Knowledge frontiers and boundaries in entrepreneurship research

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Abstract While the disruptive potential of knowledge has been receiving growing attention in small business economics and entrepreneurship research and application over the last decade, its boundaries and frontiers, including technological, spatial, institutional, cognitive, and cultural has not been fully explored. Here we present some reflections and a collection of papers on the role of knowledge investment across different cultural, institutional, geographical, and industrial contexts for this emerging area in entrepreneurship and management research. While being careful of the swift changes in knowledge creation, dissemination, and testing in a digital age, geography of knowledge diffusion, knowledge embeddedness into industries and places, skills, and strategies continue to change the way firms assimilate, absorb, create, and transfer knowledge. In this special issue, we extend our knowledge boundaries through knowledge collaboration theory, resource theory, open innovation theory, knowledge and creativity spillover of entrepreneurship theory, economic geography, and creative class and institutional theories. We give researchers and practitioners future directions for a very relevant and fast-growing area of entrepreneurship and small business research.

Keywords Entrepreneurship · Knowledge Frontiers · Multi-level analysis · Knowledge spillover · Knowledge collaboration

JEL Classification L25, L26 · L53

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1 Introduction

New and young firms have been shown to drive job creation (Haltiwanger et al. 2013), promote economic growth and innovation (Fritsch 2013), introduce new products and markets (Knight 2001), and push technological evolution in regions (Fritsch and Mueller 2004). Given differences in entrepreneurship activity between and within regions (Audretsch et al. 2018; Bosma et al. 2008; Reynolds et al. 2007), scholars and policymakers seek to identify factors at various levels (i.e., industry, regional, national) to explain these differences.

Knowledge frontiers are seen as an integral part of the innovation production function of entrepreneurs and a central driver of economic growth in endogenous

growth theory (Romer 1990). Many countries design and implement policies aimed at research and development collaboration, entrepreneurship support, acceleration, and born global. The papers in this special issue aim to understand the knowledge frontiers and boundaries of entrepreneurship research and offer the venue to further understand how innovation and entrepreneurship are contextualized within regional, industry, and country dimensions.

In this paper, we discuss knowledge frontiers and boundaries related to entrepreneurship. We critically examine the subject of knowledge management in entrepreneurial firms, the knowledge and the creativity spillover theory of entrepreneurship, resource-based view, and the entrepreneurship ecosystem perspective in bridging the micro-macro divide. We highlight the growing narrative in the entrepreneurship literature on the importance of knowledge and creativity to entrepreneurs, its boundaries and frontiers, and the need to bridge the micro-regional, industry, and national contexts for entrepreneurship. At the core of this narrative is the shift in focus from traditional inputs for entrepreneurs toward knowledge inputs (Audretsch and Thurik 2001; Audretsch and Lehmann 2005).

We identify key directions in the ambitious agenda to understand the context surrounding entrepreneurs, within their firms, industry, regions, and industry-regions, while gauging performance effects on innovation, entrepreneurial orientation, behavior, and decision-making (see Kuratko et al. 2015; Caiazza et al. 2019). We argue that successful entrepreneurship is affected by the speed and efficiency of new knowledge integration into firm and industry routines. Internal knowledge investment and external knowledge collaboration (Cassiman and Valentini 2016), in additional to knowledge spillovers (Jaffe et al. 1993; Audretsch and Lehmann 2005; Iammarino and McCann 2006), serve as a conduit for entrepreneurial opportunity recognition. The existence of these knowledge inflow and outflow is important for entrepreneurial decision-making (Bernstein and Nadiri 1988; Audretsch and Keilbach, 2005; Cassiman and Veugelers 2006) and regional, industry, and national economic growth (Romer 1990; Grossman and Helpman 1991). Finally, we lay out the contributions made by 11 papers in this special issue.

2 Internal and external knowledge in entrepreneurship research

An important question in the entrepreneurship research is concerned with the accumulation of knowledge and creativity inside an entrepreneurial firm (Florida 2002; Audretsch and Belitski 2013), as well how to capture returns to knowledge spillovers (Griliches 1979) and knowledge flows (Cassiman and Veugelers 2002). While knowledge spillovers are voluntary knowledge transfer, knowledge collaborations such as R&D agreements and joint patents may be associated with a financial reward (Hall and Sena 2017). Collaboration costs, investment in R&D and innovative training, hiring scientists, and legal and strategic protection of knowledge (Hall and Sena 2017) can strengthen new product development but also add to knowledge management costs on the edges of these knowledge boundaries.

In addition to investment in R&D, entrepreneurial firms actively search for knowledge globally (Lahiri 2010; Balland et al. 2015) and within local ecosystems (Qian et al. 2012; Stam and Spigel 2017; Audretsch and Belitski 2017), entrepreneurs collaborate with competitors, customers, suppliers, enterprise alliance units (Van Beers and Zand 2014), venture and angel capital providers (Cumming et al. 2016), education and research institutions (Scandura 2016), and other stakeholders (Miller et al. 2014).

Liaising with universities and research labs may play a key role in generating exploratory knowledge (Perkmann et al. 2013; Audretsch 2014; Guerrero et al. 2016; Belitski and Heron 2017). In addition to incumbent firms, universities and public research institutes can serve as knowledge labs for the technological base of new firms (Agarwal and Shah 2014; Miller et al. 2016). However, if the costs of knowledge collaboration and R&D investment are high, or a firm has limited internal resources, entrepreneurs will either limit their knowledge collaboration (Audretsch and Belitski 2019) or source knowledge from external environment via knowledge spillovers (Jaffe et al. 1993). Although knowledge spillovers are a public good and easily available—such as through things like conference participation, technology conference memberships, patent filings, and publications—the flow of tacit knowledge requires closer interaction between an entrepreneur and an

external collaborator for the knowledge to spill over (Audretsch and Feldman 1996; Audretsch and Caiazza 2016).

While knowledge costs will make an entrepreneur face a choice between internal and external knowledge investments, R&D collaboration or hiring scientists complementarity strategy can be used to increase firm absorptive capacity (Helfat and Martin 2015). Taken together, internal investment in knowledge, knowledge spillovers, and knowledge collaboration emerges as an important mechanism to access and assimilate new knowledge for a firm (Caiazza 2016), adding to other investments related to machinery, software, training, and equipment (Roper and Hewitt-Dundas 2015). Investment in knowledge can be a worthwhile pursuit for firms because of at least two types of benefit for firms. First, internal knowledge enables a firm to recognize tacit knowledge through collaboration across different partners, and to assimilate incoming knowledge spillovers. Second, it facilitates learning within an organization, creating stronger absorptive capacity (Cohen and Levinthal 1989; Qian and Acs 2013).

3 Entrepreneurship and knowledge: bridging a micro-industry-macro divide

Entrepreneurship policy is by nature multi-level and multi-dimensional (Audretsch et al. 2018). It can be understood at the individual level of analysis (Casson 2005; Autio et al. 2014), regional level (Audretsch and Lehmann 2005; Audretsch et al. 2006; Audretsch et al. 2015a, b), industry level (Qian 2018; Colombelli and Quatraro 2018), national level (Acs et al. 2014, 2017; Audretsch and Lehmann 2016), and international level, resulting in a complex multi-level structure of entrepreneurship activities (Estrin et al. 2013; Belitski and Desai 2016b).

While investing in knowledge within the boundaries of a firm (e.g., in-house R&D, training), entrepreneurs will also be purchasing external knowledge from ecosystem holders of resources within close proximity (Acs et al. 2018; Stam 2018) and globally, such as virtual global ecosystem and platform economies (Zahra and Nambisian, 2011; Kenney and Zysman 2016; Sussan and Acs 2017).

The traditional inputs of production for economic growth[1] have been challenged, as well as the fact that "firm exists exogenously and receives knowledge exogenously" (Audretsch and Lehmann 2005: 1192) with firms use actively invest in knowledge and training to innovate and grow. New ventures based on the development and commercialization of new ideas drive innovation and economic growth, by commercializing knowledge that would otherwise be left uncommercialized within their firms and across firm boundaries (Acs et al. 2013).

Smaller and younger firms have been found to contribute to a larger extent to entrepreneurial outcomes, than would have been expected from larger firms which accumulate significant stocks of knowledge by investing in internal in R&D and human capital (Griliches 1979; Audretsch and Feldman 1996). This paradox of the firm knowledge production function was described by Audretsch (1995) and later by Audretsch et al. (2006) and Acs et al. (2013) as the Knowledge Spillover Theory of Entrepreneurship (KSTE). The major thrust of this and subsequent work is that firms endogenously seek knowledge in a regional (Audretsch and Lehmann 2005, 2006), industrial (Qian and Acs 2013), and ecosystem context (Audretsch et al. 2018; Stam 2018), aiming to create and recombine existing knowledge available in the economy into knowledge inputs, which can lead to the generation of new products and services (Ghio et al. 2015).

Acs et al. (2013) and Ghio et al. (2015) empirically demonstrated how the knowledge production function works for entrepreneurs. A knowledge spillover view bridges the micro-divide as knowledge spillovers emerge in industries and regions Griliches (1979) and are used by individuals to start a firm. While knowledge production has been empirically tested, differences in appropriability, creation, and commercialization of knowledge have been found to be significant between small and large, young and incumbent, and firms in high-tech and low-tech sectors (Acs et al. 2009).

At the industry level, skill composition matters (Colombelli and Quatraro 2018) as industries with a paucity of knowledge are bounded and may attract less

[1] Audretsch and Thurik (2001) discuss the role of knowledge in shifting the comparative advantage in the OECD countries away from being based on traditional inputs of production. As the comparative advantage has become increasingly based on new knowledge, public policy has responded enabling the creation and commercialization of knowledge.

entrepreneurship as industries rich in knowledge and creativity (see Florida 2002; Audretsch et al. 2015b; Belitski and Desai 2016b). Therefore, the search for knowledge within firm boundaries and beyond—and the related adaptation and implementation by entrepreneurs—is at heart of this special issue. This subject has implications for economic growth (Wennekers and Thurik 1999; Wennekers et al. 2010), regional economic development (Audretsch and Keilbach 2010; Audretsch et al. 2015b).

At the regional and national levels, knowledge spillover of entrepreneurship (Thurik et al. 2008) accelerates economic growth by increasing employment. Public policy must ensure that scarce resources will be used more efficiently and effectively by entrepreneurs. Most efficient and resourceful entrepreneurial firms are more likely to introduce new products and achieve greater entrepreneurial ambition (Estrin et al. 2013). These firms can then push national economic development, reducing unemployment and creating new jobs (Audretsch et al. 2015b; Fritsch and Mueller 2008), by becoming a conduit of new knowledge and ideas, further accelerating knowledge spillovers (Audretsch and Feldman 1996; Jaffe et al. 1993; Acs et al. 2013) in a positive cycle.

Interestingly, while investing in knowledge may not be a final objective for entrepreneurs, neither reaching the production possibility frontier, entrepreneur will aim for profits and in doing so they will use knowledge as a competitive advantage (Acs et al. 2002) when competing with incumbents and collaborating within industries (Griliches 1979) and regions (Audretsch et al. 2006). The benefits which occur due to the introduction of new knowledge and ideas to market can stretch beyond competition with incumbents (Fritsch and Mueller 2008) and serve as creative destructors more broadly for the industry and region (Schumpeter 1934).

In bridging the internal and external boundaries of knowledge creation and commercialization, broadening of the knowledge frontiers with a focus on supporting entrepreneurial behavior, culture, and orientation (Ireland et al. 2009; Kuratko et al. 2014, 2015) is an important question. Contemporary entrepreneurial activity understands *characteristics* of the knowledge frontier to include the following: availability of assets, diversity, creativity, entrepreneurial cognition, opportunity. Contemporary entrepreneurial activity understands the *antecedents* of the knowledge frontier to include the following: in-house investment in knowledge (Cassiman and Veugelers 2002), development of regional and global entrepreneurship ecosystems (Zahra and Nambisan 2011; Sussan and Acs 2017; Audretsch et al. 2018; Stam 2018), developing entrepreneurial culture and orientation (Fritsch and Mueller 2004; Kuratko et al. 2015) and co-creation of innovation with stakeholders, such as exploratory types of innovation (Miller et al. 2014, 2016; Scandura 2016). Knowledge frontiers facilitate a gain in competitive advantage through knowledge assimilation, integration and commercialization by entrepreneurs (Audretsch and Lehmann 2005; Audretsch et al. 2006), and enabling an entrepreneur to speed movement toward the production possibility frontier (Mickiewicz et al. 2017).

3.1 Promising questions

Many issues emerge when an entrepreneur searches for knowledge and challenges knowledge boundaries. Next, we suggest some illustrative clusters of promising questions, but this is by no means a comprehensive list. One important question is the issue of institutions. For example, what is the state of institutions that shape incentives for entrepreneurs to engage in R&D, R&D collaborations, and knowledge sharing? Are regulatory frameworks encouraging or discouraging (Baumol 1990; Acs et al. 2014; Chowdhury et al. 2019)? Some research argue that institutional characteristics in a country and a region (Szerb et al. 2013; Belitski and Desai 2016a; Audretsch et al. 2018) open new incentives to collaborate on knowledge (Colombelli and Quatraro 2018).

Another fruitful question revolves around the internal characteristics of an entrepreneurial firm (Kuratko et al. 2014, 2015). To improve knowledge combinations in a region, an industry, or a firm, which characteristics will matter most? Also, what kind of goals are relevant—such as entrepreneurial orientation, exploration activity, introducing new product to market, process innovation, survival, and job creation—and how would these matter for the firms themselves and for policymakers? These goals may be relevant to new combinations of knowledge and demonstrate new mechanisms in obtaining the knowledge in a firm. The relevance of some of these outcomes to broader policy concerns, like entrepreneurial culture (see Covin and Slevin 1989), is also interesting.

Another question is around the value of internal and external knowledge for entrepreneurs (Cassiman and Valentini 2016). For example, how complementary are internal and external knowledge to one another, and could this vary across firms of different sizes or ages (see Acs and Audretsch 1988)?

Research on openness is also useful to better understand investments in absorptive capacity (Cohen and Levinthal 1989), as well as how knowledge from external collaborators (Colombo et al. 2011) is sourced, shared, and managed in entrepreneurial firms (see Bogers et al. 2017). Complementarity sourcing may accelerate innovation and growth (Schumpeter, 1939) but it may have boundaries, often shaped by resource allocation (Mickiewicz et al. 2017). In an attempt to commercialize available knowledge foundation of endogenous growth theory (Romer 1990), the open innovation literature (Chesbrough 2003; Chesbrough et al. 2006) offers a solution to the knowledge boundaries by allowing more knowledge flows. Interestingly, the entrepreneurship models are becoming more digital (Nambisan 2017) and more open in conceptualization (West and Bogers 2014).

Since knowledge can be deeply embedded in place and industry (Audretsch and Feldman 1996; Qian 2018; Colombelli and Quatraro 2018), entrepreneurship researchers could ask how entrepreneurial firms of different sizes and ages (Acs and Audretsch 1988) may experiment with available knowledge and implement a variety of knowledge management practices (Heiman and Nickerson, 2004), developing a better entrepreneurial climate in organizations (Ireland et al. 2009; Kuratko et al. 2014). The research may focus on how to mitigate organizational, transaction, and cognitive costs (Veugelers and Schneider, 2018), and how to expand knowledge boundaries (including platform resources and knowledge) (Cumming et al. 2019).

Future needs for research include insights from a wide range of data sources. More research using mixed data sources can accelerate insight from only perceptive or only accounting data at different levels. For example, matching both perception and accounting data at different research levels can give more insights and increase the robustness of the findings. Multi-level analysis can expand knowledge on the relative explanatory power of various levels, like firms and regions, and provide nuanced guidance to entrepreneurs and policymakers. Several studies described in the next section used cross-sectional data or a limited period of time for analysis. Future research could use longitudinal data to better understand the antecedents of entrepreneurship activity as well as in reconstructing entrepreneurial strategies.

Another need is to continue to bridge the micro-macro divide in entrepreneurship research. When it comes to the interplay of innovation and entrepreneurship, entrepreneurship and sustainability, and sustainability and innovation, the dynamics of the individual and the firm should be examined in concert with the dynamics of industries, regions, and countries. A key focus in the regional entrepreneurship literature is the spatial concentration of knowledge, human capital, and creativity in regions, while research on open innovation has demonstrated that entrepreneurial firms react to entrepreneurship ecosystems and knowledge frontiers more broadly (inter-regional, inter-industry, national, international) (West and Bogers 2014; Bogers et al. 2017; Sussan and Acs 2017).

In particular, future studies may also focus on heterogeneous measures of firm performance, like productivity and job creation, in addition to measures of innovation (Belitski and Desai 2018). Using alternative measures of firm performance can further expand the knowledge boundaries on key relationships.

4 Papers in this special issue

The papers in this special issue converge around resource-intensive search for new combinations of commercializable knowledge and technology in entrepreneurial firms (see Qian 2018), at firm, region, industry, and country levels (Autio et al. 2014; Acs et al. 2014).

In "Does equity crowdfunding democratize entrepreneurial finance," Cumming et al. (2019) build from the idea that new digital and information communications technology (ICT) could transform the nature of uncertainty and risk inherent in entrepreneurship (Nambisan et al. 2018). They examine the role of gender, age, ethnicity, and geography in entrepreneurial choices of equity crowdfunding and initial public offerings (IPOs). Using a dataset of more than 150 projects in the United Kingdom (UK), they find that investors in equity crowdfunding offerings would invest in projects with younger top management team (TMT) than in IPOs. They provide empirical insight into alternative financing and investor decision-making, also addressing a

growing question about whether or not equity crowdfunding may have a "democratizing" effect on capital markets. They find that female and male entrepreneurs, as well as minority entrepreneurs, have similar chances in raising equity crowdfunding. Interestingly, knowledge transfer across national boundaries was found to facilitate the successful completion of projects, such as remotely located companies being more likely to launch and successfully complete an equity crowdfunding offering, whereas there was a limited effect for IPOs.

The second paper, "On the relationship between origin and performance of innovative start-ups: the role of technological knowledge at founding" by Minola et al. (2019), integrates resource-based view into the knowledge spillover theory to draw a link between technological knowledge at founding and performance of entrepreneurial firms. The authors discuss the mechanisms of knowledge generation within exploration-oriented stakeholders (Bogers et al. 2017) such as universities and public research labs (Miller et al. 2016), and compare 236 corporate spinoffs (CSOs) and 102 university spinoffs (USOs). They find that workers who leave their organization to start a venture either act on new business opportunities they created or take advantage of their accumulated knowledge. Their approach introduces three dimensions that characterize technological knowledge developed by start-ups: scope, newness, and tacitness. They demonstrate that USOs have higher performance in terms of profitability since they have a technological knowledge with higher levels of newness and broader scope; however, tacitnesss of knowledge does not provide a competitive advantage.

The set of papers examines knowledge frontiers and boundaries at the region-industry level. "Amenities, Subcultures and Entrepreneurship" by Audretsch et al. (2019a) investigates the role of culture and attractiveness of a place in shaping competition, creativity, and entrepreneurship in the environment. They argue that creativity will work along with knowledge to facilitate regional entrepreneurship and innovation. They expand on extant research on creativity and regional development by examining subcultural scenes and subcultural knowledge in entrepreneurial ecosystems. The study focuses on the influence of subcultures on creativity and entrepreneurship in the 69 largest German cities. They find that the co-presence of subcultural amenities and subcultural knowledge is positively associated with entrepreneurship, while the mainstream culture has little to no effect.

Their related paper "Cultural Diversity and Knowledge in Explaining Entrepreneurial Outcomes in European Cities" (Audretsch et al. 2019b) empirically tests the role of cultural diversity as a conduit in the knowledge spillover of entrepreneurship. They demonstrate that the interplay between knowledge embedded in an industry and localized cultural diversity increases entrepreneurial dynamics and firm entry. Their study illustrates that context and cultural diversity and knowledge have differential impacts on entrepreneurial outcomes across European cities and countries. Together, both studies on the cultural context (Audretsch et al. (2019a, b) expand on the role that creativity, culture, and knowledge-intensive sectors play in entrepreneurship in European regions.

The fifth paper, "Local knowledge composition and the emergence of entrepreneurial activities across industries: Evidence from Italian NUTS-3 regions" by Colombelli et al. (2019), integrates the knowledge spillover theory of entrepreneurship with industrial economics and geography of entrepreneurship. They study the relationship of patenting in diverse industries and regions with exploratory and exploitative new venture creation, using multi-level data on 843 Italian industry-region pairs for the period 1997–2009. They find that the effect of knowledge spillovers, in terms of size and composition of local knowledge, is idiosyncratic for new firm formation. A key finding is that the availability of local knowledge spillovers does not per se trigger new firm formation while the properties of local knowledge bases, stemming from accumulated competencies across diverse of sectors, facilitates new firm formation.

"Knowledge-based service economy and firm entry: An alternative to the Knowledge Spillover Theory of Entrepreneurship" by Tsvetkova and Partridge (2019) tests the knowledge spillover theory of entrepreneurship in metropolitan statistical areas (MSAs) in the USA, which is compatible with NUTS3-level analysis in the previous paper. They develop an instrument to measure knowledge production embedded in the logic of industry mix from shift-share analysis. They find that knowledge spillovers do not have a homogeneous effect on entry in MSAs. Greater knowledge generation leads to increased firm entry in the high-tech *non-goods* sector, whereas this is not the case for the high-tech *goods* sector. This study suggests that in some markets,

mechanisms other than knowledge spillovers are likely at play. They advance extant knowledge by demonstrating the need to consider knowledge spillovers in conjunction with other factors when explaining entry in high-tech sectors.

The seventh study, "The influence of exploratory versus exploitative acquisitions on innovation output characteristics in the biotechnology industry" by Lange and Wagner (2019), investigates the influence of exploratory versus exploitative acquisitions on innovation output in the biotechnology industry. The authors estimate a model using 951 acquisitions by 209 companies with alliances and acquisitions representing two forms of external knowledge sourcing in the knowledge-based biotechnology sector. They find a non-linear (inverted U shape) relationship, expanding knowledge frontiers on how exploitation orientation of acquisitions and innovation output are interlinked. This indicates that similar knowledge has limitations and a combination of diverse knowledge is key to innovation based on complementarity of knowledge sources.

The works of Tsvetkova and Partridge (2019) and Lange and Wagner (2019) advance insight into the knowledge spillover of entrepreneurship by shedding light on the process of how knowledge diffusion can facilitate innovation and firm formation across different environments (regions, industries, alliances).

The remaining four papers focus on the micro-macro institutional context in which entrepreneurial firms operate. Entrepreneurs are embedded in institutional context comprising tax policies, contract laws, formal and informal culture and so on, and institutional change can directly and indirectly affect knowledge generation, commercialization, and exploitation. "Taxes, the tax administrative burden and the entrepreneurial life cycle" by Braunerhjelm et al. (2019) analyzes how differences in tax policy settings may change entrepreneurial behavior, using the sample of OECD countries during 2005–2012. Using Global Entrepreneurship Monitor (GEM) data, five different stages of the entrepreneurial life cycle were identified: the individual's intention to start a new firm, very early or nascent entrepreneurship (0–3 months), new business ownership (3–42 months), established business (> 42 months) stages, and exit. They find that tax burden has a negative effect on knowledge commercialization and the effect differs at the earlier and later stages of the entrepreneurial life cycle. This stretches knowledge boundaries on entrepreneurship and institutions by using an occupational choice approach to incorporate the costs of tax compliance by an entrepreneur. Their findings also illustrate that tax burden has a significant negative effect on entrepreneurial activity, with the strongest effect at start-up. For example, they find a 10% increase in the corporate tax rate reduces entry rates by 2 to 5%, whereas aggregate investments as a share of GDP declined by 2%.

The ninth paper is "How do country R&D change the allocation of self-employment across different types?" by Burke et al. (2019). The study treats country R&D as a form of knowledge spillover and tests its effect on the allocation of self-employment in the economy. Three distinctive types of self-employed are used: self-employed with employees—or employers—, own-account workers or sole proprietorships, and dependent self-employed workers. They provide a new insight into country-level investment in knowledge and entrepreneurial decision-making as a choice of self-allocation between three different types. They advance research on the role that knowledge spillovers play in explaining heterogeneity of entrepreneurial activities, clearly demonstrating that country-level R&D spending acts as a knowledge spillover to entrepreneurship and increases the share of self-employed with employees and opportunity self-employed. Interestingly, they find increased R&D negatively affects dependent self-employed and necessity self-employed.

Godley et al. (2019) expand on the role of institutional context in the next paper, "The Complementarity Theory Perspective to the Entrepreneurial Ecosystem Taxonomy." They investigate entrepreneurship ecosystem "fit" to explain how complementarities contribute to the entrepreneur's performance. Using interview data on the most successful scale-ups in a region in South East England, they focus on new business creation and the role that a combination of various factors, including knowledge inputs, can be used to achieve a "match" between mostly strong components of a spatially bounded entrepreneurship ecosystem. They argue that entrepreneurial activity can be driven by a combination of elements (Brown and Mason 2017).

The eleventh and final paper in this special issue, "Corporate entrepreneurship strategy: extending our knowledge boundaries through configuration theory" by Kreiser et al. (2019), integrates corporate entrepreneurship strategy (CES) with configuration theory. The authors examine the relationship between external CES fit—operationalized as "matched" linkages between the external environment and internal elements of CES—

and internal CES fit—operationalized as aligning the internal elements of CES—as well as the relationship between internal CES fit and firm performance. They find that the fit of these elements is associated with greater financial performance. This study demonstrates synergies between strategic intentionality, entrepreneurial orientation, and entrepreneurial behavior in an entrepreneurial firm, as well as connectedness for firm performance. The study demonstrates that precise specifications of "fit" can be used by entrepreneurs and academics to assess internal fit (through adherence to an "ideal" profile of internal elements) and external fit (through the achievement of a "match" between external and internal elements) in the context of firm performance. Their model can be tested in future research to expand on CES alignment in firms.

In the papers discussed above, entrepreneurial activity is examined in the context of how well it enables exploration of knowledge frontiers and expands knowledge boundaries, based on a mix of perspectives (institutional, entrepreneurship ecosystem, resource-based view, organizational synergies) as well as the context of entrepreneurial decision-making (organizations, industry, universities, regions, industry-regions, countries). The papers critically examine the subject of knowledge management and innovation in entrepreneurial firms, stretching the knowledge boundaries of absorptive capacity, resource-based view, entrepreneurship ecosystems, and the knowledge spillover theory of entrepreneurship to bridge the micro-macro divide in entrepreneurship research. The ambitious agenda is to advance answers on innovation and performance, and how knowledge emanating from entrepreneurial firms and sourced from external environment may facilitate entrepreneurial dynamics.

Overall, this special issue advances entrepreneurship research by expanding perspectives on regional innovation, regional development, corporate entrepreneurship, resource-based view, institutional economics, and digital economy. The papers made theoretical inroads by integrating a mix of theories and operationalizing the elements of these theories to examine the linkages between specific environmental and organizational elements (external fit) as well as among organizational elements (internal fit) of entrepreneurial firms. Their findings are diverse and sometimes unexpected, demonstrating the complexity of the relationships between institutional quality, cultural diversity, technological knowledge, internal investment in R&D, skills compositions and decompositions, and entrepreneurial outcomes. Moreover, the papers in this special issue demonstrate the importance of aligning multiple elements within the same level of analysis (organizational for CES; skill composition for industry; democratization of finance for project success) and across different levels of analysis (industry-regions; city-countries; organizations and regional ecosystems).

5 Conclusion

The body of current knowledge in the literature calls for greater theoretical and empirical research to illuminate the relationship between internal innovation and sourcing knowledge from external partners and entrepreneurship ecosystems partners, including incoming knowledge spillovers. The papers in this special issue extend the knowledge frontiers and open new avenues for future research to investigate entrepreneurship as a heterogeneous multi-level phenomenon.

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