

RESEARCH

Open Access



Regional industrial path development: The role of new entrepreneurial firms

Jan Ole Rypestøl 

Correspondence:
jan.o.rypestol@uia.no
Department of Working Life and
Innovation, University of Agder, Jon
Lilletunsvet 3, 4879 Grimstad,
Norway

Abstract

Entrepreneurs play an important role in the evolutionary process of regional industries. As founders of new firms, entrepreneurs increase the supply side of the industrial economy, and by doing so, they challenge the incumbent firms to respond. From the perspective of evolutionary economics, understanding these dynamics of entrepreneurial triggers and industrial firm responses are important, as it sheds new light to our understanding of how regional industries evolve. The entrepreneurship literature offers several classifications which are helpful in distinguishing between different types of entrepreneurs and firms. However, none of these classifications and typologies are suitable for explaining what effect new entrepreneurial firms may be expected to have on regional industries and their future development. This paper seeks to address this knowledge gap. Based on two dimensions, innovation novelty and entrepreneurial growth intention, the conceptual framework develops a typology of new entrepreneurial firms' expected effect on future regional industrial development. In doing so, the paper contributes to the field of evolutionary economic geography by introducing a new perspective on entrepreneurial firms' contribution to dynamic regional industrial path development.

Keywords: Regional development, Entrepreneurship, Path dependency, Typology, Innovation novelty, Growth intentions

Background

Evolutionary economics argue that economic development and growth take place as a result of an evolutionary process (Nelson, 2008; Nelson and Winter, 2009). As part of this process, new firms are introduced to the existing industrial structure, and during their life cycle, most new firms go through growth and decline before they eventually die (Ireland et al. 2009).

This paper argues that, in a capitalist economy, the overall level of regional economic performance results from aggregated decisions of firms. An industry is defined as a group of firms producing products that are close substitutes for one another (Porter, 1980) and regional industries consist of actors seeking to advance their interests based on bounded rationality (Simon, 1982) and in interaction with others (Scharpf, 1997). The result of these individual firm decisions are visible in overall regional industrial development.

Path dependence theory is increasingly used as a theoretical framework for analysing regional industrial development (Henning et al. 2013; Isaksen and Trippel, 2014). The

theory argues that regional industrial development is a path dependent process, as today's regional industrial structure is heavily influenced by its historical legacy (Boschma and Frenken, 2006, p. 280:281). Path dependency theory argues that the way industrial structures, infrastructure and institutional frameworks appear today will favour some industry relevant choices over others (Martin and Sunley, 2006). Path dependency theory further argues that, once created, industrial paths may develop in two directions (Martin, 2010). The first direction is towards a limited extension of the pathway, while the other is a more dynamic development. While the limited extension of the industrial path is based on a situation of knowledge recirculation, the dynamic evolution of industrial paths is based on renewed regional knowledge and innovation.

New firms play an important role in industries' evolutionary processes. The new firm contributes to regional industrial path development in one of three ways. Either it contributes to reinforcing existing technologies and knowledge, to renewing the industry by bringing in new technology, networks or knowledge, or it contributes to regional industrial path creation by exploiting business opportunities new to the region and thereby introducing a potential new industry (Martin, 2010; Martin and Sunley, 2006; Tödtling and Trippl, 2013).

As creators of new ventures, entrepreneurs contribute significantly to this process of regional industrial evolution. However, although entrepreneurship literature seems to agree that context matters (Aldrich and Cliff, 2003; Aldrich and Fiol, 1994; Baumol, 1990; Dahl and Sorenson, 2009; M. Granovetter, 1985; Jack and Anderson, 2002; Petrakis and Kostis, 2014; Van de Ven, 1993), entrepreneurship researchers tend to view both the entrepreneurs and their new firm formations as decontextualised entities (Alsos et al. 2014). In this string of research, entrepreneurs seek to increase their chances of entrepreneurial success by optimising their new firm location (Liargovas and Daskalopoulou, 2011) and as so, entrepreneurs contribute to increased regional interaction and knowledge flow.

The entrepreneurship literature offers several classifications which are helpful in distinguishing between different types of entrepreneurs (Kirzner, 1973; Schumpeter, 1934 [2012]; Smith, 1967) and various forms of entrepreneurial ventures (Campbell and Carayannis, 2016; Kirchoff, 1994; Westhead and Howorth, 2007), but none of these are suitable to explain their expected contribution to regional industrial path development. A mapping of the expected contribution of entrepreneurial firms to industrial path development is important for two main reasons. Firstly, the outcome of entrepreneurial activity seems to vary in terms of job creation (Henrekson and Johansson, 2010) and expected economic outcome (Alsos et al., 2014; Fritsch, 2011). A typology helpful in detecting the potential future impact of a new entrepreneurial firm on existing and new industrial paths is important as it would function as an early warning mechanism for the future of the regional industry. Secondly, such a typology would be helpful to politicians wishing to predict future regional development and tailor political strategies, policy instruments and infrastructure to support their desired growth trajectories.

The aim of this paper is to introduce such a typology of new entrepreneurial firms. Based on two dimensions, those of innovation novelty and entrepreneurial growth intention, the paper's conceptual framework identifies four types of entrepreneurial firms expected to contribute differently to regional industrial path evolution. In introducing this typology, the paper seeks to provide an answer to the following research question:

What common characteristics of new entrepreneurial firms support various regional industrial development paths?

The remainder of the paper is organised into five main sections: section two presents relevant theory within the field of entrepreneurship and path dependency, while section three introduces the two main variables which are important in identifying new entrepreneurial firms' expected contributions to the existing regional industrial structure. In section four, the new entrepreneurial firm typology is presented and in section five some important policy implications of the new firm typology are discussed. Finally, section six summarises and presents a short conclusion.

Theoretical framework

Entrepreneurship

Regional industries are complex systems, and according to Porter, they consist of a critical mass of related individual firms founded upon a variety of knowledge, competences, resources and technologies (Porter, 1980). It is in this context that entrepreneurs become important. As founders of new firms (Gartner, 1988), entrepreneurs increase the supply side of the regional economy and thereby create an incentive for existing firms to perform better (Fritsch, 2011; Porter, 1980). As such, entrepreneurs play a vital role in contributing to regional industrial development.

Firms are the key actors in regional industrial development as it is presented in this paper. As the majority of new firms are started by entrepreneurs, I begin the theoretical groundwork by looking at entrepreneurship theory and some of the existing classifications of entrepreneurs and firms. My main focus in this paper is to identify what determines the relative effect of these entrepreneurial firms on industrial development, and a natural starting point is the Schumpeterian and Kirznerian schools of entrepreneurship, as these schools introduce different definitions of entrepreneurship and therefore different analysis of how entrepreneurs contribute to regional development.

Schumpeterian entrepreneurs versus Kirznerian entrepreneurs

The first school of thought was founded by Joseph Schumpeter. In his book *The Theory of Economic Development*, first published in English in 1934, Schumpeter criticised neo-classical economics for being unable to explain economic change and development (Schumpeter, 1934 [2012], p. 62). Schumpeter argued that neoclassical economics illustrates the power of equilibrating forces in the economy, and thereby the economic tendency towards a state of 'circular flow' rather than economic development and growth (Schumpeter, 1934 [2012], p. 62). If economic development is to take place, he argues, a 'spontaneous and discontinuous change in the channels of the flow, disturbance of equilibrium, which forever alters and displaces the equilibrium state previously existing' is needed (Schumpeter, 1934 [2012], p. 64).

According to Schumpeter, such discontinuous change is a result of new combinations of existing resources and he defines development as either (a) the introduction of a new good; (b) the introduction of a new method of production; (c) the opening of a new market; (d) the conquest of a new source of supply of raw materials or half-manufactured goods or (e) the carrying out of the new organisation of any industry (Schumpeter, 1934 [2012], p. 66).

Defining development as a recombination of resources resulting in one of these five possibilities presupposes both a conductor and an arena. Schumpeter defines both when he writes: "The carrying out of new combinations we call "enterprise", and the individuals whose function it is to carry them out we call "entrepreneurs" (Schumpeter, 1934 [2012], p. 74).

According to Schumpeter, the role of entrepreneurs is crucial in creating economic development and growth. Entrepreneurs introduce radically new solutions to the marketplace, and in doing so they challenge 'old' solutions. As a consequence, old solutions need to be renewed in order to avoid destruction. Schumpeter called this process of increased competition creative destruction (Schumpeter, 1942) and he argued that economic development is a result of a continuous evolutionary process of creative destruction.

In his 1973 book, *Competition and Entrepreneurship*, Israel Kirzner challenged the Schumpeterian view of an entrepreneur. While Schumpeter describes the entrepreneur as the person causing creative destruction and radical changes, Kirzner describes the role of the entrepreneur as quite the opposite, namely as an equilibrating force. According to Kirzner, an entrepreneur is a person constantly searching the market for failure of coordination and therefore for potential gains from trade. According to the Kirznerian school of thought, the gaining of trade is visible as an above-equilibrium price and when such opportunities arise the entrepreneur enters the marketplace to exploit the observed business opportunities and collect the entrepreneurial profit. Kirzner describes the 'pure entrepreneur' and the 'entrepreneurial profit' in this way: The pure entrepreneur '*...proceeds by his alertness to discover and exploit situations in which he is able to sell for high prices that which he can buy for low prices. Pure entrepreneurial profit is the difference between the two sets of prices*' (Kirzner, 1973, p. 48).

As the calculation of 'above-equilibrium' prices is based on subjective price and cost analyses, the Kirznerian approach to entrepreneurship is highly subjectively orientated. If an entrepreneur exploits an opportunity, it is because (s)he considers the profit margin to be worth exploiting. Starting a new sports shop in one's neighbourhood could be a good entrepreneurial idea according to Kirzner. This is so even if the shop sells more or less the same items as other sports shops in the area. The central question is whether you act upon a subjective analysis of profit potential or not. If you do, and if you are right, the market entrance will provide entrepreneurial profit.

The Kirznerian definition of entrepreneurs as persons entering the market in order to exploit what (s)he believes will bring entrepreneurial profit contrasts with the Schumpeterian definition of an entrepreneur. According to Schumpeter, the person starting up a new sport shop would not automatically be considered an entrepreneur. In the Schumpeterian school of thought, the new firm owner would be considered an entrepreneur only if the sport shop launches an innovation radical enough to cause creative destruction.

Kirzner describes the difference between himself and Schumpeter in this way: 'For Schumpeter the entrepreneur is the disruptive, disequilibrating force that dislodges the market from the somnolence of equilibrium; for us the entrepreneur is the equilibrating force whose activity responds to the existing tensions and provides those corrections for which the unexploited opportunities have been crying out' (Kirzner, 1973, p. 127).

Based on this quote from Kirzner, it could be argued that Schumpeter promotes a 'technology push' dominated view of entrepreneurship while Kirzner, in contrast, promotes a 'market pull' perspective. According to Schumpeter, the entrepreneur takes a proactive stand and creates opportunities by introducing path breaking innovations, while the entrepreneur in a Kirznerian tradition responds to opportunities presented to them.

Even if the two definitions of entrepreneurs and their role in society are quite different, the Schumpeterian and Kirznerian forms of entrepreneurship may coexist. This has been repeatedly emphasised by Kirzner (1973, p. 149), and the coexistence of the two types of entrepreneurs is also emphasised in this paper. As both types of entrepreneur fulfil different roles within the economy, both types of entrepreneurs are important contributors to regional industrial development.

Other classifications of entrepreneurs

While Schumpeter and Kirzner present different analyses of what an entrepreneur is and how entrepreneurs contribute to economic development, several attempts have also been made to categorise entrepreneurs.

A central theme in early entrepreneurial research was to focus on the motivations and background characteristics of entrepreneurs. The early work was inspired by Norman Smith (Smith, 1967) and his presentation of the Craftsman-Opportunist dichotomy (see for instance (Davidsson, 1988; Lorraine and Dussault, 1987; Smith and Miner, 1983)). The Craftsman-Opportunist dichotomy profiles the Craftsman entrepreneur as coming from a blue-collar background and being motivated by personal autonomy and the Opportunist entrepreneur as well educated and experienced, seeking to build a successful organisation and achieve financial gains. Smith concludes that this difference in entrepreneurial motivation results in contrasting potential for growth in terms of job generation and wealth creation (Smith, 1967).

Another categorisation within the field of entrepreneurship is the theory of Dynamic Capitalism put forward by Bruce A. Kirchoff. In his 1994 book, he argues that firm growth and the firm innovation rate will determine the extent of the creative destruction effect the firm has on the economy as a whole. Kirchoff distinguishes four categories of firms contributing differently to the development of a capitalist economy. Economic Core firms have a low growth rate and a low innovation rate, while Ambitious firms have a high growth rate and a low innovation rate. Constrained Growth firms have a high innovation rate and a low business growth rate and, finally, Glamorous firms have a high business innovation rate and a high business growth rate.

The entrepreneurial ambition to build a successful organisation and achieve financial gains has, more recently, been studied closely within the field of Ambitious entrepreneurship (Stam et al., 2012). An ambitious entrepreneur emphasises the aim of creating value beyond self-sufficiency and ambitious entrepreneurs are motivated by the rewards of entrepreneurship, in either its status or its outcome (Stam et al., 2012, p. 24). Analysing ambitious entrepreneurs, Gundry and Welch (2001) found a causal link between high commitment to entrepreneurial ambitions and realised success in a number of dimensions for female entrepreneurs in the USA (Stam et al., 2012, p. 25).

Two of the later contributions within research on entrepreneurial contributions to regional growth is presented by Nightingale and Coad (2014) and by Campbell and

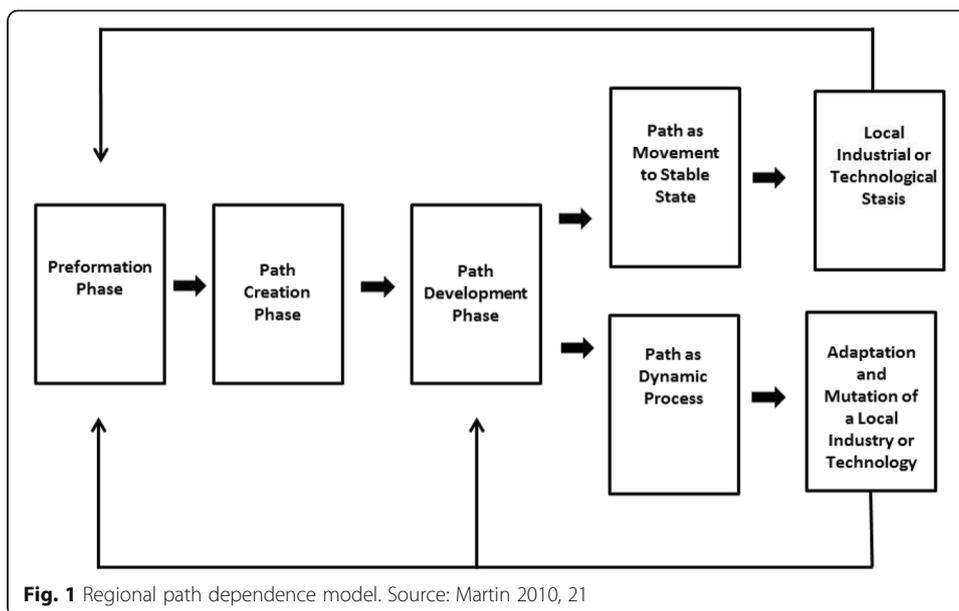
Carayannis (2016). In their paper, Nightingale and Coad argue that the contribution of entrepreneurial start-ups to the economy is multi-faceted. A large group of entrepreneurial new firms have limited impact on economic growth, while a rather small group of new entrepreneurial firms act as drivers of economic progress. As the contribution to the economy varies widely amongst start-ups, Nightingale and Coad call for a more nuanced categorisation of the term 'entrepreneurial firms'. They suggest adding the label 'muppets', as a contrast to the well-known 'gazelles'. Muppets and gazelles symbolise two extremes of entrepreneurial firms divided by their economic impact. Muppets are poor performing firms with low ambitions and low innovation novelty, while gazelles represent the very small group of entrepreneurial high growth firms making a huge impact on local economies as outstanding job creators (Henrekson and Johannson, 2010). Finally, Campbell and Carayannis (2016) introduce academic firms as an alternative to commercial firms. The authors argue that the main difference between the two categories of firms is that the first is focused on maximizing knowledge, while the latter focuses on maximizing profit.

Path dependent regional industrial evolution

From its introduction in the 1980s and 90s, path dependence theory has been increasingly important in the field of economic geography. The core of the theory is that decisions economic actors face today are affected by decisions made in the past and that history therefore favours some decisions over others (See for instance (Martin, 2010; Martin and Sunley, 2006)).

Within the field of economic geography, the theory of path dependence has shifted focus in recent years. From being mainly concerned with the development of existing pathways and lock-in situations, increasing focus has been placed upon the renewal and creation of regional industrial paths (Coenen et al. 2015; Dawley, 2014; Isaksen and Trippel, 2014; Martin, 2010; Martin and Sunley, 2006). According to Martin (2010, pp. 20–21), the evolution of regional pathways could be described as a process with four phases. *The first phase* is a preformation phase, where the creation of new paths is based on historically gained knowledge, resources and experiences. By introducing this phase, Martin extends the understanding of path creation from the original versions presented by David (1985) and Arthur (1988), who argue that paths are created by chance or historical accident. In the *second phase* new regional paths are created, while *phase three* is the early stage of path development resulting from increasing returns and network externalities. Passing through these first developing phases, the path will follow one of two possible trajectories in *phase four*. The first option is movement to a stable state resulting from a reinforcement strategy, while the second option is a dynamic path developing process resulting from a continuing process of improvement and renewals. As industries consist of firms producing close substitutes for one another (Porter, 1980), the processes of regional industrial path development result from aggregated firm decisions, including those of newly introduced firms. The model of path dependent local industrial evolution introduced by Martin (2010) is presented in Fig. 1.

From the model of regional path dependence we learn that regional industrial paths are both created and formed by structural constraints. The creation of a new regional industry represents the most comprehensive change to a regional economy. More



recent literature argues that new industrial paths could result from two possible sources of ideas. Firstly, regionally new firms could be founded upon ideas new to the world, or secondly, regionally new firms could be founded upon ideas known to the world but new to the region (Tödtling and Trippel, 2013). The first alternative results from a radical new innovation as we know it from Schumpeter, while the second alternative is more in line with Kirznerian entrepreneurship, known in the literature as either the possible start of a regional path transplantation (Martin and Sunley, 2006) or a regional path formation (Tödtling and Trippel, 2013). Path transplantation occurs when an existing industry settles in a region for the first time.

The regional path dependence approach argues that, once created, a new industry could take one of two directions. Either it could develop towards a stable state situation or the industry could develop dynamically. A regional path development leading towards a stable state situation results from reinforcement. An industry where firms lean on previous technology, structures, networks and knowledge developed over time, will gradually cement existing solutions and the industry will gradually evolve towards stasis and decline. If not reinforced, Martin (2010) argues that the path will develop more dynamically. Recent literature argues that a dynamic path evolution could follow two different dynamics. The existing path may be either extended or renewed (Boschma and Frenken, 2012). Path extension results from incremental product and process innovations based on existing knowledge (more of the same) and, without new knowledge from outside, the innovation potential will gradually decrease until the industry faces exhaustion (Isaksen and Trippel, 2014). Path renewal takes place when existing local firms branch into different but related activities and sectors (Boschma and Frenken, 2012). Which type of renewal occurs is influenced by the historically formed regional specialisations and by the dominant regional knowledge bases.

To sum up, the theory of path dependence outlines two stages of regional path evolution. In the first stage, new industries are born, as a result of either a path creation or a path formation process, and in the second stage industries develop following a pathway of reinforcement or renewal.

The entrepreneurial context

As argued by the path dependency theory, decisions made in the past influence the possibilities, resources and knowledge available in a region today. Entrepreneurs evaluate these regional possibilities and constraints, and find them more or less attractive to their entrepreneurial idea. The regional innovation system (RIS) approach (Asheim and Isaksen, 2002) argues that regional actors belong to one of two possible sub systems, and that these systems are embodied in a framework of formal and informal institutions (Asheim and Isaksen, 2002; Isaksen and Trippel, 2016). The RIS approach further argues that regions are differently conditioned to foster and promote innovation as RISs vary in their institutional and organisational support. Best conditioned for innovations are entrepreneurs and firms located in organisational thick and diversified RISs recognised from a large number of both related and unrelated actors in both sub systems, and from here the regional organisational support for innovation declines as the RIS become more organisationally specialised and less organisationally thick (Isaksen, 2014; Isaksen and Trippel, 2016; Tödtling and Trippel, 2005).

As regions differ in their support of innovation, an important question then arises as to whether entrepreneurs are embedded actors rooted in their local milieu, or if they are to be considered more as nomads searching to locate their new venture in the most supportive RIS. The literature seems to differ in this question of location determinacy. While parts of the entrepreneurship literature argue that entrepreneurs are to be considered as embedded actors which hardly ever consider localisation outside their own local community (Dahl and Sorenson, 2009; Fritsch, 2011), other parts of the literature argue differently when stating that entrepreneurs locate their business in regional contexts favouring the success of their new venture (Liargovas and Daskalopoulou, 2011).

Despite some different views on location determinants, the entrepreneurship literature agrees that regional context affects entrepreneurship in several ways. Some examples in this respect are that regions can be more or less supportive to opportunity entrepreneurship (Petrakis and Kostis, 2014), more or less supportive to financing start-ups (Liargovas and Daskalopoulou, 2011), support technology transfer, global innovation relations and collective social capital differently by innovative and forward leaning ICT solutions (Liargovas and Daskalopoulou, 2011), they can vary in their policy support to entrepreneurship, in their knowledge infrastructure and their industrial structure (Isaksen, 2014; Isaksen and Trippel, 2016; Tödtling and Trippel, 2005), and they can vary in their cultural and embedded institutional support (Asheim and Isaksen, 2002).

To sum up, we argue that regions are unevenly conditioned to foster and support entrepreneurship. Further, we argue that most often organisationally thick regions are better conditioned to foster innovation than organisationally thin regions as the number and the variety of actors are higher, and that regions hosting an organisational thick and diversified regional innovation system holds the best conditions for radical innovative entrepreneurs as the knowledge infrastructure is both thick and diverse (Asheim and Isaksen, 2002; Castaldi et al. 2015; Glaeser et al. 1991; Henderson, 1997; Isaksen, 2014; Isaksen and Trippel, 2016; Tödtling and Trippel, 2005).

Characteristics of new firms supporting various industrial development paths

So far, we have argued that entrepreneurs contribute to regional industrial development by introducing new firms, that industries consist of firms producing products that are close substitutes for one another and finally that industries tend to develop through certain pathways affected by history and their unique regional innovation system.

The consequence of these arguments is that every new entrepreneurial firm contributes to develop the industry they enter, and that this contribution can take one of three possible directions. The alternatives are (a) to extend the industry, (b) to renew the industry and (c) to bring in a potentially new industry to the region. In this section, we discuss two characteristics important to identify the expected effect of the new entrepreneurial firm to the existing industry, namely entrepreneurial growth intentions, and innovation novelty. A relevant question is why these two? Why not include other important micro variables like available resources as finance (Liargovas and Daskalopoulou, 2011) or knowledge (Komninos, 2009), or possible macro effects like entrance barriers (Porter, 1980) or industry life cycle stage (Phaal et al. 2011)? First of all, these are certainly important variables in order to predict future success of the business, and therefore also important indicators to predict possible effects on future regional industrial development. However, so is network (Burt, 2004; M. Granovetter, 1985; M. S. Granovetter, 1973; Martin and Moodysson, 2011), the socio-economic background of the entrepreneur (Dahl and Sorenson, 2009), the support of public policy instruments (Uzunidis et al. 2014) and many other factors. So, why are these not included? The answer is that the two carefully chosen dimensions (fundamenta) are to be considered as reductions (Marradi, 1990) with the intent to represent a broad set of variables. Growth intention is a reduction of the subjective evaluation of the chances to achieve entrepreneurial success, and innovation novelty is a reduction of the potential embedded in the business idea itself. In the following we present the chosen dimensions more closely.

Growth intention

Firm growth is an important driver of industrial development as it increases competition (Fritsch, 2011; Martin, 2010), provides new jobs (Henrekson and Johansson, 2010) initiates innovation (Fritsch, 2011; Martin, 2010; Stam et al., 2012) and is necessary in order to create a creative destruction process (Kirchhoff, 1994; Schumpeter, 1934 [2012]). Firm growth measures new value creation (Stam et al., 2012), and as we have seen from the Craftsman-Opportunist dichotomy (Smith, 1967), the Dynamic Capitalism typology (Kirchhoff, 1994) and the theory of Ambitious Entrepreneurship (Stam et al., 2012), new value creation is key to economic development.

However, not all entrepreneurs want their firms to grow. Edith Penrose, pointed to this fact in her classic 1959 book, writing 'There are many businessmen, and very efficient ones too, who are not trying always to make more profit if to do so would involve them in increased effort, risk, or investment' (Penrose, 2013, p. 31). As Penrose suggests, firm growth might have undesirable consequences for the entrepreneur and this observation has been confirmed also by later research. For instance, Wiklund et al. (2003) found that firm growth could be undesirable as it affects job satisfaction, involvement and job atmosphere.

If firm growth is an important driver for industrial development (Kirchhoff, 1994; Martin, 2010; Schumpeter, 1934 [2012]) and not all entrepreneurs want their firm to grow in the future (Penrose, 2013; Wiklund et al., 2003), which characteristics are essential to future growth? Penrose (2013) points to one such fundamental characteristic when arguing: ‘... and so long as a firm is dominated by men who are not ambitious always to make profits it is unlikely that the firm will grow very large’ (Penrose, 2013, p. 32). Ambition and intentions being closely related, this point of view is supported by (Ajzen, 1991). Ajzen highlights the importance of intentions when explaining different outcomes. In his well-known theory of planned behaviour, he defines intention as: ‘how much of an effort they are planning to exert, in order to perform the behaviour’ (Ajzen, 1991, p. 181), and he further describes the causality between intention and behaviour in this way: ‘... as a general rule, the stronger the intention to engage in a behaviour, the more likely should be its performance’ (Ajzen, 1991, p. 181). The finding that growth intention is (close to) a necessity in order to achieve actual firm growth is also supported by later research (Kolvereid and Bullvag, 1996; Miner, 1990; Miner et al. 1989; Stam et al., 2012; Wiklund and Shepherd, 2003). Based on these arguments, we sum up that growth intentions vary, that growth intentions are (close to) a necessity for firm growth and that the stronger the growth intention, the more likely the firm is to experience growth.

Herbert Simon (1986), states that ‘people have reasons for what they do’, and further, that their decisions are ‘reasonable in the light of the available knowledge and means of computation’ (Simon, 1986, p. 8210/8211). This procedural approach to rationality indicates that there is a link between what is available to a person, and the outcome of his/her reasoning. If this is correct, one would expect available resources and contextual conditions to influence the reasoning of entrepreneurs. Defining growth intentions as being the entrepreneur’s aspirations for future actual growth, the previous argument would suggest that individual and environmental constraints will influence the reasoning of entrepreneurs when evaluating their possibility to achieve actual growth in the future. The findings of Dutta and Thornhill (2008) support this argument of correlation. Their findings indicate that shifts in perception of competitive conditions over time, lead entrepreneurs to modify their growth intentions accordingly. Furthermore, research also indicates differences in growth intentions from socio-demographic characteristics such as, gender, age (Busenitz and Lau, 2001) and education level (Kolvereid and Bullvag, 1996). Moreover, Busenitz and Lau (2001) found that entrepreneurial commitment, the entrepreneurial need for achievement and that the social environment of the entrepreneur like market conditions, social network and business experiences, had a direct impact on growth intentions.

Based on the presented reasoning and empirical evidence, we argue that entrepreneurial growth intentions (at least to some extent) include a subjective understanding of individual and environmental constraints and possibilities available to the entrepreneur. As so, it could serve as a fundamenta suitable for a typology of entrepreneurial firms which aims to identify expected effects of their entrance to future industrial development.

Innovation novelty

Based on the Path Dependency theory, a second firm characteristic important in determining the entrepreneurial contribution to regional industrial path development is the

innovation novelty of the entrepreneurial firm. According to Tödting and Tripl (2013), new path formation represents innovation new to the region (not new to the world), while path creation in new industries represents innovation new to the world. The distinction between regional path formation in established industries and new industrial path creation is the degree of innovation novelty, where the question 'new to whom?' is essential.

Following the rather exclusive definition of innovation given by Schumpeter (1934 [2012]), the concept of innovation has become multi-faceted in later years. Based on the degree of novelty, innovation is commonly classified as either radical or incremental. Radical innovation is understood as a totally new product, process, marketing method or organisational method, in line with the Schumpeterian definition (Schumpeter, 1934 [2012]), while an incremental innovation is understood as a step-by-step improvement of existing solutions (Fagerberg et al. 2005). Innovation novelty is also central to The Oslo Manual for collecting and interpreting data about firms' innovation performance, where the degree of novelty is divided into geographically separated groups. According to The Oslo Manual, innovation can be classified as either new to the firm, new to the market or new to the world (OECD/Eurostat 2005, p. 57).

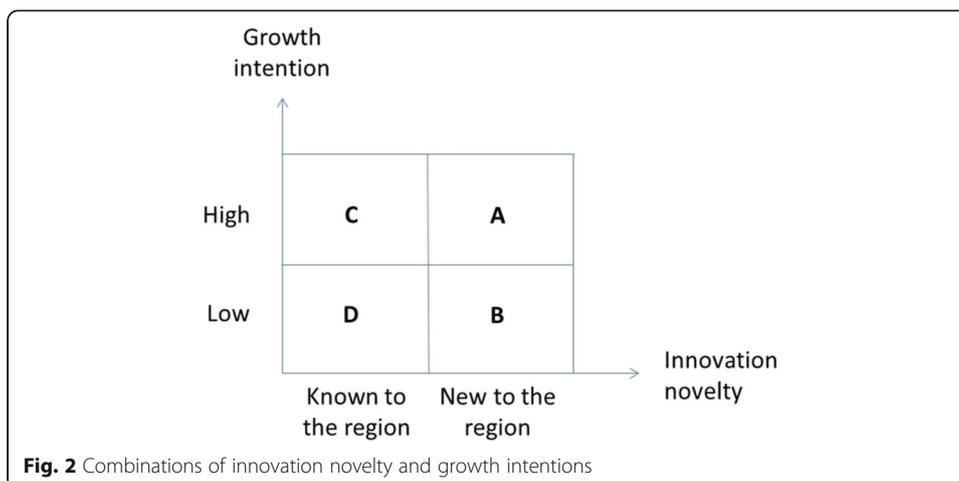
The theory of path dependency further argues that various novelties in innovation supports various path developments. Firstly, the theory argues that new firms without innovation support path reinforcement and thereby contribute to increasing rigidification of associated structures, networks and knowledge of firms (Martin, 2010). Secondly, the theory of path dependency argues that incremental innovation is needed in order to secure both path extension and path renewal (Isaksen and Tripl, 2014). While path extension results from incremental innovation based on the combination of existing knowledge to create more of the same, new knowledge is needed for the incremental innovation to lead to path renewal. Thirdly, based on the degree of innovation novelty, the theory states that innovation new to the region could result in new path formation (Tödting and Tripl, 2013) and that radical innovations could form industries new to the world (Kirchhoff, 1994; Schumpeter, 1934 [2012]; Tödting and Tripl, 2013).

This line of argument concludes that the degree of innovation novelty influences future regional industrial paths. Firstly, if industrial paths are to be renewed, new knowledge has to be created in the region or new knowledge has to be imported from outside and implemented in existing industry (Tödting and Tripl, 2013). Secondly, if new regional industrial paths are to be created, a minimum level of innovation novelty is needed at a regional level (Tödting and Tripl, 2013). Finally, if innovation is incremental and comes only from the recirculation of existing knowledge, the innovation height will gradually decrease and the industrial path will eventually face path exhaustion (Isaksen and Tripl, 2014).

Results and discussion

Towards an entrepreneurial firm typology

This paper has argued that both entrepreneurial growth intentions and innovation novelty are characteristics important for identifying the potential future industrial path contribution of new entrepreneurial firms. In Fig. 2, the two characteristics are introduced within the framework of a 2x2 matrix. The matrix outlines four different categories of entrepreneurial firms which hold different combinations of the two characteristics.



By introducing an innovation new to the region, entrepreneurs which found type A firms develops, or imports, new knowledge, and introduces novel solutions that might have the potential to initiate a new industry for the region (Kirchhoff, 1994; Phaal et al., 2011; Schumpeter, 1934 [2012]). However, industries are not formed by one single firm, and for other firms to follow, the virgin firm has to demonstrate sufficient profitability and/or growth. The entrepreneur behind firm A has high intent to grow the firm, and, as argued previously, growth intention is seen as a necessity for firm growth (Kolvereid and Bullvag, 1996; Miner, 1990; Miner et al., 1989; Stam et al., 2012; Wiklund and Shepherd, 2003). The consequence is that firm type A possesses the combination needed to be a potential path creating firm within the region. Remember that entrepreneurs of type A firms introduce innovations novel to the region, but not necessarily innovations new to the world (Tödting and Trippel, 2013). As so, type A firm entrepreneurs could be both entrepreneurs importing business ideas from other regions, and it could be entrepreneurs launching ideas novel to the world. For regions to foster innovations new to the world, the literature argues that thick and diversified RISs are the most suitable environments as they host a large number of firms, knowledge generators like universities and R&D organisations, and a large amount of policy support organisations, non-profit organisations and finance organisations. Being mostly urban and metropolitan areas, thick RISs favour unrelated knowledge linkages and externalities spurring from a variety of sectors which mutually influences each other and triggers new ideas and innovation. Tesla entrepreneur Elton Musk might serve as an example of a type A entrepreneur introducing innovations new to the world, while the boat building entrepreneur Herbert Waarum might serve as an example of the second variant of type A firm entrepreneurs. Herbert Waarum, was the pioneering entrepreneur to introduce fibreglass as a building material, and as so initiated the industry of fibreglass boats in Arendal, Norway (Isaksen, 2016).

Firm type B holds the same level of innovation novelty, but is distinguished from firm A as the entrepreneur holds a significantly lower intent to grow. By introducing a regional new innovation, entrepreneurs introducing type B firms develop, or introduce knowledge new to the region. However, the lack of entrepreneurial growth intention limits the growth potential of the new firm. As the entrepreneurs holds low growth intentions the firm is not likely to demonstrate attractive profit rates, and is therefore not

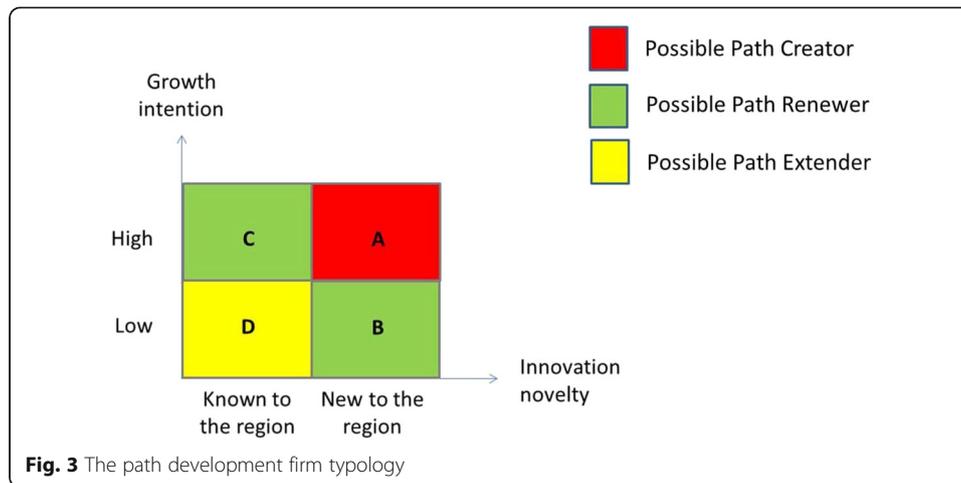
likely to attract the 'swarm' of followers needed to create a new industry. Firm B is therefore expected to contribute to regional path renewal through the introduction of new solutions, but are not expected to contribute to regional new path creation. As highly innovative, entrepreneurs forming type B ventures based on innovation new to the world would benefit from the knowledge sharing environments provided in thick regions. Thick regions are mostly found in urban economies where the access to unrelated and academic knowledge is high. Research-driven entrepreneurial firms aiming to fulfil a mission or a perceived obligation rather than to maximize profit could serve as examples of firm B entrepreneurs.

Firm type C is another moderate type of firm, as it lacks innovation novelty. As the firm does not import new knowledge from outside, its innovation is built upon the recycling of knowledge already known to the region, and as there is nothing new, the recombination of knowledge has low innovation potential. Even so, firms founded by entrepreneurs with high intent to grow will do their utmost to challenge existing firms and win market share, and will therefore act as a driver of innovation for others and, as a consequence, other firms might be forced to develop new knowledge of their own or to create knowledge pipelines outside the region. Based on this, firm type C can potentially stimulate path renewal as an indirect effect. Entrepreneurs introducing type C firms will not be focussed towards exploiting the possibilities of urban economies. Less diverse regions would fit these entrepreneurs more as long as the marked potential is high. Entrepreneurs starting up local variants of privately owned chain-stores could serve as examples of this type of firms. Their motivation is increased turnover from increased market shares rather than growth through innovation. Privately owned petrol stations could serve as an example here.

Firm type D is the least challenging entrepreneurial firm. Firm D scores low on entrepreneurial growth intentions and also on innovation novelty. As such, firm D innovates by introducing new combinations of already regionally known knowledge. The lack of both innovation novelty and entrepreneurial growth intentions leads to a process of knowledge recycling which is expected to have relatively limited impact outside the firm. Firm D thereby contributes to industrial path extension, a situation which, if not renewed, will gradually reduce into a stable state situation resulting in industrial path exhaustion. Entrepreneurs who introduce type D firms are to be found in all regions, also regions hosting an organisational thin RIS. Actually, thin RISs are dominated by this type of firms as they provide poor conditions for innovation (Isaksen, 2014). Entrepreneurs behind firms of type D are not ambitious and mainly focused on being self-sufficient. Examples of these types of entrepreneurs are most family-owned microbusinesses, farms, craftsmen's and single-person consultancy firms.

In Fig. 3, the path development firm typology is visualised.

To secure healthy regional development, all types of new firms have to be represented. The path extending firms (type D) are recognised as the supporting beam of regional industry, in which imitation and Kirznerian entrepreneurship play an important role. These types of firms have two effects on regional industrial development. On the one hand, these firms are needed to exploit the potential of local knowledge and to secure a sustainable balance between regional buyers and suppliers, but on the other hand this type of firm also contributes to cementing existing technology and processes. Possible path extenders are not expected to increase the relative competitive strength



of the region, but their main purpose is to secure low prices and stable and effective regional support based on existing knowledge.

In order to improve the competitive advantage of the region, industrial paths have to be regularly renewed. Path renewal involves the refilling of new knowledge, which is important for existing industries to branch into related activities and thereby expand the regional innovation potential. This mutation process then becomes industry driven, challenged by new firms propelled by individual entrepreneurial growth intentions and regional innovation novelty.

Finally, regions benefit from a critical mass of possible path creators (Schumpeter, 1934 [2012]). These types of new firms challenge the existing regional industrial structure as they introduce regionally new solutions paired with an intense will to succeed. Possible path creators possess two strong weapons which could both be beneficial to the region in their struggle to gain competitive advantages.

Policy implications

In the previous section, I argued that the four types of new firms have different influences on existing industrial paths and, further, that all four types of new firms are important in order to secure dynamic regional industrial development. From this, it follows that stimulation of new firm formation is a key task in regional industrial policy. An important question in that setting is what types of policy instruments are suitable for stimulating various types of entrepreneurs? In this section, I present some answers to this question. The structure of the discussion is based on the various types of entrepreneurial firms, from D to A.

Firm type D is the least radical of the four types of new entrepreneurial firms and their main contribution to regional development is to lower the price level and to maintain a stable supply of goods and services. As these factors are important in providing a high quality of life, regions would benefit from having a high number of potential entrepreneurs willing to act on potential gains from trade. The main purpose of policy instruments aiming to increase the numbers of type D entrepreneurs would therefore be to lower entrepreneurial barriers and to seek to build a supportive entrepreneurial culture. Even if they are not sufficient (Davidsson and Wiklund, 1997), we know that supporting institutions and a well-functioning financial system are important

building blocks in a supportive entrepreneurial culture (Acs et al. 2008; Liargovas and Daskalopoulou, 2011).

Firm type C and type B support regional path renewal either indirectly (firm C) or directly (firm B). As argued previously, the renewal of industrial paths requires either priming of new knowledge from outside or new combinations of regional related knowledge leading to path branching and, regardless of the renewal process motivation, industrial actors therefore need to connect to related sources of knowledge inside and outside the region (Isaksen and Trippel, 2014). In order to stimulate new firms which contribute to possible path renewal, regions should tailor their policy instruments towards the encouragement of intra- and inter-regional interaction in early stage activities. Such interaction should include both direct interaction through cooperation, mobility of labour and monitoring of firms and entrepreneurs (Martin and Moodysson, 2011).

In order to be a possible path creating firm (firm A), the new entrepreneurial firm needs to have a combination of regionally new knowledge and the entrepreneur needs to possess high intentions to grow. I have previously argued that a rich variety of actors within both RIS sub systems will fuel radical innovations (Boschma and Frenken, 2012; Fritsch, 2011; Isaksen and Trippel, 2016), but also that a new regional industry path could result from path formation in established industries (Tödtling and Trippel, 2013). Several political instruments could be important to stimulate the number of firm A start-ups. Firstly, the region should create favourable conditions for an improved relationship between R&D milieus, local entrepreneurs and early stage firms. This is important as the R&D knowledge tends to become more dominant as the degree of novelty increases (Asheim, 2007; Asheim and Coenen, 2005; Isaksen and Karlsen, 2012). Furthermore, in order to stimulate firms paving the way for industry transplantation, regions should (again) focus on inter-regional cooperation, movement of skilled labour and monitoring of actors from outside (Martin and Moodysson, 2011). However, as an industry is defined as a group of firms producing products that are close substitutes for one another (Porter, 1980), more than one firm needs to settle in the region in order to create an industry. A possible approach to encouraging more start-ups within the same industry could be to focus on policy instruments targeted at stimulating cluster growth. An important precondition for such policy instruments is, however, that there is institutional support to use these kinds of instruments within the economy (Hall and Soskice, 2001). We will not go into the field of institutional economics here, other than to touch upon the fact that the policy dimension in clusters is controversial in some economies while it is widely used and accepted in others.

From the above we can extract three main areas of importance for policy instruments. First of all, as regions benefit from low prices and a stable supply of goods and services, policy should contribute to lowering general entrepreneurial barriers and seek to support a positive entrepreneurial culture in the region. Secondly, as the renewal of industries and industrial path transplantation depend partly on new knowledge from inter-regional contact, regions should encourage and support initiatives of that kind and perhaps also initiate such initiatives themselves on behalf of regional firms and industries. Thirdly, in order to increase the influence of R&D knowledge, regions should encourage a close relationship between local firms and R&D milieus, as well as seek to stimulate diverse knowledge sharing activities between unrelated actors including potential entrepreneurs, early start-ups and established firms.

Conclusions

This paper builds on the capitalistic economic assumption that private firms, and therefore entrepreneurs, play an important role as drivers of economic growth and development. It further acknowledges that industries consist of firms producing products that are close substitutes for one another and that regional industries follow an evolutionary process from birth to death or transformation and renewal.

In this paper, I have argued that entrepreneurial new firms influence the future industrial development of the region in different ways. My main argument has been that new firms contribute to either regional industrial path extension, regional industrial path renewal or regional new path creation, and I have argued that innovation novelty and entrepreneurial growth intentions are significant firm characteristics for predicting the potential firm specific contribution to regional industrial path development.

Based on the two dimensions of entrepreneurial growth intentions and innovation novelty, I have developed a typology of new entrepreneurial firms classified by their possible path development contribution. The paper argues that possible path extending entrepreneurial firms (firm type D) can be recognised by their low innovation novelty and low entrepreneurial growth intentions, and that possible path renewing entrepreneurial firms (firm type C and firm type B) have an uneven score on the two variables, innovation novelty and entrepreneurial growth intention. Finally, the paper has argued that firms with a combination of regionally new innovation and high growth intentions from its entrepreneur (firm type A) are firms that could potentially form new industrial paths in the region.

Dynamic industrial developments in regions involve several important factors. First of all a sufficient number of competing firms are needed in order to secure low prices and stable supply (Kirzner, 1973; Schumpeter, 1934 [2012]), and secondly an industry needs a constant refill of new knowledge from outside in order to maintain its competitiveness with other regions (Martin, 2010). If it is not renewed, innovation potential will gradually decrease and the industry will face decline and finally exhaustion (Martin, 2010; Martin and Sunley, 2006). Dynamic regions need new industries to arise (Martin, 2010). New industries are important to secure long-term employment and knowledge refill in an evolutionary industrial process. From this evolutionary perspective, this paper has stressed the fact that all four types of new entrepreneurial firms are important in securing a dynamic industrial path evolution. An adequate number of type D firms are necessary to maintain low prices and stable supplies, while a significant number of type C firms are important as they create innovation pressure on existing firms based on increased competition. Firm B also creates this sort of innovation pressure, even if firm B does it somewhat more directly. By introducing new knowledge to the region firm B acts like a lighthouse for existing industries, but due to the lack of growth intentions the light from firm B is not very strong. As the entrepreneur has low growth intentions, type B firms are not likely to demonstrate very high profitability from this new knowledge, and therefore they are not expected to attract the 'swarm' necessary to create a new industry. Firm type A, however, has both high growth intentions and innovation novelty at a regional level. The paper argues that this combination is needed in order to be a possible new path creator in the region. However, industries are not easily formed and, more importantly, the combination of high ambitions and innovation novelty is no guarantee of commercial success.

As new firm entries influence future industrial path development in various ways, the question of how regions can stimulate the start-up rate of various types of firms becomes important. In this paper, I have identified three important areas of policy support, namely building a supporting entrepreneurial culture in the region, encouraging early stage firms and entrepreneurs to inter-regional knowledge transfer and seeking to increase R&D intensity and commercialisation from increased collaboration amongst R&D intensive milieus and firms dominated by other types of knowledge.

The path development entrepreneurial firm typology introduced in this paper is important for two main reasons. Firstly, a typology is helpful in analysing the future impact of a new firm on existing industrial paths, which is important as an early warning mechanism to predict the future quality of the regional industry. Secondly, such a typology will be helpful for politicians tailoring political strategies, policy instruments and infrastructure to support various future regional industry trajectories.

Future research work should look more closely at identifying the relative share of entrepreneurs in competitive regions when it comes to industrial path extension, path renewal and path creation, and also investigate how context affects this relative share of entrepreneurs. This perspective also invites a more conceptual debate concerning regional innovation systems. A central theme in such a debate should be whether or not regions should focus on building innovation systems centred on a specific type of firm.

Methods

This article is a conceptual contribution and does not include any empirical evidence.

Acknowledgements

I am grateful to Professor Arne Isaksen for his very valuable comments on previous versions of the article. The usual disclaimer applies.

Authors' information

Jan Ole Rypestøl is a PhD research Fellow at the University of Agder, Norway. In addition, he also holds a part time position as researcher at Agder Research, Norway. Rypestøl is a former serial entrepreneur with substantial international experience.

Availability of data and materials

The paper does not include any empirical evidence.

Competing interests

The author has no conflicts of interest to declare.

Received: 28 September 2016 Accepted: 24 January 2017

Published online: 13 February 2017

References

- Acs, Z. J., Desai, S., & Hessel, J. (2008). Entrepreneurship, economic development and institutions. *Small Business Economics*, 31(3), 219–234. doi:10.1007/s11187-008-9135-9.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179–211.
- Aldrich, H. E., & Cliff, J. E. (2003). The pervasive effects of family on entrepreneurship: Toward a family embeddedness perspective. *Journal of business venturing*, 18(5), 573–596.
- Aldrich, H. E., & Fiol, C. M. (1994). Fools rush in? The institutional context of industry creation. *Academy of management review*, 19(4), 645–670.
- Alsos, G. A., Carter, S., & Ljunggren, E. (2014). Kinship and business: how entrepreneurial households facilitate business growth. *Entrepreneurship & Regional Development*, 26(1–2), 97–122.
- Arthur, W. B. (1988). Self-reinforcing mechanisms in economics. *The economy as an evolving complex system*, 5, 9–31.
- Asheim, B. (2007). Differentiated knowledge bases and varieties of regional innovation systems. *Innovation*, 20(3), 223–241.
- Asheim, B. T., & Coenen, L. (2005). Knowledge bases and regional innovation systems: Comparing Nordic clusters. *Research policy*, 34(8), 1173–1190.
- Asheim, B. T., & Isaksen, A. (2002). Regional innovation systems: the integration of local 'sticky' and global 'ubiquitous' knowledge. *The Journal of Technology Transfer*, 27(1), 77–86.
- Baumol, W. J. (1990). Entrepreneurship: Productive, Unproductive, and Destructive. *The Journal of Political Economy*, 98(5 Part 1), 893–921.

- Boschma, R., & Frenken, K. (2006). Why is economic geography not an evolutionary science? Towards an evolutionary economic geography. *Journal of Economic Geography*, 6(3), 273–302.
- Boschma, R., & Frenken, K. (2012). Technological relatedness and regional branching. In H. Bathelt, M. P. Feldman, & D. F. Kogler (Eds.), *Beyond territory: Dynamic geographies of innovation and knowledge creation* (pp. 64–81). New York: Routledge.
- Burt, R. S. (2004). Structural holes and good ideas. *American journal of sociology*, 110(2), 349–399.
- Busenitz, L. W., & Lau, C.-M. (2001). Growth intentions of entrepreneurs in a transitional economy: The People's Republic of China. *Entrepreneurship: Theory and Practice*, 26(1), 5–21.
- Campbell, D. F. J., & Carayannis, E. G. (2016). The academic firm: a new design and redesign proposition for entrepreneurship in innovation-driven knowledge economy. *Journal of Innovation and Entrepreneurship*, 5(1), 12. doi:10.1186/s13731-016-0040-1.
- Castaldi, C., Frenken, K., & Los, B. (2015). Related variety, unrelated variety and technological breakthroughs: an analysis of US state-level patenting. *Regional Studies*, 49(5), 767–781.
- Coenen, L., Moodysson, J., & Martin, H. (2015). Path renewal in old industrial regions: possibilities and limitations for regional innovation policy. *Regional Studies*, 49(5), 850–865.
- Dahl, M. S., & Sorenson, O. (2009). The embedded entrepreneur. *European Management Review*, 6(3), 172–181.
- David, P. A. (1985). Clio and the Economics of QWERTY. *The American economic review*, 75(2), 332–337.
- Davidsson, P. (1988). Type of Man and Type of Company Revisited: A Confirmatory Cluster Analysis Approach. In: B. A. Kirchoff, W. A. Long, W. E. McMullan, K. H. Vesper & W. Wetzels (eds), *Frontiers of Entrepreneurship Research*. Wellesley: Babson College.
- Davidsson, P., & Wiklund, J. (1997). Values, beliefs and regional variations in new firm formation rates. *Journal of Economic psychology*, 18(2), 179–199.
- Dawley, S. (2014). Creating new paths? Offshore wind, policy activism, and peripheral region development. *Economic Geography*, 90(1), 91–112.
- Dutta, D. K., & Thornhill, S. (2008). The evolution of growth intentions: Toward a cognition-based model. *Journal of business venturing*, 23(3), 307–332.
- Fagerberg, J., Mowery, D. C., & Nelson, R. R. (Eds), (2005). *The Oxford Handbook of Innovation*. Oxford: Oxford University Press.
- Fritsch, M. (2011). Start-ups in Innovative Industries—Causes and Effects. In: D. B. Audretsch, O. Falck, S. Heblich & A. Lederer (eds), *Handbook of Research on Innovation and Entrepreneurship* (pp 365–381). Cheltenham: Elgar.
- Gartner, W. B. (1988). Who is an Entrepreneur? Is the Wrong Question. *American Journal of Small Business*, 12(4), 11–32.
- Glaeser, E. L., Kallal, H. D., Scheinkman, J. A., & Shleifer, A. (1991). *Growth in cities: National Bureau of Economic Research*.
- Granovetter, M. (1985). Economic action and social structure: the problem of embeddedness. *American journal of sociology*, 91(3), 481–510.
- Granovetter, M. S. (1973). The strength of weak ties. *American journal of sociology*, 1360–1380.
- Gundry, L. K., & Welsch, H. P. (2001). The ambitious entrepreneur: High growth strategies of women-owned enterprises. *Journal of business venturing*, 16(5), 453–470.
- Hall, P., & Soskice, D. (2001). *Varieties of capitalism: The institutional foundations of comparative advantage*. Oxford: Oxford University Press.
- Henderson, V. (1997). Externalities and industrial development. *Journal of urban economics*, 42(3), 449–470.
- Henning, M., Stam, E., & Wenting, R. (2013). Path dependence research in regional economic development: cacophony or knowledge accumulation? *Regional Studies*, 47(8), 1348–1362.
- Henrekson, M., & Johansson, D. (2010). Gazelles as job creators: a survey and interpretation of the evidence. *Small Business Economics*, 35(2), 227–244.
- Ireland, R. D., Hoskisson, R. E., & Hitt, M. A. (2009). *The management of strategy: South-Western Cengage Learning*. Mason, OH.
- Isaksen, A. (2014). Industrial development in thin regions: trapped in path extension? *Journal of economic geography*, 15(3), 585–600.
- Isaksen, A. (2016). Cluster emergence: combining pre-existing conditions and triggering factors. *Entrepreneurship & Regional Development*, 28(9–10), 1–20.
- Isaksen, A., & Karlsson, J. (2012). Combined and complex mode of innovation in regional cluster development – analysis of the light-weight material cluster in Raufoss. In: B.T. Asheim, & M.D. Parrilli (Eds.), *Interactive Learning for Innovation: A Key Driver within Clusters and Innovation Systems*. Basingstoke: Palgrave-Macmillan.
- Isaksen, A., & Trippl, M. (2014). *Regional industrial path development in different regional innovation systems: A conceptual analysis*. Lund University, CIRCLE-Center for Innovation, Research and Competences in the Learning Economy.
- Isaksen, A., & Trippl, M. (2016). Path Development in Different regional Innovation Systems: A Conceptual Analysis. In M. D. Parrilli, R. D. Fitjar & A. Rodriguez-Pose (Eds.), *Innovation Drivers and Regional Innovation Strategies* (pp. 66–84). London: Routledge
- Jack, S. L., & Anderson, A. R. (2002). The effects of embeddedness on the entrepreneurial process. *Journal of business venturing*, 17(5), 467–487.
- Kirchoff, B. A. (1994). *Entrepreneurship and dynamic capitalism*. Westport, CT: Praeger.
- Kirzner, I. M. (1973). *Competition and entrepreneurship*. Chicago: University of Chicago press.
- Kolvreid, L., & Bullvag, E. (1996). Growth intentions and actual growth: The impact of entrepreneurial choice. *Journal of enterprising Culture*, 4(01), 1–17.
- Kominos, N. (2009). Intelligent cities: towards interactive and global innovation environments. *International Journal of Innovation and Regional Development*, 1(4), 337–355.
- Liargovas, P., & Daskalopoulou, I. (2011). Capital allocation in the Greek regions. *Journal of Policy Modeling*, 33(6), 866–888.
- Lorraine, J., & Dussault, L. (1987). "Management behaviors and types of entrepreneurs: The case of manufacturing businesses in the survival and establishment stage". Paper presented at the Proceedings of the 32nd World Conference, International Council for Small Business Eds RG Wyckham, LN Meredith, GR Bushe, Simon Fraser University, Burnaby, British Columbia.
- Marradi, A. (1990). Classification, typology, taxonomy. *Quality & Quantity*, 24(2), 129–157.

- Martin, R. (2010). Roepke lecture in economic geography—rethinking regional path dependence: beyond lock-in to evolution. *Economic Geography*, 86(1), 1–27.
- Martin, R., & Moodysson, J. (2011). Comparing knowledge bases: on the geography and organization of knowledge sourcing in the regional innovation system of Scania, Sweden. *European Urban and Regional Studies*, 20(2), 170–187.
- Martin, R., & Sunley, P. (2006). Path dependence and regional economic evolution. *Journal of economic geography*, 6(4), 395–437.
- Miner, J. B. (1990). Entrepreneurs, high growth entrepreneurs, and managers: Contrasting and overlapping motivational patterns. *Journal of business venturing*, 5(4), 221–234.
- Miner, J. B., Smith, N. R., & Bracker, J. S. (1989). Role of entrepreneurial task motivation in the growth of technologically innovative firms. *Journal of Applied Psychology*, 74(4), 554.
- Nelson, R. R. (2008). Economic development from the perspective of evolutionary economic theory. *Oxford development studies*, 36(1), 9–21.
- Nelson, R. R., & Winter, S. G. (2009). *An evolutionary theory of economic change*. Cambridge: Harvard University Press.
- Nightingale, P., & Coad, A. (2014). Muppets and gazelles: political and methodological biases in entrepreneurship research. *Industrial and Corporate Change*, 23(1), 113–143. doi:10.1093/icc/dtt057.
- OECD/Eurostat. (2005). Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition. Paris: OECD Publishing.
- Penrose, E. T. (2013). *The theory of the growth of the firm*. Oxford: Oxford University Press.
- Petrakis, P. E., & Kostis, P. C. (2014). Medium term effects of culture, transactions and institutions on opportunity entrepreneurship. *Journal of Innovation and Entrepreneurship*, 3(1), 1.
- Phaal, R., O'Sullivan, E., Routley, M., Ford, S., & Probert, D. (2011). A framework for mapping industrial emergence. *Technological Forecasting and Social Change*, 78(2), 217–230.
- Porter, M. E. (1980). *Competitive strategy: techniques for analyzing industries and competitors*. New York, NY: Free Press.
- Scharpf, F. W. (1997). *Games real actors play: Actor-centered institutionalism in policy research*. Boulder: Westview Press.
- Schumpeter, J. A. (1934 [2012]). *The Theory of Economic Development*, Cambridge, Mass.: Harvard University, 1934. Sixteenth printing 2012, Copyright 1983 by Transaction Publishers, New Brunswick, New Jersey.
- Schumpeter, J. A., (1942) *Capitalism, socialism and democracy*. New York: Harper.
- Simon, H. A. (1982). *Models of Bounded Rationality*. 2 vols. Cambridge, Mass.: MIT Press.
- Simon, H. A. (1986). Rationality in psychology and economics. *Journal of Business*, 59(4), 209–224.
- Smith, N. R. (1967). The entrepreneur and his firm: The relationship between type of man and type of company. *Occasional Papers, Bureau of Business and Economic Research, Michigan State University*, 109, 1967.
- Smith, N. R., & Miner, J. B. (1983). Type of entrepreneur, type of firm, and managerial motivation: Implications for organizational life cycle theory. *Strategic management journal*, 4(4), 325–340.
- Stam, E., Bosma, N., Van Witteloostuijn, A., De Jong, J., Bogaert, S., & Edwards, N. (2012). Ambitious entrepreneurship: A review of the academic literature and directions for public policy. *Den Haag: Advisory Council for Science and Technology Policy* (pp. 1–162).
- Tödtling, F., & Trippel, M. (2005). One size fits all?: Towards a differentiated regional innovation policy approach. *Research policy*, 34(8), 1203–1219.
- Tödtling, F., & Trippel, M. (2013). Transformation of regional innovation systems. In P. Cooke (Ed.), *Re-framing regional development: Evolution, innovation, and transition* (Vol. 62, pp. 297–317). New York: Routledge.
- Uzunidis, D., Boutillier, S., & Laperche, B. (2014). The entrepreneur's 'resource potential' and the organic square of entrepreneurship: definition and application to the French case. *Journal of Innovation and Entrepreneurship*, 3(1), 1–17.
- Van de Ven, H. (1993). The development of an infrastructure for entrepreneurship. *Journal of business venturing*, 8(3), 211–230.
- Westhead, P., & Howorth, C. (2007). 'Types' of private family firms: an exploratory conceptual and empirical analysis. *Entrepreneurship and Regional Development*, 19(5), 405–431.
- Wiklund, J., Davidsson, P., & Delmar, F. (2003). What do they think and feel about growth? An expectancy-value approach to small business managers' attitudes toward growth. *Entrepreneurship Theory and Practice*, 27(3), 247–270.
- Wiklund, J., & Shepherd, D. (2003). Aspiring for, and achieving growth: The moderating role of resources and opportunities. *Journal of Management Studies*, 40(8), 1919–1941.

Submit your manuscript to a SpringerOpen® journal and benefit from:

- Convenient online submission
- Rigorous peer review
- Immediate publication on acceptance
- Open access: articles freely available online
- High visibility within the field
- Retaining the copyright to your article

Submit your next manuscript at ► springeropen.com