

# Knowledge, entrepreneurship and regional transformation: contributing to the Schumpeterian and evolutionary perspective on the relationships between them

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## 1 Introduction

What is the role of knowledge in stimulating entrepreneurship and regional transformation? This is an intriguing and fundamental question in social science. Answering it would enable us to understand how and why the acts of developing, using and diffusing different forms of knowledge help stimulate economic growth and societal well-being. Finding an unequivocal answer to such a multifaceted question cannot be tackled in one set of articles. Instead, our aim is more limited in further developing a set of theories, related to the Schumpeterian and evolutionary perspective on the relationships between knowledge, entrepreneurship, and regional transformation. More specifically, we position this special section to contribute to the theorizing and growing stock of empirical evidence within the research community fascinated with developing a Schumpeterian

and evolutionary perspective on entrepreneurship, small business economics, and regional economic change.

Nelson and Winter (1982) remains the seminal contribution to an evolutionary perspective, and their ideas have been further diffused and developed in a variety of ways.<sup>1</sup> One key notion is that long run economic growth is driven by technological advance, industrial dynamics as well as heterogeneity in the behavior, routines, and capabilities of business firms (Nelson and Winter 2002; Malerba and Orsenigo 1996; Fagerberg 2003; Dosi and Nelson 2010). Another key notion is the fundamental role of information and knowledge, in stimulating processes of creative destruction and renewal in the economy (Metcalf 1998; Murman 2003; Antonelli 2008; Andersen 2011). Of relevance to our topic here, an evolutionary economics approach has also been instrumental in developing the notion of organizational routines, and much associated work on how routines are linked to entrepreneurship within capitalism as a phenomenon of disruption (Winter 2016; see review in Salter and McKelvey 2016).

Moreover, in the past decades, evolutionary economics has had considerable influence on research also in other adjacent and quickly expanding topics and research literature. Of special interest to this issue are three streams of research from an evolutionary perspective, which go into more specific detail of how to relate knowledge to small business economics. The three

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<sup>1</sup> We recognize that there are a number of debates and competing propositions about evolutionary economics (Hodgson and Knudsen 2006; Witt 2002) but generally, Nelson and Winter (1982) can be seen as a seminal contribution.

streams analyze entrepreneurship (McKelvey 1996; Buenstorf 2007; Acs et al. 2009; Carlsson et al. 2013; Alvarez et al. 2013), regional development and change (Essletzbichler and Rigby 2007; Frenken 2007; Boschma and Martin 2010; Boschma and Frenken 2011), and the relationship between entrepreneurship and regional change (Garnsey and Hefferman 2005; Cooke and Piccaluga 2004; Braunerhjelm and Feldman 2008).

The aim of this special section is to contribute to a more nuanced understanding of how different expressions of knowledge—such as science, routines, technology, education, design, and skills—are used in ways which transform business activities, firms, and regional economies. This special section advances our understanding by providing more nuanced view on the distinctive role of knowledge in relation to both entrepreneurship and regional economic transformation separately, as well as the two together.

Two topics unite the subsequent six articles in this special section. The first topic—with three articles—further develops this Schumpeterian and evolutionary perspective to understand entrepreneurship as a process. These papers thus advance our theoretical and empirical understanding of the relationships between knowledge, the entrepreneur as a person, and entrepreneurship as a process, over time. The second topic—with three additional articles—rely upon a similar theoretical perspective but shifts the focus to knowledge, economic renewal (including entrepreneurship), and regional change. In doing so, they advance our understanding of micro-foundations of regional transformation.

## 2 Entrepreneurship as a process

The first topic covers entrepreneurship as a process involving individuals, business activities, and firms as related to knowledge, in that these three articles all focus upon processes of entrepreneurship.

Our view is that even though a Schumpeterian and evolutionary perspective is widely used within entrepreneurship, more can be done to develop more explicit analysis of the role of knowledge. This relates back to classical topics, where level of analysis—from individual to venture to the context—remains important to define. Important ideas that impacted the field include Low and MacMillan (1988), by stressing the need to

focus upon “the creation of the enterprise”; Lumpkin and Dess (1996), by focusing upon the “entrepreneurial orientation”, which was later applied to both individuals and organizations; and Baumol (1968 p. 64) on the policy level, lifting up the missing entrepreneur into economic theory, where “the entrepreneur is at the same time one of the most intriguing and one of the most elusive characters in the cast that constitutes the subject of economic analysis.” A Schumpeterian approach is widely spread within entrepreneurship research today. It is associated with a theoretical positioning in a series of central debates—specifically creating opportunities as opposed to discovering them (Alvarez et al. 2013) and of the need to include many levels of analysis, in an evolving domain of research (Carlsson et al. 2013). Schumpeter is sometimes used as a reference to justify ontological positioning of creation, instead of used to engage in a detailed analysis of topics within modern evolutionary economics. Interesting topics—which this special issue relates to in different ways—include research which has focused more upon the specific role of knowledge spillovers, functions, and capabilities (Audretsch and Keilbach 2007; Acs et al. 2009), and the extensive debate over entrepreneurial opportunities as related to dynamic capabilities and absorptive capacity (see reviews, Zahra et al. 2006; Zou et al. 2018). These topics are grounded in evolutionary economics, explicitly the theory of the firm and recent research further links the micro and macro levels.

Malerba and McKelvey (2018) propose a novel conceptualization and empirical insights in “Knowledge-intensive Innovative Entrepreneurship: Integrating Schumpeter, Evolutionary Economics and Innovation Systems.” To do so, they rely upon many existing theories, and explicitly integrate three theoretical building blocks: Schumpeter, evolutionary economics, and innovation systems. This enables them to propose a theoretical definition and a stylized process model of knowledge-intensive innovative entrepreneurship, which links the individual entrepreneurs, with a much broader context to access resources, opportunities, and which influences future development of the firm. Based on a large-scale survey, they are also able to identify three key empirical characteristics, namely that these firms are empirically relevant across the studied European countries and many sectors; that these firms interact more with actors in the innovation system than do other new firms; and that sectoral and national innovation systems provide different settings for the KIE firms.

This article helps contribute to re-develop the concept of the entrepreneur, taking it into 21st century, in a modern and knowledge-intensive economy.

Buenstorf and Heinisch (2018) provide insights to “Science and industry evolution: Evidence from the first 50 years of the German laser industry.” They investigate the impact of scientific knowledge on industrial dynamics, by examining the evolution of the German laser industry during the period 1964–2013. In contrast to existing findings about patterns of shake-out of industry evolution (Klepper 1997), the laser industry has demonstrated a different industry evolution, and the population has stabilized, due to new entrants replacing exits. They build upon a huge data collection work, and move on to analyze not only the usual academic entrepreneurs but also the doctoral training of founders and corporate investors. They can thereby trace the impact of specialized knowledge on industrial evolution, by analyzing how the backgrounds of entrepreneurs, and especially an academic background, links to the performance of the laser firms. They find that the competitive performance of academic start-ups increases over time, and that doctorate-holding inventors also contribute to the performance of entrants. This article provides insight about the different ways in which advanced scientific knowledge can be translated into firm capabilities, and in turn, affect both firm performance and industry evolution.

Miozzo and DiVito (2018) explore “Productive opportunities, uncertainty and science-based firm emergence.” They analyze how the firm mobilizes resources (or not) in conjunction with a variety of actors, in order to secure the firm’s ability to exploit productive opportunities arising in different phases of industry development. Similar to the focus in the previous article but from a different methodology and perspective, they stress that science-based firms are different from other varieties, in that they arise from a non-commercial context, and are explicitly dependent upon the continuing development of a particular type of knowledge, e.g. science. Firm decisions as related to technological specificities and uncertainty related to knowledge continue to influence the further development of the entrepreneurial venture. Miozzo and DiVito develop a qualitative understanding of the emergence of science-based firms, which provides insights into the entrepreneurial process as linking individuals, ventures, and resources from external partners. In doing so, they further develop Penrose (1959/2009), which enables them to bridge two

types of literature in their analysis, namely technological opportunities, as found in evolutionary economics (Rosenberg 1982; Malerba and Orsenigo 1996), and the literature on creation of the entrepreneurial venture (Shane 2000). This article provides insights into the uncertainty involved during the development of technology, and especially its role in the emergence and unfolding of productive opportunities, building upon internal and external resources.

### 3 Regional change as a process

The second topic relates to regional change as a process. These three articles shift the focus to knowledge, economic renewal (including entrepreneurship), and regional change, and are good examples of the recent trend towards interdisciplinary approaches to tackle complex issues.

The articles here contribute to a growing literature, which is now starting to link insights about knowledge development and diffusion, entrepreneurship, small business development, and regional transformation. On one hand, we might say that the idea of linking these topics is of course not new. Previous contributions by many researchers provide examples of this: Sorenson and Audia (2000), Cooke and Piccaluga (2004), Staber (2005), Garnsey and Hefferman (2005), Stam (2007) and Braunerhjelm and Feldman (2008). The diffusion of knowledge and ideas in space has been a long-standing issue in geography, which can be seen as going all the way back to Hägerstrand’s work (1968), with more recent prominent examples on related topics in Audretsch and Feldman (1996) and Gertler (2003).

On the other hand as demonstrated here, there are new developments. We can currently see how evolutionary ideas are starting to enrich the discussion on quite established topics in regional research, such as regional agglomeration externalities (Neffke et al. 2011a) and processes of regional structural change (Neffke et al. 2011b). Similarly, ideas from business research and strategy, such as those about the resource bases of firms, find regional analogies (Lawson 1999; Neffke et al. 2018). Another set of research has probed deeper into the role of regional economic environments to find out how different industry structures and knowledge structures affect the performance of firms (Eriksson 2011; Neffke et al., 2011a, c). This specific literature goes back to the basic distinction between the

effects of urbanization and localization externalities, and the agglomeration externalities tradition (Beaudry and Schiffauerova 2009; Henderson 2003). Additional recent papers have attempted to make a more detailed distinction between not only regional effects arising from firms in the same industries or from the pure size of cities, but also between firms in related industries (Frenken et al. 2007).

Antonietti and Gambarotto (2018) examine “The role of industry variety in the creation of innovative start-ups in Italy.” They develop an interesting combination of the traditions outlined above, together with the small business economics literature. Their study is of innovative start-ups in Italy between 2012 and 2015, and analyzes which regions are more likely to have a higher frequency of start-ups. Their findings highlight the importance of related and unrelated variety to new start-ups and unrelated variety to innovative start-ups. Moreover, they also show the importance of the metropolitan areas in these processes. Antonietti and Gambarotto align well with the broader ongoing discussion about value of regional variety in the generation of novelty and regional renewal, in contrast to the more incremental and sector-specific innovation patterns observed in many traditional industry regions (Neffke et al. 2011a). This article therefore partly questions the emphasis often put in recent decades on the importance of strong regional specialization of localized knowledge, and instead provide new quantitative findings about the role of regional variety for different types of start-ups.

Attour and Lazaric (2018) address “From knowledge to business ecosystems: Emergence of an entrepreneurial activity during knowledge replication.” They develop a qualitative understanding on the regional renewal process and entrepreneurial change, by studying the emergent business ecosystem around communication technologies (for close-range communication between devices) in Sophia-Antipolis in France. By conducting a theory based and highly detailed case study, they show how a highly spatialized ecosystem that involves a multitude of actors can serve as a structure for knowledge renewal in a region and in a particular field of innovation. Clearly, such a process is not without complications, and they stress that public actors sometimes have a vital role to play, which goes beyond their traditional roles. In fact, the public policy actors almost tend to take on entrepreneurial roles themselves. Of course, the general importance of public actors to some entrepreneurial efforts and small businesses has been known

in the literature for a long time. This article however provides a rich level of detail and understanding, which enables the authors to specify exactly *how* public policy mattered in the cluster or business ecosystem, providing the more detailed mechanisms of regional change.

Andersson et al. (2018) study “Workers’ participation in regional economic change following establishment closure.” Their point of departure is the discussion about Schumpeterian creative destruction, and to what extent established regional capabilities, in this case experienced labor, participate in creation after being subject to destruction (closedown of plants). Andersson et al. use very detailed Swedish longitudinal micro-level data to study workers who leave closing plants, and analyze to what extent they participate in positive regional economic change after job loss. From a regional point of view, the findings of Andersson et al. are not entirely optimistic. A large part of the redundant workforce actually enters activities that are less productive or more addressing a local market than was the case for their old firm. At the same time, Andersson et al. also find that some particular types of workers tend to participate in entrepreneurship, or move to higher productivity plants in the region. The article contributes to a Schumpeterian understanding of regional change, but it addresses this by drawing also on the large research field concerned with labor market outcomes of redundant and/or displaced workers, as found in both labor economics (Fallick 1996) and human geography (Eriksson et al. 2016).

#### 4 Avenues for future research

This special section contributes to a more nuanced understanding of how different expressions of knowledge—such as science, routines, technology, education, design, and skills—are used in ways, which transform business activities, firms, and regional economies. The six articles all draw upon—or are inspired by—a Schumpeterian and evolutionary perspective. By reflecting upon these contributions, we propose three avenues for future research.

One avenue is to further develop research which may be interdisciplinary, multidisciplinary, and/or cross-disciplinary, to make further progress in analyzing the nuances of the relationships between knowledge, entrepreneurship, and regional transformation. Indeed, the

idea to develop this special section arose during a cross-disciplinary workshop, “Evolutionary approaches informing research on entrepreneurship and regional development” held at the School of Business, Economics and Law at the University of Gothenburg, Sweden in December 2015. All the participants contributed to a lively debate on these topics, and some of the articles published here were presented in an early version. We recognize that engaging in cross-disciplinary dialogues is not free from obstacles and risks creating misunderstandings. Still, there is a long tradition of dialogue around these topics and within certain research communities. We believe that a higher degree of integration and dialogue between different traditions is necessary to solve some important research issues highlighted in this issue, as related to knowledge dynamics, entrepreneurship, and regional change.

A second avenue is to continue to develop novel methodologies, and also to bring together qualitative and quantitative approaches to study the same phenomenon. Taken together, the articles in this special section represent very different ways of defining, measuring, and analyzing the role of knowledge in entrepreneurship and regional change. But they also demonstrate the need to continue developing a refined, and realistic, view on how these three entities are interlinked. Indeed, taken individually as well as together, they contribute novel nuances to the ongoing discussion about who, under which circumstances, and under which types of knowledge involved, participates in economic renewal. The current research literature represented here is gradually developing an empirical understanding of the exact mechanisms involved in regional renewal and diversification. But there is much more to be done in this field (Boschma 2017). Knowledge, innovations, and different societal actors are obvious components in the process of developing new technological trajectories, but they often of course come with features that are hardly captured in quantitative measures. Hence, we also stress the need for systematic qualitative research, to better understand these processes and mechanisms of entrepreneurship and regional renewal.

A third avenue is to reflect upon the findings here, but to go beyond the academic discourse to further debate vital policy issues. The articles here provide somewhat new answers, reflecting the need to return to the fundamental issues, such as, How do we define entrepreneurs? Who do we, in which regions, think will become successful entrepreneurs? Which links are

needed between small innovative firms and their business environments? What does this business environment actually consist of? What are the most important institutional obstacles to regional high-tech change? And how can destruction be turned into long-term creation? Although the EU’s *Smart Specialization* approach aligns well with many of the propositions and suggestions made in the literatures we have considered, we feel that sharp policy conclusions of recent findings are largely missing. We propose that researchers should further engage in public policy and governance activities, because the actual policy consequences of recent theoretical and empirical advances need to be evaluated.

We see great potential in future avenues of research, which explore and explain the relationships between knowledge, entrepreneurship and regional transformation. The articles collected here each contribute to interesting, new, and partly overlapping streams of research, which address aspects of the fundamental question, What is the role of knowledge in stimulating entrepreneurship and regional transformation? More diversity and interesting results will be developed in the future. Even though they are joined by a common ontological positions, these different streams of literatures appear to gradually develop their own, hopefully complementary interpretations of what it means to be “evolutionary,” and what the evolutionary approach implicates for empirical practice and theoretical interpretation.

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