (0.076)	11.591*** (1.622)
Observations	312,711	312,711

***p < 0.01, **p < 0.05, *p < 0.1 Results for OLS and IV models are available on request

shows results that have important private effort and policy support implications. For the entrepreneur, it shows that educational attainment up to the eighth grade shall have no significant bearing on the income levels. Also, there is a marked difference between the impact of Matric (10 years of formal education) or intermediate level (12 years of formal education) education versus getting a professional degree. For the purpose of policy design on some intervention supporting women entrepreneurship, this result provides some insights on the target population that can markedly impact the earnings of female entrepreneurs.

The quality of urbanization is important to analyze to determine if the city shall always remain the engine of economic growth. The presence of public transportation facilities positively influence the female entrepreneurs earnings as they make their mobility constraint less binding and can be considered as an urban amenity. However, the quality of urbanization also depends on the level of environmental pollution as gauged through per-capita carbon emissions here. Districts using dirty sources of energy such as firewood in comparison to clean sources such as natural gas have higher per-capita emission figures. The fuel choice also indicates the level of development in the district as mostly remote and backward districts resort to use of environmentally dirty fuel. The results show that earnings are lowered significantly as the environmental quality degrades in the district. The results show that public transport variable is positive and statistically significant for in both the work decision and earnings equation. The final variable of interest is the workplace region. The results show that controlling for other factors including migration decision, female entrepreneur's income is higher in urban centers. This result supports hypothesis 4 and hence, we can safely conclude that urban centers do ease out the constraints faced by female entrepreneurs.

9.6 Conclusion

Urbanization in the developing countries is prevalent due to various economic reasons. In an urbanized economy, costs associated with congestion and crime can easily offset agglomeration benefits if the regulatory mechanisms, public services, and infrastructural support are not appropriately designed to create a healthy business environment and do not support the growth of enterprise. As women constitute

nearly half of the total population, it is very important to tap their entrepreneurial potential for the overall economic growth. However, easing out of various constraints faced by women is quite a challenge and requires a multipronged approach. State interventions at any level and in any form can be helpful in this regard but there are always resource constraints and priority issues that limit public support. Hence, there is a ceiling on state intervention in terms of scope, intensity, and duration of support for women entrepreneurs.

This paper is an attempt to understand if the urban economy generated as a result of spatial concentration of economic activity can create a conducive environment for female entrepreneurs. This is all the more important as urbanization is going on at a rapid pace in the developing world particularly South Asia and Pakistan. Improving the management of urban centers can be rewarding in many ways usually related to governance matters, but their role in providing a conducive environment for the growth of women entrepreneurs is the focus of this chapter. The statistics and the empirical analysis show that urban centers are able to attract more female entrepreneurs. Besides, there are benefits associated with urban migration of female entrepreneurs and they are able to earn higher incomes in cities. Hence, the role of urban economies in promoting innovation and creating employment opportunities with better income options is very important.

The results from the data also point out certain issues that need immediate policy focus. Despite the extremely limited economic opportunities in rural areas, the rural women still face many hurdles in their migration decisions. Much smaller proportion of respondents reported reasons related to education, economic well-being, and employment as their motives for migration. This suggests that women in Pakistan are still subject to many social and cultural taboos and a lot needs to be done to help them realize their actual potential in market and business.

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Chapter 10
Exploring the Entrepreneurial Ecosystem Within the Informal Economy with a Multifactor Framework

Georgina M. Gómez, Suthida Chawla and Jan Fransen

Abstract Despite its prominence, scale and dynamism, the informal economy is viewed as remnant of a traditional economic order that needs to be systematically reduced and eventually eradicated. Only in the past few decades has a promising strand of research emerged to explore the marked heterogeneity among entrepreneurs along the formal-informal continuum and the existence of ambitious entrepreneurs committed to business growth. These entrepreneurs combine their ambitions with the pervasive informality in their society; they make both informal transactions but register their firms. We adopt a critical position of the formal-informal dichotomy. We are guided by the question of how ambitious entrepreneurs find the support in entrepreneurial ecosystems characterised by pervasive informality to further innovation. We contend that informality is embedded in entrepreneurial ecosystems at the meso-level. We contribute an analytical framework that accommodates the diversity of entrepreneurs as they, deal with, and maintain varying levels of formality and informality in infinite combinations that are compatible and conducive to business growth.

Keywords Growth-oriented entrepreneurship · Informal economy · Entrepreneurial ecosystems · Formalisation policies

10.1 Introduction

A relative disconnect transpires in the conceptualisation of the 'formal' and 'informal' economies resulting in the porous realities where growth-oriented entrepreneurs in developing countries exist. According to the classical definition by Castells and

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Portes (1989: 12), the informal economy is 'characterized by one central feature: it is unregulated by the institutions of society, in a legal and social environment in which similar activities are regulated'. Yet, up to 90% of urban firms in developing countries operate informally (UN-Habitat 2006) and over two-thirds of non-agricultural employment is informal (Charmes 2012; ILO 2012). Moreover, the informal economy contributes between 40 and 60% of GDP in emerging economies (Schneider and Williams 2013; Charmes 2012). In the past few decades informal economies have expanded faster and created more jobs than formal economies, making it not only consistent with economic growth but, 'vital for growth and livelihoods' (Harriss-White 2018). Informal economies have also significantly contributed to economic development in several countries in Asia, Africa and Latin America, and persist through economic booms and crises (Grimm 2012; ILO 2004). Some authors (for example, Daniels 2010: 7) go as far as claiming that the next wave of industrialisation in Africa should originate in the informal economy for a sustainable growth: 'When approaches to industrialisation begin to recognize the potential of informal sector entrepreneurial producers, appropriate technologies will finally meet local needs and create sustainable jobs on the ground'. Despite its prominence, scale, and reports of its dynamism, the informal economy is still viewed as remnant of a 'traditional economic order' (Cross 2000: 30) that needs to be systematically reduced and eventually eradicated.

Only in the past few decades has a promising strand of research emerged to explore the marked heterogeneity among entrepreneurs along the formal-informal continuum (for example, Davis 2006; Portes and Haller 2010; Babbitt et al. 2015; Floridi et al. 2016; Berner et al. 2012). This strand of research recognises that the informal economy is composed of different types of entrepreneurs (Godfrey 2011) with some entrepreneurs committed to making their businesses grow (Williams et al. 2016; de Beer et al. 2016).

We propose that these entrepreneurs bypass constructed boundaries of formality and informality by creatively combining their ambitions with the pervasive informality in society, for example, they make informal transactions while still registering their firms. These are 'ambitious entrepreneurs', who explore 'opportunities to discover and evaluate new goods and services and exploit them in order to add as much value as possible' (Stam et al. 2012: 3). They reconcile aspirations with pervasive informal settings, indicating that elements of the informal environments are conducive to business growth (de Beer and others 2016). Ambitious or growth-oriented entrepreneurs find support in 'entrepreneurial ecosystems' (Audretsch et al. 2006, 2017) that consist of 'the set of actors and factors coordinated in such a way that they enable' businesses to grow (Stam 2016: 1).

In this chapter we aim to better understand the actors' heterogeneity along the formal—informal continuum and to build an analytical framework that can effectively unveil their diversity. We are guided by the question of how ambitious entrepreneurs find the support in entrepreneurial ecosystems characterised by pervasive informality. We conceive of their entrepreneurial activity as one of hybridity among transactions and types of work. In the chapter, we first review the literature on the informal economy and search for the variety of institutional spaces where ambitious entrepreneurs

thrive. We adopt a critical position of the formal-informal dichotomy based on an economic activity's performance within or without state regulation. We contend that this dichotomy hides the diversity of entrepreneurial activity, leading to the third section where we elaborate on a conceptualization within and beyond the formal-informal continuum. We further argue that formality—informality is not simply a continuum but a multilevel concept that cannot be captured within a single level of analysis. We hence contribute an alternative framework in Sect. 10.3 that discloses the hybridity of entrepreneurs along the formal–informal continuum and makes room for entrepreneurial ecosystems where entrepreneurs find inspiration and resources to grow. We subsequently consider the economic activities of ambitious entrepreneurs that find support in the institutional plurality of formal and informal settings. Finally we reflect on the policy implications of our framework to capture levels of business informality in entrepreneurial ecosystems.

10.2 Revisiting Classical Views of the Informal Economy

Descriptions of the informal economy often consider the sector as a nuisance within urban economies while in policy circles around the world it is often being recognised as a necessity for the livelihoods of thousands of people (Maloney 2004). Others see the informal economy as a seedbed of entrepreneurship that may have significant economic contributions once it is organised and formalised, at least partially (Chen 2012). The formal economy almost invariably appears as superior (ILO and WIEGO 2013; Chen 2012), so it transpires that formalisation should be kept as the point of arrival for successful entrepreneurs that start in the informal economy (Ferragut and Gomez 2013). In this section we revisit these classical approaches to the informal economy.

Early studies of the informal economy did not represent the transition from informality to formality as even possible. Classical approaches considered the informal economy mostly as a separate sector, with identifiable borders, actors and activities. It portrayed almost exclusively marginal actors, distant and subordinate to the modern economy, who engaged in informal activities for their immediate survival in the fringes of urban cities (Hart 1973). In stark contrast to actors in the modern economy, these individuals were synonymous with poverty and characterised by low skill, capital, organisation (Sethuraman 1981), and productivity (Tokman 1982).

Chen (2012) refers to this view as a dualist model, a label that reflects the dominant modernization theory in which developing countries were expected to organise their economies along the model of the developed economies (William and Round 2008). Floridi et al. (2016) argue that the dualist approach was a close relative of the family of two sector models typical of the early development economic theory as described, for example, by Potter et al. (2017). An example of this reasoning was the Lewis model (1955) that discussed how the modern, industrial and urban economy would absorb the labour surpluses of the traditional, rural and agricultural economies. According to this version of development, the traditional informal sector

would disappear and the formal modern one would remain (International Labour Organisation 1972). In this approach, the existence of ambitious entrepreneurship and entrepreneurial ecosystems at the micro and meso-levels were masked over by the view of the informal economy as the failure of the state to modernise. Innovation, capital accumulation and reinvestment, risk-taking and access to modern finance were terms only used to describe the formal or modern economy.

As decades passed and the informal economy showed no signs of disappearing or organising, the dualist model underwent significant criticism that led to the emergence of a structuralist perspective (Chen 2012). This second perspective views the informal economy as a set of activities linked to the capitalist system (Portes and Haller 2010; Tokman 1982) and functional for the formal economy. A key scholar in this tradition is Alejandro Portes, who claimed that the capitalist system fuels informal economies (for example, Portes 1994; Portes and Schauffler 1993; Portes et al. 1989). As Light (2004: 717) highlighted, 'work characterized by low wages, short career ladders, temporary or unstable employment, few rules and rights and many ports of entry has obvious advantages for any business', be it formal or informal. Portes and Sassen-Koob (1987) identified informal economies thriving in developed capitalist societies and underlined that over 75% of the enterprises in the USA were 'very small enterprises', defined as those with up to 10 workers. Larger enterprises bought from these small firms which helped to keep costs down and workers' demands in check (Rakowski 1994). As such, the informal economy represented a cost-saving option as well as a mechanism to discipline the formal economy. Davis (2006, quoted in Floridi et al. 2016) went even further and referred to the informal economy as a 'living museum of human exploitation'. In this structuralist approach the mobility of entrepreneurs from the informal economy into the formal one was largely overlooked. The structural forces of the capitalist system created an informal ecosystem of exploited labour and reduced costs which effectively eradicated any possibility of entrepreneurial ingenuity outside of formal firms. Growth-oriented entrepreneurs that resorted to creativity and innovation, generated jobs and acquired modern technologies would be rather incompatible with the shady activities in the informal economy.

Critique of the dualist approach also put down roots for the legalist approach. The focus of this third perspective is not the actors and practices of the informal economy but the barriers that separate it from the formal economy. The perspective's focus on regulations gave it its title: legalist approach. It understands the perseverance of the informal economy to be a result of excessive regulations which adds heavy transaction costs for entrepreneurs (Floridi et al. 2016). A key proponent of this perspective is Hernando De Soto (1989) who analysed the inequality between urban elites and migrants after the Lewis model (1954) and concluded that there was no absorption of the labour from the traditional into the modern sector because urban elites prevented it from happening. These elites captured the state and managed to increase regulations in such a way that traditional sectors would not have the same access to public services and social benefits, among others. Entrepreneurs in the formal and informal economies hence competed for resources and influence over the bureaucratic apparatus (De Soto 2003; Chen 2012). A slightly different version underlined

the costs of formalisation and administrative processes that informal entrepreneurs were unwilling to cover (Friedman et al. 2000; Schneider and Enste 2000).

In the legalist perspective, both the formal and informal economies are expected to co-exist in the capitalist economy and compete for resources, customers, and so on, so this approach does not elaborate on the transition from one to the other. An entrepreneur may exceptionally cross the border (Floridi et al. 2016) from an institutional field characterised by unwritten rules, opportunistic behaviour and contingent agreements, into another one regulated by legal norms, efficiency, rationality and established procedures. Like other classical perspectives, the legalist approach continues to centre on the division of actors in the formal and informal economies as urban elites versus underprivileged, which are separated by a strict border. It gives no further information on the heterogeneity of actors within the informal economy, including the possibility of growth-oriented entrepreneurs within it.

The fourth classical perspective shares many of the assumptions of mainstream economic theory and relies on the rational behaviour of agents. The 'voluntarist' view considers formality and informality as a matter of choice made in relation to the costs and benefits of formality. Entrepreneurs would hence participate in the informal economy to reap benefits of operating informally (Chen 2012; Maloney 2004). In that sense, the voluntarist approach suggests that firms may deliberately decide to stay informal due to the higher benefits compared to operating formally (Chen 2012; Maloney 2004) and emphasises the cost of formalising instead of presenting it as a mere obligation. Informality saves costs and is a profit maximisation strategy of agents, so it is particularly well fit for contexts with weak enforcement capacity of state rules. The transition from the formal to the informal economy appears as something particularly easy for the ambitious entrepreneur, who would be choosing at the same time between entrepreneurial ecosystems in which the entrepreneur gets access to the various factors that sustain business growth (for example, finance, business training, government and non-government support).

The notion that entrepreneurs can abstract from their legal obligations and freely choose a profit maximisation strategy that includes participating in the formal or in the informal economy is not entirely convincing. Even the weakest states have the legitimacy, as well as an interest, in collecting taxes from entrepreneurs; state's failure to do so through legitimate means has been reported to breed corruption in the form of gatekeeper's rents for state officials on the ground that are as costly to entrepreneurs as taxes (Wallace and Latcheva 2006; Webb et al. 2009). However, this perspective is valuable as it suggests that entrepreneurs can choose to combine actions in either sector to enhance competitiveness. For example, they may decide to hire some workers formally and others informally, or to exchange goods and services with a supplier according to the formal rules and then evade these in the next transaction. The approach allows for more fluid combinations decided locally and on a daily basis, instead of making a once-and-for-all decision. The borders between the formal and informal economies hence appear to be porous and the level of analysis is no longer the enterprise as a monolithic unit.

In all four classical approaches described in this section, informal economic activities are seen as circumscribed to a sector inhabited by destitute individuals

barely scrapping a living in the margins of cities (Hart 1973, International Labour Organisation 1972). The view persists to this day with several scholars continuing to characterise the informal economy by what it lacks, namely: capital accumulation, human capital, productivity, product quality, and so on (LaPorta and Shleifer 2008, USAID 2005). Only the voluntarist approach places some agency in the hands of entrepreneurs, consistent with rational mainstream economics which contends that firms can make choices based on a cost–benefit analysis. Other than that, there is minimal or no room for creative and ambitious entrepreneurship within these classical approaches.

10.3 Beyond the Dichotomy

While fundamentally different, the dualist, structuralist and legalist approaches share the premise that formal and informal economies are separated by a normative border. The formal economy is taken as the point of reference to define the border that distinguishes it from everything else. This type of reasoning that separates A from B is the central critique of the following alternative approaches.

A first challenge to the 'family' of dichotomous approaches to the informal economy is reflected in the new definition of informal economy adopted by ILO in 2002 (International Labour Organization 2002) which focuses on employment and not on firms. This fifth approach is known as the 'continuum model' and is promoted by various UN organisations (International Labour Organization 2002, 2013, 2015; International Labour Organization and WIEGO 2013, Guha-Khasnobis et al. 2007; Sindzingre 2006; Chen 2005, 2012). The ILO report defined the informal economy as both (a) the set of employment activities within the informal sector and (b) informal, casual employment within the formal sector. Based on that report, Chen (2005) differentiated situations in the informal economy, including: poor and marginalised households with minimal contact to the formal economy, self-employed entrepreneurs that choose to operate outside state regulations and avoid taxes, informally employed workers in formal firms, homeworkers, and other casual jobs. These are different segments of the informal economy along 'a continuum between pure formal relations (i.e. regulated and protected) at one pole and pure informal relations (i.e. unregulated and unprotected) at the other, with many categories in-between' (Chen 2005: 8). Chen (ibid) recognises that the situation varies rapidly, so workers and firms move along the continuum and may even operate simultaneously at different points. The segmentation by employee relations in the informal economy is represented in Fig. 10.1 extracted from Chen (2005; 9).

In this continuum model, the dichotomous logic is partially left behind but only for employment relations which is understandable given the ILO mandate (International Labour Organization and WIEGO 2013, International Labour Organization 2002). Floridi et al. (2016: 9) critiques the continuum model, arguing that, 'the approach tends to subscribe to the dichotomist contraposition between formal and informal firms in other dimensions and thus keeps the dichotomy'.

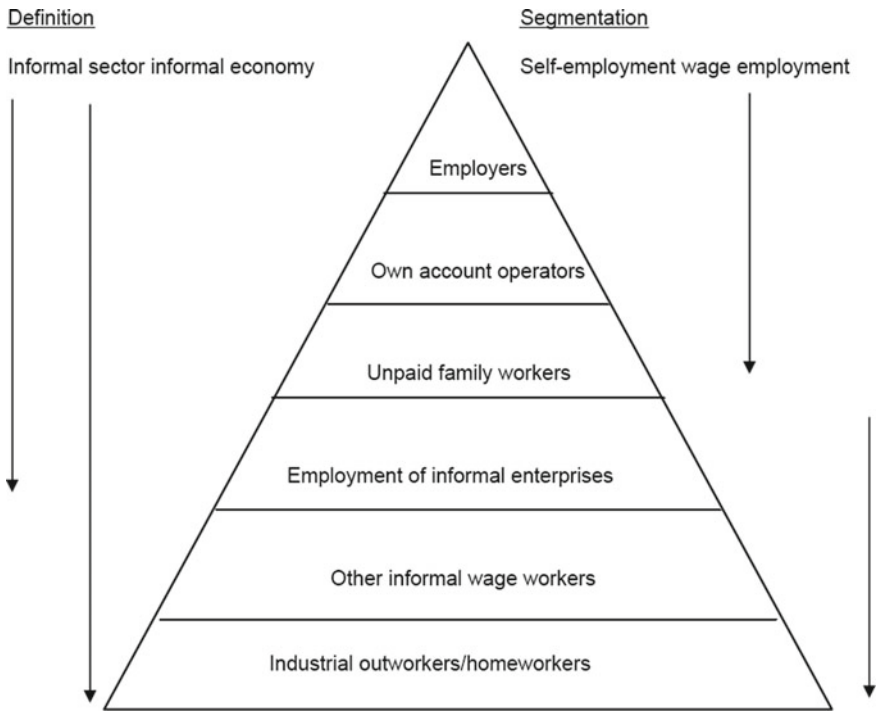

Fig. 10.1 (*Source* Chen 2005: 9)

In other words, the continuum model does not recognize mixed and hybrid business situations, but shifts the focus to employment relations with individual workers at the micro-level (including self-employment). Thus, the continuum model is ill-suited to analyse informal entrepreneurial ecosystems, which operate at meso-level and requires a different set of theoretical tools. Although the continuum model stays within the micro level, it makes an important contribution to entrepreneurial ecosystems by underlining the fluidity of the formal-informal employment situation and recognising that hybrid situations need further analysis.

A political theory angle, the sixth approach, critiques classical approaches from the rejection of a pre-existent formal economy as a point of departure and adds a significant political undertone to the study of the informal economy. The postcolonial and post development positions take into consideration economic organisations in developing countries that existed before the arrival of European-centred notions of nation states and state regulations. These previous organisations were ignored with the imposition of colonialism. European-centred categories were transferred onto developing countries and have persisted to be used by those that benefit from being formal; hence, the informal economy is a discourse imposed by the modernization project, which has been achieved only partially. In the line of authors such as Escobar (1995) and Latouche (1989), the opposition between a formal and an infor-

mal economy is part of a political construction to make local economic traditions appear inferior and eventually disappear. It is a direct critique of modernisation theory because informality is a result of the incomplete imposition of a formal economy on to the existent structures. Hence, the informal economy becomes a subproduct of coloniality within a development discourse.

Moreover, this position shares a post-structuralist tradition that critiques dyadic ways of thinking such as the formal—informal dichotomy, which are 'above all not one of legality (which is a purely formal category), but the ability of competing interest groups to impose their own perception of legality' (Cross 2000: 33). The implication is that there is a wide range of economic activities that exist but remain invisible because they do not fit well in the dyads of formal and informal thinking as constructed by those in power.

Post-structural and post-capitalist approaches offer some interesting avenues towards gaining deeper understanding of informal entrepreneurial ecosystems. Among these views, the diverse economies approach (Gibsom-Graham 2006, 2008) proposes a loose grouping of empirical economic activity into three domains. Enterprises are framed as capitalist (profit-driven), non-capitalist (such as communal enterprises and household sharing), and alternative capitalist (including state-owned and non-profit firms). Informality is considered a characteristic of transactions and not a type of firm in itself. It could be argued that firms that perform all their transactions in informal markets are consequently part of the informal economy, but Gibson-Graham (2008) did not make such a claim because they explicitly did not wish to base their analysis on pre-established categories. The authors underlined that their interest was to build a 'new economic ontology that could contribute to novel economic performances' (Gibson-Graham 2008: 615). Moreover, they claimed that the variety of informal economic activities includes remittances and international gifts, among other disparate flows, so they cannot all be grouped together consistently. A deeper discussion of entrepreneurial ecosystems is beyond the interest of this body of literature, but the principle of looking for the informal economy in the transactions presents novel theoretical possibilities. It redirects the focus to the domain of circulation, as opposed to restricting it to production, employment and enterprises.

The seventh approach to the informal economy predates all others but was not influential on development studies until the recent decades. The founder of the substantivist approach was historian and anthropologist Karl Polanyi who distinguished the 'substantive' and the 'formal' analysis of economic activity. The substantive understanding of the economy is factual and derives from human dependence on each other and nature for a living (Polanyi 1992: 29). Scarcity and choice may or may not be present in the achievement of a livelihood. In contrast, the 'formal meaning of the economy' (ibid) is logic and addresses the process of making choices between the different uses of means when these are limited. From a Polanyian perspective, all empirical economic activity is substantive—oriented towards making a livelihood—and only when the state appears, some economic activity becomes regulated, registered and hence formal. Economic activities have existed far longer than nation states and governmental regulations that organise production and consumption, so the separation between formal and informal activities does not make sense in

Polanyi's longer historical perspective (Polanyi 1992: 30). Polanyi further argues that 'only the substantive meaning of 'economic' is capable of yielding the concepts that are required by the social sciences for an investigation of all the empirical economies of the past and present'(ibid). While Polanyi does not use the term 'informal economy', a notion that was invented two decades later, his work set the foundations for a rich research programme that sees substantive economic activity as the norm and state-registered economic activity as a special case of modern economic systems.

As substantive economic activity is by definition diverse, it led to the emergence of a family of frameworks that elaborates on 'work', as opposed to enterprises or capitalist employment (for example, Brown 1978; Gershuny and Pahl 1979; Gershuny and Miles 1985; Pahl 1987; Harding and Jenkins 1989). Work is loosely defined as a 'general category of economically oriented transformative activity' and employment is a special type of work relationship within the capitalist system that binds capital and labour for a wage (Harding and Jenkins 1989: 10). Work can be done in a myriad of ways: for one self (self-provisioning) or for sale (self-employment), for a relative's business or for the household or community (unpaid, voluntary, for social obligations), informally for a wage (i.e. informal job), formally for a wage (formal job) or per piece (sub-contracting), or even in the commitment of a crime (Harding and Jenkins 1989: 104–107). All work that transforms the environment and is oriented to production and circulation in a social setting is part of the universe of activities that count as economically relevant in a substantive economy approach and are part of the economic portfolio of households (Hillenkamp et al. 2013).

Moreover, Polanyi underlined the key role of institutions is organising economic activities since the origins of human kind. A world of substantive economy possibilities lies beyond and in-between the formal—informal dichotomy. Polanyi (1944: 49–51) identified 'principles' that ensure production and distribution and form 'institutional patterns' that confer 'unity and stability' of economic processes. These forms are reciprocity, re-distribution and exchange (ibid). For the purposes of this analysis, we follow the standard definition of institutions as 'socially embedded systems of rules' (Hodgson 2006: 2). Across the formal-informal continuum, economic activity takes place under the regulation of institutions that affect actions and define what is possible, who has access to what, how business is performed and so on (Mair and Marti 2009; Harris-White 2017; Chen 2005). The Polanyian understanding of the economy as instituted process presents organised and stable patterns of distribution in which the transaction is the main focus, as with the diverse economies post-structural approach. These views of circulation and transactions cover a diverse landscape in which, for instance, formal enterprises can contingently combine formal and informal exchanges with firms and workers at the same time. Within the entrepreneurial ecosystems literature, institutions are a key element where ambitious entrepreneurs seek support to make their business grow. Entrepreneurs thus navigate the institutional plurality of entrepreneurial ecosystems in search of support for business growth.

The three approaches reviewed in this section are alternatives to the dichotomous or classical views of the informal economy presented in Sect. 10.2 and provide a broader analytical lens on the diversity of economic activities of entrepreneurs beyond

the formal—informal dichotomy. They shift the analysis in three directions: (1) to employment relations (ILO continuum model), (2) to circulation and transactions (post-structural and substantivist approaches) and (3) to the performance of work for others or oneself (substantivist approach).

The three approaches similarly avoid contending that the informal economy will disappear as economies become modern. In fact, an opposite question would fit better with these approaches: why would the informal economy disappear? A myriad of economic activities have existed for a long time so the analytical tools to approach them should be similarly encompassing of their varied realities. In the meantime as traditional economic activities persist, some new types such as e-work appear and thrive for a long time before they are 'made formal' by state regulation (Light 2004). These approaches become more complex to operationalise and measure; going beyond the dichotomy implies giving visibility to activities in the 'grey zones' between and beyond the two extremes of formal and informal.

We suggest a multilevel framework with several indicators in Table 10.1 and Fig. 10.2 in which entrepreneurs combine the ways they operate in relation to formality. Formality, as a result, is a characteristic of the enterprise. Table 10.1 contains a list of indicators used in the existing literature on the informal economy which we have rephrased in non-dichotomous language. We distinguish three broad dimensions, economic, social and political, and the indicators within each dimension are purposely chosen to reflect classical and alternative approaches of the informal economy. The economic dimension relates to the activity of producing goods, particularly the financial aspects of production and distribution. Regularity of income, source of income, productivity and documentation are a few of the static indicators used by the early scholars of informal economy as determinants of formality or informality. Accordingly, an enterprise that can maintain predictable income, has high productivity, provides a household with their main source of income, and clears financial documentation for tax purposes is considered a formal enterprise (Chen 2012; Hillenkamp et al. 2013; Sindzingre 2006; Tokman 1982). Legalist scholars also emphasised entry barriers to the formal economy as deterring informal enterprises (De Soto 1989; ILO 1972).

The political dimension is largely linked to the legality of the enterprise and the features that derive from its legal status, including the lack thereof. Tax and permits are common indicators of legality and, in association, a formal enterprise (Chen 2012). These regulations are viewed as lowering the competitive advantages of the informal enterprises (Cross 2000; De Soto 1989). Moreover, indicators have also been chosen to reflect an understanding of the regulatory environment from the point of view of authorities. Cross (2000: 47) recognises that the 'suspension of regulations is often due to the ability of informal enterprises to avoid regulatory control and equally important is the inability of authorities to enforce them.' In reality, the level of compliance achieved by enterprises is a mixture of regulations in place and their enforcement.

The social dimension reflects an understanding of the substantive economy and enterprises as a being that cannot be removed from society. The lack of separation between household and business is indicative of informality in an enterprise

Table 10.1 Re-elaboration of indicators of formality and informality

Formal enterprise	Informal enterprise	Source
Economic situation of enterprise		
Regular income	Semi to irregular income	Sindzingre (2006), Hillenkamp et al. (2013), Chen (2012)
Only source of income	Additional sources of income	ILO (1972), Sindzingre (2006), Chen (2012)
Documented finances following standards	Some records to undocumented finances	ILO (2004)
Productivity higher than similar businesses	Productivity lower than similar businesses	Tokman (1982)
Complex entry barriers	Low to no entry barriers	ILO (1972), Sethuraman (1981)
Political situation of enterprise		
Permitted and registered with public offices	Obscure situation to forbidden by public offices	Hillenkamp et al. (2013), Chen (2012), Sethuraman (1981)
Regulated and monitored by government	Minimal to no regulation and monitoring	ILO (1972), Sethuraman (1981)
Paying all taxes	Evading some to all taxes	Hart (1973), Chen (2012)
Transparent legal status	Ambiguous to no legal status	ILO (2004), Hart (1973), Chen (2012)
Full reliance on written and legal contracts	Some to full reliance on informal channels	Sindzingre (2006), Chen (2012), Portes et al. (1989)
Protected by membership in association	Invisible to formal associations	ILO (2002)
Social situation of enterprise		
Motivations of capital accumulation	Motivations of survival	Sindzingre (2006), Hillenkamp et al. (2013), Chen (2012)
Separated business cash flow	Cash flow partially to fully mixed between business and household	Sethuraman (1981), ILO (2004), Floridi et al. (2016)
Dedicated business space	Mixed household and business	Sethuraman (1981), Hillenkamp et al. (2013), ILO (2004)

Source Own elaboration

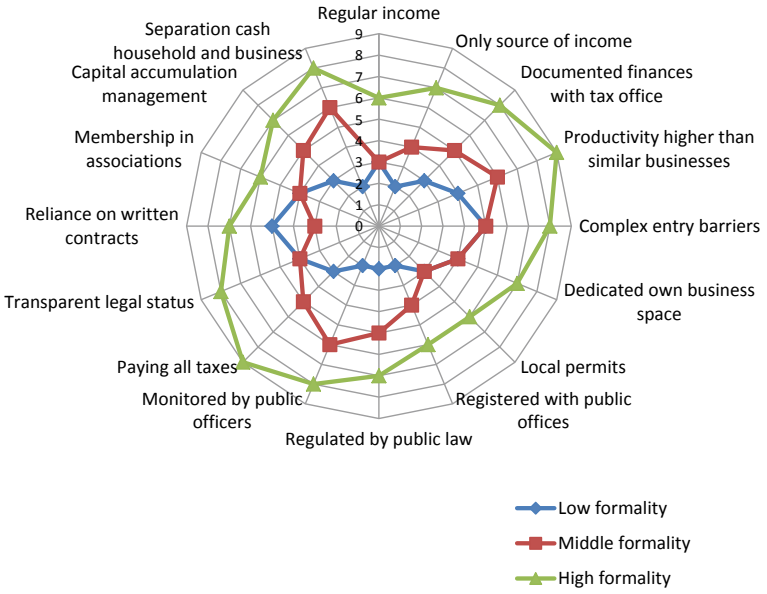

Fig. 10.2 Multilevel framework of formality (*Source* Own elaboration)

(Sethuraman 1981; Hillenkamp et al. 2013). The ILO (2004) also considers membership with a registered association as a way informal enterprises could seek to 'formalize', become more visible, and protect themselves. Moving beyond the static understanding of social, there is also a need to understand the networks and contracts that operate seamlessly in the background and are crucial to an entrepreneurial ecosystem, including linkages with the household. The physical space(s) of economic activity are often linked to social networks and important in providing completive advantage to entrepreneurs in their costs (legitimate and otherwise) and proximity to customers (Bhowmik 2005; Cross 2000).

The list of indicators in Table 10.1 operationalizes several criteria(s) associated with the formal—informal spectrum and can be used to score shades or gradients of formality. This framework can be deployed in the field allocating 0–10 scores, in which 10 corresponds to the highest compliance with formal regulations. In Fig. 10.2 we depict three examples of hybridity with low, middle and high levels of formality from the centre outwards to indicate that varying levels of each indicator is possible. The figure shows, for example, an entrepreneur that scores low levels of formality on most accounts, hence consistent with the classical views of the informal sector. It also shows two other examples of entrepreneurs who present a mix of characteristics with high degrees of formality and informality, indicating a hybrid situation. The argument is not that firms can freely choose their levels of formality. To the contrary: their choice is conditioned by the institutional system within which they operate. Our

argument is that different localities and sectors may offer different entrepreneurial ecosystems, with different scores for each criteria.

Such framework accommodates for entrepreneurs that maintain varying levels of formality and informality in infinite combinations that are compatible and conducive to business growth. A study by Chawla (2017) in Thailand provides an example that has engaged with such a multilevel framework to understand entrepreneurship along the formal—informal continuum. Chawla researched street food vendors in Yoawarat Road in Bangkok, Thailand. Eating street food on Yoawarat Road is considered a top tourist attraction and one that the government of Bangkok is interested in promoting. The government has defined some rules on registration, security, and hygiene that the vendors must comply with while remaining on public space, leaving the vendors vulnerable to eviction at any time, like all informal street vendors around the world. In the case of Yoawarat Road, many vendors are growth-oriented, they register their business, hire workers to meet growing demands, and constantly search for business improvement (for example, new products to offer tourists) but they are socially perceived as informal entrepreneurs and cannot join a business association.

The multilevel framework proposed speaks directly to Chen (2012)'s critique of 'simple' formalisation policies that do not provide informal actors the benefits of the formal economy. Specifically, it stresses aspects of an informal enterprise that are not improved with simple formalisation, such as 'providing business incentives and support services to informal enterprises; securing legal and social protection for the informal workforce, recognising the organisations of informal workers, and allowing their representatives to take part in rule-setting, policymaking, and collective bargaining processes.' (Chen 2012: 15). By the same token, the framework allows us to account for the fact that informality in some aspects need not hinder business growth. As a result, it facilitates a better match between entrepreneurial support and needs, as will be elaborated in the next section.

10.4 Ambitious Entrepreneurs and Pervasive Informality

At the level of the entrepreneurs, the framework allows us to analyse ambitious entrepreneurs that navigate formality and informality contingently on different fronts and social relations (employment, transactions, legal regulations, work). Ambitious entrepreneurs may comply with some legal rules but not with others (De Castro et al. 2014; Harris-White et al. 2017; Williams et al. 2016), and may find in informality a platform for innovation (de Beer et al. 2016) or to try out new ideas (Light 2004). They adopt a strategic approach to business development that has been recognised only occasionally in the literature (for example Williams et al. 2016; de Villiers et al. 2014; Kanbur 2009; Fransen and Helmsing 2016; Verreyne et al. 2014; Williams 2006; Williams and Martinez 2014). The question is how informality can support ambitious entrepreneurship. We contend that informality is embedded in entrepreneurial ecosystems and supportive of enterprises at a meso-level.

An enabling entrepreneurial ecosystem comprises many institutional factors that contribute to the smooth running and growth of a business, and the formal-informal continuum pervades supportive entrepreneurial ecosystems. Isenberg (2011: 1) identified six domains within entrepreneurial ecosystems that converge to promote entrepreneurial performance: enabling policies, finance, human capital, markets, conducive culture and the support of other institutions and organisations. In developing countries, and to a lesser extent in developed countries, informality is compatible with dynamic entrepreneurial ecosystems and growing businesses, for example

- Informality is found in the ways of accessing and implementing policies (Wolf 1966; Erdmann and Engel 2006), including clientelistic practices and patronage that entrepreneurs learn to deal with at the time of registering firms and getting permits. The exceptional study on the informal economy in Dominican Republic by De Castro et al. (2014) found that growth-oriented entrepreneurs were selective in their choice of fees and registrations depending on the perceived benefits and legitimacy by the various levels of government. Many entrepreneurs in the study could make sense of paying local fees but not central tax as they understood the benefits of the local government's presence but felt too distant from the central government's regulations (ibid.).
- In relation to finance, there is a substantial body of research that shows that informal finance allows entrepreneurs to start-up and to grow for a while, as long as they pay their loans. One study in China even argued that informal finance is more effective in promoting business growth than formal banks (Ayyagari et al. 2010). Depending on national regulations, formal banks are also allowed to work along the formal—informal continuum and can lend to unregistered firms, as shown by a study in India (Harris-White 2017). In relation to formal financial organisations, Webb et al. (2009) reports on an entrepreneur that chose to legally register only one of the business operations to access a formal financial institution without arising suspicion from the state. Payments of specific taxes and fees came with this choice.
- The third area identified by Isenberg (2011) is human capital and we have already covered the pervasiveness of hiring workers that are partially or totally unregistered. ILO (2004) has covered this aspect extensively. Besides straight self-employment, there is a variety of arrangements to transfer work and transaction costs to workers in more or less legal ways, such as outsourcing, piece work, apprenticeships, internships, Internet work and so forth (Light 2004).
- Related to the previous point, some transactions are selectively conducted informally both with suppliers as with buyers. The relation to markets is the fourth domain of entrepreneurial ecosystems and a key element in the formal—informal continuum. These have been studied by Webb et al. (2009) and De Castro et al. (2014), for example. Different stakeholders and transactions are registered differently or not at all.
- The fifth domain is business culture. In developing countries there may be a higher cultural tolerance to informality or at least to conduct economic activities outside the scope of state regulation. Al Mataani (2017) and Light (2004) highlight cultural settings in developing countries in which it is acceptable to operate in the

institutional plurality of formality and informality. Webb et al. (2009) add a distinction between what is legal and what is legitimate, which implies a cultural acceptability of unregistered activities (Webb et al. 2009: 498). Growth-oriented entrepreneurs are hence tolerated when creatively combining different levels of political, economic and social factors to build and grow their operations.

- The sixth domain is the support of other institutions and organisations and we also see variation in the degree of formality in this domain. An example is a business incubator which aimed to offer an institutional niche by enabling start-ups to operate in a sheltered ecosystem formally and informally (Fransen and Helmsing 2016). De Castro et al. (2014) discussed entrepreneurs' engagement in economic activities under various institutional settings that are sometimes at odds with each other. The study showed that as enterprises grow, they become more visible and exposed to the formal institutional sphere, in contrast to survivalist entrepreneurs who engage almost exclusively with the informal side of the continuum. The study by Chawla (2017) showed contradictory regulations among different areas of government, namely the interest in promoting tourism versus collecting fees and controlling food street vendors.

For successful entrepreneurs it is important that the six domains in an ecosystem support innovation and learning. Informal firms face major constraints in innovating. Some constraints relate to firm characteristics; a small firm's size and low education levels of the entrepreneur are well known barriers to innovation (see for instance Bradley et al. 2012; De Mel et al. 2009; Gebreeyesus 2009). In a study on Nairobi's handicraft sector, Harris (2014) found that informality hampers innovation, because being out of the formal institutional structure creates high levels of entrepreneurial risk, diseconomies of agglomeration, and rational but problematic decision making processes of firms. A study on Cape Town showed that other institutional constraints relate to the location of informal firms in squatter settlements, differentiated social networks, segregated education and highly dependent position of informal firms at the bottom of value chains (Fransen and Helmsing 2016).

Most research on innovation, however, focuses on radical innovations taking place within the formal economy, by-and-large ignoring the wide range of institutional options offered within the entrepreneurial ecosystem (Cozzen and Sutz 2014; Edquist 2001; Fransen 2016). Innovation policies in the global South have followed suit and tend not to offer much appreciation of, and support to, innovative informal firms (Fu and Zanello 2015). Only recent studies have shown that incremental innovations of informal firms can drive processes of local economic development, especially in poorer communities (Lundvall et al. 2010; Martin and Moodysson 2011). Fu and Zanello (2015) found that innovation is a determinant factor for the growth of informal firms in Ghana. They also argue that economies nowadays are intrinsically more interconnected enabling informal firms to acquire available technologies through various (digital) networks.

So, what do we know about the innovation of informal and small firms? First, innovations of formal and informal firms are likely to depend on interactions within and among firms, conditioned by different institutional settings. Illustrating an extreme,

radical innovations of formal firms benefit from interactions among firms, research institutes and governments (Etzkowitz and Leydesdorff 2000; Fagerberg 2005). It may take place in especially created institutional niches, within which firms are relatively free to experiment (Geels and Schot 2007). By contrast, incremental innovations rely more on the firms' interactions with users and local social networks (Strambach 2008). Institutional settings that enable close interactions may enable informal entrepreneurs to quickly adapt products and services to user needs, leading to incremental innovations (Lundvall et al. 2010). Stimulating innovation among informal firms may therefore require radically different policies and practices.

Second, we have some basic knowledge on how informal entrepreneurial ecosystems may work in support of innovation. Scholars on incremental and grassroots innovation highlight how tacit experiential knowledge accumulates within localised informal innovation systems. These innovation systems may be comparable to a tightly knit community, which operates in a cluster-like environment. Knowledge and skills are held in different tacit forms and are often experiential rather than scientific. Informal firms use their experiential, context specific knowledge and networks to make new products, technical devices and organisational mechanisms, in order to solve local problems (Bhaduri 2016; Daniels 2010). They also creatively adjust, reuse and repair technologies, leading to local adjustments that add value within a specific local context (Godin 2008; Radjou and Prabhu 2015). Gigerenzer (2008) points out that search processes for local solutions initiate processes of learning and imitation, which emphasise actual performance of solutions rather than their scientific validation. Such decisions are rarely inferior to decisions based on optimisation calculations and scientific validation (Gigerenzer 2008). New knowledge from outside the localised innovation system may also initiate innovations. Firms may acquire knowledge from new clients, non-firm actors, value chains or the Internet on new technologies, product designs or marketing techniques. They are subsequently likely to experiment and combine new and experiential knowledge.

Third, we know that most informal firms operate far from the technological frontier and tend to absorb knowledge instead of creating new knowledge. The absorptive capacity of informal firms therefore mediates their ability to innovate (Fransen and Helmsing 2017). Absorptive capacity is a firm-level capacity defined as 'a dynamic capability pertaining to knowledge creation and utilisation that enhances a firm's ability to gain and sustain a competitive advantage' (Zahra and George 2002: 185). Informal firms require different absorptive capacities than formal firms. First of all, the entrepreneur plays a more central role in absorbing knowledge, if only because most informal firms do not set up departments to acquire knowledge, conduct R&D and transform production processes. These activities are often conducted by the entrepreneur. Second, most informal firms require access to local, experiential knowledge. This demands highly localised network capacities embedded in ties of trust. Third, informal firms are better able to absorb knowledge if they can appreciate the importance of knowledge from outside their community or ecosystem as well. Language abilities, education, training and previous experience facilitate acquiring new external knowledge. Finally, informal entrepreneurs who engage in business planning, possess risk-taking propensity and have access to finances are more likely able

to transform their organisation and exploit new knowledge (Fransen and Helsming 2017; Geenhuizen and Indarti 2010).

A similar rationale applies to new types of work that can exist for a long time before a regulation to formalise them appears (Light 2004). New technologies, especially in the gig and creative economy, require new institutions, production technologies and routines (Storper and Walker 1989; Martin 2010). In first instance, new sectors operate in entrepreneurial ecosystems which have institutional voids (Mair and Marti 2009). For instance, Uber uses apps offering flexible on-demand transport services and operates in an entrepreneurial ecosystem which is not yet fully formalised. In many locations it is unclear what labour or other laws and standards Uber-drivers adhere to. Similar institutional voids exist in relation to privacy laws on the Internet, the insurance of self-steering cars, block chain technology, etc. Over time, institutions may develop, more formal entrepreneurial ecosystems emerge and the window of opportunity closes. In the meantime, the hybrid, emerging entrepreneurial ecosystems provide an opportunity to experiment.

This rationale acknowledges that multiple entrepreneurial ecosystems are needed and operate in parallel. In the six domains highlighted by Isenberg (2011) formality and informality are both present and intertwined within entrepreneurial ecosystems structured by institutions that have a high degree of flexibility (Strambach 2010).

10.5 Reflections on Formalisation Policies

We have shown that the formal–informal dichotomy does not reflect the wide range of realities and practices within institutionalised economic processes in which entrepreneurs operate. We have argued instead that economic activities take place in relation to a variety of institutions, which come together locally in entrepreneurial ecosystems with various degrees of formality. Treating informal entrepreneurs as a left-over category of what is formal and modern does not capture their growth potential and—as we argue—its importance for entrepreneurial development.

A better understanding of these formal-informal combinations among entrepreneurs constitutes a new research agenda. Williams et al. (2016) argue that while most supra-national agencies and governments are seeking to facilitate the formalisation of informal sector enterprises and workers, relatively little is known about the levels of informality among entrepreneurs that operate along the formal—informal continuum. We contend that a reason for this poor policy targeting lies in the lack of adequate tools to identify and capture the hybridity of entrepreneurial activity. Most formalisation policies are not tailored to reduce informality but to incorporate enterprises into the formal economy in one go (Ferragut and Gomez 2013). We expect a multilevel framework such as the one depicted in Fig. 10.2 will offer an alternative approach to better tailor entrepreneurial support policies that may guide entrepreneurs to move towards higher levels of formality gradually and per domain. It could help policy-makers find answers to basic questions such as: What aspects of entrepreneurial activities could or should be formalised? Which enterprises can progress in some aspects of formalisation? How will such

formalisation support tax collection or business growth, or actually play against these goals? Our multilevel, multiscalar framework allows a better identification of entrepreneurs and consequent better policy targeting. The main implication is that different levels of government would need to follow different formalisation policies that match entrepreneurial needs. So while formalisation of employment and financial services are typical concerns of the central governments, the participation in local entrepreneurial networks and markets, incubators, and experimentation in the new economy are mostly bounded by place specificities and hence better tackled by the local governments.

Our line of argumentation follows that of De Castro et al. (2014: 91), who describe formalisation as an 'entrepreneurial journey into institutional pluralism'. We envision economies as a plurality of entrepreneurial ecosystems, whereby ecosystems combine institutions and actors across the formal—informal spectrum. We agree that most informal entrepreneurs are poverty-driven instead of growth-oriented, but every now and then local institutional configurations form into local innovation systems within which clustered informal firms innovate incrementally and grow, create jobs, and pull others to a better life. A closer look at the entrepreneurial ecosystems permeated by informality leads to different kinds of questions regarding which type of entrepreneurship is best to support and how. We contend that it is not the entrepreneurship that best fits in the categories of the modernisation project but the ones that secure jobs and livelihoods to the majority of the population in a sustainable way.

The core question is not whether these ecosystems and its firms can be formalised, but what specific configuration of institutions leads to sustainable local economic development that may eventually become more formal. Reducing levels of informality hence becomes a desirable goal for states that need to collect taxes and exert its regulation powers on its territory, but it becomes one of several goals. It might well be that strong ties of trust among entrepreneurs in a locality is more central to innovation, learning and growth than formal support mechanisms, or that a culture of unpaid family labour enables a skill to regenerate over time. In such cases, informality is not an impediment, and processes of formalisation based on a dualistic approach may hamper instead of foster local economic development in cities.

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Chapter 11
Shaping and Making a Future: Iranian American Business and Technology Leaders in Silicon Valley

Kathrine Richardson

Abstract The Iranians in America is a compelling yet understudied topic area within the academic literature. Although there have been recent efforts dedicated to the lives and contributions of Iranians elsewhere within the United States (U.S.), very little academic work has focused on Iranian Americans within the San Francisco Bay area and more importantly, Silicon Valley. Despite the industrious leadership and intellectual and professional contributions that these Iranian Americans make towards the advancement of Silicon Valley, there is limited understanding of this high achieving group. Although there is special attention to highly skilled Taiwanese, Indians, and Israelis in Silicon Valley and their on-going relationship with their respective countries of origin within the recent academic literature, little work has been conducted on the role of highly skilled Iranian Americans in Silicon Valley. Thus, this chapter begins to document and explore who is this elusive, yet extremely important, highly skilled group of Iranian Americans. Drawing from 20 semi-structured interviews as a primary methodology, the study works to uncover the various types of highly skilled Iranian Americans and their entrepreneurial and/or professional contributions to Silicon Valley through two lenses; the first focuses on elements of self-motivation; the second includes a better understanding of regional conditions that may have supported such success.

Keywords Silicon valley · Iranian Americans · Immigrants

11.1 Introduction

The Iranians in America is a compelling yet understudied topic area within the academic literature. Although there have been recent efforts dedicated to the lives and contributions of Iranians elsewhere within the United States (U.S.), very little aca-

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demic work has focused on Iranian Americans within the greater San Francisco Bay area and more importantly, Silicon Valley. Anecdotal evidence is indicating that key entrepreneurs and venture capitalists, who self-identify as Iranian American, have played important roles in propelling Silicon Valley in its stratospheric technological growth. Despite the industrious leadership and intellectual and professional contributions that these Iranian Americans make towards the advancement of Silicon Valley, there is limited understanding of this high achieving group. Although there is special attention dedicated to highly skilled Taiwanese, Chinese, Indians, and Israelis in Silicon Valley and their on-going relationship with their respective countries of origin within recent academic literature, little research has been conducted on the role of highly skilled Iranian Americans in Silicon Valley.

Based on the above, this study begins to document and explore who is this elusive, yet extremely important, highly skilled group of Iranian Americans. Drawing from 20 semi-structured interviews as a primary methodology, the chapter works to uncover the various types of highly skilled Iranian Americans; their entrepreneurial and/or professional contributions to Silicon Valley and the greater San Francisco Bay area; sources of motivation and inspirations that propel this type of achievement; and the regional conditions that may have supported this type of success.

11.2 Literature Review

11.2.1 Notions of Talent and Achievement for Ethnic and Cultural Groups

Perhaps some of the most current work on this topic area include Lee and Zhou's (2015) work on the paradox of Asian American achievement. Drawing from in-depth interviews with adult children of Chinese and Vietnamese immigrants and refugees based in the great Los Angeles area, Lee and Zhou found that many of the interview subjects' parents immigrated to the U.S. after 1965, and subsequent U.S. immigration policies after this year favored immigrants who had the equivalency of a university degree and professional skills. Thus, Lee and Zhou (2015) argued that this in turn brings a "success frame," which is clearly defined as expecting their child to earn a degree from a prestigious university and securing a career in a high status profession. Lee and Zhou (2015) also noted that many of these second-generation Asian American were subjected to "Positive Stereotyping", by teachers and counselors, for example, who assumed that these Asian American students were intelligent, driven, scholarly, and disciplined. These assumptions, in turn, helped to guide these Asian American youth into competitive academic programs. Thus, this positive stereotyping found in many institutions, such as public schools, was then crucial in supporting and reproducing the cycle of Asian American achievement. However, Lee and Zhou's (2015) stressed the expectations of exceptional success and achievement comes with a dark side. Importantly, the notion of Asian American

success creates an "achievement paradox" in which Asian Americans who do not fit this success framework categorized themselves as failures or racial outliers.

Seeking notions of modern American achievement and success, Chua and Rubenfeld (2014) examined what are the key drivers of success in various ethnic and cultural groups within the U.S. They found that certain successful immigrant and cultural groups have three things in common, namely, notions of group superiority; self-insecurity; and impulse control. Drawing from a number of secondary sources primarily focused on Nigerian Americans', Asian Americans', Jewish Americans', and Mormons' group and individual achievement, Chua and Rubenfeld (2014) found that when these three distinct forces comes together in a particular group's culture, it propels the group and individuals within that group to disproportionate success. Similar to the Asian American achievement paradox (Lee and Zhou 2015), Chua and Rubenfeld (2014) go on to cite a number of downsides to this drive and achievement, which include depression, anxiety, and even suicide. This coincides with much of Waters' (2003) research on the children of "astronaut and satellite families"[1] of Vancouver, Canada. Debunking much of Ong's (1999) work, Waters found that poor school performance, depression and even suicide attempts was evident in many of the adolescence children of recently migrated Chinese Canadian families. As well, Colvin (2010) argues that extreme achievement and success is less about "talent", and more about discipline, dedication, time commitment, and willful practice.

Applying the above to the Iranian American experience generally and to the highly skilled, Bozorgmehr (2012, 1998, 1997) (also Bozorgmehr and Sabagh (1988) and Bozorgmehr and Douglas (2011)) has written extensively over the past 30 years on the Iranian American experience through many lens. This includes economic, locational, cultural, and assimilation. With a focus on Iran, Lotfalian (2004) examines how Muslim scientists and engineers, in the global context in which Islam has become an ingredient of identity discourses, are grappling with competing discourses to create new technoscientific outlooks. Mobasher (2012) examined the current state of Iranian Americans in Texas covering a wide range of issues such as the current anti-Muslim sentiment to the Iranian hostage crisis in the late 1970s. Drawing from over 200 interviews with Iranian Americans living in Texas, he also explored the drive to "perform" for many of these people in an effort for personal and family achieve, but also to demonstrate that Iranian Americans were high achievers, who could perform well in (and for) the American economy and society.

[1] Waters (2000) examined the recent emergence of Astronaut and Satellite family forms in Vancouver, British Columbia. Drawing from evidence in several cities around the Pacific Rim, Waters found that these transnational arrangements among recent economic-class immigrants from Hong Kong and Taiwan involved one or both adult members of the nuclear family returning to the country of origin to pursue a professional career or business. In the Astronaut arrangement, it is usual for the woman to remain in Vancouver - taking charge of all domestic and childcare tasks. In the Satellite situation, both parents returned to the country of origin for work for an extended period, and the minor children were usually left with a full-time or part-time caregiver in their new home of Vancouver.

11.2.2 Cities, Highly Skilled Talent, and Entrepreneurship

While there has been little empirical study of inter-city competition for foreign talent, generally, scholars have noted the degree to which urban knowledge capital is crucial for the continued growth of high technology and biotechnology clusters and subsequent entrepreneurship (Beaverstock 1996; Beaverstock and Smith 1996; Findlay et al. 1996). For example, Bresahan and Gambardella (2004), who explored recently emerging high tech clusters around the world, found that Taiwan and India have relied heavily on U.S. educated repatriated Chinese and Indian engineers, and much of Israel's advancements could be attributed to highly skilled Russian immigrants over the past twenty years. Specifically, firms in these emerging clusters had to attract key talent from outside of the immediate region or cluster if the particular firm and the cluster as a whole were going to continue to grow. Exploring North America, Wolf and Gertler (2004) stressed that the centrality of skilled labor was seen as one of the most important local asset to a cluster and subsequent entrepreneurship. Considering Canadian regions specifically, Holbrook et al. (2003) conducted an overview of Vancouver's biotechnology cluster. The authors stressed that it is unlike other Canadian biotechnology clusters in that its sole output is intellectual property, which is highly dependent on star talent. Importantly, Richardson (2016) found that the volatility of Vancouver's biotechnology cluster helped to spur successful entrepreneurship within the existing cluster after the 2008 financial crisis. Overall, it is critical then for emerging technology and biotechnology clusters to be able to attract and retain highly skilled foreign talent, which over time, can lead to successful entrepreneurship.

What then are the specific factors that are essential to attracting and retaining foreign highly skilled workers or talent? Here again there has been minimal empirical work. Some of the more traditional factors that are seen as crucial in motivating the highly skilled to move from one country to another include better employment opportunities, more stable political environments and social conditions, and tertiary graduate education opportunities (Sassen 2012; Abella and Kuptsch 2006; Solimano 2008). Boyle and Motherwell (2005) examined how to entice highly skilled young Scots away from the vibrant city of Dublin, Ireland and repatriate them back to Scotland. Based on the use of key cultural indices developed by Florida (2002), namely the Bohemian Index, the Gay Index, and the Multicultural Index, the study worked to move beyond the traditional motivators of foreign talent to something called "cultural cosmopolitanism". Although Florida's (2002) place specific attributes have drawn serious questioning by various scholars such as Peck (2005) and Houston et al. (2008), cities and urban regions continue to apply various applications of Florida's creative class elements in an effort to entice the highly skilled and entrepreneurial talent.

11.2.3 Silicon Valley, Talent, and Ethnic Entrepreneurship

In considering Florida's (2002) notion of Tolerance, Technology, and Talent, Saxenian (1994) captured the evolution of the South San Francisco Bay area into what is now called "Silicon Valley" in a compelling way. One of her most important findings is the discovery that innovative institutions and networked relationships between high technology professionals and technicians that transcended firm and job title were essential to building what is now called "Silicon Valley". As well, the author spent considerable time juxtaposing these loosely linked confederations of high tech teams found in Silicon Valley to the rigid hierarchy and autarkic practices found along Route 128 outside of Boston. As well, Kenney (2000) described the "ecology" of the Silicon Valley region. Beyond the loosely linked confederations of engineers and professionals found in high tech firms as explored by Saxenian (1994), Kenney (2000) expands this unique network to include the importance of the knowledge and connections of Silicon Valley venture capitalists and lawyers, who were probably more valuable to the evolution of the region for their network of connections and "know-how" than for their money or legal advise. As well, Kenney (2000) also points to the fact that rather than key universities just sending patents, entrepreneurial professors, and newly minted graduates into the region, there are considerable "return flows" back to the universities, in the form of highly successful Silicon Valley entrepreneurs and professionals returning to Stanford University, for example, to teach classes and give key lectures. Thus, the creation of circular flows of knowledge and talent between different institutions substantiates and further reinforces this growing "ecology" that makes up the region. Despite these successes over the past 50 years, Silicon Valley and the greater San Francisco Bay area are beginning to show signs of an agglomeration diseconomy with astronomical housing prices, extreme economic inequality, and severe environmental damage as eloquently depicted by Walker (2018).

From a perspective of highly skilled human resources, Silicon Valley was able to generate its first wave of success in the 1950s with local talent. However, over the last three decades Silicon Valley has had to increasingly attract and retain not only talent from the rest of the U.S., but, in fact, must seek and draw from an international pool of talent for many positions in Silicon Valley's high tech industry. Importantly, Saxenian (2006) has captured much of this new dynamic by exploring how highly skilled Taiwanese, Indians, and to some degree Israelis in Silicon Valley have established themselves as professionals and entrepreneurs and their on-going relationship with their respective countries of origin. Saxenian (2006) found that these high skilled foreigners came from elite home universities such as the National Taiwan University and the Indian Institutes of Technology to the U.S. as graduate students in the technical sciences. These newcomers eventually secured a professional position in Silicon Valley during boom times, and eventually learned what Saxenian (1994) calls the Silicon Valley model, which included the loosely linked network of engineers and ventures capitalists in a seemingly nonhierarchical way. This wave of ambitious highly skilled high tech foreign students began in earnest in the late 1980s for the

Israelis and Taiwanese and into the 1990s for Indians. Saxenian (2006) found that many returned to their home country as what Saxienian describes as "new Argonauts" to take advantage of their own networks and began to establish high tech businesses and companies in Taiwan, Indian, Israel and China. Those that returned to their home countries were able to use and apply the Silicon Valley model while also knowing how to work with the institutions and the culture of their home places and language better than anyone. This, for many included in the study, resulted in successful businesses and start-up firms in their countries of origin.

However, in a study conducted in 2012 by Wadhawa et al., which examined immigrant entrepreneurship and immigrant-founded companies throughout the U.S., it was revealed that for the first time in decades, the growth rate of immigrant-founded companies in the U.S. had stagnated if not declined. The study also focused on Silicon Valley and found that 43.9% of Silicon Valley startups founded from 2005 to 2012 had at least one key founder who was an immigrant. The study stressed that this was a notable drop in immigrant-founded companies since 2005 when 52.4% of Silicon Valley startups were immigrant founded (Wadhawa et al. 2007). Nevertheless, the 2012 study noted that of the total immigrant-founded companies, 33.2% had Indian founders, which was an increase of about 7% from 2005 which was the last year of data collection from the original study. Overall, Wadhawa et al.'s 2012 study concluded that the rate of immigrant entrepreneurship has plateaued, and placed particular attention on Silicon Valley's considerable decline in numbers of immigrant founders from 2005 to 2012. The authors stressed that this raised serious questions about the U.S.'s future ability to remain economically competitive in the international market (p. 3).

11.3 A Background on Iranian Americans and Their Achievements

To provide more details on Iranian Americans for this portion of the literature review, the author draws from current research and general information produced by the Public Affairs Alliance of Iranian Americans (PAAIA) based in Washington, DC.

A 2014 report written by the (PAAIA) on Iranian Americans and their status regarding immigration and assimilation, found that 470,341 (± 21,201) individuals in the U.S. reported their first- or second-generation ancestry as Iranian, based on the U.S. Census Bureau's 2011 American Community Survey. The official PAAIA website stressed that this figure may be considered as an undercount of the Iranian American community, and a more reasonable estimate of the size of the Iranian American community ranged from 500,000 to one million in the U.S. Over 37% of Iranian Americans live in California. The greater Los Angeles area can be considered home to the largest community of Iranian Americans in the state, but there are over 27,000 Iranian Americans living in the San Francisco, Oakland, San Jose metropolitan area. The official PAAIA website goes onto stress that the Iranian American community,

similar to the population of Iran, is ethnically diverse and includes Persians, Azaris, Kurds, Lors, Gilakis, Arabs, Balochs, Armenians, Assyrians, and Turkmens. The Iranian American community is also religiously diverse, and includes Muslim, Christian, Jewish, Zoroastrian, and Baha'i faiths. Importantly, the 2014 report emphasized Iranian Americans are well-assimilated into American culture with only 21% of American Iranians engaging with mostly other Iranian Americans outside of the workplace according to the PAAIA 2013 annual Public Opinion Survey.

Based on the work of Bayor (2011), PAAIA emphasized that 55% of Iranian Americans surveyed said they had received a bachelor's degree or higher. This is higher than the age 25 or older total American population, with approximately 30% of Americans generally receiving a BA or higher. The 2014 PAAIA report notes that 50% of all employed Iranian Americans are working in what are classified as professional and managerial occupations. The report emphasizes that it is greater than any other ethnic or host group in the U.S. Iranian Americans can be considered extremely entrepreneurial with a self-employment rate of 22%, ranking Iranian Americans in the top 25 immigrant groups with the highest self-employment rate. This drive for success and entrepreneurship can been seen with Iranian Americans today holding positions as university and college deans, founders, CEOs, and senior executives at larger American companies, top scientists in the U.S. government, and entrepreneurs and executives in Silicon Valley (PAAIA 2014).

From an economic perspective, the 2014 PAAIA report found that a majority of Iranian Americans respondents, 54%, said that their annual household income was $60,000, citing the PAAIA 2013 annual Public Opinion Survey of Iranian Americans. It should be noted that only 42% of Americans as a whole earned at the same rate, according to the U.S. Census Bureau. Drawing from the same PAAIA 2013 survey, 32% of Iranian Americans who responded had a household income of $100,000 or more. Only 21% of total Americans had similar income earnings based on 2011 Census Bureau data.

Based on the above, there is great evidence about the critical importance of immigrant groups and their contributions to the economy and growth of Silicon Valley, the U.S., and the international economy. However, there still remains a gap in the literature regarding highly skilled Iranian Americans and their specific influence in Silicon Valley, and the larger U.S. economy as well as possible professional on-going relationships with Iran. Thus, key outcomes of this chapter will help to shed light on the various types of highly skilled Iranian Americans; their entrepreneurial and/or professional contributions to Silicon Valley; sources of motivation and inspirations that propel this type of achievement, and the regional conditions that may have supported this type of success. Finally, outcomes will also explore what similarities does this ethnic group have in common with other successful ethnic groups in the region, as well as unique talents and attributes that were specific to just highly skilled Iranian Americans.

11.4 Methodology

The specific methodology behind this qualitative research study focused on semi-structured in-depth interviews with highly skilled Iranian Americans residing in the greater San Francisco area and Silicon Valley, specifically. Currently, there is a lack of documentation regarding the varied experiences of Iranian Americans residing in this geographic region of the U.S. Thus, the semi-structured in-depth interview format was chosen as the major approach to gathering information due to the lack of consistent quantitative data on Iranian Americans. As well, the open-ended nature of the semi-structured interview allowed interviewees to add other dimensions to the interview that could not be captured by the original questions developed by the researcher. "Highly skilled" Iranian Americans may be defined as those households that have a base salary of $120,000 or higher a year, or a net worth of $1,000,000 or higher.

Subjects for the study could be considered part of an expert panel and were selected through purposive sampling. The choice of purposive sampling as a technique allowed the study to seek out desirable traits and elements that may be attributed to high performing Iranian Americans in Silicon Valley, and helped to facilitate investigation and subsequent analysis. Thus, subjects were selected through Iranian American professional associations, Silicon Valley/South Bay venture capital professional associations, and general Silicon Valley/South Bay professional associations. Each possible participant was contacted in advanced and the researcher explained the merits of participating in the study, and assured confidentiality and so on. Eight to ten questions were asked of each study participant and were directed at the following themes: the various types of highly skilled Iranian Americans; their entrepreneurial and/or professional contributions to Silicon Valley; sources of motivation and inspirations that propel this type of achievement (notions of seeking greatness); backgrounds and sources of learning and education; notions of self-identity; notions of family and faith; notions of heritage; and notions of possible futures. The questions developed from these themes "teased out" the key issues and hypotheses that emerged from the study. All interviews were transcribed and analyzed using a thematic approach. Interviewees were subject to a follow-up interview if more information was needed.

11.5 Findings

Drawing from 20 semi-structured interviews as a primary methodology, the study worked to uncover the various types of highly skilled Iranian Americans and their entrepreneurial and/or professional contributions to Silicon Valley through two primary lenses; the first focuses on elements of self-motivation; the second includes a better understanding of regional conditions that may have supported such success.

11.6 Migrating and Establishing Roots in Silicon Valley and the Greater San Francisco Bay Area

Study participants could be placed into three temporal groups: (1) Those that came to the U.S. before the Iranian Revolution of 1978–79 to study at an American university (9 subjects interviewed); (2) Those that immigrated to the U.S. after the Iranian Revolution of 1978–79 as a political refugee or as a family member (6 subjects interviewed) and; (3) Those that could be considered a second generation Iranian American—an interviewee born in the U.S. to at least one Iranian parent (5 subjects interviewed).

Many interviewees came to the U.S. to study temporarily with the intension of eventually returning to Iran. However, for many, employment opportunities in the U.S. enticed these Iranian students to remain, even after they graduated from an American university. However, immediately after the Iranian Revolution of 1978–79, many of these "temporary" Iranian students chose to remain in the U.S. for political reasons, and became permanent residents and eventual citizens since, for many, the Iran they knew no longer existed.

For those that sought advanced educational training in the U.S., many said that they applied to the very best schools, but they were realistic about getting in. So they also applied to state universities, and universities that already had a history of accepting Iranian students. One interviewee elaborated,

Well, state universities in Oklahoma and Texas had a good acceptance rate when it came to Iranians, so I applied there. I would have rather have applied to schools in California (and Harvard!) but I had to be realistic. I had to get accepted to an American school.

Others chose the option of immigrating to the U.S. as a family member, and then sought admission to a U.S. university. For these interviewees, they noted that it was easier and considerably less expensive than applying as a foreign student. So, many wound up attending the public university in the state that their sponsoring family member resided in.

One interviewee noted,

Yeah, I found myself living with my aunt in Iowa. So, I wound up attending Iowa State University.

Another explained,

I came here [to Silicon Valley] because my mom was living here….Yes, I always say if she was living in Oklahoma I would be living with cows on a ranch or something like that.

Based on the above, a majority of those interviewed who immigrated to the U.S. as a family member could be considered part of a family chain migration, namely settling into parts of the U.S. that already had existing family members. Importantly, unlike other highly skilled migrants, the majority of Iranian Americans interviewed were not hired from Iran (or from Europe) by firms based in Silicon Valley for

employment. The majority of these Iranian Americans applied as a domestic professional applicant for a position, and had usually graduated from (or spent considerable time at) an American university. Importantly, a majority of these Iranian Americans were eventually successful in securing a position in Silicon Valley, and, hence, were relocated to Silicon Valley as part of the firm's hiring package. One interviewee explained how he eventually established himself in Silicon Valley,

I was working for a firm in the Midwest, they did some reorganizations within the firm, and transferred me out here as one of their 'tech guys'. I never thought I would wind up in Silicon Valley, but here I am. I have had several other jobs and positions since then. I am now an entrepreneur. I wonder sometimes if I could do what I do if I were still in the Chicago area. I do not know. It is different here. Not as helpful or "nice" as the Midwest, but there is an urgency or anxiety that pressures you to do things before someone else does it.

11.7 Elements of a High Achieving Group

In regards to notions of entrepreneurial and material success, study participants were placed into three groups as depicted in Table 11.1:

1. Super Elites—These interview subjects were considered titans of industry. They either started a very successful firm, and/or was on the board of directors of a large company, or was a venture capitalist. All interviewed had a net worth over $5 million dollars. All Super Elites emigrated to the U.S. from Iran as graduate students in the 1960s to the late 1970s.
2. Elites—These interview subjects made a mid-range six figure salary or higher, and they were either a senior executive of a large company or a founder of a small

Table 11.1 Categories and characteristics of high achieving Iranian Americans

Super elite (3 subjects interviewed)	Elite (9 subjects interviewed)	Professional (8 subjects interviewed)
"Titans of industry" • Net worth over 5 million dollars • Founder of large company • Board of directors of large companies • Venture capitalist • High tech, auto, and real estate • Ages ranged late 50s–60s • First generation immigrant	"Leaders of industry" • Six figure salary and above • Senior executive of large company • Founder of small/medium/start-up firm in high tech or biotech • Ages ranged from late 40s–60s • First generation immigrant and 1.5 generation	"Professional class" • Low to medium six figure salary • Doctor, surgeon, lawyer, professor, engineer • Active and well regarding in profession • Volunteer in community events • Ages ranged from 30s–60s • 1.5 generation and second generation

Source Interview data from study

or medium sized start-up firm in high tech or biotech. Elites interviewed either emigrated from Iran originally as a graduate student for purposes of studying in the U.S. Or, the person interviewed immigrated to the U.S. after 1979 as a child or adolescent with their parents. These Iranian Americans could be considered the 1.5 generation.

3. Professionals—These interview subjects made a low to medium six figure salary, and they fell into a professional classification of either a doctor, surgeon, lawyer, professor, or engineer. All subjects in this category were active and well regarded in their profession, as depicted by acknowledgements in regional trade journals and/or as the recipients of national and international awards. All professionals noted that they volunteered in some sort of community or societal event throughout the greater San Francisco Bay area. All professionals interviewed could be considered the 1.5 generation or second generation. Thus, they immigrated to the U.S. with their parents after 1979, or they were born in the U.S. to at least one Iranian parent.

The study revealed that all people interviewed were highly educated, and at least had an undergraduate university degree if not a master's degree. A vast majority were educated in Iran or Europe at top high schools or universities before immigrating to the U.S. Before the Iranian Revolution of 1978–79, a considerable number of those interviewed came to the U.S. as university students and majored in some type of engineering degree. Many noted that the U.S. and Iran had a good relationship at the time, and so there was a wave of young male students, for the most part, that chose to complete their university studies in the U.S. As well, during the 1960s and 1970s, there was a considerable amount of American influence within the Iranian educational system, so many of those interviewed took classes from American professors that were on leave from elite American universities. Thus, many mentioned that the transition to the educational system in the U.S. was not much of a culture shock due to their learning experiences with American professors who taught at their high schools or universities in Iran.

As well, all people interviewed had family who were in high political positions before the Iranian Revolution of 1978–79 and/or had parents who were accomplished professionals (doctors, lawyers, surgeons, professors and so on) that required advanced university degrees and years of learning. Thus, 14 noted that it was expected that they would earn at least an undergraduate degree and secure a good profession. Many stressed that there was no choice but to accomplish this. Regarding the notion of "seeking greatness", those that were considered a "Super Elite" or an "Elite" (see Table 11.1) rose into their particular position by hard work, but also being able to visualize achieving that particular position. Three "elites" noted that in Iran, one now has to have connections or direct family relations to achieve a senior executive position in a firm, or to establish a firm. However, in the U.S. they noted that it was relatively easy to achieve professional "greatness" without a lot of impediments and obstacles, which was the case in Iran.

One elite senior executive explained,

In Iran, it is very difficult to get ahead now. If you do not have the right connections, you will never get to a particular position. Whereas here, it is relatively easy. If you have the right education, training, and you perform well, you will be noticed. There is so much opportunity here, people want the very best performers, regardless of your background.

One super elite noted that even though things move relatively quickly in Silicon Valley, it was also very important to be able to wait and have patience. He noted that he was careful not to burn out and let Silicon Valley "eat him", like was the case with so many of his professional colleagues throughout his career. He explained,

Everyone moves very fast here, and if you miss an opportunity, it is seen as the end of the world. I took a different approach. I waited. I watched. I learned how things worked, and what seemed like perfect opportunities turned out many times to be great failures. When I was younger, I worked for a firm with ambitious high tech types…Many of them left the firm for what was seen as a better high tech start-up that was supposed to offer aggressive professional upward mobility, pay, and, of course, stock options…After a few years, it didn't pan out, and many of them lost their positions during a downturn in the high tech industry… Even though there is a lot of talk in the Valley about, "It's OK to fail," it can be very hard on people, and many do not get back up quickly and sometimes even at all. I am not saying that I have not had setbacks, disappointments, and even failures, but I can describe myself as being more cautious, and I have the ability to wait. So, when an opportunity came up to start my own company in my 40s, I finally took it. I was set financially already… I also had enough of a network in the Valley, so I could step back into an executive position if my company did not do well. Some might say this is too cautious, but it worked well for me.

11.8 Silicon Valley and the Paradox of Plenty

Although Silicon Valley is seen as the epicenter of the global technology era and a haven of well-paid employment for highly skilled professionals, five of the subjects interviewed for this study explained that they applied for jobs below their professional abilities and educational training initially. They stressed that although they knew they were qualified for mid-level professional employment at a number of high tech firms in Silicon Valley, they applied for entry-level professional positions and technical work that did not mandate a university degree. They explained that they wanted to get their "foot in the door" with a firm in Silicon Valley, and if they applied for a position at a lower level than what they were qualified for, they would stand a much greater chance at securing that position, since one of the goal of establishing oneself professionally in the U.S. was to get "Silicon Valley" work experience on the resume. There was also concern that if they put in for a mid-level professional job that they were qualified for, an applicant who was not Iranian would be hired over the interview subject's application. Thus, by applying for an entry-level professional

position or a technical job, the subjects found they would have a much greater chance of securing employment, and then they could also rise within the firm.

One founder of a medium sized high tech company explained,

I had been a managing director in Iran for 1 year at an engineering high tech firm. However, it did not count here in the U.S. and that I had an MBA from a business school in Iran that was affiliated with Harvard, also did not count…I applied to different jobs and I got rejection after rejection. Finally, I went to a resume consultant…and the guy said, "Hey, we don't recognize the degree from other places…Downgrade yourself to a high school diploma, get a job, and if you are that good, if you are a real MBA, you are going to move up."… He was perfectly right! I entered a company with a high school diploma, and I ended up moving up like a rocket. First time that my boss was thinking that I may have a degree was when I was working on a difficult project… He said, "Come on, tell me, do you have an advance college degree?" I said, "Yeah, I have a bachelor degree…" Three quarters of a month later…and the human resource manager said, "Are you sure you don't have a master degree?" and I said, "Yeah, I have a master degree. I got an MBA." She then said, "Come on, if you have a Ph.D., you have to tell me right now. If you tell me later, I am going to fire you because of lying on the application." So that was just a joke that she would fire me.

Although some of the interviewees had considerable success eventually securing employment and advancing with existing firms in Silicon Valley, other Iranians Americans interviewed for this study with advanced professional degrees had a very difficult, if not impossible, time securing employment with existing professional establishments in the greater San Francisco bay area. One professional explained that even though she had a law degree from a good American university and that she passed the Bar in California, she could not get a job at a law firm in the South Bay, or Silicon Valley, area. Thus, she had to resort to professional entrepreneurialism by starting up here own law firm. She explained,

Well, I couldn't get a job at a law firm, despite my qualifications. I don't know if it was that Silicon Valley Boy's Club thing, or that fact that it was "closed to Iranians", but I could not get a job with a law firm. So I opened my own firm. What they [law firms] would charge $2000 for, I would charge $200 for. I am very good, and did the same quality of work, if not better. I developed a reputation for it [among immigrants]. Many people came to me needing my services, and I helped them. I now have a very successful practice. I still charge less than what the big firms charge, but I can keep a good living, and I don't need to work at a large practice. I have done it on my own…..

As well, for the Iranian Americans that did secure professional employment with a high tech firm, or a hospital/clinic if they were a medical doctor, many were motivated to remain entrepreneurial on the side. Four explained that they would go home and work on an idea or technology after dinner or on the weekends. They noted that they had a professional income, but they wanted more out of their professional lives. Thus, they would develop independently a particular idea into a prototype that

possibly could be patented, trademarked, or copyrighted. Some noted that they were concerned that their existing place of employment would not take their creation seriously, or that they would be seen as not focusing on the particular position that they were hired for. Others were concerned that the firm would take the burgeoning idea that the interview subject was working on and claim it as the firm's property, and only give the interviewee a small amount of rights to it. Thus, many used their own sources of capital and income to support their initial entrepreneurial start-up activities, which included developing prototypes and the securing of patents, copyrights, and trademarks before approaching venture capital firms or a particular firm that might be interested in partnering (equally) with the particular subjects interviewed. In regards to raising independent capital, one particular benefit of living in Silicon Valley was the escalating value of real estate. Thus, seven of the study participants found investments in real estate to be more financially promising than as a professional salaried employee. Nevertheless, these people maintained their professional jobs (usually in the high technology and biotechnology sectors), but also pursued their own interests in real estate as well as entrepreneurial activities in high tech ventures. Interestingly, of those that were entrepreneurial in nature, three were able to act as "angel investors" to their own idea and prototypes rather than having to rely on the initial terms and conditions of outside investors. The one super elite venture capitalist interviewed for the study noted that he could not find funding in Silicon Valley for a prototype that he wanted to develop when he was younger. Thus, he financed his project on his own initially and became very successful with it. He was now a highly regarded venture capitalist/angel. He noted that for many years it was hard to find funding for people in Silicon Valley who were not a particular "type". He elaborated,

For many years, it was very much a "club" and if you did not have the right background or gender, it was hard to even get a VC to set up a meeting with you in the Valley. This is changing now, slowly. There are many people here, from many backgrounds. A number of them have excellent ideas. You are leaving money on the table, as they say, if you close people off based on background or gender. I try to be as open minded as I can. I don't necessarily favor Iranians or Iranian Americans, but I understand them based on my background. This is something that was lacking in the past.

Sense of Family, Faith, or Self: What were the critical elements needed to achieve success?

Despite the strong bonds to family, faith, and culture that dominate much of the literature on Iranian identity, all interviewees emphasized that it was their own personal individual selves that accomplished success in the U.S. When probed about parental motivation and family funding for education, real estate, and entrepreneurial activities, it was acknowledged that there were contributions, but at the end of the day, it was the particular individual (interview subject) that created these achievements. Many also noted that they were not particularly religious, although the majority identified most strongly with the Muslim or Baha'i faiths. As well, there was also a sense of loss and lamenting for careers and life experiences that were sacrificed to achieve

what these Iranian Americans achieved. Many talked about wanting to become artists rather than doctors or lawyers. Others talked about forgoing social events when they were university students and international travel opportunities, like other students at the time, so that they could study, with the goal of doing well on the next exam.

One engineer noted the importance of relying on himself,

I did this. I got here. I cannot say my parents did this or my family. It was me. I do not believe in God. I do not believe in Allah. I do not believe in Jesus Christ. I only believe in myself. I am responsible for my success and my failure.

In thinking about the next generation, all discussed the importance of being able to give their children a better chance in the U.S. as a result of their individual success. Although many of those interviewed claimed that their children seemed to be American, rather than Persian, in their identity, interviewees noted that they wanted their children to be as successful as they were. However, the benefit of being "American" for their children was the hope that they would explore what interested them most, rather than what would make them lots of money.

One elite high tech executive explained,

Yes, sometimes I think I could have been a great artist, but my mother would not allow me to focus on art in school. She always said I had to be an engineer. So, I took many many classes in mathematics and physics. Once you take so many of these classes, and you eventually become an engineer, you lose sight and forget what really interested you when you were younger…I have a daughter in college right now. She really wanted to be an artist when she was younger, so I encouraged her to be creative. We always allowed her to paint at home, and she went to many summer camps around the South Bay so that she could really develop her skills. She is now studying art at a very good private university in Southern California. I am happy to do this for her. I do not care about the cost. I want her to do what makes her happy.

11.9 Next Steps

Overall, the interviewees were grateful for the American system and its relative opportunity. Unlike many other immigrant groups that had circular migrations when it came to business opportunities between the U.S. and the immigrant's home country, the opportunity to do something similar in Iran was relatively dormant due to the stalled political relations between the U.S. and Iran for over the past forty years. However, during the time of the interviews, some interviewees noted that things were changing for the better in Iran, and stressed that relations between the U.S. and Iran under then U.S. President Obama had improved. Thus, two interviewees had recent aspirations to return to Iran to set up business opportunities between Iran and the U.S. Despite all the impressive accomplishments, most interviewees did not find that they had achieved "greatness" yet, and listed off between two to five things that they still wanted to accomplish in their lifetimes.

11.10 Discussion

Similar to Lee and Zhou's (2015) findings, many of these Iranian Americans were self-selected from high achieving families and it could be argued that much of the success and achievement demonstrated by these Iranian Americans could be attributed to their "socio economic class" rather than the specific attributes of a particular ethnic group. As well, the fact that the U.S. had long established relations with Iran from the early 1960s until 1979 proved advantageous for the first wave of Iranians who came to study in the U.S. as advanced university students. The transition to understanding and learning in an American university was minimal for many of these Iranians who came to study in the U.S. during the 1960s through the late 1970s. Thus, the possible learning and success impediment of culture shock when it came to studying in the U.S. was not an issue for most interviewed. However, they were much more pragmatic compared to other immigrant groups when it came to securing admission into U.S. universities. Unlike what Lee and Zhou (2015) found with Asian immigrants in California, Iranian Americans were less concerned about prestige and reputation of a university, and more about the odds of being able to be admitted, and whether or not the university was comfortable with Iranians. The Iranian Americans interviewed noted it was much more important to demonstrate that they had been acculturated in the U.S. through an American university education, rather than the prestige of a degree from an elite American university. They found this in the long-run made employers most comfortable with their job application. (See Table 11.2 for a comparison of Iranian Americans and other immigrants group regarding the key attributes of self-motivation and regional conditions that supported these groups in professional achievement and success.)

Although a majority of Iranian Americans interviewed could be considered transnational by the time they reached Silicon Valley and the greater San Francisco Bay area, many interviewed were not part of a "foreign talent pool," as was the case with a number of Indians, Chinese, Israelis, and Taiwanese, as discussed by Saxenian (2006). Importantly, many Iranian Americans interviewed had secured U.S. citizenship or permanent residency and had some professional American work experience by the time they located to Silicon Valley or the greater San Francisco Bay area, and were considered "domestic talent." This worked in the Iranian Americans' favor when securing professional positions in the greater San Francisco Bay area. Unlike other newcomer or immigrant groups, these Iranian Americans did not have to go through the cumbersome and time-consuming process of securing a work visa, and could demonstrate to a potential employer that they were already acculturated to working in the U.S. As well, many firms prefer to hire a domestic applicant over a foreign applicant due to the expensive and time-consuming nature of securing a work visa for the employee as discussed by Richardson (2016). Thus, Iranian Americans demonstrated a certain advantage over other newcomer or immigrant groups in this area.

Even though these Iranian Americans may have had an advantage as being considered "domestic talent", they frequently downplayed their educational accomplishments and degrees in order to become established with a Silicon Valley firm. Some

noted that they were worried about being seen as a professional threat to others in the workplace, coupled with the fact that they may be seen as "Iranian" and, more recently, "Muslim". Thus, a number of subjects interviewed did not want to draw attention to themselves or be seen as "overstepping" another applicant or employee. Thus, interview subjects frequently made the decision to undersell themselves to get the position, and were then able to work their way into the desired profession over time. This is perhaps in contrast to what Chua and Rubenfeld (2014) found with notions of group superiority for various ethnic and faith based groupings in American society, and what Lee and Zhou (2015) found with the expectation of securing a certain type of highly regarded profession in a sequential ordering for Asian Americans. Since the Iranian Revolution of 1978–79 and the post 9/11 Muslim backlash, Iranian Americans perhaps are subjected to more discrimination in the work place and in hiring practices than other immigrant groups, as discussed by Bozorgmehr (2012). Thus, unlike other immigrant groups, Iranian Americans have found that keeping a low profile and underselling oneself in the workplace may prove to be much more beneficial over time.

Despite the strong entrepreneurial nature of over half the subjects interviewed, many of them had to be their own angel when seeking financing to initially launch an idea or make a prototype. Many noted that they did not think that they were discriminated against by venture capital firms or angels in Silicon Valley, as perhaps may have been an issue when seeking professional work. They noted that this type of funding was hard to come by for anyone. They did stress that rising price of real estate in Silicon Valley, and subsequently their own real estate holdings, greatly helped with financing their initial ventures independently. Finally, unlike the highly skilled Taiwanese, Indians, and Israelis who spent some time in Silicon Valley but eventually returned to their home country to start up successful high tech firms supported by capital stemming from investors and extended family based in the home country (Saxenian 2006), the Iranian Americans, for the most part, were unable to return to their home country of Iran. Thus, for those interviewed, they stress they had no choice but to start a life and career in the U.S., which was their new home.

Finally, many stressed the fact that they sacrificed much in their life to achieve their professional success. This perhaps confirms what Chua and Rubenfeld (2014) found with the notion of impulse control, or delayed satisfaction, which was a key component found in immigrant and faith based groups that were deemed as successful in American society. Overall, many Iranian Americans interviewed were not sure that they would forgo all the things they gave up in life to get to where they were, and therefore, wanted to make sure their children had a much more well-rounded life experience. Once again, this is counter to other high achieving immigrant groups such as Asian Americans as described by Lee and Zhou (2015), Chua and Rubenfeld (2014) and Waters (2003), who found that there was considerable pressure on the 1.5 and second generation of Asian immigrant parents to continue to achieve a certain level of professional status and accomplishment, thereby reproducing the family's cultural capital.

11.11 Key Attributes that Contributed to Professional Achievement and Success in Select Immigrant Groups

See Table 11.2

Table 11.2 Key Attribute Iranian American Other Immigrant Group(s)

Talent and achievement (Self-motivation)	• Self-selecting from elite families • Most concerned about being admitted to any American university and also a university that is familiar with Iranians • Played down achievements when seeking U.S. employment • Seen as "Iranian" and "Muslim" led to concerns about hindering professional advancement	• Self-selecting from elite families • Most concerned about prestige and reputation of American university (Asian Americans especially) • Notions of group superiority and expectation of sequential achievement • Positive "Success Framework" helped further achievement (Asian Americans especially)
Impulse control/delayed satisfaction (Self-motivation)	• Sacrificed much in life for success • Encouraged their children to pursue their own interests rather than a high paying profession	• Expectation of 1.5 generation and second generation to achieve a certain level of professional status and accomplishment (Asian Americans especially)
Entrepreneurial support (Self-motivation and regional condition)	• Self-financed owned venture, initially • Relied on personal Silicon Valley real estate holdings and stock market investments	• Relied on home country investors and extended family to launch high tech firm in home country (Indians, Chinese, Israelis, and Taiwanese)
U.S. Work Status (Regional condition)	• Domestic applicant for U.S. job (U.S. permanent resident "green card holder" or U.S. citizen)	• Usually needed to secure a foreign work visa for U.S. employment (Indians, Chinese, Israelis, and Taiwanese)
New citizen or New argonaut—who stays in the U.S. and who returns to the country of origin? (Regional condition)	• Iranian Americans had little choice but to start a new life and career in the U.S. after 1979	• Other immigrant groups spent time in U.S. as students and/or young professionals and eventually returned to country of origin to start a successful firm (Indians, Chinese, Israelis, and Taiwanese)

11.12 Conclusion

This chapter has attempted to shed light on an elusive, yet important, group of entrepreneurial Americans, namely highly skilled Iranian Americans. Similar to Lee and Zhou's (2015) findings, many of the Iranian Americans interviewed were from high achieving families and perhaps much of the success and achievement demonstrated could be attributed to their "socio economic class" rather than the specific attributes of a particular ethnic group. Many interviewed were educated and skilled in high technology and the sciences, and therefore, gravitated to the opportunities of Silicon Valley from the 1970s onward. The chapter revealed that Iranian Americans proved to have an advantage of other immigrant groups when seeking professional employment in Silicon Valley since many of them had acquired U.S. citizenship or permanent residency, and were considered "domestic applicants" rather than "foreign applicants." Despite the seemingly fast and immediate culture of Silicon Valley, many Iranian Americans approached career and entrepreneurial opportunities with notions of waiting and patience, which seemed to pay off in the long run for those interviewed. For those subjects working in high technology, some found investments in real estate to be more financially promising than as a professional salaried employee. Nevertheless, study participants maintained their professional jobs in the high technology sector, but also pursued their own interests in real estate as well as entrepreneurial high tech ventures. These investments in the greater San Francisco Bay area and Silicon Valley real estate and the stock market, generally, helped to finance initial entrepreneurial activities. Since for several interviewed, they were unable to secure venture capital funding despite being located in Silicon Valley. Overall, this study has helped to demonstrate that Iranian Americas have made serious and important contributions to the growth and success of what is known as Silicon Valley and the great San Francisco Bay area. However, there remains a need for further study of this high achieving and accomplished group of Iranian Americans, and how they might continue to contribute to American society broadly and the U.S. economy generally.

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Part V
Perspectives from Emerging and Developing Economies

Chapter 12
Greening Energy Provision in Urban Pakistan

Sardar Mohazzam, Ayesha Ali and Saleem H. Ali

Abstract Entrepreneurship for green energy provision in Pakistan is direly needed to ensure universal access to energy, diffusion of renewable energy, and improving energy efficiency. Pakistan's per capita electricity consumption is less than 467 kWh, which is very low compared to other countries in the region. Employing the green technologies is already creating new markets and job opportunities. In most of the developing countries in the world, the green technologies adoption has been slow. While governments have shown commitment to integrating these technologies into the economy, we have not seen a visible shift in the prevalence of green technologies in most of the developing countries. As with any new technology, it is the private sector and the entrepreneur that play a key role in commercializing technological inventions and diffusing them. In this chapter, we assessed the effectiveness of macro factors such as institutions, policies, and regulations, and micro factors such as access to finance, inputs, and infrastructure, which affect the private sector's decision to invest in renewable and green technologies for providing energy. This chapter concludes that current institutions and policies have focused on grid-scale investments in renewable energy, which were not able to attract substantial capital. We proposed the importance of integrated planning coupled with decentralization of policy implementation to the local city or district level, a stable policy and regulatory framework

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that would mitigate investor risk. We also emphasize that private-sector entrepreneurship will thrive with the provision of enabling goods such as smart infrastructure, financing, and addressing gaps in the research and development ecosystem.

Keywords Green technologies · Pakistan · Regulatory · Electricity

12.1 Introduction

Greening the provision of energy is inevitable without promoting effective entrepreneurship in Pakistan. The challenges of rising climate change concerns, unsustainability of conventional energy sources, as well as the availability of renewable energy sources and potential for energy efficiency and conservation provide opportunities for entrepreneurs to design innovative solutions for greening energy provision in Pakistan. Analysis of the government policies and regulations[1] show that considerable policy framework has been put in place but the initiatives from the entrepreneurs and the private sector in response to these policies are sluggish. However, the missing enablers for entrepreneurs such as financing mechanism (including micro-financing), institutional support, and subsidies for conventional energy sectors are some of the major bottlenecks.

Many countries have turned to clean and green energy technologies as a means of adapting to and mitigating the effect of climate change through effectively mobilizing their entrepreneurs. While the demand for green technologies has increased, as they promise a viable alternative to carbon-emitting fossil fuels, the supply of green technologies has also gone up due to falling costs. There has been broad international and national commitment and policy support to explore the potential and development of green technologies.

Green technologies minimize any external cost on the environment generated during its production process and as part of its supply chain. They also include those technologies which are designed to mitigate and reduce the effects of human activity on the environment. Green technologies include energy generated from renewable sources such as solar panels, wind turbines, biomass plants; energy saved through greater efficiency and conservation; technologies that facilitate sustainable use of economic resources such as food, water, air, other materials; as well as environmentally friendly products.

Anthropogenic emissions mainly due to economic activities are the primary cause of global emissions.[2] Energy consumption from fossil fuels is among the major source for these emissions (IPCC 2018). Employing the green technologies is creating new markets and job opportunities. Green technologies are means to achieve the end

[1] World Bank, 2016 "Regulatory Indicators for Sustainable Energy", http://www.worldbank.org/en/topic/energy/publication/rise---regulatory-indicators-for-sustainable-energy (Accessed online September, 20, 2018).

[2] Source: http://www.ipcc.ch/report/sr15/.

goal of emission reduction without harming the economy. However, in most of the developing world, the green technologies adoption has been slow. While governments have shown commitment to integrating these technologies into the economy, we have not seen a visible shift in the prevalence of green technologies in developing countries. As with any new technology, it is the private sector and the entrepreneur that play a key role in commercializing technological inventions and diffusing them (Roger 2010).[3] Thus far, the private sector's role in propagating and commercializing green technologies in the developing world has been limited.

Using Pakistan's energy sector as a case study, we examine the macro and micro factors that will open up and support private-sector participation in green technologies in the area of electricity generation and provision. Pakistan is among the top ten countries most vulnerable to the negative impact of climate change (Global Climate Risk Index 2018). It has the highest rate of urbanization in South Asia and experiences a very long and hot summer season. The country has faced electricity outages lasting 12–16 h per day (Economic Survey of Pakistan 2017) and urban areas have suffered an economically due loss to the businesses and unemployment. Households and businesses in urban areas are using expensive fossil fuel based generators and rely on backup storage devices to tide over the frequent breakdown in electricity supply. At the same time, the cost of generating electricity from green technologies such as solar panels has come down rapidly and is now comparable to the cost of conventional fossil fuel based technologies. The government has recently announced a regulatory framework for private electricity generation and resale to the grid (Net-Metering). However, distributed generation through renewable technologies has not achieved wide spread penetration in urban areas as yet (AEDB 2017).

In this context, we assess the effectiveness of macro factors such as institutions, policies, and regulations, and micro factors such as access to finance, inputs, and infrastructure, which affect the private sector's decision to invest in renewable and green technologies for providing energy in Pakistan. We find that current institutions and policies have focused on grid-scale investments in renewable energy, which were not able to attract substantial capital. We highlight the importance of integrated planning coupled with decentralization of policy implementation to the local city or district level, a stable policy and regulatory framework that would mitigate investor risk. We also emphasize that private-sector entrepreneurship will thrive with the provision of enabling goods such as smart infrastructure, financing, and addressing gaps in the research and development ecosystem.

The remaining chapter is organized as follows. In the next section, we discuss the urbanization pattern, the status of the energy sector with a focus on the nascent green energy sector in Pakistan. Next, we present our analytical framework and then discuss the factors that shape the participation of the private sector in the provision of green energy from a macro and micro perspective. We assess the extent to which these factors have been successful in spurring private-sector participation and

[3]Entrepreneurship is a process by which individual either on their own or inside organization pursue opportunities without regards to the resource they currently control. "Opportunity" is defined here as a "future situation which is deemed desirable and feasible."

entrepreneurship in the deployment of green technologies for meeting the energy needs. We conclude by proposing a way forward for accelerating the adoption of green technologies with the private sector playing a key role supported by enabling public policies, institutions, regulations, and public goods that increase the ease of doing business.

12.2 The Economy and Green Technologies in Pakistan

12.2.1 Urbanization and Population Distribution

Pakistan is the world's sixth most populous country with a population of 207.07 million.[4] It is also the most urbanized country in South Asia, having recorded a growth rate of 2.7% in the urban population between 1998 and 2017. Today 36.5% of the population (75.58 million) resides in urban areas (See Table 12.1). About 54% of the urban population lives in ten cities, having a population exceeding one million each (Pakistan Bureau of Statistics 2017) (Fig. 12.1).

Pakistan is going through a rapid increase in urbanization caused by population growth, urban migration, and Internally Displaced Person (IDPs) and refugees' migration. This has led to an expansion of under-resourced urban and peri-urban settlements, causing unprecedented levels of economic, spatial, social, and infrastructural challenges, and climate change impacts. Some of the key challenges of high urbanization include; "eroding livability, aggravating urban deficit, productivity, and efficiency of urban areas and degrading urban ecology" (Ministry of Climate Change 2015). Therefore, Pakistan Vision 2025 set the policy guidelines to address the issue of urbanization while developing "Center for Rural Economy".[5] This vision incorporates the national and provincial policies and strategies. The government is also taking measures to address historic economic disparities in less developed areas.[6] It has initiated the development of intermediate cities and towns in all provinces and has prepared Master Plans to improve urban infrastructure network, services, and utilities to address the impact of rapid urbanization (Government of Pakistan 2017a, b, c, and d). Moreover, 68.4% of Pakistan's population is below the age of 30 years, which provides the opportunity to reap the benefits of "Demographic Dividend" till the year 2045.[7] The urbanization policies must cater to the needs of a large young population.[8]

[4]Pakistan Bureau of Statistics, Government of Pakistan. National Census, 2017.

[5]Planning Commission of Pakistan, source: https://www.pc.gov.pk/web/initiate/rural Date Taken August 15, 2018.

[6]Source: https://www.dawn.com/news/1370584, Date Taken August 18, 2018.

[7]UN-Habitat: Pakistan National Report 2015.

[8]Government of Pakistan (2017); Pakistan in the 21st Century, Vision 2030; Planning Commission, Islamabad, Page 28.

Table 12.1 Population census 2017

Administrative units	Households (million)	Population—2017				1998–2017 average annual growth rate
		Male (million)	Female (million)	Transgender	Total Population (million)	
Pakistan	32.20	106.45	101.32	10.418	207.77	2.40
Rural	20.01	67.30	64.89	67.67	132.19	2.23
Urban	12.19	39.15	36.43	76.51	75.58	2.70

Source Pakistan Bureau of Statistics

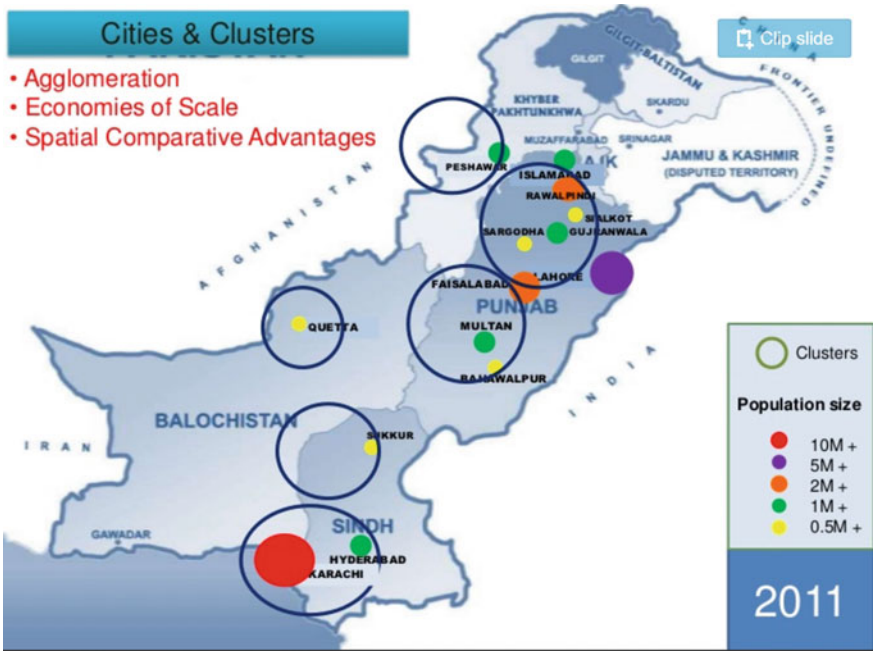

Fig. 12.1 *Source* National status of peri-urbanization in Pakistan

12.2.2 Overview of the Economy

Pakistan's economic history is characterized by recurring cycles of high growth and subsequent stagflation, which have coincided with political regime changes. Since 2008–09, when the growth rate dipped to 0.4%, the economy of Pakistan has regained a slow but steady growth path, as GDP growth reached to 5.28% in 2016–17. It is the highest in 10 years, on the back of rebound growth in agriculture. Services sector continues to be the largest sector accounting for 60% of GDP, followed by industrial sector which accounts for 21% of the GDP and agriculture which accounts for 19.2% of the GDP. Agriculture and manufacturing sector employ 43 and 15% of the labor force in Pakistan.

Source Economic Survey of Pakistan- 2017

12.2.3 Energy Sector

In 2017, Pakistan's primary energy supply was 80 million tons of oil equivalent. The primary energy supply mix has increased by 7.6%. Pakistan energy year book 2017 reported that the share of oil and gas is 34.4% and 37.9%, respectively, followed by 12.7% from hydroelectricity and 8.1% from coal (See Table 12.2). The share of renewable energy (including solar and wind but not biomass) in primary energy is 0.8%. The share of off-grid electricity from renewable sources has not been reported officially.

Table 12.2 Pakistan's solar sector jobs by market segment and value chain

	Residential	Commercial	Utility-scale	All
Installed capacity 2014/2015 (MW)	300	200	100	600
Value chain activities	Jobs (thousands)[a]			
Manufacturing[b]	0.4	0.2	0.1	0.6
Supply chain	1.0	0.5	0.1	1.6
Installations	4.0	1.6	0.3	5.9
Design	0.0	0.4	0.0	0.4
Business development	4.0			4.0
Project development		1.2	0.0	1.2
O&M	1.0	0.6	0.2	1.7
Total employment	10.4	4.5	0.6	15.5

Source Alternative Energy Development Board 2016
[a]Based on employment factors defined in Engelmeier et al.
[b]Assuming 20% local manufacturing primarily in structures and electrical equipment

The installed power capacity of the country is dominated by thermal power, as it constitutes over 60% of the total installed capacity. In contrast, the share of renewable (solar, wind, biomass) is just 4.2%, as it has only been a couple of years since investment by private and public sectors has opened-up in the renewable energy market in Pakistan.

Primary energy supply of 2017		
	Unit TOE	% Share
Source	2016–17	
Oil	27,366,526	34.4
Gas	30,163,334	37.9
LNG import	4,455,734	5.6
LPG	1008,673	1.3
Coal	6,482,401	8.1
Hydro electricity	7,681,699	9.7
Nuclear electricity	1,670,560	2.1
Renewable electricity	636,825	0.8
Imported electricity	118,480	0.1
Total	79,584,246	100

Source Pakistan Energy Year Book 2017

Overall, these supplies grew from 58.06 Million Tonnes of Oil Equivalent (MTOE) in Fiscal Year (FY) 2006–80 MTOE in FY 2017. The figures for biomass are is not officially estimated and published by the government.[9]

Final Energy Consumption 2017		
Source	Unit TOE	%Share
Oil	17,904,977	34.4
Gas	17,031,100	37.9
Coal	6,097,816	8.1
Electricity	7,779,939	20.8
LPG	1,308,471	1.3
Total	50,122,304	100

Source Pakistan Energy Year Book 2017

[9]The International Renewable Energy Agency Report 2018 "Renewable Readiness Assessment Pakistan".

Rising income and urbanization of Pakistani households has meant an ever-increasing demand for electricity. Adoption of electricity-using appliances by urban middle class has added a substantial load to the electricity grid. It is estimated that for 1% of GDP growth requires an increase of 1.25% in electricity supply.[10] Therefore meeting the increasing demand for electricity needs huge investment, and there is a market and opportunity for entrepreneurs to take benefit from this opportunity. Despite these trends, the power sector has suffered from poor planning for enhancing the generation, transmission and distribution capacity to ensure the provision of reliable electricity.[11]

Electricity prices for end users especially households have been subsidized by the government through a mechanism that compensates the electricity distribution companies for the difference between actual cost of supplying a unit of electricity and the sale price of a unit of electricity. The mismatch between the costs and revenues of distribution companies trickles all the way up into the electricity supply chain, as distribution companies are unable to pay for electricity purchased in a timely manner, which delays payments to power producers who are in turn unable to pay for energy inputs, creating a chain of intercorporate debt also known as circular debt. In absence of the comprehensive governance reforms, the circular debt will be a major burden on Pakistan's overall economy and more specifically power sector viable operations, as it reduces the ability of the electricity sector to meet demand in a timely manner and creates uncertainty for private-sector companies involved in electricity generation.

12.2.4 Green Energy and Green Jobs in Urban Pakistan

Private-sector participation in the energy sector has been limited to generation activities. Independent Power Producers (IPPs) using oil or gas account for 38% of the total electricity generation capacity. The federal and provincial governments have formulated renewable energy policies to encourage large grid-scale private-sector projects using solar, wind, and biomass. These initiatives have met with varying degrees of success as discussed later.

Transmission and distribution infrastructure is owned by government entities. The only exception is one vertically integrated private utility that supplies electricity to the largest city of Karachi. Electricity distribution in the rest of the country takes place through ten government-owned Distribution Companies (DISCOs). By law, the DISCOs have the exclusive right to sell electricity to end users in their area of operation. Any private entity generating electricity not for own use, has to apply

[10] https://www.icmap.com.pk/Downloads/Booklet_Power_Sector_in_Pakistan.pdf.

[11] Previous government through CPEC projects has planned and installed new power generation plants, however, due to poor distribution and transmission system the electricity cannot reach to the consumers.

for a license to supply electricity to an outside party. Recently the government has announced net-metering regulations, that delineate a process for private-sector entities such as households to install small-scale generation systems and to sell electricity back to the DISCOs for supplying into the grid.

Within the renewable energy sector, the solar industry has seen the fastest growth due to an exponential decline in the cost of solar PV panels. Presently, Pakistan's solar industry is still at its early stage of development, employing more than 15,500 people. The workforce is engaged in small-scale residential and commercial deployment. Installation jobs such as construction workers, installers, etc., provides the bulk of employment, followed by business development. Employment in PV manufacturing remains limited to the industries that prepare mounting structures and electrical equipment. As deployment grows in both small- and large-scale markets, solar and other renewable energy technologies can provide a growing Pakistan labor force with much-required job opportunities.

Technical, economic, and policy and regulatory frameworks shape the employment trends and patterns in the nascent solar industry. The cost of green technologies is spiraling down, and it will help spur the deployment of such technologies. Similarly, the labor markets are dynamic and subject to geographic shifts in the production and deployment of green technologies. At the corporate level, the strategies and alignments of different industries also play an important role, as the supply chain becomes more globalized.

12.3 Analytical Framework

In order to the understand what affects the willingness and ability of private sector and entrepreneurs to participate in the provision of green energy, we adopt an analytical framework in which we categorize the driving forces in the entrepreneurs' ecosystem into macroeconomic and microeconomic factors, as shown in Fig. 12.2. The macroeconomic factors are those factors that determine the environment in which the business operates including the key government institutions, policies, regulations, laws, and the level of political support. The microeconomic factors are those factors that affect the micro-decisions of the business and include access to finance, access to inputs like human capital, infrastructure, research and development institutions. Together these factors determine the financial and administrative cost of setting up and carrying out business, the expected returns, security of capital and investment, growth and future innovation potential of the firm. We discuss each factor in turn and then we assess its effectiveness in encouraging private-sector entrepreneurship in the green energy sector.

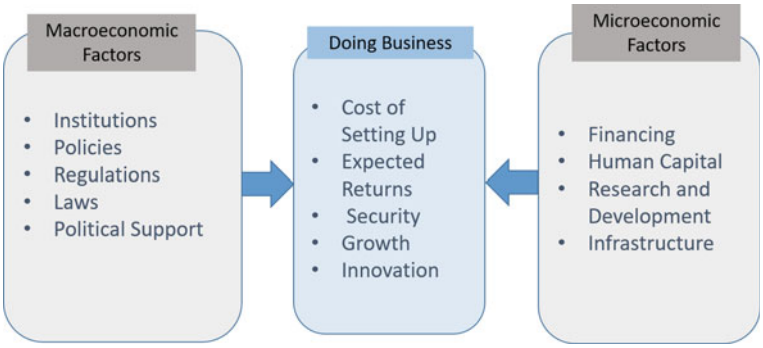

Fig. 12.2 Framework for analyzing entrepreneurship in green energy

12.4 Current Context of Doing Green Business in Pakistan

12.4.1 Key Institutions

The key government institution responsible for the formulation of energy policy is the Power Division of the Ministry of Energy. The Ministry is supported by various implementation agencies among which the Alternative Energy Development Board (AEDB) is the primary agency responsible for the development of renewable energy. Similarly, the National Energy Efficiency and Conservation Authority (NEECA) is responsible for energy efficiency and conservation. At the provincial level, the Energy Departments and provincial energy conservation agencies are responsible for policy formulation and implementation. The National Electric Power Regulatory Authority (NEPRA) provides independent regulatory oversight to the power sector and is responsible for setting generation, transmission, and distribution electricity tariffs, licensing of private producers including utility-scale as well as small-scale distributed renewable energy producers and acting as a clearinghouse of all the companies involved in the electricity sector.

12.4.2 Federal and Provincial Policies

The main policy framework governing the development of renewable for electricity generation is the Alternative and Renewable Energy Policy (ARE) of 2006. The goals underlying this policy are (1) increasing energy security through utilization of indigenous renewable energy sources, (2) reaping economic benefits of greater supply and lower cost energy sources for income generation and productive activities in the country, (3) achieving social equity through expansion of energy access to the remote and backward areas of the country, and (4) environmental protection and

reduction in greenhouse gas emissions toward which Pakistan has pledged action under the UN Framework Convention on Climate Change.

This policy sets a soft target, which is to increase the amount of electric power from renewable energy technologies to at least 9700 MW by 2030. The policy initially covered solar, wind, and small hydro (less than 50 MW) and was later extended to include bagasse, biomass, and waste-to-energy technologies as well. The policy provides a set of attractive incentives for the development of grid level renewable energy projects by private investors. The main features of the policy are:

- No customs duty and general sales tax on the purchase of machinery, equipment, and spares.
- Exemption from income tax, turnover rate tax, and withholding tax on imports.
- Guaranteed market through the purchase of all generated electricity.
- The power purchaser is responsible for the provision of grid connectivity.
- Insurance against damages incurred due to unforeseen political events.
- Repatriation of equity and dividends freely allowed subject to State Bank of Pakistan regulations.

The AEDB is responsible for reviewing development proposals from private sectors and issuing a letter of intent or project initiation permit to successful projects. The total time from submission of a proposal to achieving financial closing is around 32 months (IRENA 2018). The process starts with securing approval from AEDB, the developers have to approach NEPRA for a generation license and negotiation of generation tariffs. The other key agency that plays a role in completing this process is the National Transmission and Dispatch Company (NTDC), which is responsible for the approval of grid connectivity and offering a power purchase agreement to the developer, based on the tariffs determined by NEPRA.

The provinces have also delineated their respective policies focused on the development of indigenous renewable energy technologies, giving very similar incentives to attract private capital as in the federal policy. The provincial government has set up their own Energy Departments that approve renewable energy projects (similar to AEDB at the federal level). However, NEPRA has to be approached for project licensing and tariff setting for all projects approved by the provinces.

In Sindh, the government has adopted the ARE policy and also announced the Sindh Land Grant Policy for usage of public land for renewable energy projects. In Balochistan, the government passed the Balochistan Power Generation Policy 2007 modeled on the federal Power Policy of 2015, to give various incentives to private-sector developers including solar and wind energy projects. They have set up the Balochistan Power Development Board to act as a one-window facilitator for private-sector investors. Similarly, the Punjab Power Generation Policy of 2006 covers local resources such as biomass, hydropower wind and solar, and aims to mobilize investment through the private sector as well as public–private partnerships. The Punjab Power Development Board has been set up to approve private-sector projects and to support coordination with federal agencies for tariff and grid access. In Khyber Pakhtunkhwa (KPK), the government has announced the KPK Hydropower

policy in 2016 and announced a ten-year action plan for developing hydropower projects through public and private investment.

12.4.3 Laws and Regulations

The AEDB and the provincial Power Development Boards offers project initiation permits or letters of intent to private-sector developers of renewable energy. However, NEPRA is responsible for licensing and tariff setting for all on-grid and off-grid projects.

The tariff negotiations for the grid-connected renewable energy projects set up under the ARE policy have been based on a cost-plus or upfront (feed-in) tariff mechanism. In both cases, NEPRA calculates a tariff taking into account parameters such as resource cost, capacity factor, project construction periods, length of energy purchase agreements, equipment and financing costs, operations and maintenance costs, and debt servicing costs associated with the project. A rate of return on equity is also included as per the relevant federal or provincial policy. Since 2009, NEPRA issued upfront tariffs for solar PV, wind, bagasse, and small hydropower for up to 25 years.

Presently, only upfront tariff regime is only applicable for bagasse and small hydropower.[12] For any new solar and wind project initiated after January 2017, NEPRA has instructed AEDB and the relevant provincial agencies to determine tariffs through competitive bidding or reverse auctions. It has also set a benchmark tariff for wind projects, which will serve as the ceiling tariff for the reverse auction.[13] No benchmark tariff has been announced for solar PV as yet and the process for these auctions has to be developed further.[14]

The regulatory framework for microgrid, off-grid, and standalone projects has not been delineated by provincial governments as envisioned in ARE policy. One of the biggest impediments to the expansion of small-scale renewable energy projects in non-electrified rural areas of the country is the legal framework set up under the NEPRA Act of 1997. This law stipulates that small-scale developers cannot generate and sell electricity to private parties without a NEPRA license as well as an approval from the relevant Distribution Companies (DISCOs).

[12]NEPRA—Bagasse Rs. 9.09/kwh and Small hydro up to 25 MW Rs. 10.06/kwh—Rs. 12.78/kwh).

[13]For foreign financed projects USD 0.0675/kwh and for local financed projects USD 0.0773/kwh.

[14]Previous upfront tariff of solar announced in December 2015 ranged from Rs. 10.73/kwh-Rs. 11.45/kwh and for wind ranged from Rs. 10.45/kwh—Rs. 12.51/kwh.

12.4.4 Political Support

The renewable and green energy sector has received political support by federal and provincial governments. There is a general understanding that green energy represents a viable alternative to conventional energy sources, and a means to reduce greenhouse gas emissions. However, apart from a few political leaders in each party that are involved in energy ministries and agencies, the level of support required from other political actors, especially at the local levels of government has been low. There is a lack of awareness and education about how green energy technologies can change energy provision and provide solutions to energy woes of the public. Political actors are not clear about the role of the public sector vis-a-vis the private sector in the development and deployment of these technologies.

12.4.5 Human Capital

While the public sector runs various skills development programs, there is no targeted program that prepares professionals for working in the green energy sector. The current labor force is drawn from the pool of workers who have been associated with the conventional energy sector either in the public or private sector, or fresh graduates of electrical and power engineering degree programs. These workers usually learn on the job how to deploy green technologies. Another common trend is that foreign investors will bring a small pool of foreign workers who can help set up the project and train the local workforce.

12.4.6 Financing

In 2009 the State Bank of Pakistan (SBP) launched a scheme for issuing subsidized loans for renewable energy projects. In 2016 the scheme was revised, and it currently offers financing for (1) private investors setting up grid-scale projects between 1 and 50 MW, and (2) consumers installing facilities for generation of electricity using renewable energy sources ranging from 0.004 to 1 MW for own use or for sale to distribution companies. The SBP has earmarked funds for this purpose and will provide refinancing to commercial banks at a service charge of 2%, while the banks will charge the borrower a rate of 6% for loans of 10–12 years depending on the category of the project. Currently, the funds are available on a first-come-first-serve basis, and only for projects that will achieve a financial close by June 2019. The terms of the scheme are likely to be revised after that.

In 2017, the SBP also issued "Green Banking Guidelines" for all commercial banks in the country. The implementation of these guidelines is mandatory for all commercial banks, while licensed microfinance banks are also encouraged to imple-

ment them. The goal is that the financial sector should recognize the responsibility of supporting policy initiatives for transforming the country's economy toward a low carbon and climate-resilient economy. To achieve this end, the guidelines mandate that banks should integrate environmental consciousness about their products/services and all aspects of their operations. However, at this end, the banks are unable to extend small financing schemes lacking due to nonavailability of professional to do mortgage assessment of the renewable as well as Energy Efficiency assessment.

A key objective of these guidelines is "green business facilitation". Banks are encouraged to earmark a certain percentage of their overall financing and investment portfolio as a dedicated fund for green investment, including renewable energy projects as well as infrastructure projects with environmental benefits (e.g., sewage treatment, water conservation, waste disposal, wastewater treatment, and public transport).

12.4.7 Research and Development

A number of research centers and labs have been set up at various universities in the country for carrying out renewable technologies research. Among these are the Energy Informatics Group at Lahore University of Management Sciences (LUMS), Centre for Energy Research and Development at University of Engineering and Technology (UET) Lahore, and Energy Research Centre, COMSATS Institute of Information Technology, Lahore. The USAID has also provided funding for setting up the U.S. Pakistan Centers for Advanced Studies in Energy at University of Engineering and Technology Peshawar and National University of Sciences and Technology, Islamabad. In May 2018, the Higher Education Commission of Pakistan approved funding of Rs. 2 billion for setting up a National Center for Big Data and Cloud Computing housed at LUMS with 12 affiliated labs located at different universities across the country. The research agenda of this center is broad. However, it also has the potential to produce valuable research on energy supply and demand issues using modern data analysis tool. However, there is a missing link between the academia, industry, and decision-makers at the government level to effectively utilize the research produced in these institutions.

12.4.8 Access to Grid Infrastructure

The important wind and solar energy sites in Pakistan are not located close to the national grid, and therefore offering adequate transmission infrastructure to developers is critical. The NTDC has developed multistage plans for grid expansion to important sites such as the wind corridor in coastal Sindh and the solar parks in South Punjab. The USAID has also carried out a study for NTDC in 2015 to assess the tech-

nical and financial feasibility of integrating power from solar and wind energy into the grid. The study finds that up to 9400 MW of renewable energy could be integrated into the grid once reinforcements to 500, 220 and 132 kV transmission lines are made by NTDC. The study also recommended that grid code amendments have to be made for integration of renewable energy sources into the grid. Following this, NEPRA has initiated the process of grid code amendments to facilitate solar and wind power evacuation and connectivity to the grid.

12.5 Assessment

We can assess the effectiveness of current state of macro and micro factors in promoting private-sector entrepreneurship in the provision of green energy technologies by examining the extent to which green energy sources have become part of the electricity grid and the prospects for off-grid expansion of these technologies.

12.5.1 Performance of the Renewable Sector

Presently, only 0.8% of the electricity supplied to the grid can be traced back to green energy sources. The share of solar, wind, and bagasse in installed capacity is 5.5% and the share of hydropower in installed capacity is 27% (NEPRA 2017). There are a number of small and medium solar and wind generation projects that are at various stages of completion. According to AEDB, a total of 6 wind energy projects with a total capacity of 308.2 MW are currently operational, while another 9 projects with a capacity of 477 MW have achieved financial close.[15] In terms of solar, 28 projects with a capacity of 956.8 MW are at various stages of development. Four projects with a combined capacity of 472 MW have been awarded upfront tariffs while 7 projects of a total of 73 MW are at in process of achieving financial close.[16] For biomass/bagasse, 6 projects with a total capacity of 201 MW have started operation while another eighteen totaling 577 MW are at an advanced stage of development.[17] At present 128 MW of small hydro capacity is operational while 877 MW is under development.[18] Under the current policy framework, it is forecasted that the share of solar, wind, and bagasse in electricity generation capacity will go up to 10% by 2025, while that of hydropower will expand to 37%.

[15] AEDB, Current Status of Wind Projects, http://www.aedb.org/ae-technologies/wind-power/wind-current-status, (accessed June 2018).

[16] AEDB, Progress Made So Far on Solar Projects, http://www.aedb.org/ae-technologies/solar-power/solar-current-status, (accessed June 2018).

[17] AEDB, Current Status of Bagasse Projects, http://www.aedb.org/ae-technologies/biomass-waste-to-energy/current-status, (accessed June 2018).

[18] AEDB, Current Status of Small Hydro, http://www.aedb.org/ae-technologies/small-hydro, (accessed June 2018).

The provincial governments have also met with varying degrees of success in attracting private investors in the renewables sector. In Balochistan, no big project has been initiated due to the remoteness of grid transmission lines and due to the security situation. The KPK small hydro policy is quite recent and it remains to be seen how the private sector will respond. The Sindh government has approved proposals of solar and wind projects of 2900 MW capacity (IRENA 2018). In Punjab, the government has set up Quaid-e-Azam and Chishtian solar parks and dedicated 10,000 acres of land for solar PV installations in South Punjab. One unit of Quaid-e-Azam Solar Park with a capacity of 100 MW was constructed and is operational. The government has also approved numerous private projects in solar and small hydro with a total capacity of 1519 MW and 230.47 MW, respectively, (Punjab Power Sector Board 2018).[19]

Although the current policy framework is quite comprehensive for grid-level renewable energy projects, it does not provide sufficient guidance for off-grid and standalone projects. The policy directs AEDB and provinces to develop new procedures for off-grid power generation and standalone projects that can supply to local communities through isolated distribution lines not connected to the grid.

Efforts toward facilitating microgrid, off-grid, and standalone installations have been initiated by the provincial governments but are still at very initial stages. For example, the Punjab government has announced Khadim-e-Punjab Ujala Program for electrification of schools, basic health units and tube wells using solar energy. Similarly, Balochistan and KPK governments plan to initiate various off-grid programs using solar and micro hydro for rural electrification.

The ARE policy of 20006 also allowed for Net-Metering or selling back of electricity by distributed renewable energy producers with a capacity less than 1 MW to the distribution company. However, this part of the policy has only recently become operation as a result of Net-Metering Licensing and Tariff guidelines issued by NEPRA in 2015. According to initial reports, a few hundred households and commercial establishments have applied for and received Net-Metering Licenses in different cities of the country.[20] AEDB estimates that net-metering has the potential to add up to 1000 MW of solar capacity to the grid by 2021 and 4500 MW by 2045.

12.5.2 Macroeconomic Factors

Historically, power sector planning has been centralized with federal government ministries and its implementation has been carried out by federal agencies (WAPDA—Water and Power Development Authority). After the 18th Amendment which decentralized many areas of policymaking to the provinces, the provincial govern-

[19]Punjab Power Development Board, http://www.energy.punjab.gov.pk/_pages/initiatives.html, (accessed June 2018).

[20]NEPRA, Distributed Generation—Net-Metering, http://www.nepra.org.pk/Lic_netmetering.htm, (accessed June 2018).

ments have started developing their own energy policies with a focus on renewable and green technologies. The provincial institutions which comprise the Energy Departments and the associated implementation agencies have been forward-looking and taken the various initiatives to open up the energy sector to renewable, as described previously.

In terms of the policy direction, while ARE policy of 2006 is forward-looking, however, it does not set clear targets. The only target set under Medium Term Budgetary Framework (MTDF) is generating 9700 MW of renewable energy in the energy mix by 2030 which has been not revised even the prices and uptake of renewable has increased exponentially globally.[21] The policy is also not clear in terms of objectives, such as cost-effectiveness of renewable in reducing carbon emissions, job creation, innovation, and dynamic efficiency, intrinsic value of clean energy. These gaps have led to the absence of national policy discourse on these issues. And thus, the support for green technologies has remained largely confined to policy documents, government offices, and selected forums. The 2006 RE policy needs an evaluation and review to reformulate policy with tangible and futuristic targets.

While integrated planning can help set a clear direction for all actors, there is a need to decentralize policy implementation through local institutions. With a clear policy direction set at the higher level (federal or provincial), lower level governments (district or cities) should facilitate private entrepreneurs to identify and reap suitable opportunities for developing green technologies that arise in the local context. Such decentralization is consistent with the principle of subsidiarity, according to which decisions and actions should be executed at the lowest level possible at which they can be performed competently.

The role of public and private sector in the deployment of green technologies must also be assessed. Despite significant renewable energy potential, private-sector investment in grid level wind and solar energy projects has been slow to trickle in. The long and cumbersome application, licensing, and tariff-negotiation process discourages private investors. NEPRA had previously offered feed-in-tariffs to renewable energy projects, but presently tariffs on long-term contracts are being determined through competitive bidding or reverse auctioning. This regulatory framework passes on the entire cost risk to the investor, and it remains to be seen how it will actually be carried out. Administrative delays and uncertainty of regulation and pricing will certainly affect the extent to which private-sector investment may be forthcoming in the future and the extent to which projected targets of integrating renewable into the grid can be met.

On the upside, the distributed generation which has been operationalized through Net-Metering laws has opened-up the small-scale investments for the private sector. Households, schools, hospitals, and commercial establishments can apply for a license to sell back excess electricity generated from rooftop solar PV systems back

[21] Source: Alternative Energy Development Board https://www.aedb.org/Documents/Policy/REpolicy.pdf (accessed on October 20, 2018).

into the grid. The growth and the effects of distributed generation on grid capacity, reliability, costs, and future innovation need to be studied further as the data from the deployment of these systems become available. This growth of distribution generation will be purely urban focused.

12.5.3 Microeconomic Factors

In order to realize the full potential of green technologies, it is imperative to pay attention to the micro level business climate factors that will facilitate private sector to enter and reap the rewards of commercializing these new technologies.

Access to quality human capital remains a big challenge for private-sector investors seeking to enter the green energy sector. The traditional electrical and power engineering programs offered by higher education institutions need to be revised to include specialization in renewable energy technologies. In the absence of formal educational and skills training, businesses rely on on-the-job training. As a result absence of quality manpower quickly becomes a bottleneck in the expansion of green business.

The Research and Development initiatives which are taking place at higher education institutions across the country, aim to bring together valuable expertise to find innovative and practical solutions for Pakistan's energy challenges. However, their functioning has suffered from various problems. Research institutions have faced difficulty in attracting and retaining the right kind of human capital. This is in turn linked to the absence of a well-established mechanism for funding and rewarding research and researchers. Funding of research has mostly come in the form of donor grants or one-time government support schemes. There is a lack of consistent support from policymakers, and an absence of a national research vision and strategy to incentivize research.

Industry and academia linkages are weak, which often results in research being carried out without sufficient attention to the needs of the local market. Lack of supportive mechanisms for commercializing research, such as financing through commercial banks, venture capital funds, or angel investors, is a big barrier in the introduction of new technologies to the market. The SBP Green Banking guidelines are a step in the right direction, however, they are still in the experimental stage. It is imperative that the program should be evaluated with appropriate data and measures to assess the effectiveness of the program in increasing private investment and entrepreneurship for the promotion of green technologies.

The government has conducted studies to help determine the needs and requirements of transmission infrastructure required to integrate renewable projects into the grid. However, there needs to be more focus on modernizing the grid and integrate smart technologies such as Advanced Metering Infrastructure (AMI) and smart meters that allow collection and usage of real-time energy consumption data to take

generation, transmission, and pricing decisions. The technical, economic and political feasibility of infrastructure investments must be evaluated and incorporated into grid expansion and modernization plans to enable the growth of green technologies in the future.

12.6 Way Forward

In this section, we propose a roadmap for boosting entrepreneurship on green technologies at a macro level and more specifically through short-, medium-, and long-term plans. We examined the energy landscape, country's vulnerability to the negative impact of climate change, highest rate of urbanization, low diffusion of green technologies, and less effective entrepreneurial activities in Pakistan. We observed that the households, businesses, and industries are still using expensive fossil fuel based generators and rely on backup storage devices. At times, the cost of generating electricity from green technologies and energy efficient appliances has come down rapidly and are economically and financially viable compared to conventional fuels.[22]

Moreover, we assessed the effectiveness of macro factors in Pakistan, such as institutions, policies and regulations, and micro factors such as access to finance, inputs, and infrastructure, which affect the private sector's decision to invest in renewable and green technologies. The assessment shows that current institutions and policies are focused on grid-scale investments in renewable energy, which were not able to attract substantial capital. This highlights the importance and needs for integrated planning coupled with decentralization of policy implementation to the local city or district level, a stable policy and regulatory framework that would mitigate investor risk and incentivize the entrepreneurship. The private-sector entrepreneurship will thrive with the provision of enablers such as smart infrastructure, financing, and addressing gaps in the research and development ecosystem.

Pakistan power sector is still in transition from fully owned government utility to private-sector utility. The phased and systematic changes are ongoing, whereas the wholesale market is partially established and competitive bidding ongoing (CPPAG 2018). However, capacity markets and its integration with demand response and load management at the consumer side are still developing. Government policies and regulations for renewable energy as well as traditional power generation, transmission, and distribution require evaluation and subsequently comprehensive reforms. A reform option which has been debated a lot is to fully privatize the electricity utility companies which will transform the central power generation and distribution. The deregulated generation and capacity markets will help centralized power plants to

[22]NEPRA Tariff Determination for Solar and Wind based Power Generation. Source: https://nepra.org.pk/tariff.htm (Accessed Online September 22, 2018).

trade with other companies at a wholesale level to sell surplus or buy excess energy and then sell the energy on to the consumers as experience in most developed world.[23]

The unbundling of DISCOs (Distribution Companies) with independent boards was an attempt to decentralize the governance process for the power sector, which has not achieved its objective, as these DISCOs are still public-owned entities. However, decentralization of these DISCOs to the district and city level can be the preferred option. This decentralization at grass-root with distributed governance will open opportunities for entrepreneurship at the immediate and short-term plan. This will help provide the innovative, customized as well as localized solutions for each city and district based on the natural endowment.

As a prerequisite, Net-Metering has been completed on the regulatory side, but market uptake is yet to be seen of this initiative. This market uptake represents major opportunities for local companies to close this loop with innovative customized solution from entrepreneurs in the short-term. Net-metering and advanced metering infrastructure (AMI) is the starting points towards creating value from more granular data of the grid. Further integration of Internet of Things (IoT) and Artificial Intelligence (AI) will provide more long-term value chains and thus long-term plans need to include this aspect. In such a case, technology-oriented entrepreneurs who want to gain the market share of this prospected value chain will see long-term gains in focusing on this thematic area.

This implies that the old centralized grid system will discover new ways to approach the evolving marketplace. These innovative ways include new business models and new smart technologies that are helping this centralized system to be decentralized. Decentralization has shown potential in reducing transmission and distribution losses for an existing grid, and more advantages for off-grid customers to adopt microgrids thus as a cost-effective alternative to extending grid. Consider resiliency of system in the context of ever-increasing erratic climate events, decentralization of energy systems in general and Distributed Energy Resources (DER) in particular are key to reduce added grid infrastructure costs and increase resilience. Such decentralization further from provincial to district levels and then to each facility/building level in energy markets will spur deployment of green technologies.

With the advent of data-based industrial revolution, the transformation from how we live in cities, suburban, municipalities, and towns, and how we interact with cities infrastructure is unrelenting. Especially for a growing nation, such steps are foundational in securing order and promoting an ecosystem of entrepreneurship. Furthermore, climate change and its adverse effect on our infrastructure, especially our centralized governed grid, need to transform and adapt to the challenges of climate change and the opportunities which smart cities create. Such adoption and transformation are not possible unless we use best practices of peer markets and then customize such solution to fit local context and sociopolitical landscape of the country.

[23] https://www.sciencedirect.com/science/article/pii/S136403211830128X.

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Chapter 13
The Evolution of Urban Entrepreneurship in Zambia

Progress Choongo, Emiel L. Eijdenberg, Mwansa Chabala, John Lungu and Thomas K. Taylor

Abstract Zambia is a former British colony. It gained independence in 1964 and now ranks as one of the middle lower income countries even though it has dropped from a higher ranking at independence. This history has had a bearing on entrepreneurship development in the country. This chapter discusses urban entrepreneurship in Sub-Saharan Africa (SSA), in general, and Zambia in particular. The chapter further elaborates the social-political factors that have shaped the entrepreneurial landscape of Zambia, and the status quo of entrepreneurial activities in four main urban and large cities in the country. The last section provides an empirical showcase of factors influencing the location decision of entrepreneurs in one of the urban cities, Kitwe. The lessons learned from this chapter are: first, historical events in the urban, institutional environment shape entrepreneurial activities of the present day; second, the four main urban areas in Zambia have developed distinctive types of entrepreneurial activities; and third, besides institutional factors, entrepreneurs make deliberate, personal choices for establishing firms in certain urban locations, primarily driven by the attitude towards avoiding tax, perceived levels of institutional corruption, size of the informal business activities and the overall satisfaction and comfort of the entrepreneur in having the business in the residential areas where they reside.

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13.1 Setting the Scene: Entrepreneurship in Sub-Saharan Africa

This chapter sets off to discuss four research aims which are: (1) an introduction on entrepreneurship in Sub-Saharan Africa (SSA), the remainder focusses on (2) an exploration of the social-political factors that shape the entrepreneurial landscape of Zambia (the focal SSA country); (3) a discussion of the status quo of entrepreneurial activities in the largest urban areas in Zambia; and (4) a presentation of a case study of factors influencing location decisions of entrepreneurs in Kitwe, a city in the Copperbelt Province of Zambia. Thus, the research question for this chapter is *What factors influence business location decision of entrepreneurs in urban areas?*

Understanding the evolution of entrepreneurship in urban areas can help entrepreneurs to identify more opportunities to start new businesses. The chapter also provides insights, and a richer understanding to policymakers, scholars, educators and regulators on enablers and constrainers of urban entrepreneurship in SSA.

13.1.1 Defining Entrepreneurs(hip) in SSA

Context derived from the Latin *contexere* meaning "to weave together" (Van Gelderen and Masurel 2012) is important in entrepreneurship research: it helps to understand, how and why entrepreneurs recognise opportunities and others do not and why the outcomes of entrepreneurial activities vary across different countries, regions and other contexts (Baker et al. 2005). Context has been debated in terms of *who, where* and *when* (Whetten 1989). The "*where*" and the "*when*" are relevant for entrepreneurship research (Welter 2011), because the two context specifications influence the "*who*", i.e. the entrepreneur. Concerning the "*where*" and the "*when*", the context has been researched at various levels of analyses, such as the business level (i.e. industry, market), the social level (i.e. network, extended family), the institutional level (i.e. culture and society) and the spatial level (i.e. geographical areas) (Johns 2006; Eijdenberg 2017; Welter 2011).

Traditionally, entrepreneurs are seen as economic actors and their actions as the determinants of economic development (Schumpeter 1934; Kirzner 1974, 1997). The creation of organisations (in this chapter also referred to as "businesses") is called entrepreneurship and those who create them are the entrepreneurs (Gartner 1989). "Entrepreneurial activities" entail all activities that revolve in and around creating organisations, for example starting, running and quitting an organisation. Entrepreneurship occurs all over the world, including SSA's emerging context: an

underdeveloped region of 46 countries in which 46% of the people are living in extreme poverty (United Nations 2018). Many SSA's factor-driven economies are distinguished by a lack of infrastructure, severe poverty, relatively low life expectancy and government and market failure (Organization for Economic Co-operation and Development 2016; Rivera-Santos et al. 2015). Such resource-constraints contexts create low market entry and exit barriers (Khavul et al. 2009), which is a condition that brings forth opportunities for innovative entrepreneurs (Eijdenberg et al. 2018; Rivera-Santos et al. 2015).

Some of the opportunities are seized by people who create and (temporarily) run the so-called "micro and small enterprises" (MSEs) or "small and medium-sized enterprises" (SMEs). What differentiates MSEs from SMEs is that MSEs are "one-person operations, poorly managed, sometimes temporary, less productive, and undercapitalized" (Kiggundu 2002, p. 248). Additionally, MSEs are often informal and the last resort of the poor. SMEs, on the contrary, are more viable, sustainable and generating more income and employment. Overall, both MSEs and SMEs are small businesses and those who create and run them are referred to as, "small business owners" (i.e. the type of entrepreneurs in this chapter): "(a person or group of people) who creates a new business (for profit) and employs at least one other paid employee" (see also Kirkwood 2009, p. 350). High numbers of small businesses are very typical for SSA economies as this region is characterised by a small large-scale sector and a large small-scale sector (McDade and Spring 2005).

Entrepreneurs in SSA countries use contextual opportunities that are instrumental for making decisions and implementing what they perceive to be an innovative product or service (Rooks et al. 2014). Many of the innovations are a "design innovation process in which the needs and context of citizens in the developing world are put first in order to develop appropriate, adaptable, affordable, and accessible services and products for emerging markets" (Basu et al. 2013, p. 64). Such products and services are called "frugal innovations." Frugal innovations are cheap, easy to use, easy to access/purchase, portable and both economically and socially sustainable (Basu et al. 2013; Rao 2013). Typical frugal innovations in SSA include self-made mosquito nets; home-built water purifiers; and various self-made utensils, games and practical applications (e.g. floor brushes, chessboards, pans, cutlery) (Eijdenberg 2016).

Frugal innovations and other basic necessities are made and sold by many entrepreneurs dwelling in urban areas in SSA. Although the term "urban entrepreneurship" has hardly been defined as such, it clearly concerns entrepreneurship taking place in the urban milieu contexts (e.g. metropoles, cities, towns, residential areas) which are typically characterised by their institutional challenges (in contrast to more remote, rural contexts), such as long-standing business traditions, high competition, wealth inequality, (in)formality, crime and other social and economic difficulties (Eijdenberg 2016; Sriram and Mersha 2006; Jessop and Sum 2000). The contrast between rural and urban areas has become larger in recent years. In larger cities, the traditional African collective culture has changed into a more individualistic culture (Rooks et al. 2014), because of society's modernisation, internationalisation, rapidly growing population and a stronger diversity with interacting ethnic groups. In light of that, much research in urban contexts in SSA has for long

focused on many different aspects of entrepreneurs(hip) with examples of studies in Tanzania (e.g. Eijdenberg et al. 2018; Lyons et al. 2014), Uganda (e.g. Bewayo 1995; Langevang et al. 2012), Rwanda and Burundi (e.g. Eijdenberg et al. 2015, 2017), Namibia and Zimbabwe (e.g. Frese et al. 2007; Krauss et al. 2005), South Africa (e.g. Naudé et al. 2008; Krauss et al. 2005) and Zambia (e.g. Choongo et al. 2018; Mwiya et al. 2018; Choongo 2017; Choongo et al. 2016, 2017).

Urban areas, seen as distinctive institutional contexts that are intimately linked with entrepreneurial activities, has gained increasing interest from the scholarly community in the last few decades (Bruton et al. 2010). Institutions entail notions of culture, social-political factors, traditions, history and economic incentives, which organise social interaction by constraining and enabling entrepreneurial activities (Greenman 2013). The main idea of institutional embeddedness of entrepreneurial activities is that prevailing values, rules, expectations and material infrastructure in countries often shape entrepreneurial activities (Jain and Sharma 2013). SSA's urban areas have become strong attractors of entrepreneurial activities as remote rural areas are becoming increasingly deserted because of the lack of job opportunities.

This chapter focuses on entrepreneurial activities in the context of urban areas in Zambia. The next section is a discussion of the social-political factors that shape the entrepreneurial landscape of Zambia. This discussion paves the way for a more tailored discussion of the current status of entrepreneurial activities in the largest urban areas in Zambia. The chapter closes with a showcase: empirical evidence of factors influencing the location decisions of entrepreneurs in Kitwe.

13.2 Social-Political Factors that Shape the Entrepreneurial Landscape of Zambia

Zambia has an estimated population of around 16 million. It is typified as an "emerging country" with increasing gross domestic product (GDP) growth rates per year and an average GDP per capita of USD 4000, while high inflation rates on consumer prices were recorded in 2017, at around 6.6%. More than half of the country's population live below the poverty line and is younger than 17 years old. The urbanisation rate is high at around 43.5%, a typical factor comparable with many SSA countries (Central Intelligence Agency 2018). The mining industry is the main economic activity and has considerably contributed to the economic and social development of the country since 1928 (Lungu and Kapena 2010). Mining activities are mainly concentrated in the Copperbelt Province and North-western Province. Other sectors significantly contributing to the growing economy include agriculture, construction, oil processing, food processing, manufacturing and textiles.

Despite the fact that mining is the largest industry in the country (and will therefore receive most attention in the sections hereafter), the majority of the people work as farmers. We break down the discussion on history in three large sections: (1) the part during British rule until 1964; (2) the part since the country's independence in 1964 until the 1980–90s; and "modern times" since the 1980–90s to the present day.

13.2.1 Brief Historical Overview

During British rule (1880–1964), the country's economic mainstay was farming (Beveridge and Oberschall 1979). Mining activities began in the 1920s and two private companies namely, Anglo-American Corporation and Roan Selection Trust owned the copper mines until 1969. The British government passed a legislation that restricted enterprise ownership by local people. Additionally, there was an introduction of taxes which forced people to look for employment to ensure that they made enough money to pay the "hut" tax and to feed their families. This greatly inhibited the development of a strong entrepreneurial culture in Zambia. Thus, most of Zambia developed as labour enclaves for the copper mines (Fraser and Lungu 2007).

In 1964, the country got independent. Following a change in ideology, to humanism (as socialist ideology that was meant to hold the nation together), the two private mining companies were nationalised by the state and renamed as Nchanga Consolidated Copper Mines (NCCM) and Roan Consolidated Copper Mines (RCCM), respectively, in 1969. Between 1964 and 1990, there were still hardly any entrepreneurial activities. This was because Zambia's economy was led by the public sector which discouraged people to go into entrepreneurship. There was also a threat of nationalisation of a firm if a firm grew to a certain size. Hence, this explained why there were very few entrepreneurial activities among the Zambian citizens during the first republic under the United National Independence Party (UNIP). UNIP was the political party which led Zambia to independence from colonial rule.

In 1982, the two mining companies were merged into one state-owned company called the Zambia Consolidated Copper Mines (ZCCM) (Fraser and Lungu 2007). Later on, in 1991, a change of government kicked-off an era of change. A new government, led by the Movement for Multi-Party for Democracy (MMD), adopted a liberal policy framework that was aimed at helping the recovery of Zambia's economy. The new policy encouraged entrepreneurial activities among Zambians even though the pace was very slow due to low entrepreneurial activities in the past (MCTI 2009). Since this new government supported private sector investment, it embarked on a privatisation programme aimed at preventing the collapse of the state-owned companies and bringing in investment (Central Intelligence Agency 2018). The new government sold the mining companies to investors from various countries including Britain, Canada, Switzerland and new players from China (Fraser and Lungu 2007; Lungu and Kapena 2010).

The privatisation programme was meant to encourage the private sector investment and diversification of the mining sector (Graig 2007). It was envisaged that the new mine owners would support local businesses and help in the development of local entrepreneurs by awarding them contracts to supply goods and services. Through this arrangement, local SMEs would sell various goods and services to the mines. This led to the rise in entrepreneurial activities and the increase in the number of SMEs selling goods and services to the mining sector. It is important to note that in the past, there had been a number of policies and initiatives to support entrepreneurship.

13.2.2 Supporting Activities in Modern Times

Since the early 1980s, the Government of Zambia recognised the importance of SMEs and contribution that small firms would make to the urban and rural economy. Following this understanding, the Small Industry Development Organisation (SIDO) Act of 1981 was passed and later, the Small Enterprise Development Act in 1995. The two acts were meant to help SMEs with infrastructure, business skills, training and formation of cooperative unions to help in bulk purchases of inputs for resale and distribution. Nevertheless, the resources that the government was giving were reported to be inadequate. Later, SIDO was replaced with Small Enterprises Development Board (SEDB). However, this Act did not also guarantee adequate support to small businesses that existed. Currently, the Ministry of Commerce Trade and Industry (MCTI) has a policy aimed at supporting and encouraging small businesses (MCTI 2009). Small business support was also provided through the National Development Plans starting with the Fourth National Development Plan (1989–1993). Currently, the Ministry of Commerce Trade and Industry (MCTI) has a policy aimed at supporting and encouraging small businesses (MCTI 2009). The institutional interventions of the 1980s and 1990s yielded limited results. This made the government to establish the Zambia Development Agency (ZDA).

ZDA has taken the initiative to start support programmes like the "Building Young Futures Programme" to help the existing and potential entrepreneurs by assessing their ideas, sensitising them on the importance of owning their own businesses, linking them to buyers and sellers as well as mentoring them. This has been done with the aim of bringing in new jobs and wealth as these enterprises are likely to grow and employ more people.

Zambia continues to formulate initiatives aimed at encouraging entrepreneurial activities through training institutions. The Copperbelt University has taken the initiative to introduce the subject of entrepreneurship as an elective in most faculties so as to encourage more young people to take up the subject with the aim of making them realise the importance of entrepreneurship so that they can later make a decision after graduation as to whether they want formal employment or they can be innovative and start-up their own ventures. Apart from these initiatives, the Government of the Republic of Zambia has been promoting diversification.

13.2.2.1 Diversification

Diversification is about spreading risk in investment. In the business world, the major actors in the diversification strategy are the investors, guided by the profit objective. These investors may be individuals, institutional or corporate investors. In economic development terms, however, the major players in the diversification game include the state or the government. The state's objective is to structure the economy using incentives to move or attract investment between sectors. It is this diversification from the government perspective which is pursued. However, in Zambia's current economic dispensation, the role of the entrepreneur guided by the profit motive in the process of diversification is critical.

The strategy of diversifying Zambia's economy has been on the books from the early days of independence. Zambia inherited an industrial structure, which was highly dependent on the Southern Rhodesian industrial complex. During the First National Development Plan (FNDP) period, it was realised that diversification was necessary and would necessitate structural change in the economy (Republic of Zambia 1966). Therefore, from the point of view of the FNDP, two major diversifications were necessary:

(a) The first form of diversification focused on the production of a wide variety of both food and cash crops. The aim was to achieve a considerable degree of self-sufficiency in the production of both food and cash crops.
(b) The second was the diversification strategy that took the form of import substitution. This was to involve production of goods in Zambia that at the time were being imported. This strategy was to apply to large-scale industries such as iron and steel, nitrogenous fertiliser and sugar and to a range of consumer goods, which at the time were being imported.

After FNDP, Zambia underwent a number of similarly called plans focusing on economic development by diversification; privatisation of the private sector; and creating an open, liberal market economy. Yet, all of these plans revealed that government was going to be strongly involved in the implementation of the diversification strategies. With one major actor formulating policy as well as playing the role of implementer, the strategy of diversification was going to be relatively easy to implement. The approach removed a fundamentally inherent difference in focus between policy formulation and project or programme implementation. Despite this advantage, the government still failed to change the structure of the economy. The state became the major player in establishing manufacturing firms. Unfortunately, regulatory measures dissuaded entrepreneurship development. Nevertheless, there is a new wave of diversification. It is at national scale.

The government has established institutions such as the Multi-Facility Economic Zones under the Zambia Development Agency (ZDA) which require full operationalisation to take on the challenge of diversification. Local entrepreneurial participation in these zones should be emphasised. In addition, three important issues must be

recognised as the country endeavours the diversification challenge. These include the value addition challenge, the role of local entrepreneurs and the role of education and research institutions in the process of diversification. These institutions are located in urban areas.

13.3 The Status Quo of Entrepreneurial Activities in the Largest Urban Areas of Zambia

As mentioned before, urbanisation is a recent and decisive trend in SSA. Urban areas function as magnets for people seeking jobs, as rural and remote areas are failing to do so. In factor-driven economies in SSA, such as Zambia, large small-scale sectors dominate the small large-scale sectors and these are especially located in urban areas.

The small large-scale sector mostly manufactures furniture, rubber, leather products, plastics, pharmaceuticals, beverages, clothing and soaps/toiletries, or operates in the construction, mining or transportation industry (Adenikinju et al. 2002; Schulpen and Gibbon 2002). The majority of the large-scale businesses in SSA are owned by foreigners, such as Asians and Europeans, as opposed to the indigenous peoples (McDade and Spring 2005). Especially in southern Africa (this includes Zambia). For instance, South African organisations (e.g. Hungry Lion, Shoprite and Woolworth) are well represented.

Two major problems are typical for SSA's MSEs and SMEs: that is, the problem of copy behaviour, which involves imitative as opposed to innovative businesses; and the problem of a "limited ability to compete on price and quality in a liberalized economy" (Kristiansen et al. 2005, p. 366). This leads to millions of MSEs retailing all-and-the-same products, as mentioned previously, from the small large-scale sector. In most of the SSA's urban areas, the MSEs are found on the streets (i.e. street vending of food, cloths, utensils and handicrafts), often moving around (in "mobile" self-built premises, such as wooden boxes) to avoid government authorities and to seek for better locations with just a little higher chance on increasing sales. Even though their motivations of being an entrepreneur may change over time (e.g. a few of them started out of necessity and were able to stand out, make a profit and turn their necessity motivations into opportunity motivations), the people behind businesses are typically necessity motivated as opposed to opportunity motivated (Eijdenberg 2016).

Moreover, another observed factor in SSA countries such as Zambia is the high number of female entrepreneurs: "hundreds of millions of poor people in developing countries make their living as micro-entrepreneurs: as farmers, street vendors and home workers, and in a range of other occupations, a large share of them women" (World Bank 2004, p. 33). The reason for the high numbers of female entrepreneurs is generally related to increasing household income, or poverty. The men are not able to bring home sufficient income to sustain the family, and therefore, the women are forced to start and run MSEs.

Governments of SSA countries that fail to create sufficient, well-paid jobs for their entire workforce—that is, for both men and women, regardless (cultural) gender disparities in the working domain—make necessity-motivated entrepreneurs use creative responses to institutional constraints. Such responses are traditional entrepreneurial strategies (e.g. competition based on low price or based on differentiation), as well as, developing inner strength, joining associations, giving back to communities and skillfully managing relations with authorities (Eijdenberg et al. 2018).

All of the above-mentioned trends and factors are typically for urban areas in SSA countries, including Zambia. Yet, differences do exist between one urban area and the other. In Zambia, four major urban areas with substantial entrepreneurial activities can be identified: Livingstone, Lusaka, Kitwe and Ndola. Livingstone is located in the southern part of Zambia and is the tourism capital of Zambia; entrepreneurial activities are mostly linked to tourism. Lusaka city is found in the Lusaka Province, it is the capital city of Zambia; entrepreneurial activities are most linked to government and services. Kitwe and Ndola are located on the Copperbelt Province where the economic mainstay is mining, with entrepreneurial activities linked to it. The next section briefly describes each of the previously mentioned cities.

13.3.1 Major Entrepreneurial Cities in Zambia

Livingstone city is the tourist capital of Zambia. The city has been a tourist destination since the nineteenth century. Livingstone was named after the Scottish explorer and missionary Dr. David Livingstone, who was the first European to see the Mosi-Oa-Tunya Falls which he named as the Victoria Falls after the Queen of England then in 1855. Tourist attractions include national parks, safaris and museums. Entrepreneurial activities revolve around tourism and hospitality (prominent among the activities are bungee jumping, elephant rides, helicopter flights and wild water rafting). The city became the capital of Zambia in 1911 after the shift from Kalomo until 1935 when the capital city was moved to Lusaka. The city is located in the southern part of Zambia and shares borders with Namibia, Botswana and Zimbabwe (Livingstone City Council Strategic Plan 2010).

Lusaka is the capital city of Zambia, and is situated in Lusaka Province. The population of Lusaka is dynamic due to urban migration and being the market centre for the whole country, therefore, it keeps on increasing in size every day (Lusaka District Situation Analysis Report 2015). The majority of the city's people are engaged in entrepreneurial activities of various types ranging from small-scale manufacturing and fabrication activities to high-level businesses in manufacturing and Financial services. Equally, prominent are MSEs popularly known as "Tuntemba" and street vending for which the majority earn an income. Lusaka has a population of 1.8 million out of which only a small fraction of the people work in formal establishment. One of latest developments in the city is the development of shopping malls which are providing competition to the local businesses. Being the capital city, Lusaka is

the leading financial centre. Central bank and headquarters of leasing, microcredits companies, local banks and international banking institutions are located in Lusaka (Lusaka District Situation Analysis Report 2015).

Established in 1951, Kitwe's major economic activity is copper mining, thus, attracting all sorts of entrepreneurial activities related to this industry such as transportation, recycling of raw materials and used goods. The city has two compact and well laid out commercial centres with shopping facilities including large privately owned stores and many medium but well-stocked shops dealing in various goods. Kitwe used to be the most industrialised district in the Copperbelt Province. However, most of the manufacturing companies have closed down due to unfavourable competition with companies in the subregion, especially South African companies. As a result, a significant number of people have lost jobs due to retrenchments and have been pushed into entrepreneurial activities such as trading and provision of services (Kitwe District Situational Analysis Report 2011). One of the latest developments in the city is the increase in the number of shopping malls which have increased competition for the local small shop holders.

Ndola is the third largest city of Zambia; the city is the Provincial Headquarters of the Copperbelt Province. During the flourishing copper mining era of the 1960s–1970s, Ndola became the leading commercial, industrial and distribution centre. However, the city experienced a period of economic slump mainly due to the government's economic liberalisation and privatisation policies of the 1990s. The economic activities of Ndola have gradually increased as evidenced by a number of infrastructure development programmes being undertaken and a fast-growing extractive industry that has led to the setup and expansion of companies like Zambezi Portland Cement, Lafarge Cement, Ndola Lime, Nelcant Lime Company and Dangote Cement (Ndola District Situation Analysis Report 2015). Entrepreneurial activities in Ndola include vegetable farming, poultry, fish production, beekeeping and services (Ndola District Situation Analysis Report 2015).

The four cities represent the most prominent forms of entrepreneurship in Zambia. While Livingstone is dependent on tourism and hospitality industry, Lusaka being the major administration centre of the country attracts entrepreneurial activities in trading and service provision. The two Copperbelt towns attract entrepreneurial activities related to mining and supply of agricultural products to mining-related employment. From the previous discussion of entrepreneurial activities in urban areas, highlighting four important cities in Zambia, it can be concluded that location can be a determining factor in establishing a business. Each urban area has specific characteristics that attract entrepreneurs. Besides the geographical and socio-economic factors that shape a location, entrepreneurs can also have certain personal factors that influence their choice of the location of the business within a specific urban area. In the next section, the individual factors influencing the location decision of entrepreneurs in urban areas is empirically explored.

13.4 Factor Influencing Location of MSEs in Urban Areas: The Case of Kitwe

Entrepreneurship has been considered as a cause and outcome of the geographical distribution of economic activity (Plummer and Pe'er 2010). Entrepreneurs seek to fulfil unmet market demands in an effective and efficient way through local innovations. As such, the choice of location, be it region or neighbourhood within a city may influence the entrepreneurial success. The choice of location has a potential to unlock an entrepreneur's alertness and ability to discover profitable opportunities. Each location has its own unique collection of profit opportunities that entrepreneurs may discover as a result of how markets coordinate knowledge that is specific to time and place (Andersson 2005). The conditions conducive to entrepreneurial activity vary across space even within national boundaries. In this section, we present a case study of Kitwe city in Zambia, an urban area with abundant entrepreneurial activities. The case highlights the factors that influence the location of MSEs in low-cost residential (i.e. typified as "urban" in this chapter) areas. Residential characteristics can be an important barrier or enabler to locating an MSE in a residential area (Reuschke 2016).

13.4.1 Factors that Influence Business Location in Residential Areas

In general, the decision of where to locate an MSE involves making trade-offs in maximising potential economies of scale and minimising costs such as rent (Dubé et al. 2016). The objective of making such trade-off decisions is usually profit optimisation by the entrepreneur by targeting cost minimisation (Daniel and Ellis-Chadwick 2016; Mason et al. 2011). One way of achieving this is by locating a business in an area that provides competitive setup and operational costs. The use of residential areas can considerably reduce start-up and operational costs. The availability of adequate space within the residential area is one of the primary cost-related reasons for locating a business in a residential area (Vorley and Rodgers 2012). Entrepreneurs who have access to adequate, flexible space within a residential area are likely to locate such businesses in that space. Access to housing can provide financial security and space as well as the flexibility needed for entrepreneurship (Reuschke 2016).

The majority of residents in low-income residential areas in Kitwe became engaged in necessity-motivated entrepreneurship after job losses due to the privatisation of copper mines in the 1990s. Most of the former employees were compensated with home ownership schemes and cash benefits. This made them have some form of start-up capital and an area to trade from (Mususa 2010). As a way of reducing costs, homeowners engage in mixed land use for both business and residential dwelling.

Entrepreneurs may consider their businesses too small (i.e. the MSE type of business) to support cost of separate premises away from their residence. Additionally, locating a business at the residence reduces the security risks. Thus, cost considerations include adequate space, acceptance of mixed land use, security of a business, and the size of informal activity. Therefore, we hypothesise that:

Hypothesis 1 (H1) Cost considerations have an effect on the decision to locate MSEs in residential areas.

One of the reasons African entrepreneurs choose to operate in the informal economy is the administrative difficulties and cost to properly register and operate a licensed business (Khavul et al. 2009). MSEs are likely to exist where the costs of formalisation reduce the profit potential of the business. Such formalisation includes registration to tax and local authorities. Some of the factors that have been identified as leading to increase the numbers of MSEs established are taxes, regulatory discretion and cost of market entry (Monteiro and Assunção 2012; Williams et al. 2016). Low-income residential areas offer MSEs lower costs for start-up and market entry because of the weaker legal and regulatory enforcement that exist in such locations. Tax administration and collection from the informal sector in high density, low-income areas tend to stretch the tax authorities (Dube 2014). Further, locating a business in such areas may lead to lower risk of detection by the tax authority. Therefore, high density, low-income areas may act as tax avoidance havens and attract MSEs. Hence, we hypothesise that:

Hypothesis 2 (H2) Desire to avoid tax has an effect on the decision to locate MSEs in residential areas.

Lack of access to alternative commercial places resulting from lack of awareness and institution corruption at planning authority can also influence the decision to locate MSEs in residential areas (Mason et al. 2011). Commercial places tend to be expensive and in high demand in urban areas. The lack of capacity by the planning authorities, backlogs in land administration and weak land delivery systems have resulted in corruption in the land allocation systems in Zambia's urban areas (Chitonge and Mfune 2015; Taylor and Thole 2015). MSEs also have limited information on the availability of commercial places which limits their ability to consider them as possible business locations. Therefore, we hypothesise that:

Hypothesis 3 (H3) Lack of access to alternative commercial places resulting from lack of awareness and institutional corruption at planning authority has an effect on the decision to locate MSEs in residential areas.

Apart from economic drives, personal lifestyle factors can influence the choice residence as the location of a business (Walker and Brown 2004; Vorley and Rodgers 2012). Such factors offer convenience and flexibility for the entrepreneur and may

include proximity to family and comfort of the entrepreneur with the location. Locating a business in a residential area enables the entrepreneur the flexibility to operate a business that accommodates family needs. Further, residential areas may offer convenience by being near to customers as well as reducing urban commuting for the entrepreneur. MSEs are more reliant on local communities and the use of a physical facilities nearby location may reinforce network ties which may be a resource for the business. Thus, we hypothesise that:

Hypothesis 4 (H4) Personal lifestyle factors have an effect on the decision to locate MSEs in residential areas.

13.5 Methodology

13.5.1 Sample and Data Collection

Our sample was drawn from low-income residential areas in Kitwe, Zambia. The respondents in our sample included entrepreneurs running and owning MSEs who were operating in areas not officially designated as business or trading areas by the local authorities. As such, we targeted MSE owners that operated within their residences such as small shops (i.e. commonly known as the previously mentioned "Tuntemba") and small workshops. Out of the 820 questionnaires that were distributed, 617 were returned fully completed and usable, giving a response rate of 75%.

13.5.2 Measures

The entrepreneur's preference to locate the MSE in a residential area is the dependent variable for this research. We asked the entrepreneurs to indicate on a five-point Likert scale (ascending order), the extent to which they (not) agreed with statements that indicated their preference to locate a business in a low-income, high-density residential area.

We used Principal Component Factor Analysis with Varimax rotation to assess the convergent validity and reliability of the measurement scale. The Kaiser–Meyer–Olkin (KMO), a measure of sampling adequacy, was 0.70 and Bartlett's Test of Sphericity (BTS) was significant at $p < 0.01$. All communalities for the variables were above the critical value of 0.30. All the items on the scale loaded on one factor and accounted for 49.68% of the total variance. The scale also showed reliability with a Cronbach's alpha (α) value of 0.66.

Regarding the independent variables, these were based on factors that can motivate the entrepreneurs to locate their MSEs in high density, low-income areas. The factors were grouped into cost considerations, entrepreneur's attitude towards tax avoidance, perceived lack of access to commercial trading places and personal lifestyle factors. Cost considerations included the availability of space, possibility of mixed land use within residence, size of business and security (covering *H1*). Tax avoidance involved measuring the respondents desire to avoid tax (covering *H2*). The access to alternative commercial trading places was measured based on the respondent's awareness of planned trading areas and perceptions of the level of corruption on allocations of such spaces (covering *H3*). The measurement of personal lifestyle factors involved asking the respondents about their desire to locate the MSE close to the family and residential home, and the overall satisfaction and comfort of the entrepreneur in having the MSE in the residential area where s/he resides (covering *H4*). For all the factors, we asked the entrepreneurs to indicate on a five-point Likert scale (again, ascending order), the extent to which they (not) agreed with statements that measured the above factors. All scales showed convergent validity and reliability.

13.6 Results

Table 13.1 presents the mean values, standard deviations and correlations among all the variables in the study. The correlations among the variables representing cost considerations of locating MSE in the residential area hypothesized in *H1*, namely availability of space, mixed land use, size of business and security of business, were positively correlated, ranging from $r(607) = 0.21–0.07$, $p < 0.05$. The correlation between lack of awareness and institutional corruption in allocating planned trading spaces representing access to alternative commercial trading places as hypothesized in *H3* was statistically significant $r(607) = 0.27, p < 0.01$). Similarly, the correlation between the proximity to family and satisfaction of the entrepreneur with location, representing personal lifestyle factors as explained in *H4* was statistically significant $r(607) = 0.11, p < 0.01$. Additionally, all but one of the correlations between independent variables and the dependent variable were statistically significant ranging from $r(607) = 0.13–0.44, p < 0.01$. The variable regarding adequate space within the residence was not correlated with the dependent variable. All the inter-factor correlations were below the recommended level of 0.80 indicating that multicollinearity was not a problem (Tabachnick and Fidell 1996a, b). Overall, the correlation table results suggest that there was a significant positive association between the independent and dependent variables.

We used a linear regression model to identify factors which influenced the decision to locate the MSE in a low-income residential area. The results are shown in Table 13.2.

Table 13.1 Descriptive statistics and correlations

#	Variable (relation to hypothesis)	Mean	Standard deviation	Correlations								
				1	2	3	4	5	6	7	8	9
1	Adequate space within the residence	3.22	0.79	–	–	–	–	–	–	–	–	–
2	Mixed land use at residence	3.73	0.98	0.07[a]	–	–	–	–	–	–	–	–
3	Security of business	3.81	0.72	0.21[b]	0.31[b]	–	–	–	–	–	–	–
4	Size of informal activity	3.87	0.66	0.14[b]	0.01	0.15[b]	–	–	–	–	–	–
5	Tax avoidance	3.82	0.84	0.09[a]	0.03	−0.06	0.30[b]	–	–	–	–	–
6	Lack of awareness	3.90	1.03	0.17[b]	0.16[b]	0.22[b]	0.18[b]	0.11[b]	–	–	–	–
7	Institutional corruption at planning authority	3.50	0.95	0.13[b]	0.10[b]	0.23[b]	0.07	0.10[a]	0.27[b]	–	–	–
8	Proximity to family and residence	4.06	0.62	0.02	0.07	0.05	0.14[b]	0.30[b]	0.04	0.07	–	–
9	Satisfaction and comfort of the entrepreneur with location	3.98	0.72	0.13[b]	0.39[b]	0.34[b]	0.23[b]	0.14[b]	0.37[b]	0.16[b]	0.11[b]	–

[a]Correlation is significant at the 0.05 level (two-tailed)
[b]Correlation is significant at the 0.01 level (two-tailed)

Table 13.2 Linear regression model of determinants of locating MSEs in residential areas

Variables (relation to hypothesis)	Beta	Standard error	Significance value
Adequate space within the residence (*H1*)	−0.02	0.03	0.38
Mixed land use at residence (*H1*)	0.04	0.02	0.10
Security of business (*H1*)	0.02	0.03	0.61
Size of MSE informal activity (*H1*)	0.28	0.03	0.00
Tax avoidance (*H2*)	0.19	0.03	0.00
Lack of awareness (*H3*)	0.03	0.02	0.21
Institutional corruption at planning authority (*H3*)	0.05	0.02	0.04
Proximity to family and residence (*H4*)	0.01	0.03	0.79
Satisfaction and comfort of the entrepreneur with location (*H4*)	0.10	0.03	0.00
F	–	–	30.55[a]
Model R^2	–	–	0.31
Adjusted R^2	–	–	0.30

[a]Effect is significant at the 0.01 level (two-tailed)

The regression model was statistically significant with R^2 value of 0.31 ($F = 30.56$; $p < 0.01$). The factors that significantly influenced the location of MSEs in residential areas were the entrepreneur's attitude towards tax avoidance ($\beta = 0.19$; $p < 0.05$), perceived levels of institutional corruption at planning authority ($\beta = 0.05$; $p < 0.05$), size of the MSE informal activities ($\beta = 0.28$; $p < 0.01$) and the overall satisfaction and comfort of the entrepreneur in having the MSE in the residential area where he resides ($\beta = 0.10$; $p < 0.05$). The influence of failure to apply for designated business land due to lack of awareness, the existence of adequate space within the residence that could be used as a trading area, mixed land use of residence, security of the business, desire to locate the MSE close to the family and residential home (Proximity of family and residence), were not statistically significant. In sum, all the results from Table 13.2 indicate a partial acceptance of *H1*, *H3* and *H4*, however, *H2*, is fully accepted.

To check whether our results hold regardless of the assumptions made in the model, we conducted robustness checks using the procedure outlined by Young and Holsteen (2017). This procedure demonstrates model robustness across sets of possible variable definitions, controls, standard errors and functional forms, using all possible combinations of the specified model ingredients and identifies the variables in the model that are empirically most influential. Thus, Young and Holsteen (2017)

procedure tests show how estimated results are sensitive to different configurations of the tested model (Nikolaev et al. 2018). The results of this analysis (see Appendix) confirm that within the scope of our configurations, the regression results presented in Table 13.2 were robust.

13.7 Concluding Discussion

Urban entrepreneurship in Zambia began to evolve after the British colonial rule in 1964. Since Zambia's independence, its economy has gone through different development stages to foster diversification, privatisation and creating an open, liberal market economy. Although some institutional changes have been more effective than others, contemporary Zambia has a number of clearly distinctive urban areas each characterised by different entrepreneurial activities. Yet, the common denominator of entrepreneurial activities in urban areas in Zambia is the making and retailing of products which are typical for factor-driven economies. The entrepreneurs selling these products have learned how to use creative responses to changes over time in the institutional environment.

The different entrepreneurial activities in the main urban areas can be described as follows: Livingstone is widely known as a tourist destination, thus, attracting much entrepreneurial activities related to safaris, excursion and hospitality; Lusaka is the heart of the country offering the main economic and governmental services—and entrepreneurial activities related to this. Kitwe and Ndola are known for the mining industry: entrepreneurial activities are usually the types that relate closely to the industry (e.g. transportation, recycling of raw materials and used goods), as well as other activities such as fishing and poultry.

Besides the social-political factors from the institutional environment, the entrepreneurs also have personal factors to make decisions of locating their MSEs in a particular urban area. In the showcase of Kitwe, the results indicate that business location decisions were primarily driven by factors that include the entrepreneur's attitude towards tax, perceived levels of institutional corruption, size of the informal business activities and the overall satisfaction and comfort of the entrepreneur in having the business in the residential area where he or she resides.

Appendix

Variables	(β)	R Ratio	Sign stability	Sign rate	Positive	Positive and significant	Negative	Negative and significant	N	Overall
Adequate space within the residence (*H1*)	−0.023	0.067	55	0	45	0	55	0	617	Not Robust
Mixed land use at residence (*H1*)	0.038*	1.526	100	49	100	49	0	0	617	Not Robust
Security of business (*H1*)	0.016	0.890	89	26	89	26	11	0	617	Not Robust
Size of informal activity (*H1*)	0.284***	6.649	100	100	100	100	0	0	617	Robust
Tax avoidance (*H2*)	0.189***	5.441	100	100	100	100	0	0	617	Robust
Lack of awareness (*H3*)	0.027	1.884	100	73	100	73	0	0	617	Not Robust
Institutional corruption at planning authority (*H3*)	0.046**	2.310	100	94	100	94	0	0	617	Robust
Proximity to family and residence (*H4*)	0.009	1.096	100	50	100	50	0	0	617	Not Robust
Satisfaction and comfort of the entrepreneur with location (*H4*)	0.097***	3.208	100	100	100	100	0	0	617	Robust

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

These results are based on the Young and Holsteen (2017) methodology. The results are a summary of modeling distribution of all the variables in our regression model. The analysis is based on 265 unique combinations of the nine core variables

(β) = average β coefficient across all 256 estimations, R Ratio = robustness ratio. If higher than 2, it suggests robustness (Young and Holsteen 2017); Positive is the percent of models in which the variable enters with a positive sign; Positive and significant is the percent of models in which the variable enters with a positive and significant sign; Negative is the percent of models in which the variable enters with a negative sign; Negative and significant is the percent of models in which the variable enters with a negative and significant sign; Sign stability indicates the percentage of models that have the same sign; Sig rate is the significance rate indicating the percentage of models that report statistically significant coefficient. A significance rate of 95% or higher indicates strong robustness while a significance rate of 50% sets a lower bound for weak robustness; N = number of observations

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Chapter 14
Entrepreneurship in Chinese Cities in the Post-reform Era

Liou Xie

Abstract This chapter reviews and summarizes the driving forces of urban entrepreneurship in China in the post-reform era. The objective is to answer questions pertaining to the current status and future trends of entrepreneurship, including What are the milestones in institutional restructuring and their significance? What are the political, economic, and social forces that have either positive or negative effects on urban entrepreneurship? And, how are these forces reflected in the current status of entrepreneurship? The chapter, however, raises concerns about tariff fights between two major exporting economies (US and China). It also suggests in-depth investigation of impacts of mutual tariff barriers on export-oriented entrepreneurs.

Keywords Urban entrepreneurship · China · Post-reform era

14.1 Introduction

The rapid economic growth of China in the post-reform era since 1978 attributes to a complex interplay of institutional reforms, market economy, and participation in the global market. Privatization, the creation of land and property markets, decentralization of governance, and the policy preference for attracting Foreign Direct Investment (FDI) have been some of the major drivers of industrialization and urbanization during this transitional era. The constitutional amendment in 2004 to recognize and protect the lawful rights of the private economy and the passing of a property rights law in 2007 created a supportive institutional environment for the growth of entrepreneurship. These forces also created a vigorous environment for active local entrepreneurship, learning from the administrative experiences and technological advancement brought by international investors, trying to serve the large domestic market and the "newly" accessible international markets (The Economist 2011).

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Entrepreneurship is recognized as a major driving force behind a country's economic growth, especially in terms of driving innovation, increasing economic diversity and employment opportunities, and improving competitiveness (Gürol and Atsan 2006). In post-reform China, both necessity entrepreneurship and opportunity entrepreneurship have been observed to be growing, utilizing individual human and financial capitals. Entrepreneur-led small and medium-enterprises (SMEs) have been playing an important role in improving economic prosperity and social stability. It's estimated that SMEs accounted for 99% of the total number of enterprises in China, accomplishing 70% of new patents, providing over 80% of new jobs, contributing to 50% of total taxes and 60% of GDP in 2017 (Xinhua News 2017).

This chapter reviews and summarizes the driving forces of urban entrepreneurship in China in the post-reform era. The objective is to answer questions pertaining to the current status and future trends of entrepreneurship, including the following:

(1) What are the milestones in institutional restructuring and their significance?
(2) What are the political, economic and social forces that have either positive or negative effects on urban entrepreneurship? and,
(3) How are these forces reflected in the current status of entrepreneurship?

The chapter ends with a discussion about the future trends of entrepreneurship of China as informed by some recent shifts in both domestic and global circumstances.

The analytical framework is illustrated in Fig. 14.1. The exploration of institutional reforms helps build the foundation for understanding the emergence and evolution of the entrepreneurial ecosystem. While the institutional foundation is built for the whole country, the analysis of entrepreneurship growth in this chapter focuses on the urban areas. Based on this foundation, a range of political, economic and social drivers are evaluated according to their positive or negative impacts on entrepreneurship. Discussion covers the impacts of legislative advancements, decentralization and revenue pressure at different levels of the government, the banking industry reforms as formal capital sources, transitions of the social welfare system, the effects of the booming housing markets, as well as some circumstances functioning as push or pull factors for start-up activities. The success of entrepreneurship in China also largely benefited from a thriving global market and the Central Government's efforts for creating a friendly international trading environment. With the state recognition

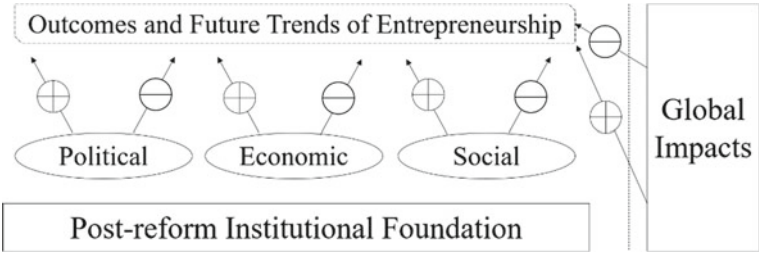

Fig. 14.1 Analytical framework

of the importance of entrepreneurship for the economic growth and job creation, policy incentives in favor of entrepreneurship will continue to be implemented. It is expected that China's entrepreneurship will transition toward innovation-based. However, recent changes in the global trading policies present considerable uncertainties for the Chinese entrepreneurs who are export-oriented opportunity chasers.

14.2 The Institutional Foundation for Entrepreneurship

Entrepreneurship ecosystems are a concept that combines local cultural outlook, social networks, investment capital, knowledge generation, and active economic policies that create supports for capital ventures (Spigel 2017). Entrepreneurship is recognized to happen in two forms. Necessity entrepreneurs mobilize their formal and informal resources to start a business due to the lack of alternative options; while opportunity entrepreneurs seized what they perceive as business opportunities with good potential for success (Gilad and Levine 1986).

When economic reforms started in 1978, the efforts were primarily in the east coastal regions which gradually spread to the inland. A range of new entrepreneurial forms beyond the transitioning State-owned Enterprises (SOEs) started to emerge, including village and town collective enterprises and private start-ups (Huang 2008). Institutional reforms protecting the private investment came much later than the economic innovations. It wasn't until September 1997 at the 15th Party Congress did the country see a momentous shift in the Chinese ownership system. For the first time, private ownership was officially recognized as an important component of the economy, as a complement to the state ownership which stepped down as one of the economic pillars (Qian 2004). On November 16, 1999, <Several Opinions about Establishing a Venture Investment Mechanism by the State Council> was approved and released, as the first government document laying out guidelines for venture capital regulations in China (Government document 1 1999). Soon after that, the Law on the Promotion of SMEs was released in 2003, amended in 2017, as the first special law for encouraging entrepreneurial organizations in China (Legal document 1 2017).

All these small steps for pushing forward the private investment led to the 2004 Constitutional Amendment to "protect the lawful rights and interests of the private sector", providing the private economy with legal protection. Furthermore, the Property Law adopted in 2007 defined the ownership of property and regulated the creation, change, transfer and elimination of real right (Legal Document 2 2007). These legislative advancements were the milestones in China's post-reform history, having profound impacts on individuals' confidence to invest in entrepreneurial initiatives. In 2011, the National Development and Reform Commission established the goal of implementing a good global strategy, by improving the financial and tax, insurance tax to support Chinese private enterprises (Iacob 2015; Zhou 2012).

On the other hand, the institutional reforms of social welfare, especially health insurance schemes, provide further support for urban entrepreneurs and improve their job security and mobility. Urban residents in China during the social era were regulated based on their urban *hukou* status, receiving all social benefits through their SOE employers. With the dissolution of planned economy and weakening SOEs, a new welfare system was gradually established after years of experiments and adjustments. Today, while over 98% of the rural residents are covered by the voluntary New Cooperative Medical System (NCMS) established in 2003, urban residents are now covered by the Urban Employee Basic Medical Insurance (URBMI) and the Urban Resident Basic Medical Insurance (URBMI), in addition to a small number of commercial health insurance (Dong 2009).

URBMI is also a voluntary program, which was piloted in 2007 and fully adopted in China in 2009, allowing urban *hukou* residents without formal employment to be insured. Under this program, the unemployed and self-employed urban population are now covered by subsidies from central-local government (about 36% of the cost on average), on top of their personal contribution. According to the China Statistic Yearbooks, a total of 448.6 million urban residents were covered under URBMI in 2016, showing a 129.7% increase from the 195.28 million insurers in 2010. Based on the China Health and Nutrition Survey data (2000–2011), Liu and Zhang (2018) find that URBMI has a very positive impact on urban entrepreneurship and the urban labor market, as it largely improves job mobility for workers with lower wage. It's estimated that the self-employment rate was increased by URBMI by 8.73% when comparing urban residents with and without an urban *hukou* status.

Financial sources, both formal and informal, are key to the success of entrepreneurs. Besides mobilizing informal financial sources through personal relationships (*guanxi*), both necessity and opportunity entrepreneurs, at different levels, are restricted by formal capital sources. Banking and financing regulations have been loosening up with all other reforms under the principles of stimulating economic growth (Hua et al. 2016).

Different from the single central banking system during the period between 1949 and 1978 when the People's Bank of the China (PBC) dominated the financial system using a strict top-down administrative system, financial and banking reforms since 1978 established a dual central banking system that consists of both central and local banks where the central bank is responsible for monetary policies while the local banks enjoy more decision-making power in the day-to-day operation. There are three main phases of banking reforms since 1978.

Reform Phase 1 (1979–1994): Establishment of specialized banks, along with dual central banking system. During this period, four main specialized banks were established, including Agricultural Bank of China (specialized in agriculture), Bank of China (specialized in foreign exchanges), Industrial and Commercial Bank of China (specialized in industries and commerce), and China Construction Bank (specialized in infrastructure construction). In the meanwhile, PBC transformed to function as the central bank for the nation. In 1986, the Bank of Communications, originally established in 1908, was recapitalized.

Reform Phase 2 (1994–2003): The main reform during this period was the separation of policy-oriented banking operation from the commercial function. Three main policy lenders, i.e., China Development Bank, the Export-Import Bank of China and the Agricultural Development Bank of China, were established to practice in their exclusive fields. The above four specialized banks were instead transformed into the largest wholly state-owned commercial banks. A major milestone was the first National Financial Work Conference (NFWC) held in late 1997, right on the brink of the Asian Financial Crisis. A number of measures were taken to improve the performance of bank assets and to strengthen the regulation of the banking industry. Such measures included issuing special treasury bond in 1998 to improve the capital base of commercial banks, establishing four financial assets management companies in 1999 to deal with nonperforming loans, and to implement a united credit granting system in commercial banks. Since then, NFWC has been held every 5 years, to identify and solve issues in the industry.

Reform Phase 3 (since 2003): the second NFWC in 2002 started a new round of reforms for the commercial banks, transitioning them from wholly state-owned to state-controlled shareholding banks. Today, the profile of banks in China has evolved into a very diverse system.

The banking system of China has remained closed to the global investment market until early 1980s. Along with economic reforms and commercialization of state-owned banks, China has been gradually opening up its capital market to foreign banks and financial institutions. Some key milestones are listed below:

- A representative office of Japan's Export-Import Bank was opened in Beijing in 1980.
- Nanyang Commercial Bank (Hong Kong) established a branch in Shenzhen in 1981.
- Regulations Governing Foreign Banks and Joint Chinese-Foreign Banks in Special Economic Zones of the People's Republic of China, 1985–1994.
- Regulations of the People's Republic of China on the Management of Foreign-Funded Financial Institutions, 1994–2001. Amended in 2002.
- Notice on Implementing Relevant Administrative Measures for Foreign-funded Banks' Pilot RMB Business Operations in Pudong of Shanghai and Shenzhen, 1998.
- In 2001, China joined the World Trade Organization (WTO), and opened up its foreign exchange operations to all clients for all foreign banks.
- Detailed Rules for the Implementation of the Regulation of the People's Republic of China on the Administration of Foreign-funded Banks, 2006, amended in 2015.

Today, foreign banks and financial institutions in China largely concentrate on the economically more advanced coastal region. While mostly serving foreign companies, their Chinese currency operations have been expanding very fast in recent year, but mostly serving high-quality clients. Almost all of these reforms on financial institutions started in major cities, building a large, diverse and strong investment banking system (see Fig. 14.2).

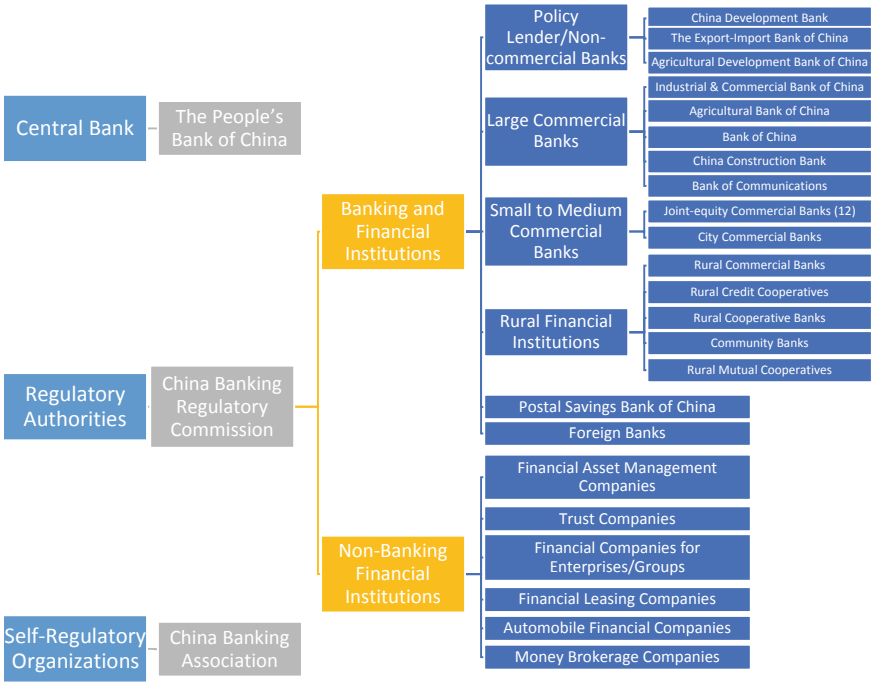

Fig. 14.2 The banking system of China today

However, researchers have found that SMEs are not at the frontline of these formal financial sources. The firm size, age, profitability, and incorporation largely limit their ability to access credit (Newman et al. 2012). Very few of the millions of SMEs in China were successful in obtaining formal financing (Cong 2009). By investigating into a unique data source for 260 urban entrepreneurs between 2007 and 2011, Elston et al. (2016) find that at the time of start-up, personal saving and family/relative funding are the most essential source of capital. For long-term growth and continuous investment, wealth and household income become the most important factor. While these informal financing sources will most likely continue to be the main funding for SMEs, further reforms are in need to establish banking and credit systems in China that offer financial support for its entrepreneurs.

Legislative reforms, open and supportive financial and social welfare institutions are crucial for creating a healthy entrepreneurship ecosystem. Through rounds of new regulations and programs for the past four decades, China has transformed from a planned economy to a market-dominated one, building a friendly investment environment for risk-taking urban entrepreneurs. While the state remains as a dominant influencer on the economy, through the control of large commercial banks and policy-oriented banks, for example, the market has been more and more open for competition for the past four decades.

14.3 The Political Drivers: Decentralization and Revenue Pressure

Administratively, the post-reform decentralization of urban management not only gives the local governments more decision-making power in terms of policy innovations as they are at the frontline of attracting investment but also promotes inter-jurisdictional competition that incentivized local officials to push for economic development. Urban entrepreneurship has been largely encouraged and favored by the local governments as a result.

China still maintains an overall top-down administrative system after four decades of reforms. Before December 2013 when sustainability indicators were added, urban managers' annual performance review had been solely focused on economic prosperity, such as growth of GDP and FDI attracted (Hu 2013). Under such evaluation framework, entrepreneurial policies were created in cities to foster a business-friendly environment to attract and fixed mobile capital. When the policy regimes are undergoing rapid changes and the local governments are endowed with decentralized policy-making power over the fine prints, pragmatism is usually the guideline for creating effective "policies that work" (Peck 2011). Such policies range from streamlining bureaucratic procedures, to preferred loan approval or terms, to favored deals on land or other resources. Economic incentives are usually the most commonly used, and fall into the following categories:

(1) Technological innovation subsidies;
(2) Land purchasing subsidies;
(3) Tax exemptions or deductions;
(4) Tax refund;
(5) Export rebates;
(6) Preferential credits.

This could be a double-bladed sword, as on the one hand, entrepreneurs enjoy preferential policies to open and run their businesses, while on the other hand, local development could become pollution havens (van der Kamp et al. 2017).

At the same time, reforms in the fiscal system changed the revenue structure of the country, providing local government with more power over taxing and spending within its jurisdiction (Rodden 2004). These fiscal reforms have been evolving since early 1980s and vary by province. Guangdong province, which has been a pioneer of economic reforms and geographically hosts Shenzhen Special Economic Zone (SEZ), for example, has gone through rounds of revenue changes:

(1) 1980–1985: a fixed quota of RMB$1 billion of its tax revenue was required to be handed over to the central government;
(2) 1986–1987: the fixed quota reduced to RMB$778 million;
(3) 1988–1993: the fixed quota increases by 9% annually starting from RMB$1.413 billion;
(4) 1994: marked a new era of China's fiscal management. The fixed quota system was abandon and replaced by a tax-sharing system that includes three categories

of tax collected: central tax, local tax, and shared tax. This newly created shared tax category includes value-added tax, securities transaction tax, and resource tax. The ratio between the central and provincial governments for value-added tax was set as 75:25 (Loo and Chow 2006);

(5) 2002: income tax (corporate and personal) started to be included in the shared tax categories. Using the 2001 amount as the baseline, any income tax beyond the baseline is shared between the central and provincial government at the ratio of 50:50 in 2002, which was changed to 60:40 in 2003.

The fixed quota system before 1994 provided significant incentives for the local government to attract more private investment and to promote higher economic output. Since 1994, under the tax-sharing system, local government has a strong incentive for increasing tax revenue from industries that are not included in the shared tax categories. As China is highly unequal in economic development, with the coastal region being much more developed than the other parts, some cities with a strong tax base to focus more on innovation in governance and sustainability to support and encourage higher quality and environmentally more responsible entrepreneurship. While other cities with weaker revenue-generating capacity tend to base their economic growth on resource-intensive industries and are less environmentally transparent (van der Kamp et al. 2017).

14.4 The Economic Factors: Push or Pull

From an individual perspective, economic factors brought by the post-reform transitions in China have either a push or pull impact on entrepreneurship, especially for small and micro firms.

With the privatization and restructuring reforms of the SOEs, some of them had to reduce their numbers of employees or emerged to achieve better efficiency while some others failed to adjust to the new market mechanisms and had to close down. The result is the sudden increase of the number of laid-off workers between the early 1990s and the early 2000s. According to Liu and Wang (2005), about 2.5 million SOE workers were laid-off in 2002. The number peaked in 1997 at 11.51 million. After that, it decreased but remained at a high level of 6.18 million in 2002. For those 11 years, an accumulated total of 76.01 million workers were laid off, averaging 6.91 million per year. Urban unemployment rate escalated from 2.3% in 1992 to 3.1% in 1997 and peaked at 4.3% in 2003. It has remained above 4.0% ever since (China Statistical Yearbooks, various years). The sudden loss of their jobs and all the social benefits associated with it, turned many laid-off workers to the burgeoning private employers or jump-starting their own businesses from small. Most of them fall into the category of necessity entrepreneurs. While the government provides preferential policies for laid-off workers turning to entrepreneurs, such as streamlining registration procedure and tax reduction, sources of funding and continuous financial support remained as their main challenges. Starting from the end of 2005, “laid-off workers” from their

former SOE employers have been considered as a historic concept as they are treated as general unemployment in the statistical sense.

Along with economic reforms, China has been rapidly urbanized, with an urbanization rate that increased from 19.39% in 1980 to 35.39% in 2000 to 58.52% in 2017. Total registered urban population grew from 191.4 million to 813.47 million for the same period (China Statistical Yearbooks, various years). There are usually two ways of urbanization: transitioning existing rural areas to urban land uses and moving people from rural to urban areas. Both processes have been happening simultaneously in China. Major metropolitan areas like Beijing and Shanghai have expanded tremendously for the past four decades, by expropriating land in the peripheral areas for urban development, turning a large number of farmers to urban residents without land (Wu et al. 2004). Take Beijing for example. According to three National Agricultural Censuses conducted in 1996, 2006 and 2016, total farming land within the boundary of Beijing Municipality decreased from 3,440 to 2,325 to 1,052 km^2. These land-lost farmers and residents had to find some other livelihood. Having a relatively lower education level than their urban counterparts, a large number of them resorted to starting their own small or micro businesses. Based on a small data sample obtained from a few areas around Hangzhou and Ningbo in Zhejiang province, Bao et al. (2016) found that while the amount of compensation has a negative impact on the entrepreneurial behavior of land-lost farmers, their entrepreneurial behavior is largely driven by achievement motivation, innovation orientation, and social capital they are able to mobilize. Their land location relative to the urban center and local policies also seem to have a positive impact on their entrepreneurial decisions. Compared with those much farther away from the city center, land-lost farmers living in the urban–rural fringes are closer to urbanization, urban lifestyle with better access to information, which offers them more opportunities and motives to start their own business. This is another type of entrepreneurship that hasn't really received a lot of policy support, but has provided a living for many (Bao et al. 2016; Bao and Peng 2016; You 2017).

Surprisingly the rapid appreciation of housing prices in most Chinese cities is observed to have a negative impact on urban entrepreneurship. Reforms in the land and property markets were a key part of the market-oriented economic reforms. Urban housing was allocated based on one's work unit (i.e. state employer) during the planned economy era. By separating user right from land ownership, China has been able to build a commercial housing market that allows people to own and transfer property rights under the regime of state ownership. Commercial residential development mushroomed in cities, with the average sales price skyrocketing in the past two decades driven by high demand and speculation (see Fig. 14.3, using Beijing and Shanghai as examples). Wei and Zhang (2011) find that the continuous rising price of housing convinces people that buying houses is one of the safest ways of investment with a high return rate for a relatively short period. It also fits perfectly well with the Chinese tradition of valuing home ownership. This negative impact of surging housing price plays on both house owners and nonowners when faced with opportunity entrepreneurship. For house owners, while their total wealth increase, the ratio of mortgage over income has discouraged them from being risk-

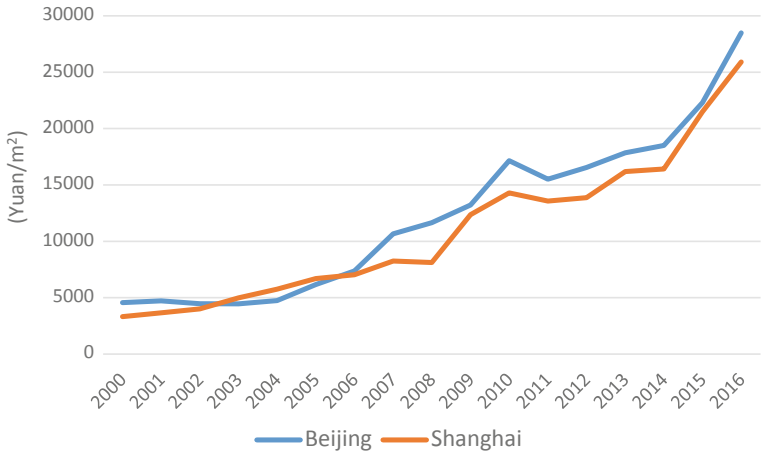

Fig. 14.3 Average sales price of commercial residential properties in Beijing and Shanghai, 2000–2016 (*Source* China Statistical Yearbooks)

taking entrepreneurs. For nonowners, the low affordability of houses, as reflected in increasing rental prices, also decreases their chance of turning into entrepreneurs (Li and Wu 2014).

14.5 The Social Drivers: *Guanxi* and Human Capital

Social capital has always been recognized as an essential asset in entrepreneurship theories, which emphasizes the importance of access to information, and opportunities and support brought by social networks. In the Chinese context, social networking is perceived in the concept of *guanxi*. When in the realm of business, *guanxi* has multiple implications that refers to not only the intricate network of connections and obligations businessmen develop and maintain to gain access to resources and advantages, but also the dynamic exchange of favors that keeps the relationships mutual beneficial and continuous (Abramson and Ai 1997). *Guanxi* can exist naturally, such as family *guanxi*, or need to be cultivated, activated and maintained through constant networking activities (Fan 2002). For urban opportunity entrepreneurs, *guanxi* brings exclusive information that is not available outside their *guanxi* circle, resources to turn the opportunity into business, and support for continuing business success financially or institutionally. For urban necessity entrepreneurs, the *guanxi* circle they usually start with is their family, friends, and relatives who could offer both financial and emotional support. Successful entrepreneurs, either opportunity or necessity ones, will be able to expand and reinforce their *guanxi* circles to gain long-term resources and benefits (Wang 2007).

In efforts for understanding the underlying driving forces of *guanxi*, researchers observe that historical tradition and fellow-townsmenship play a more significant role in the Chinese Confucius culture than the Western context (Wang and Shen 1989). Liu et al. (2015) examine the behavior and decision-making processes of the Ningbo Bang doing business in the nearby Shanghai, a group of entrepreneurs from the port city of Ningbo which has a long and strong history of entrepreneurship that can be traced back as far as the Song Dynasty (960–1279 AD). Fellow-townsmenship refers to a special type of homophilous network of people with shared identities based on their common birthplace. When doing business away from their hometown, they bond together in a similar way as expatriates who understand and follow shared implicit norms. After hundreds of years of migrating to major cities in China and engaged in the trading business, Ningbo Bang formed a distinctive tradition of trust and commitment, belief in mutual support and sharing resources. Such a strong shared social capital not only allow Ningbonese to exploit business opportunities but also offer viable business partners to form joint ventures to increase their competitiveness.

Human capital, especially the individual's educational levels and skills, contributes to entrepreneurs' success by equipping them to identify opportunities and learn about the markets and technologies (Shane 2000). Higher formal education also enables individuals to better exploit opportunities (Dimov 2017). In the recent decade, there seems to have been an uprising trend of college student entrepreneurship in China. According to a study published by MyCOS Research and the Chinese Academy of Social Science, the number of college graduates who started their own business increased from 1.6% in 2011 to 3% in 2017, which translates into about 200 thousand entrepreneurs with post-secondary education. Besides the high entrepreneurial intention of college students, the universities and the government both contributed to this rising entrepreneurship by providing policy incentives, curriculum support, and incubator facilities. In 2016, the Ministry of Education issued a guideline that encourages university teachers to be creative about their pedagogical methodologies and turn their research into products or even businesses. Many universities hold innovation and entrepreneurship competitions to provide space, such as offices, conference rooms, and workshops, for start-ups (Zhou 2017). E-commerce and catering consistently are the most popular entrepreneurial industries. Limited access to starting capital continues to be the biggest challenge. About 54% of the college entrepreneurs pool their start-up funding from informal sources such as parents or relatives. 24% of them set aside enough personal savings. Very few are able to obtain investment from venture capital or government fund or loans (see Fig. 14.4). The lack of managerial expertise and marketing problems present additional hurdles (Ma 2017). Research also found that their survival rate is around 5%, much lower than their counterparts in the Western countries (MyCOS Research 2017; You et al. 2017). Providing college graduate entrepreneurs with viable financial schemes and managerial and marketing training seems to be an effective way to help them achieve success.

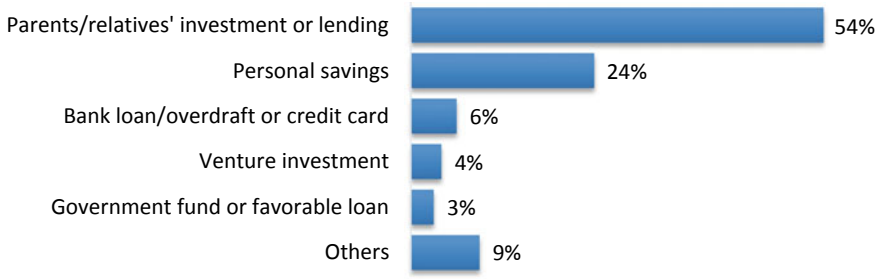

Fig. 14.4 Source of starting capital for college entrepreneurs (*Source* Ma 2017)

14.6 Trend, Current Status, and the Future of Chinese Urban Entrepreneurship

China has come a long way since 1978 to build a healthier ecosystem for urban entrepreneurship through institutional and social welfare reforms, banking system and fiscal revenue transformations. While the planned economy transitioned toward a market economy, some economic and social drivers appear to be either pushing or pulling people from becoming entrepreneurs. As a result, the private economy emerged and has been growing dramatically, of which SMEs and self-employed economy have been major contributors. As shown in Fig. 14.5, the total number of private enterprises surged from a mere 30 thousand for the whole country in 1992 to 2 million in 1997 to 6.23 million in 2002 and kept growing tremendously to 29.6 million in 2014. Their total employees increased from 23.2 million in 1992 to 34 million in 2002 to 143.9 million in 2014. 56.7% of all private enterprises were concentrated in the east coastal region, showing a significant regional disparity in term of spatial distribution of entrepreneurship. On top of that, the number of self-employed individuals quintupled from 24.7 million in 2002 to 128.6 million in 2014, of which self-employed urban entrepreneurs surpassed their rural counterparts in 2003 and have become the dominant driving force. In 2016, there were 86.27 million self-employed urban individuals, compared with 7.4 million in 1992.

The Chinese Statistical Bureau announced the classification of large, medium, small and micro enterprises in 2013, which was revised in 2017 (see Table 14.1). The Third National Economic Census conducted in 2013 revealed that there were 7.85 million Small and Micro Enterprises in the secondary and tertiary industries, accounting for 95.6% of all enterprises. They employed a total of 147.3 million workers, accounting for 50.4% of the total employment. Their total asset amounted to 138.4 trillion yuan, or 29.6% of all the enterprises. Table 14.2 is a summary of their employment and assets by industries. Entrepreneurship has become a major component of China's economy.

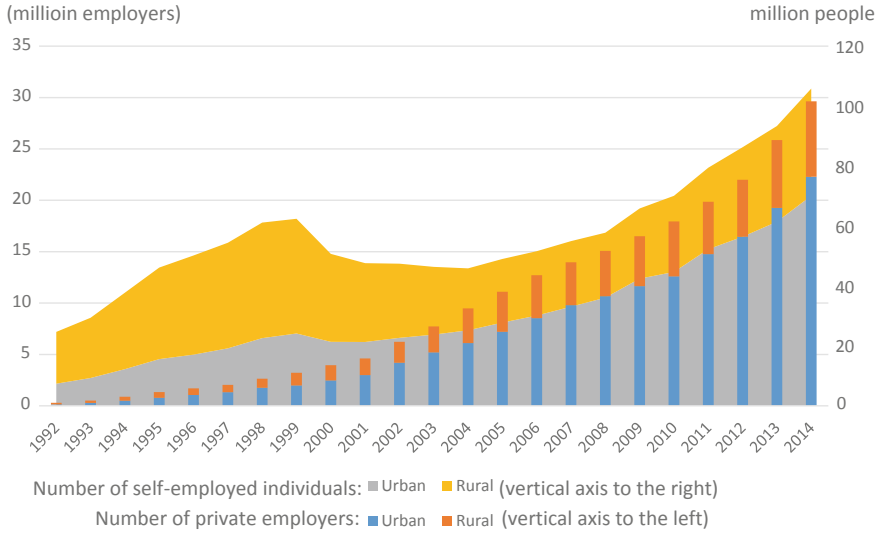

Fig. 14.5 Growth of private employers and self-employed entrepreneurs in China, divided by urban and rural regions, 1992–2014 (*Source* China Statistical Yearbooks, various years)

Table 14.1 Statistical classification of large, medium, small and micro enterprises (2017) (persons; million yuan)

Industries	Indicators	Large	Medium	Small	Micro
Agriculture, forestry, animal husbandry and fishery	Operating revenue (Y)	$Y \geq 200$	$5 \leq Y < 200$	$0.5 \leq Y < 0.5$	$Y < 0.5$
Manufacturing	Employees (X)	$X \geq 1000$	$300 \leq X < 1000$	$20 \leq X < 300$	$X < 20$
	Operating revenue (y)	$Y \geq 400$	$20 \leq Y < 400$	$3 \leq Y < 20$	$Y < 3$
Construction	Operating revenue (Y)	$Y \geq 800$	$60 \leq Y < 800$	$3 \leq Y < 60$	$Y < 3$
	Total asset (Z)	$Z \geq 800$	$5000 \leq Z < 800$	$3 \leq Z < 50$	$Z < 3$
Wholesale trades	Employees (X)	$X \geq 200$	$20 \leq X < 200$	$5 \leq X < 20$	$X < 5$
	Operating revenue (Y)	$Y \geq 400$	$50 \leq Y < 400$	$10 \leq Y < 50$	$Y < 10$
Retail trades	Employees (X)	$X \geq 300$	$50 \leq X < 300$	$10 \leq X < 50$	$X < 10$
	Operating revenue (Y)	$Y \geq 200$	$5 \leq Y < 200$	$1 \leq Y < 5$	$Y < 1$
Transportation	Employees (X)	$X \geq 1000$	$300 \leq X < 1000$	$20 \leq X < 300$	$X < 20$

(continued)

Table 14.1 (continued)

Industries	Indicators	Large	Medium	Small	Micro
	Operating revenue (Y)	Y ≥ 300	30 ≤ Y < 300	2 ≤ Y < 30	Y < 2
Warehouse and storage	Employees (X)	X ≥ 200	100 ≤ X < 200	20 ≤ X < 100	X < 20
	Operating revenue (Y)	Y ≥ 300	10 ≤ Y < 300	1 ≤ Y < 10	Y < 1
Postal services	Employees (X)	X ≥ 1000	300 ≤ X < 1000	20 ≤ X < 300	X < 20
	Operating revenue (Y)	Y ≥ 300	20 ≤ Y < 300	1 ≤ Y < 20	Y < 1
Hotel services	Employees (X)	X ≥ 300	100 ≤ X < 300	10 ≤ X < 100	X < 10
	Operating revenue (Y)	Y ≥ 100	20 ≤ Y < 100	1 ≤ Y < 20	Y < 1
Catering services	Employees (X)	X ≥ 300	100 ≤ X < 300	10 ≤ X < 100	X < 10
	Operating revenue (Y)	Y ≥ 100	20 ≤ Y < 100	1 ≤ Y < 20	Y < 1
Information transmission	Employees (X)	X ≥ 2000	100 ≤ X < 2000	10 ≤ X < 100	X < 10
	Operating revenue (Y)	Y ≥ 1000	10 ≤ Y < 1000	1 ≤ Y < 10	Y < 1
Software and information technology	Employees (X)	X ≥ 300	100 ≤ X < 300	10 ≤ X < 100	X < 10
	Operating revenue (Y)	Y ≥ 100	10 ≤ Y < 100	0.5 ≤ Y < 10	Y < 0.5
Real estate development	Operating revenue (Y)	Y ≥ 2000	10 ≤ Y < 2000	1 ≤ Y < 10	Y < 1
	Total asset (Z)	Z ≥ 100	50 ≤ Z < 100	20 ≤ Z < 50	Z < 20
Property management	Employees (X)	X ≥ 1000	300 ≤ X < 1000	100 ≤ X < 300	X < 100
	Operating revenue (Y)	Y ≥ 50	10 ≤ Y < 50	5 ≤ Y < 10	Y < 5
Leasing and business services	Employees (X)	X ≥ 300	100 ≤ X < 300	10 ≤ X < 100	X < 10
	Total asset (Z)	Z ≥ 1200	80 ≤ Z < 1200	1 ≤ Z < 80	Z < 1
Others	Employees (X)	X ≥ 300	100 ≤ X < 300	10 ≤ X < 100	X < 10

The Global Entrepreneurship Monitor (GEM) considers China as an efficiency-driven economy, as opposed to factor- and innovation-driven. Their expert ratings of China's national entrepreneurship framework are higher than the regional average, especially in areas of Internal Market Dynamics, Physical Infrastructure and Entrepreneurial Education at Post School Stage (see Fig. 14.6).

Table 14.2 Total number, employment and assets of small and micro enterprises by industries in 2013

	Number of enterprises as judicial entities (thousand)	Employees (thousand persons)	Total assets (trillion yuan)
Total	**7,850**	**147,304**	**138.4**
Agriculture, forestry, animal husbandry and fishery	48	721	0.3
Manufacturing	2,342	74,036	40.8
Construction	322	16,754	5.0
Transportation	211	4,628	5.2
Warehouse and storage	24	424	1.1
Postal services	12	228	0.0
Information transmission	34	405	1.4
Software and information technology	179	1,745	1.6
Wholesale trades	1,698	14,578	12.7
Retail trades	1,031	7,662	3.2
Hotel services	68	1,682	0.6
Catering services	121	2,568	0.4
Real estate development	96	1,821	18.7
Property management	102	2,779	1.2
Leasing and business services	784	9,453	36.8
Others	777	7,821	9.3

Source The Third National Economic Census, 2013

14.7 Conclusion

The future of entrepreneurship seems to be continuing with the current trend of moving from network-based to innovation-based (Li 2013). This transition benefits from the innovation capacity development of private SMEs. Because SMEs owned by one or a few families tend to have more incentives to re-invest their profits in Research and Development to keep the edge of their products (Deng et al. 2013). At the same time, internet entrepreneurs were especially vibrant since the mid-1990s. Some of the most successful ones evolved into today's giants, including Alibaba, Baidu, Tencent. Starting from the 2000s, e-commerce became the main form of internet entrepreneurship, with successful companies like jd.com and Xiaomi. Entrepreneurs have also started entering many other industries that demand high levels of science and technology, such as healthcare and pharmaceutical and renewable energy.

China has made impressive progress in fostering and growing its domestic entrepreneurs. At the National People's Congress in 2016, Premier Li Keqiang made mass entrepreneurship and innovation the leading agenda of the national economic

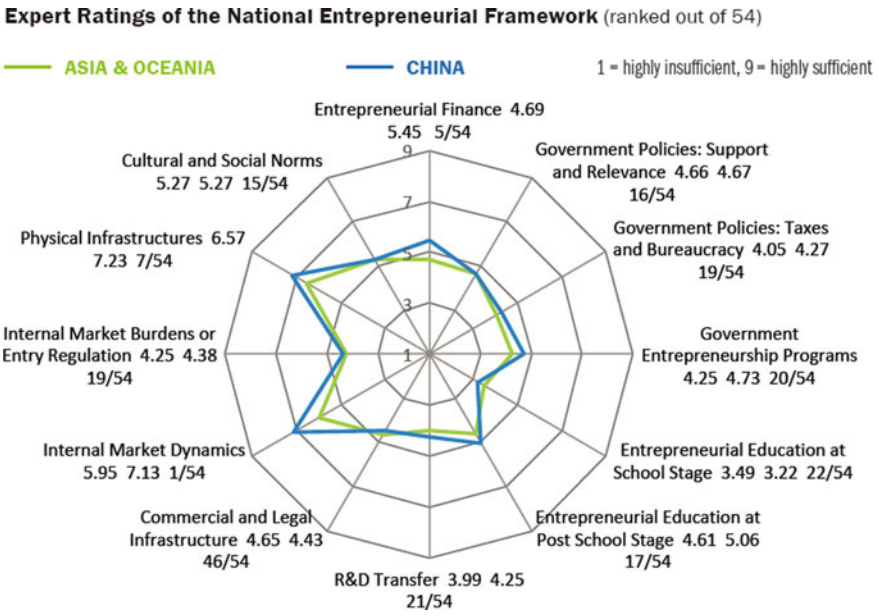

Fig. 14.6 Expert ratings of the national entrepreneurial framework (ranked out of 54). *Source* Permission to use a figure from the GEM 2017-2018 Global Report, which appears here, has been granted by the copyright holders. The GEM is an international consortium and this report was produced from data collected in, and received from, 54 economies in 2017. Our thanks go to the authors, national teams, researchers, funding bodies and other contributors who have made this possible

strategy (Tse 2016). It is believed to be of the national interest to keep up with this high entrepreneurial spirit. More recently, a series of events have brought uncertain shifts to the global trading market, especially the U.S. administration's accusation of China's violation of free trade practices and intellectual property. Along with such accusations are increased tariffs being imposed on certain categories of products manufactured in China, such as solar panels. China correspondingly imposed tariffs on American made products such as soybeans. Such tariff fights between two major exporting economy undoubtedly have adverse impacts on export-oriented entrepreneurs, which merit in-depth investigation in the future.

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