Makale / Article

Hayek on Product Innovation and Market Shaping: Opening the Black Box

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Abstract

Innovation is very often described as the introduction a novelty that has a commercial value, and it remained in the agenda of economics since Schumpeter's ground-breaking observations. Current literature categorizes innovations by means of product and process innovations; nevertheless, the economics literature in general and evolutionary economic literature in particular focus mainly on process innovations. In this literature review, the author aims to answer the question of why product innovation and the corresponding pioneer market shaping phase remain to be a black box in economics, and how the concerns underlying this observation can be addressed by using Hayekian insights.

Keywords: Product Innovation, Market Shaping, Hayek, Evolutionary Economics.

Hayek'te Ürün İnovasyonu ve Pazar Şekillenmesi: Kara Kutuyu Açmak

Öz

İnovasyon ya da yenileşim genelde ticari değeri olan yeni bir şeyin ortaya çıkması olarak özetlenir ve Schumpeter'in önemli gözlemlerinden beridir ekonomi biliminin gündeminde yer tutmaktadır. Çağdaş literatürde inovasyonlar ürün inovasyonu ve süreç inovasyonu olarak ikiye ayrılsa da, genelde ekonomi bilimi özelde de evrimci ekonomi ekseriyetle süreç inovasyonuna odaklanmaktadır. Bu literatür taramasında ürün inovasyonu ve beraberinde gelen piyasa şekillenmesinin neden ekonomi literatüründe kara kutu olduğu araştırılmaktadır. Bununla birlikte, ürün inovasyonu ve pazar şekillenmesinin analizi önündeki engellerin Hayek'in kuramlarıyla nasıl aşılabileceği de bu araştırmada gösterilmektedir.

Anahtar kelimeler: Ürün İnovasyonu, Pazar Şekillenmesi, Hayek, Evrimci İktisat.

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Introduction

An innovation is often associated with the introduction of something new (Merriam Webster Online, 2018). However, different taxonomies frame this term and the ways to explain it in different ways. A generally accepted standard definition by Rogers (1995: xviii) describes innovation as "an idea, practice, or object that is perceived as new by an individual or another unit of adoption". Very often, innovation as an economic concept is associated with the economist Joseph Alois Schumpeter – not only was Schumpeter one of the most known economists who made thoughts on innovations and the ways these shape the economy, he was also the first one who observed innovations in an entrepreneurial framework (Sastry, 2005). From the perspective of Schumpeter, technological change is an industrial mutation which revolutionizes and replaces old economic structures, and creates a new economic structure (Schumpeter, 1950). After his ideas became known, different scholars interpreted these from controversial perspectives. Nevertheless, Dosi (1990) identifies the following elements from the perspective of Schumpeter, that can serve as a common denominator of different approaches to the Schumpeterian theory: (1) The observation of change, (2) Time as the decisive factor in the framework of analysis, (3) The detachment from individualistic-axiomatic modelling.

Answering the question of how many forms of mutations can be identified and generalized, Schumpeter (1934) lists five different categories: (1) The emergence of a new product or production of a known product with a new quality, (2) The emergence of a process innovation, (3) The development of new resources for input factors, (4) The emergence of a new market, (5) A change in the industrial organization, e.g. emergence of a monopoly. In contrast to these five categories, contemporary economic literature differentiates between product and process innovations. Whereas process innovations focus on production methods or technologies, product innovations focus on the emergence of new products. Grupp (1997) says that a product innovation in a certain context can correspond to a process innovation in another context, and it is often hard to distinguish between the two, or delimit one from the other.

A successful product innovation may shape a market in different ways, and may imply a change in market practices. Yet what happens from the point of time, at which a new product emerges, to the point of time, at which this product becomes an acceptable standard (an artefact) in a market, is a black box for economics. In this article, the author aims to explore this black box by reviewing the literature on innovations and aiming to answer the question of

why product innovations and market shaping processes remain to be a black box in economics. The rest of the article is as follows. The author will first focus on defining the research questions that will be explored. Next, the review of the literature will be provided based on these research questions. A conclusion and an agenda for future research follows.

Research Questions

The meaning and the emergence of a new market or a new market segment is important for every developed economy. Especially for the competitive advantages of economies, the role of innovation gained importance during the last decades. Not only countries, but both national and multinational firms need to find innovative ideas and to create new market segments for their future existence based on competitive advantages. Recent empirical evidence based on the data from the Global Entrepreneurship Monitor and the Index of Economic Freedom suggests that even though countries may differ in terms of their economic conditions, some similarities regarding their structures in case of innovation and competitiveness can be identified. Erkut (2016a) provides empirical evidence on this issue and comes to the conclusion that a combination of perceptions (cognition) of individuals towards new attempts on market shaping, and a number of infrastructure support measures on the institutional level can explain the structural similarities of countries within a given cluster of competitive advantage. The author identifies the perception of new economic opportunities as an important source of explaining the relation between entrepreneurship and economic freedom on the national level.

Even though new economic opportunities and their perception can often be associated with the introduction of novelties in forms of new products into the market, conventional focus of the economics of innovation appears to be biased towards process innovations instead of product innovations, since the analysis of product innovation can be more complicated due to the fact that product innovations cannot be really isolated from the pioneer market creation phase, whereas for process innovations comparative models of the situation prior to the process innovation and the situation after the process innovation can be assessed theoretically to show e.g. in which ways a process innovation influences the price and the marginal costs of a certain good (see e.g. Pfähler and Wiese, 2006).

In case of product innovations, the relevant point for the economic analysis is the commercial success of the product. Schumpeter (1934) also confirms this idea, in which he differentiates between an invention and an innovation.

Whereas a discovery can be described as the invention of something new, the economic meaning of a discovery has the consequence that the invention turns into an innovation (Voßkamp, 2002). The third stage of this process is the diffusion of the innovation, i.e. how, why and at what speed it will spread to the market. Whereas the innovation generates a monopoly advantage to the entrepreneur who introduces it to the market (Schumpeter, 1934), different factors may either postpone or cancel the diffusion phase – technological complicatedness, licenses or cost barriers can be relevant factors, to name a few.

Economics, especially studies of the general topic of industrial organization, frequently focused on the structure-conduct-performance (S-C-P) paradigm as a point of departure. This approach, going back to Mason (1939) and Bain (1956) among others, reflects the idea of causality (Pfähler and Wiese, 2006): The structure determines the behavior (conduct), which – in turn – determines the result (performance). For example, new and hitherto unknown technological knowledge is discovered and developed by a visionary (structure), who conceptualizes this knowledge with a business conception (conduct) and shapes a new market segment where he can enjoy the advantages of a monopolist (at least for some time), can make profits and match the needs of his target group to the technology (performance).

Once applied to product innovations, this paradigm may offer a way to explain the successful market shaping of a new market segment, but since these two events of an emergence of a product innovation and the market success occur sequentially over time, i.e. one after the other, a new problem emerges (Lehmann-Waffenschmidt, 2004): These two events may not necessarily build a cause-effect relation, but this can be (wrongly) concluded due to the time factor – a problem known as "post hoc ergo propter hoc" in the literature. Nevertheless, the literature, especially the attempts to model such an innovation process in open loop evolving socioeconomic environments, did not yet deliver any answer to this problem of whether the successful market shaping occurring *after* the emergence of a product innovation is a necessary consequence of the product innovation. Answering this question necessarily involves a specific historical context, since "real search processes take place in specific historical contexts, and their outcomes clearly depend in part on what those contexts contain in the way of problem solutions that are available to be 'found'" (Nelson and Winter, 1982: 172).

Recent attempts in the theoretical development of evolutionary economics questioned the role of competitive advantages. Especially the contribution of Maxfield (2008) focused on the question of how it would be possible

to implement corporate social responsibility strategies in order to associate them with the competitive advantage of the firm. Here, different paradigms can be observable (Maxfield, 2008): Whereas one way of this association is to have a trade-off between corporate social responsibility and competitive advantage. In other words, according to this perspective, responsibility activities are justified "if they contribute to, or at minimum, do not detract from profitability" (Maxfield, 2008: 367). This is the more traditional perspective, which focuses on imperfect markets, and proposes the governmental intervention to the firms by obliging these to implement responsibility activities. Another way to associate these efforts with the competitive advantage of the firm is to introduce to them with innovation and social engagement as ways of opportunity recognition and generation of new knowledge for keeping the existing competitive advantage and building upon it. This corresponds to the voluntary provision of responsibility activities, where the association of responsibility activities with innovation, and social engagement with strategy can be more profitable than mere public relations-focused actions (Maxfield, 2008). However, a question remains open on whether this new perspective is a necessary consequence of the initial competitive advantage of the firm, or if it resembles a more emergent structure that does not necessarily end up in the innovativeness of the responsibility activities.

Finally, a third question that is still open in the literature is the role of perceptions in the innovation process, to be more precise, how those who are part of the innovation process perceive this process. Even though a managerial implication by Drucker (2008) advises to focus more on the role of perceptions in decision making processes, little has been done to analyze this. How the use of behavioral economic concepts that emerged in the last decade (such as nudging in the sense of Thaler and Sunstein, 2008) can help the organizations work more on the perceptions of those involved in innovation processes deserved little attention from the managerial economic literature (Potts and Morrison, 2009).

Review of the Literature

Recently, it has been found out that by focusing more on the emergence stage of new market segments can increase the explanatory power of marketing by gaining new insights (Araujo et al., 2010) for identifying recurring patterns of behavior or general behavioral rules, having implications both for research and practice. Within the emergence stage of new market segments, different components can be considered to provide an overview: The role of users

in innovation processes was recognized by research in 1980s (von Hippel, 1986) and is still a relevant topic covering a wide range of service-dominated product innovations (Sundbo and Toivonen, 2011). The focus of innovation research is on how to find relevant target groups outside the companies for finding innovative ideas (Chesbrough, 2003), whereas the entrepreneurial research is going in the direction of exploring and explaining entrepreneurial orientation in a broader context, combining both personal characteristics of existing and potential entrepreneurs and the economic landscape such as conditions, opportunities and cultural influences (Saeed et al., 2014; Erkut. 2016a). For increasing the innovativeness, both entrepreneurial and marketing skills are necessary (Atuahene-Gima and Ko, 2001). Often, a coupling of needs to technology (Teubal and Zuscovitch, 1997) and the successful market creation phase require a combination of these factors (Erkut, 2016a).

Evolutionary versus Neoclassical Economics

The literature review is building upon the research landscape, which is shortly described above. The theoretical foundation of the literature review is evolutionary economics, which is a novel discipline of economics with a long history. It does not take institutions such as markets, or new knowledge such as a new technology as given, but focuses on their emergence and evolution over time (Hodgson, 1998) as a result of a change introduced by economic agents who are part of the system involved in search activities. These search activities may or may not turn into profitable business models. Evolutionary economics involves different streams of thought and methods, and focuses primarily on innovation – to be more precise, also evolutionary economic models are biased towards process innovations (Grupp, 1997). However, it has not yet explicitly integrated marketing knowledge "into its analysis of the dynamics of innovation and markets" (Callon, 2010: 229).

Regarding the differences between evolutionary economics from neoclassical economics, a short overview can be provided at this stage in order to highlight the relevance of evolutionary economics for the topic. Lehmann-Waffenschmidt (2004) differentiates between two streams of thought in the discipline of economics, which focus on models of innovation:

Whereas neoclassical economics determines optimal growth paths based on the set of possibilities of permissible paths, modelling market shaping product innovations cannot be realized within this setup – since the set of possibilities of permissible paths imply that all paths of parameters are known, and one is chosen from these paths, which promises optimal growth.

This logic is contradictory to the emergence of product innovations introducing novelties to the market, and shaping new market segments. As explained by the author earlier, neoclassical economics chooses to focus on process innovations instead of product innovations where the S-C-P paradigm remains as the basis of analysis. On the other hand, evolutionary economics offers a different perspective than neoclassical economics by focusing on non-foreseeable novelties in the framework of "the self-organized economic evolution, which is at least partially open-loop and consequently cannot be predicted and designed perfectly" (Lehmann-Waffenschmidt, 2008: 105).

According to Metcalf (1994), technology and innovations within this framework can be associated with two aspects of observation: The first one is the processes of variation, with which the range of innovations can be explored, whereas the second one is the processes of selection, which change the economic meaning of competing alternatives. These two processes differ from neoclassical economics by means of action-generating processes (Lehmann-Waffenschmidt, 2004) that cannot be predicted. In this context, market is an institutional framework that enables the cognitive processes of a continuous formation of demand and supply (Dubuission, 1998).

The motivation to analyze product innovation and market shaping in an evolutionary economic framework can be highlighted by pointing out to the fact that evolutionary economics uses subjectivist methodology to focus on a process view of generation of novelties (Buenstorf, 2007), which is also the main topic when product innovation and market shaping are analyzed from an economic point of view. Even though this discipline lacks a common ground of analysis (Witt, 2014), it can be said that its crucial factor is "an emphasis on processes of endogenous development and change rather than equilibria and the adjustment toward them" (Buenstorf, 2007: 336), corresponding to the observations of Metcalf (1994). Since the domain of analysis of this discipline is to focus on the "emergence and dissemination of novelty" (Buenstorf, 2007: 336), framing the analysis of product innovation and market shaping by focusing on evolutionary economics can bring new exploration and explanation opportunities for understanding the relationship between them.

For this purpose, it is also needed to mention that the most visible direction within evolutionary economics is categorized as the Neo-Schumpeterian stream of research, going back to the contribution of Nelson and Winter (1982) and being institutionalized in the research with the Journal of Evolutionary Economics among others. This stream of research is known to focus on technological knowledge, nevertheless, ignoring the role of imagination,

leadership and how business conceptions (Witt, 1998) emerge or the role of marketing and marketing-related knowledge in the observation of the innovation processes (Callon, 2010). The generally accepted framework of the Neo-Schumpeterian evolutionary economic analysis, known as the micro-meso-macro framework, starts the process of analysis with the following activity: "One or more of the agents (...) produce and introduce into the market a new consumer item or new production technique" (Dopfer, 2005: 30). According to this framework, in the meso dimension the unit of analysis is the capability of agents to establish a firm, whereas the macro dimension has the unit of analysis as the design or the artefact building a new market segment. This aspect fails to integrate the stage leading to the discovery, which is crucial for understanding the emergence of novelties, how they shape the market and which predictions can be accomplished based on this emergence.

Hayek and Innovations

Regarding *how* the stage of discovery is relevant for economics, one can focus on the contributions of Hayek (1948), who differentiates between information and knowledge in an economic context. According to him, information is described as objective, whereas knowledge comes into existence by our perception and interpretation of objective information in our own cognitive models. Rizzello and Spada (2013) interpret this as helpful to understand market dynamics, since the relevant issue is how a person can build knowledge on the information he or she possesses. According to the perspective of Hayek (1952), perceiving and pattern association / recognition are the starting points, which lead to the human action of building knowledge (new products, new technologies, ...) upon the possessed information perceived within the cognitive model of that individual. For every individual, his or her perception differs from the perceptions of the others, since every individual has different previous experiences. The aspect of perceptions as the stage before knowledge is not explicitly integrated in the Neo-Schumpeterian framework of evolutionary economics.

As stated previously, what happens between the emergence of a product innovation (as a new technological knowledge), and its possible success and retention in a market or a market segment, is largely a black box in economics. However, many scholars of evolutionary economics did not choose this way to proceed. Instead, they interpreted evolutionary economics based on a generalized Darwinian framework of a blind variation-selection-retention. If evolutionary economics is expressed in terms of a strict analogy building

from evolutionary biology, the claim is that there is a general variation-selection-retention scheme which can be used to explain any complex system, also the biological evolution (Hodgson, 2002: 260): "(...) Darwinism contains a broader and more general set of ideas, whose application is not confined to biology. Darwinism involves a general theory of the evolution of all open, complex systems. Furthermore, Darwinism involves a basic philosophical commitment to detailed, cumulative, causal explanations. In both these senses, Darwinism applies fully to socio-economic systems". Therefore, if the focus is put on constituting a strict analogy, it is not hard to explain the process between the emergence of a product innovation, and the success of this product innovation on the marketplace. Nevertheless, this blind analogy building may lead to a trap of *post hoc ergo propter hoc* (Lehmann-Waffenschmidt, 2004) as it has been explained in the introductory part of this chapter. Therefore, new attempts can be done in order to avoid this trap, and instead, provide explanatory power to the evolution of socioeconomic systems, where introduction of novelties by entrepreneurs contribute to the gradual evolution of such a system (Ebner, 2005).

This observation by Ebner (2005) is a feature of the Hayekian perspective, which observes entrepreneurship by means of an interplay between competition and knowledge, and by emphasizing the difference between information and knowledge in the sense that "every economic agent commands a specific advantage in his subjective knowledge" (Ebner, 2005: 138). Nevertheless, very little is found when Hayek and technological knowledge are searched for (in combination). As stated by Witt (2013), Hayek does not provide an explanation to the emergence of technological knowledge by pointing out to Hayek (1978: 188), where the author states that he does "not consider (...) the undoubted role competition plays in the advance of technological knowledge" (cited from Witt, 2013).

Nevertheless, one can build upon the Hayekian theory to provide an alternative explanation and a theoretical/conceptual contribution to evolutionary economics with an emphasis on product innovation and market shaping – hence, targeting to close a gap in evolutionary economic analysis, which is also biased towards process innovations since the major contribution of Nelson and Winter (1982). Erkut (2016b) focuses on this challenge, and for this purpose, the differentiation between information and knowledge as put forward by Hayek (1948) plays an important role in this approach – together with the psychological insights of Hayek (1952), and the empirical evidence confirming these insights (Fuster, 2011). Erkut (2016b) introduces a conceptual framework of analysis to evolutionary economics, with which the notions

of product innovation and market shaping can be analyzed in an integrated way. The result is a conceptual model that provides a unifying framework to evolutionary economics. The conceptual model consists of four dimensions. These four dimensions are *perceptions (nano), knowledge (micro), capabilities (meso)* and *artefacts (macro)*. Whereas the latter three dimensions are present in the framework of evolutionary economics, the first dimension (nano) is the contribution of the author in order the capture the pre-step of knowledge generation, perceptions. Hence, the evolution of an idea to a product, a product to a business conception and a business conception to an accepted artefact is illustrated in an open loop evolving way.

Erkut (2016c) opens a new front of discussion, which combines the issue of perceptions in generation of new knowledge (Hayek, 1952) as it was expressed by the author with the nano dimension in Erkut (2016b), with the idea of making use of the possessed information to turn it into (from the perspective of the market) valuable knowledge (Rizzello and Spada, 2013). Due to the dispersed and subjective character of knowledge in the society (Hayek, 1945), the society experiences competition as a discovery procedure (Hayek, 1978). This discovery procedure can also cover innovations, which are seen as a type of spontaneous order (Potts, 2014). Therefore, the logic of Hayek applies to innovation management as well: Innovations are not pre-defined, pre-determined search processes, but rather emerge out of the procession and transformation of information in human mind, coming out as new and valuable knowledge. This process is by no means a deterministic one, since often the problem is that of sheer ignorance (Kirzner, 1997), i.e. not knowing that one does not know about a certain, useful information. The process is therefore not the result of human design, but rather of human action, since it has been empirically shown that human mind – just like the market itself – does not need a central planner to generate new knowledge – neither it (hypothetically) can generate knowledge, once it is unknown to the mind (and to that person) what it does *not* know (sheer ignorance).

It is to this property of spontaneous order that Hayek rejects to define "optimal" (or at least "viable" in the sense of Lehmann-Waffenschmidt, 2002) rules of conduct through which a spontaneous order (in our case an innovation) can emerge. At least the central planning of this process is, in terms of Hayek, a pretence of knowledge by the central planner. Therefore, rules that are needed or at least applicable, shall not intervene to the personal decisions of individuals in the sense of paternalism. Since the emergence of the discussion around the concept of nudge, actually going back to concepts in

behavioral economics, a new front can be opened to discuss the role of nudges as possible rules of conduct for spontaneous orders.

The Hayekian Research Program and Innovations

In this sense, even though Hayek (1948) has a very big potential for emphasizing the importance of perceptions in the emergence phase of innovations, one has to point out to the fact that even earlier works of Hayek implicitly considered this differentiation between information and knowledge. It remains on the agenda of evolutionary economics that the role of tacit knowledge in innovation processes is an important contribution that can be seen in Hayek's works (Lewis, 2020). As early as 1928, the focus of Hayek was on the misperceptions that can arise from the interpretation of money prices by people, which do not reflect real scarcities (Birner, 2017). As a response, Hayek was interested in research programs for economics and for methodology, where the methodology comprised of subjectivism, methodological individualism, theoretical reunification and decreasing abstraction (Birner, 2017). These can be sketched briefly, and their relevance to the observation of product innovation and market shaping can be highlighted accordingly:

Subjectivism means that social sciences must incorporate individual perceptions for explaining the occurrence of social phenomena (Birner, 2017). Approaches such as that of Teubal and Zuscovitch (1997) do not neglect the role of individual perceptions during the emergence of new markets, but they also do not explain how new technological knowledge emerges. Even though Hayek is primarily known as an economist, his contribution in theoretical psychology (Hayek, 1952) was validated by empirical neuroscience (Fuster, 2011) and since this validation, recent contributions such as Arena and Larrouy (2015), Olivia (2015), Erkut (2016b), Erkut (2018) and Lehmann-Waffenschmidt and Erkut (2018) aim to incorporate Hayek's psychological work (1952) with his economic theories and to address the issue of subjectivism. In general, one can see a recent trend of incorporating Hayek's theories of different areas into one, as recently mentioned by Metin and Özkan (2018).

A logical consequence of subjectivism is methodological individualism (Birner, 2017). The criticism of Hayek in the aggregation debate was in the context of business cycles and monetary policy, the notion of rejecting an aggregate perspective for the sake of disaggregating processes is still relevant for the context of product innovation and market shaping. The specific historical context and the attempts to identify causal structures may need an individualistic focus for understanding the conditions under which

new knowledge emerges (Witt, 1996). Understanding the reasons of different co-evolutions need an individualistic focus, even though the author acknowledges that there is no generally acceptable definition of methodological individualism (Hodgson, 2007), and that the term has been interpreted differently than the original suggestion Schumpeter (1908: 91, cited from Hodgson, 2007) has made, that is, "(...) one starts from the individual to describe certain economic relationships".

A further notion is the theoretical unification (Birner, 2017). This notion can be explained with the need to associate the theoretical contribution with the state of the art of the theory. The fact that empirical evidence from neuroscience confirms Hayek's psychological work, and the observation that generalized Darwinism actually takes the stand of 18th century Darwinism and not the advanced, contemporary stand of evolutionary biology points out to the need that theoretical unification needs to be done in considering evolutionary economics (with its domain in the introduction of novelties) by focusing on the state of the art of the theory.

Furthermore, decreasing abstraction was a relevant point (Birner, 2017) where an ideal-typical case was conceptualized at the beginning, in order to develop more complex arguments later on, based on the main causal elements. This point of view can be seen as a third, different way of observing the emergence of novelty – which, in the open loop evolving socioeconomic systems, are either considered as historical singularities or are modeled as stochastic notions – where modelling of gradual evolutionary change in the system can be done, starting with an ideal-typical case.

This methodological research program was used by Hayek in order to explain the misperception of the real scarcities (Birner, 2017) and how this turned out to be causing business cycles. Looking at his later work, the role of different perceptions was always in the foreground. At this point, the author reminds the reader of Hayek (1948) and Hayek (1952) as the starting point of this discussion in this section. Since this methodological research program is relevant for evolutionary economics, the author will proceed with briefly explaining the concepts from Hayek's contributions. The relevance of Hayek's contributions for increasing the explanatory power of evolutionary economics can be highlighted as follows:

A notion associated with the Hayekian theory is that innovation can be considered as the result of human action, but not of human design (Potts, 2014). This is known as the spontaneous order, as put forward by Hayek (1973) based on Adam Ferguson – pointing out that not all orders are planned

ones. Noticed by Aspers (2009: 5), the construction of the identities of actors during the emergence of a new market, which he calls "orientation", "is central to our understanding of markets, but is not discussed (...) by economists". Hence, the starting point of an economic model must precede the introduction of the novelty, since apart from an interest in trading, economic actors' "motives or preferences are also affected in this process of interaction; these have to be socially constructed and cannot be assumed" (Aspers, 2009: 15). In other words, human beings may start to show interest into solving a problem (such as matching technology to needs in the sense of Teubal and Zuscovitch, 1997) but the outcome – a certain artefact that is identified with a new market segment – cannot be planned. Furthermore, we cannot strictly talk about "misperceptions" in case of the emergence of innovations, since we cannot know what is the objective notion to be perceived correctly – as put forward by Tuomi (2002), innovations are meaningful when they are socially interpreted in a certain context. Instead, we can talk about different perceptions that may end up in different standards, products, interpretations of technology and so on. For example, even though the starting conditions and the technological frontiers may be the same for a number of start-ups that are geographically located in the same region, and maybe also sharing similar backgrounds regarding their human capital and technological frontiers, we observe a heterogeneity among them once they start to operate – leading to a smoother division of knowledge in the sense of Hayek and Smith than a disruptiveness in the sense of Schumpeter. Since innovation is primarily an interpretation in the social context (Tuomi, 2002), the focus must be put on the role of perceptions. The shaping of a new market segment is more than only by introducing a product innovation that has a commercial value. The decisive factor is how this product innovation is commercialized and organized in a framework (Witt, 1998) in such a way that this framework matches needs of the target group and their willingness to trade with the proposed business conception and the product it offers.

Within its conceptual framework, evolutionary economics is in line with F. A. Hayek's perspective of observing markets as the outcome of human action, but not of human design, and the perspective of Israel Kirzner (1997) who introduced the notion of discovery into the entrepreneurial context with describing an alert entrepreneur who is looking for undiscovered opportunities that will bring him or her profits. Analogously to the contingent character of markets on the midway between chance and necessity, entrepreneurial discovery is defined as "midway between deliberately produced information in standard search theory, and that of sheer windfall gain generated by pure

chance" (Kirzner, 1997: 72). In fact, the process of entrepreneurial discovery, which may in turn shape the market, is highly associated with the thinking of an individual or a group of individuals. This is the cognitive aspect of the market shaping process as described above. Although Hayek's psychological work on describing the process of perception goes back to 1952, it is still a relevant work as put forward by Butos (2010) and Rizzello and Spada (2013) for understanding market dynamics. Another primer in the evolutionary economic literature is a primer in understanding product differentiation is the approach by Teubal and Zuscovitch (1997). Teubal and Zuscovitch's (1997) conceptual work makes use of the user experience as well as user adaptation to describe evolutionary product differentiation and market creation; its novelty that is relevant for the evolutionary economic literature is the endogenous observation of change as described previously, where the authors describe the governing dynamics of product differentiation with the interactions of users and producers. These interactions give the market shaping activities and actions a dynamic character.

Regarding market shaping, marketing literature primarily accepts the contribution of Jaworski et al. (2000) to be the central work. The authors differentiate between market driving strategies and those strategies which are driven by the market. Even though this approach remains as a central approach, it still lacks to provide an overview of the contingent character of the markets and their dynamics. Nenonen et al. (2014) explain market shaping by introducing a definition based on the interplay between stability and dynamics, which they call the plastic character of markets.

Regarding the product innovations, the lock-in effect is an important notion, which is explained by Cecere et al. (2014: 1041) as follows: "Small historical accidents can provide a given technology an initial advantage over competitors that can create path dependence – because of switching costs – and therefore lead to the locking out of alternative solutions". A lock-in effect implies a competition between different standards of products, where the "surviving" standard does not need to be the most advanced one. The lock-in effect does not necessarily increase by investing into the research and development departments; Lanzillotti (2003) concludes that increasing research and development investments would not necessarily increase the probability of discovering a new product, since this is always associated with a random component.

Contingency of Innovations and Markets, and Methodological Concerns

The concept of "contingency" goes back to Aristotle's philosophical thinking, and means "not impossible, but also not necessary" (Lehmann-Waffenschmidt, 2010: 482). It was transferred to a graph-theoretical framework by Lehmann-Waffenschmidt (2010) and was used by Erkut (2018) to model the market emergence due to the introduction of a product innovation in case of the enterprise resource planning (ERP) software market with the emergence of the present-day market leader SAP (Systemanalyse und Programmentwicklung). With the theoretical framework of Lehmann-Waffenschmidt (2010), a time graph can be introduced which involves the actual path of the emergence of a novelty and alternative possible developments over time. The degree of causality is defined in Lehmann-Wafenschmidt (2010) as method aiming to determine "whether the present state has been inevitable, or necessary, or whether it is just one of several possibilities that could have been realized." (Lehmann-Waffenschmidt, 2010: 482).

Using this approach, Erkut (2018) finds out that the emergence of the ERP software market is contingent and was not pre-determined; path dependencies play a big role in the way how this market segment emerged; and with respect to both entrepreneurial and economic factors of relevance, the case of the SAP is far from a pre-determined success story. The results are relevant for a number of reasons: First, the results indicate that instead of talking about success stories, a new perspective in market shaping can highlight a more realistic way of the contingent nature of entrepreneurial activity and product innovations. Second, the results aim to bridge the gap between marketing and the emergence of markets, as it was indicated as a research gap by marketing scholars like Araujo, Finch, Kjellberg and Callon. Third, the introduction of counterfactual events in the business history of SAP indicate a methodological innovation that has not yet been considered by marketing and entrepreneurship scholars, which may be helpful regarding recognizing patterns from the past and also regarding contingent planning for the future. A similar analysis conducted by Erkut and Kaya (2017) highlights the role of reconciling corporate social responsibility and competitive advantage by focusing on the firm culture and business history of SAP.

This method is suitable for the analysis for a number of reasons. First of all, contingency is a managerial issue, involving contingent behavior of managers according to the conditions of competition, market, environment to name a few (Woodward, 1958 and 1965; Lawrence and Lorsch, 1967). Second,

the method is more novel than convenient scenario analysis, because it can be observed how different scenarios can be connected with each other. Third, even though it involves a historical analysis by carefully selecting counterfactual events, structural patterns can be observed as a result, enabling propositions for the future. Finally, the character of markets is also contingent, as Hayek describes them with the notion of spontaneous order – meaning that markets emerge by human action, but not by human design (Hayek, 1973) which makes the method suitable for analysis, since once it is carefully operationalized, it can provide an opportunity to measure evolutionary economic change gradually, and offering a tool for the analysis of causality.

As discussed earlier, the method differs from the observation of an innovation as a historical singularity, or modelling it stochastically. Apart from that, it also enables the gradual measurement of causality, which is not given in the regression models that are building the basics of the S-C-P paradigm, neither in concepts like Granger causality (which "measures the precedence and information content (...) does not measure causality by itself", Bhar and Hamori, 2005: 59). It enables to model the emergence of novelties, unlike the Nelson and Winter (1982) type of models, which "deal solely with production techniques and thus delimit their focus to process innovation and imitation" (Andersen, 1996: 124). Evolutionary economic models based on Lotka-Volterra equations (Cantner and Hanusch, 1997), on the other hand, mainly focus on the innovation-imitation dynamics and hence more on the diffusion phase of innovation, where one has to mention that the cyclical dynamics of these models imply that they are not open loop: Since the modelling attempts are based on differential equation systems, a fixed point equilibrium is the result – making the concept only pre-evolutionary, but not evolutionary. Hence, the contingency approach of Lehmann-Waffenschmidt (2010) remains as a useful tool that does not have the shortcomings of the other alternatives in evolutionary economic modelling discussed here.

Concluding Remarks

Evolution of markets and market practices are occupying a big space both in the theoretical considerations of economics as a discipline, and evolutionary economics in particular, and practical considerations of managerial economic decision making. The current trend in both theoretical and practical perspectives is to focus on the psychological factors that may have both an explanatory power and a potential to be shaped. This literature review only focused on the very specific case of market evolution and market practices as a result of

a product innovation in a given theoretical context. Three research questions were formulated at the beginning, focusing on product innovations, market shaping and perceptions in the evolutionary economic literature. The literature review concludes that product innovations and pioneer market shaping processes remain a black box in the literature, primarily because of the methodological concerns, and gives some alternatives to overcome these concerns. Furthermore, the literature review also implies that because innovations are mainly in the domain of evolutionary economics, and evolutionary economics is mainly in the domain of the Neo-Schumpeterian school of thought, the role of perceptions has been ignored implicitly by this school of thought. The literature review focuses on the Hayekian research program and delivers insights from the Hayekian literature that has a potential to be used in future studies about innovations. Even though this theoretical context may have unique properties, its implications can be relevant for providing explanation and exploration possibilities to other forms of market practices.

An issue that can be incorporated by the future research is to emphasize the role of digitalization in changing pattern recognition performance of actors, taking into consideration how new technological knowledge is generated. This notion may be helpful to understand more on the process of the generation of new knowledge, since depending on how this process evolves, also the outcomes may be different – and so will be the model predictions. The emergence of social media applications and their use in business life clearly changed the way individuals behave in terms of their processes of thinking and acting. Since social networks provide a medium for capturing the capacity of tacit knowledge in terms of enabling both its accumulation and transfer, it can shed more light on the issue of how actors recognize patterns based on social networks, that can turn into tacit knowledge as a starting point of new technological artefacts. An extension in this sense can also be more emphasis on new concepts of behavioral economics and their use in the generation of new knowledge, especially from the perspective of behavioral rules generating spontaneous orders, such as innovations.

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