1. Introduction: diversity, innovation and clusters – spatial perspectives

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1. INTRODUCTION

Regions, and especially urban regions, are increasingly considered to be the areas driving economic development in the global economy (Malecki, 2007). The innovations and the entrepreneurship that these regions have the capacity to give rise to are increasingly seen as a key factor that lays the foundation for future growth (Fritsch and Mueller, 2004). Innovations require knowledge, and urban regions have become incubators of new ideas in the modern knowledge economy and provide opportunities for the discovery of new valuable knowledge (Huggins and Williams, 2011). Today, more and more researchers emphasize the link between, on the one hand, regional diversity and, on the other, regional knowledge, innovation and entrepreneurship (Özgen et al., 2011; Rodriguez-Pose and Hardy, 2015).

In regional and urban economics, it has been shown that there is a fundamental relationship between market size and diversity. For example, in spatial models based on the general model of monopolistic competition (Dixit and Stiglitz, 1977; Chamberlain, 1933), the diversity of inputs generates increasing returns at the aggregate level (Fujita and Thisse, 2002). By increasing the return on diversity at intermediaries, companies clustered in a region with a variety of input goods suppliers will have higher productivity than similar companies in a region with a less varied range of input goods.

Diversity in urban regions is the characteristic that is often highlighted in explaining why these regions are prosperous and have long-term economic development and growth (Jacobs, 1969; Florida, 2002). Jacobs argues that cultural heterogeneity in the labour market expands the collective diversity of skills, knowledge and ideas and thus becomes an important and valuable economic asset for a region's economic development.

Jacobs' explanation of the drivers of regional growth is in line with those found in more modern models of endogenous economic growth, where the generation, transfer and use of knowledge within and across regional economies are increasingly seen as the main drivers of regional economic growth (Antonelli et al., 2011). Jacobs claims that urban development and growth largely derive from the possibility that individuals can combine different sources of knowledge and interact with individuals who have other experiences and backgrounds. Consequently, increased diversity can benefit regional economies by broadening the regional knowledge base and improving their absorption capacity (Cohen and Levinthal, 1990), which in turn develops the ability to identify, evaluate, assimilate and utilize new knowledge (Hong and Page, 2001).

A region where the population is diversified and where people have different backgrounds is likely to offer a wide and varied range of available knowledge as well as many ways of combining existing knowledge in the region (Qian, 2013). The geographical proximity offered by the region also facilitates communication as the transfer of knowledge between individuals can take place face to face. Interestingly, there is some recent research stating that geographical proximity eases knowledge exchange via digital communication (via Twitter) (Delbaggio et al., 2018). Feldman et al. (2016, p. 10) captures the essence of how diversity, innovation and clusters are related: 'Despite the pervasive image of the lone genius, innovation is a social activity that requires a mix of individuals with different skills to collaborate to create value. Rather than distributed uniformly through time and across geographic space, innovation tends to cluster both temporally and spatially.'

2. DIVERSITY AND INNOVATION IN URBAN REGIONS

Innovations play a crucial role in the renewal and growth of regional and national economies. In particular, more pervasive innovations tend to be the result of the establishment of new companies (Aghion et al., 2009). This means that the fundamental factor in an innovation often comes from companies and/or basic research laboratories in technology-related industries and not from existing companies (Winter, 1984). Since innovation is a complex process that often requires knowledge and expertise from other economic agents, contacts with other economic agents are crucial for a successful innovation process (Bergenholtz and Waldstrøm, 2011). The links between economic agents facilitate the flow of ideas, R&D, knowledge, technology, skills and competence, and include both supplier–customer

links and links to competitors, consulting companies, R&D companies and research universities (Andersson and Karlsson, 2007). Although innovation collaborations often exist in local networks, they also need global knowledge links to stay updated (Ter Wal and Boschma, 2011).

The introduction of new products can be expected to be more common in large urban regions where it costs less to develop networks for innovation cooperation and where access to networks with the right knowledge and competence profile exists (Grant and Baden-Fuller, 2004). Of course, innovative companies and especially those belonging to a multinational company will also be able to obtain knowledge from other regions (Davenport, 2005). For companies in smaller regions, interregional sourcing can act as a substitute when local knowledge is not available (Drejer and Vinding, 2007).

Although it may be possible to obtain knowledge inter-regionally, companies that participate in regional knowledge networks have a competitive advantage in that the knowledge network is likely to contain a variety of diversified knowledge-producing organizations, a large and diversified range of highly qualified workers and a diversified set of qualified partners. All in all, this can be expected to have a positive impact on companies' innovation ability, as a wider range of complementary and collaborative knowledge expansion can generate synergies (Lavie, 2009).

Typically, larger urban regions are characterized by more entrepreneurs and more innovating firms, which may explain the high likelihood that companies supplying new products will be located in such regions (Johansson and Andersson, 1998). Another reason why companies that are more innovative are located in large urban regions is that the companies are likely to meet customers who, together, have a broader and more diversified demand. During the innovation phase of a product cycle, it is assumed that each supplier communicates with its customers. This can be regarded as a distance-sensitive activity, since communication must, to a great extent, be face to face so that one can fully understand the other. Moreover, for every new product, only a small proportion of all potential customers are willing to test the new product (Vernon, 1966). This small proportion will only constitute enough demand in large urban areas.

Urban regions, especially large urban regions, offer a diversified access to knowledge and a sufficiently large and diversified internal market potential to make the launch of innovations profitable. In addition, geographical transaction costs are low in these regions, which is crucial in reducing the interaction costs of entrepreneurs who develop innovations. Thus, innovative activities show a strong tendency to cluster, especially in large urban regions (Karlsson, 2016) and the knowledge-intensive and high-tech industry tends to be localized in larger urban areas where there is a diversified

set of higher education and research. Several studies from both the US and Europe provide empirical evidence for a link between diversity in urban regions and innovative activity (Peri, 2007; Özgen et al., 2011).

3. DIVERSITY AND CLUSTERS IN URBAN REGIONS

Porter (1998) highlights the role of clusters for economic development, as proximity, achieved through co-location of companies, customers, suppliers and other institutions, increases the ability to innovate. The existence of a well-developed cluster offers great benefits for productivity and the ability to innovate that are difficult to match by companies based elsewhere.

It is possible to assume that the larger the region, the greater the opportunity to combine internal and external economies of scale, which also gives an increased economic density. Especially for large urban regions, economies of scale provide a place advantage for those products where demand is ‘thin’ and therefore clusters in these industries are formed mainly in such regions. Thus, large urban regions can specialize in ‘cluster diversity’ and benefit from the dual power of internal and external economies of scale. However, economies of scale represent an equally important phenomenon for industrial clustering in regions of all sizes. Hence, clusters can also be developed in smaller regions, but in this case the development is limited to a set of closely related products in the same industry with low geographical transaction costs supported by localization economies (Karlsson, 2007).

Large and dense urban regions have many advantages that are not present in other types of regions. As larger regions not only generate more entrepreneurial opportunities but also have a larger stock of entrepreneurial human capital and have richer potential entrepreneurs, these regions will not only experience more entrepreneurial events, but will also experience a superior build-up of entrepreneurial human capital, as there are more entrepreneurial activities to learn from in such regions (Karlsson and Gråsjö, 2019). Successful entrepreneurial activities and innovations stimulate growth and structural change in these regions, which in turn will generate even more entrepreneurial opportunities and innovations. The structural change involves the formation of new clusters at the expense of older clusters, as resources will be allocated to the new and growing clusters. The new and growing companies operating in markets characterized by monopolistic competition can generally offer higher payments. Incumbents in declining clusters must become more productive and perhaps also must move their production to other smaller regions that offer lower production costs if they want to stay in business.

Porter (2003) argues that knowledge spillovers that affect innovation and performance ought to be strongest within a cluster and among related industries. Hence, specialization in clusters, and not in industries, should lead to higher performance. A diverse range of overlapping clusters should cause better performance than a diversity of clusters that are unrelated. Of course, these overlapping clusters are mainly found in regions of a particular size, that is, in large urban regions.

4. CONCLUSIONS

The discussion above demonstrates that to increase the understanding of the multifaceted dynamic relationships between diversity, innovation and clusters, there is a strong need to further focus on and investigate the spatial perspectives of these relationships. Such investigations include identification and empirical testing of the mechanisms that may explain possible causal relationships. This is necessary from a scientific point of view, but also from the need to provide policy makers with a better and more comprehensive basis for decision-making, since the spatial perspectives are crucial in understanding what drives economic development. We hope that this book will make a small contribution to ‘the economy of spatial diversity’.

5. THE CONTRIBUTIONS IN THIS BOOK

In this section the contributions are summarized following their appearance in the book in order for the reader to plan their reading experience.

In Chapter 2 Grønning contributes empirically and conceptually to the studies of technological trajectories, that is, the paths by which innovations in a given field occur. Hitherto technological trajectories have mostly been treated as constructs at the global level, whereas there has been relatively little attention on how various locations relate to such trajectories except for a focus on the presumed advanced locations of a trajectory. The analysis concludes that for firms, there was a period of initial emergence and first results, followed by periods of consolidation and contradictions. For policies, there was a period of policy formation followed by a period of mainly basic research and marine biotech focus and a period with a new pluralistic policy. As seen through the relations between business and policies, the country’s part in the global biotechnology trajectory has not yet reached a mature phase.

Tentative indices for regional economic development using Swedish municipal data from 2015 are explored by Arvemo and Gråsjö in Chapter

3. The authors use variable selection methods and examine variables potentially suitable as indicators for different dimensions of economic development. Since potential factors for measuring economic development typically will differ greatly over large geographical areas, the study uses indicators at municipality level to avoid large geographical units of analysis. An extensive search yielded a number of prospective indicators to use even though the official data gathered in Sweden are not particularly suitable for investigating the softer dimensions of economic development. The results of the study suggest that the indicators of economic development can be categorized into five dimensions/indices that represent 'Quality of Living', 'Economic Capacity', 'Wealth and Stability', 'Growing Worries' and 'Gross Municipal Product per inhabitant' in the municipality.

In Chapter 4, Bernhard, Olsson and Lundh Snis contribute knowledge on the nature and challenges of stakeholder inclusion within local community regeneration in order to identify innovative, collaborative approaches at work in smaller cities through case studies in Norway and Sweden. Place innovation perspectives are applied to address issues of diversity and collaborative approaches in the renewal of a small city centre or district based on cultural heritage. The results reveal stakeholders' views on challenges related to collaborative approaches for place innovation. The complex nature of the two cases is characterized by diverse perspectives, conflicts and attitudes; limited inclusion of stakeholders; lack of communication and information; and indistinct place identity. Findings indicate that place innovation requires an integrated approach based on including diverse stakeholder perspectives, common communication, common physical and digital platforms, cultivating place identity and applying a step-by-step regeneration.

In Chapter 5, by Mulligan, the incidence of (utility) patents across US metropolitan areas during the period 1990–2015 is examined. Patent volumes are shown to have become increasingly concentrated in the nation's largest metropolitan areas during this period. Next, following an earlier study, estimates of these volumes are made every five years using only population size as an explanatory variable. Then other patenting estimates are made for the years 2000, 2005, 2010 and 2015 using more than twenty different metropolitan attributes. Besides population size, these other attributes include education of the workforce, industrial specialization, location (climate), average wages, per capita GDP, and various human-created amenities. A multivariate approach, which reflects differences in metropolitan innovation ecosystems, replaces the list of variables with six orthogonal factors. A performance score is provided for each metropolitan area on each of the six factors and, together, these (ordinal) scores provide a time-specific performance vector for each economy. Linear regression

next indicates that three factors – Economic Size, Location, and Industrial Specialization – have become especially important in US metropolitan patent generation in recent times. The pattern of estimates for patent densities, or per capita patenting volumes, is shown to be remarkably similar.

Mósesdóttir and Jonsson aim in Chapter 6 to contribute to further development and ‘progressive problem shift’ of the neo-Schumpeterian research programme by theorizing the role of actors in real critical junctures. The authors argue that on a global scale, societies are facing a technological revolution that is expected to have a fundamental impact on their social, economic and political foundations. Theoretical frameworks analysing technological change seldom include political agency and rarely consider outcomes in terms of socio-economic inequality. In the context of the present cybernetic, bio-technological revolution, various stakeholders and actors struggle for alternative forms and content of what has been termed ‘transformative change’ involving capacity building to turn opportunities created by technological revolution into socio-economic progress. The authors claim that transformative change requires transformative innovation involving cooperation of different actors around mission-oriented and experimental policies in various constellations at the micro-, meso- and macro levels. How the actors shape transformative change depends on the challenges and opportunities created by context of critical juncture, the balance of power and their capacity to collaborate on restructuring society.

Chapter 7 relates to the larger question of how academic engagement with industry through collaborative research between universities and firms can influence firm innovation. Berg and McKelvey explore industrial PhD students and perceptions of their impact on firm innovation. Specifically, they explore university–industry collaboration from the perspective of industrial PhD students, who in the present case are simultaneously PhD students and firm employees. The empirical context is collaborative research in the engineering field in Sweden. Given the lack of previous relevant research, the authors first explore the conditions of industrial PhD students, leading to a definition. They then present an existing conceptual framework for academic engagement and elaborate on it by detailing the micro-level activities of these PhD students in order to understand their perceived contribution to firm innovation during their education. Their results suggest that industrial PhD students are more involved in developing firm capabilities for innovation than they are directly involved in developing product innovations or patents.

In Chapter 8 Bartlett and Mroczkowski examine the growing visibility and importance of start-up companies in the global economy. Drawing on field research in the San Francisco Bay Area, they examine the role of four types of business development organizations in spurring the globalization

of high potential start-ups: Business Incubators, Business Accelerators, International Bridge Organizations, and Corporate Innovation Centres. The chapter augments the scholarly literature on global start-ups by (1) developing a typology of business development organizations dedicated to speeding the globalization of start-up companies; (2) using the results of preliminary field research to assess the relative effectiveness of these organizations; and (3) formulating a conceptual model to guide future research on start-up globalization.

Chapter 9, by Imase, reports on IT business case studies which have been created by the citizen/non-profit sector. This sector has a function as an 'economic entity' as well a 'public interest entity' and has been creating new business in regions. In regions with deep seated problems, innovation becomes easy to create, resulting in emerging new businesses. Activation of local contribution initiatives by citizen/non-profit sectors and their 'businessization' will make local needs more achievable. In the fields of products and services where market mechanisms have been difficult to actualize, companies have also started to do business, with the expectation that new products and service fields will mature. Through such processes, new markets and industries are created. Regionally, the citizen-based/ non-profit sector performs a 'seedbed function' for new industry. Furthermore, considering the role played by the citizen/non-profit sector, the author clarifies 'input resources' of regional innovation clusters and the process of new industry creation.

In Chapter 10, Kishida analyses a sake brewing cluster which has emerged since the 1980s. The results reveal that successful open innovations require not only new technologies from outside, but also good enough skills inside. The author bases the results on three factors that are relevant to regional inputs in this case: (1) Human resources: the sake brewing technologies have been supported by several seasonal migrant sake artisans' groups called Toji. There was Shida Toji in Shizuoka, but most of them worked only in Shizuoka and ceased migrant works in remote breweries at that time. (2) Inputs other than human resources: the Shizuoka yeast is one of the premium sake yeasts available only for Shizuoka breweries. (3) Sharing of the industry-specific technology and knowledge: in the early 1980s, Tojis from different regions tried to brew unique sakes with Shizuoka yeast. Kawamura formulated the standard process for the Shizuoka yeast sake with character and introduced it to Shizuoka breweries. The efficient brewing skills of ex-Shida Tojis would contribute to Shizuoka sake success in 1986.

In the last chapter, Chapter 11, authored by Okuyama, Yasui, Maneo and Sakakura, knowledge creation in the industrial cluster in the Sumida Ward in Tokyo is analysed. The Sumida Ward was selected for this research

because the concentration of SMEs in industrial clusters is the highest in Japan and the spatial clusters are remarkable. The study uses and expands the design-driven innovation theory applied to cases of horizontal and co-creative networks of SMEs. The results show that the development of a dialogue between various stakeholders became an opportunity to give a new ‘meaning’ to the product, leading to the possibility of creating a new industry.

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