

Product Innovation and Market Shaping: Bridging the Gap with Cognitive Evolutionary Economics

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Abstract

Evolutionary economics is like a patchwork, as it was said by Witt (2014), which has different streams focusing on different fields of research. Whereas the Schumpeterians focus on innovations, some recent approaches try to integrate marketing knowledge into the dynamics of this field. This conceptual paper aims to bridge the gap between these two fields by providing a four dimensional Hayekian framework, which integrates both the spontaneous market formation due to Hayek (1982) and the generation of new knowledge in the psychological work of Hayek (1952), which has been proven by neuroscience (Fuster, 2011). The author first focuses on the canonical model of market shaping due to Jaworski et al. (2000), and an evolutionary product differentiation model by Teubal & Zuscovitch (1997). Next, contingency of markets and contingency of business conceptions are analyzed and brought together by the subjective character of knowledge, which is necessarily behind these two notions, and generated by human mind. Through this observation, the stream of research around Hayek (1952) is analyzed and the four dimensional framework is presented.

Keywords: Evolutionary economics, innovation, knowledge, markets

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1. INTRODUCTION

Product innovations are reflections of a matching process between technology and market demand, and are accepted as starting points of new market segments and marketing activities in those new segments (Avlonitis & Papastathopoulou, 2014). Twentieth century advanced with the shift of competition from prices to products due to the evolution of production, communication and transportation (Avlonitis & Papastathopoulou, 2014). In the past thirty years, the role of user experiences (von Hippel, 1986) and the combination of ideas from inside and outside of a firm (Jaworski et al., 2000; Kumar et al., 2000; Chesbrough, 2003) have been in the agenda of innovation and marketing scholars, aiming to explain the generation of new technological knowledge, and contribute to its further development. This new agenda is particularly useful, when a company cannot achieve the leader position in a certain market segment due to limited resources, but focuses on a niche market, hence, avoiding confrontation with competitors (Avionitis & Papastathopoulou, 2014).

Cooper (1994) analyzed different generations of models for new product development (NPD). The first and the second generation of NPD models used by firms were either very disciplined and had a narrow scope, or they were simply too bureaucratic (Avionitis & Papastathopoulou, 2014). However, the third generation of NPD models focused more on flexibility, adaptability to environment with fluid stages, and most importantly fuzziness – meaning that “Go decisions are not necessary

absolute” (Cooper, 1994, p. 10) but rather “conditional and situational” (Cooper, 1994, p. 10), i.e. contingent to the conditions the firm faces during the NPD. Cooper (1994) concluded that this type of thinking and decision making differs from the black-and-white decisions of the contemporary managerial world, which lacks to capture the evolution at the markets.

A field of economics that primarily focuses on how natural and social systems continuously change is evolutionary economics, which analyzes endogenous economic change either as a result of the learning processes of economic actors (Rizzello, 2000) which imply a change in a certain direction, or as a result of drift processes that do not imply a certain direction. It observes change processes in general, where change does not need to be an upward-going process. As a new discipline with different historical roots, evolutionary economics lacks the “agreement on some conceptual common ground” (Witt, 2014, p. 646). Two emerging fields of research within evolutionary economics are the attempts to integrate psychological aspects (Rizzello, 2000) and marketing knowledge (Callon, 2010) into its analysis of change. Observing economies as evolving and self-organizing systems instead of centrally planned ones, technological change is highlighted as both the source and the outcome of the competition. Economy as a self-organizing system involves a self-augmenting process of innovation competition based on new technological knowledge (Witt, 2013) discovered by individuals (Buenstorf, 2007).

The aim of this conceptual work is to analyze the evolving process of how a new idea is

formed, translated into technological knowledge and shapes a new market segment with the corresponding marketing knowledge. For this purpose, a four-dimensional framework will be proposed. The role of perceptions will be integrated to the framework of evolutionary economics as a pre-step to the generation of novelties, where new findings from neuroscience will be associated with the earlier psychological and economic works of F. A. Hayek. The aim of the author is to contribute to the following research deficits in evolutionary economics: 1. Neuropsychological foundations in decision making processes (Rizzello, 2000); 2. Marketing knowledge (Callon, 2010); 3. Product innovation (Erkut, 2016a). The rest of the paper is structured as follows: Part 2 provides some background information on a central market shaping model from marketing, and a product differentiation model from evolutionary economics, whereas part 3 focuses on the notion of contingency and how subjective knowledge and market activities of individuals can be explained with this notion. Part 4 provides the new framework building upon the background in part 2 and results in part 3. A conclusion follows in part 5.

2. BACKGROUND AND RATIONALE

Market orientation as the organization-wide generation and dissemination of knowledge on customers and competitors gained importance as a way of achieving and keeping the competitive advantage of firms (Blut et al., 2012). Briefly sketched, the widely used concept of market orientation by Jaworski et al. (2000) involves two complementary approaches with customers, competitors and conditions as action parameters. Market structure consists of the players on the market and their roles within the value chain.

Shaping market behavior can be done by offering a new product (market driving) or shifting the attention of customers to products they did not consider to buy (market driven).

Hence, market driven companies “place the customers at the start of the process” (Kumar et al., 2000, p. 132) and only by knowing their needs, they can shape markets (Blut et al., 2012) and offer a new product. Empirical evidence for the basic model of Jaworski et al. (2000) delivers a significant relation between the two approaches, and focuses on “a firm’s innovation orientation, market orientation, and top management’s risk taking” (Blut et al., 2012, p. 462) as the explanatory factors of market shaping activities. For the simultaneous use of the two strategies due to Jaworski et al. (2000), software markets build a good case (Goertzel, 1994), since new software programs are based on old ones combined in new ways. In economic terms, this can be done by product differentiation in a differentiated market with customer differences. A new product emerging in such a market can eliminate old products by offering a standardized alternative to them, especially when it eliminates customer differences (Teubal & Zuscovitch, 1997). In evolutionary economics, a known theoretical model explaining this phenomenon by involving both product innovation and market shaping is due to Teubal & Zuscovitch (1997).

Their model is placed in an evolutionary setup – i.e. the change comes from within the system and not as an exogenous shock. Both preferences and technology evolve over time (Teubal & Zuscovitch, 1997) in the self-organizing system. There is a pre-defined product class which has subclasses. Hence, a process innovation for a certain market segment offering a certain

subclass of the product can lead to a product innovation for a new market segment creating a new and differentiated product class. The building blocks of this model are search activities and discriminating capabilities of users and producers, who help each other for stimulating the coupling of technology to needs (Teubal & Zuscovitch, 1997). Search activities focus on finding out the existing options of choice. These can also include virtual options that may bring a high utility from the perspective of users. Discriminating capabilities, on the other hand, serve as a gateway between technology and needs, since successful technologies are characterized with their market determinateness, meaning that these technologies can translate needs of users into technological solutions (Teubal & Zuscovitch, 1997).

New markets are shaped based on the interaction between producers and users; the authors differentiate between three models. These are increased standardization in terms of a mass market, creation in terms of a differentiated market, and sub-market elimination which can eventually lead to one of the former two models. The authors provide empirical evidence for supporting their model, which focuses on information technologies and biotechnologies. Empirical evidence from software sector focusing on standardized business software is also in line with the model outcomes of authors (Meissner, 1997; Erkut, 2016a; Erkut, 2016b). Hence, from a managerial perspective, the model of Teubal & Zuscovitch (1997) can be associated with the third generation of NPD models having a wide scope in an evolutionary setup. The model captures the early phases of market emergence, which have conflictive natures due to uncertainty and dispersed knowledge

(Toral, 2013). Unanticipated and unpredictable novelties as the outcomes of competition in markets (Lehmann-Waffenschmidt, 2004) cannot be centrally planned. Although human action is intended, its consequences can be unintended (Lehmann-Waffenschmidt, 2008). Even though it is a known fact that entrepreneurial activity is planned intendedly (Krueger Jr. et al., 2000), the way it is planned and realized differs among individuals, since subjective imagination is the key feature of creating the alternatives the mind perceives by a combination of “individual experience, subjective understanding, and current information” (Witt, 1998, p. 163). Hence, it is the perceptions of individuals that build the cognitive dynamics of finding a new, economically relevant idea to shape the market – a notion described as discriminating capability “which is neither purely technical nor wholly related to marketing” (Teubal & Zuscovitch, 1997, p. 273).

Based on this background, the role of subjective knowledge in product innovation and market shaping deserves more attention, especially how individual perceptions lead to the generation of subjective knowledge relevant for the market, since “perception represents the source of the unpredictability of behavior, and the cornerstone of economic change” (Rizzello, 2000, p. 129).

3. CONTINGENCY OF MIND AND MARKETPLACE

Within the framework of evolutionary economics, searching for new ideas or solutions to problems is contingent to several factors, and always take place in a specific historical context (Nelson & Winter, 1982). However, the Schumpeterian tradition of evolutionary economics neglects business conceptions as

entrepreneurial inputs, and their cognitive basics (Witt, 1998), whereas the Hayekian tradition neglects technological knowledge and focuses on the long run development and cultural evolution (Witt, 2008). Since the aim is to focus on bridging these two gaps under an evolutionary theory, the point of departure is how new technological knowledge is discovered and shapes new markets. Recent empirical evidence shows that two factors are relevant for explaining the relation between the economic freedom a country provides to its inhabitants, and how they can make use of this freedom to become entrepreneurially active (Erkut, 2016c): Institutional-infrastructure factors and factors associated with market shaping activities. From the perspective of NPD, the latter one is more central than the former one, since the latter one can only offer some conditions easing the generation of new knowledge. Different stages of national competitiveness consist of different factors reflecting the competitive advantage of a nation in the corresponding stage, where the evolution of firm-level activity starts from very simple products or natural resources to the imitation and improvement of the technologies from more innovative nations, to offering innovative, technology-oriented, differentiated products (Erkut, 2016c).

In a competitive economy, every economic actor possesses a certain bit of knowledge specific to himself. Knowledge is dispersed and never completely available for everyone; therefore, it is not possible for an individual to know how objects in their environment can be used in different contexts. Individuals can follow the prices which tell them what is demanded to what extent (Hayek, 1978). It is the ability of individuals to perceive conditions, recognize patterns and come up with a new idea, a new

technological knowledge, a novelty that can shape the market (Witt, 2013). This process is highly associated with individual capabilities and competencies; the result of a discovery process cannot be predicted due to the structural change it creates. But, this process is not a deterministic one; human mind is “an open and non-deterministic system, [therefore] action cannot be explained as a by-product of objective external constraints” (DiIorio, 2015, p. 187).

A recent survey by Sood et al. (2012) delivers empirical evidence that evolution of industries cannot be generalized with some popular laws of motion, because they are complex phenomena which are context-dependent. In other words, they are contingent (Lehmann-Waffenschmidt, 2010, p. 482): “If there are alternatives of the present state, the actual present is only a possible, but not necessary consequence from the past”. The contingency of markets can occur both on the level of a system (in terms of the structure of an economy generating a variation) and on the level of decision makers (situational generation of variation) (Lehmann-Waffenschmidt, 2010), which will be analyzed in terms of the contingency of markets and contingency of business conceptions. What connects the two is the human behavior which shows analogies in the decision making processes in human mind and on market place (Butos, 2003). In other words, this distinction between system level and decision maker level is due to the recent findings of neuroscience, stating “that knowledge is dispersed and distributed in the cerebral cortex much as it is in the marketplace among individuals” (Fuster, 2011, p. 9), indicating how perceptions and actions associated with them govern both human mind and markets in an unpredictable, subjective, contingent way.

3.1 Contingency of Markets

In a market economy, individuals act in an intended way to offer goods and services to the others; however, contingent circumstances also influence these efforts (Koslowski, 2001). This is due to the fact that needs of the others evolve over time, hence, human action aiming to address these needs also evolves and both components contain “a high degree of contingency” (Koslowski, 2001, p. 236). This observation of markets and human action goes back to the work of F. A. von Hayek.

In his contribution “Law, Legislation and Liberty” (1982), Hayek’s point of departure was to criticize constructivist rationalism, which defines reason as the method of logical deduction from explicit assumptions. According to Hayek (1982), this definition implies that every success of human beings goes back to the application of reason, and institutions such as a market as well as behavior which do not come into existence by reason can have only by chance an advantage. From a critical point, the author says that many institutions are the results of routines, traditions or practices which were neither invented nor practiced with the target of creating such institutions. In other words, institutions emerge as a result of rules. These rules shaped by both a selection process and the experiences which are transferred from generation to generation (Hayek, 1982).

Hayek characterizes the rules generating institutions with two points (Hayek, 1982): First, they are followed in the context of an action without an explicit knowledge to the actor (tacit knowledge). Second, they are applicable because they empower the environment they

are applied in to be stronger. To sum up, as an alternative to constructivist rationalism, Hayek suggests that rules emerge as a result of an evolutionary process. The second critical point of him is on the issue of what he calls the false dichotomy of “natural” and “artificial”, which was first criticized by Mandeville and Hume. Hayek’s (1982) point of departure is Ferguson’s following observation (1995, p. 119): “Every step and every movement of the multitude, even in what are termed enlightened ages, are made with equal blindness to the future; and nations stumble upon establishments, which are indeed the result of human action, but not the execution of any human design.”. A category which lies between those phenomena resulting from the nature and those resulting from intentional decisions and agreements of human beings can be observed historically: some phenomena come into existence as a result of human action, but not of human design (Hayek, 1982).

As “order”, Hayek (1982) defines a state, in which different, heterogeneous elements are so much interconnected that by knowing a spatial or temporal part of them is enough for forming expectations about the others, which are either completely correct or most probably correct. He distinguishes between two types of order: a created order (which is exogenous) and an emerged order (which is endogenous and spontaneous). A spontaneous order cannot have a target, but it emerges from the conscious action of people. Sabooğlu & Langlois (2001) describe the spontaneous order as an “intermediate space” which consists of objects that are neither created by people, nor by the nature but emergent as a result of the rules of conduct. A change of these rules can be interpreted as the process of

selection of an evolutionary process. The degree of complexity of the spontaneous order cannot be limited to the part of it which human mind can understand; its existence does not need to make sense to us, it is a complex order which may persist also when its elements are subject to change (Hayek, 1982).

Competition on the market is also based on the rules, but its outcome depends on chance as well as on skill and power (Hayek, 1978); hence, it is a type of spontaneous order. The outcome of competition, which is a discovery procedure for finding new knowledge, is not pre-determined. Hayek uses the word *catallaxy* to describe “the order brought about by the mutual adjustment of many individual economies in a market” (1982, p. 269). *Catallaxy* can be interpreted as a game, where the outcome is not necessary, but includes both chance and abilities of economic actors (Hayek, 1982). According to Koslowski (2001), with the rules that lead to the emergence of new markets by e.g. discovery of new technological knowledge “contingent changes can be discovered just as much as foreseeable and essential changes, and in which only the structure of the system and action types, but not individual courses of actions, are determined and stipulated” (p. 236).

In the Hayekian framework, it is the entrepreneurial activity which is responsible for “gradual evolutionary change within the economic system” (Ebner, 2005, p. 132). Although entrepreneurial activity is usually associated with situational knowledge, it can comprise technological knowledge as well (Witt, 2013). According to Ebner (2005), “entrepreneurship in Hayekian terms mirrors the relationship between competition and knowledge, rooted in the condition that every economic agent commands

a specific advantage in his subjective knowledge” (p. 138). Competitive selection of rules and institutions as social interaction frameworks builds the basics of market competition in Hayekian terms where search, experimentation and knowledge generation are considered as important factors contributing to economic change, and entrepreneurship is decisive for the growth of civilization (Ebner, 2005). Therefore, within the contingent character of markets, human action is the key figure for progress.

Even though Hayek might have overemphasized the role of contingency in markets (Koslowski, 2001), it seems like more scholars of evolutionary thought find this concept attractive for explaining market shaping, and although Kjellberg et al. (2012) do not explicitly use the term *contingent*, they say that markets have a plastic character – meaning that they can “take on multiple forms” (Nenonen et al. 2014, p. 3). This is by no means coincidence, since evolution favors plasticity in contingent, evolving environments (Balduš, 2006). This implies that a market in present time is not the only possible realization of a certain event, or a series of events, from the past – which corresponds to the definition of contingency in the sense of Lehmann-Waffenschmidt (2010). In the Hayekian sense, the evolution of market does not merely depend on the plans of actors, but it is also a matter of luck – which he describes as a game (Hayek, 1982). As a socially constructed notion, how the market evolves is a path dependent issue; it can take on different forms depending on how actors interact with their environment (Butos, 2003).

The use of plasticity in a market context goes back to Alderson’s definition: “potentiality for being remolded and responding in a different way thereafter” (1957, p. 277). Market entities

have both fluid and stable characteristics at the same time, which can be seen from the market practices they are involved in (Nenonen et al., 2014). The authors deconstruct market plasticity using a classification scheme, in which they observe the plasticity of exchange objects, market actors, market structures, market institutions and market practices as factors that can influence the plasticity of markets. Five main facets of plasticity are the ability of markets to take form, retain form, give form, annihilate form and change function (Nenonen et al., 2014) and on the level of decision makers, it leads to the following classification with the action parameters of retaining form and taking form (Nenonen et al., 2014):

The two extreme cases of markets which are either high or low in both retaining and taking forms may have the following characteristics: Markets which are high in both retaining and taking form are characterized with the interplay of stability and change. Actors need to recognize and act on both stability and fluidity phases strategically. On the other hand, markets which are low in both retaining and taking forms are usually those which emerge due to previously unmet consumer needs and exist for a short period; they are shaped indirectly through other socio-material enactments. In addition to these both cases, markets can be low in retaining form but high in taking form. These markets change rapidly and continuously; actors who wish to shape these markets need to understand and analyze the market capabilities correctly. The last of the four cases is markets which are high in retaining form but low in taking form; they are resistant to intentional changes and their structures, institutions, practices and logics are stable. Actors who wish to shape such markets

need to cooperate with other actors who have similar interests.

From the perspective of market actors who drive the market processes, the challenge is “building and improving effective routines” (Tidd & Bessant, 2014, p. 83) and business conceptions in form of “cognitive aspects relevant to the firm’s behavior” (Witt, 1998, p. 175) by observing their environment and combining it with their personal experiences, which is not an explicit process but rather an implicit one, since “we only understand our world, and ourselves, because we understand one another (...) because we spent all some substantial part of our lives being encultured into the life-world” (Lavoie, 1991, p. 482). Oguz (2000) interprets this with the term “pre-understanding of the situation” (p. 72), meaning that human beings can understand things because they have a pre-understanding which is the point of departure for any knowledge generating process in human mind. In the interpretation of Oguz (2000, p. 72), “all human activities (...) are interpretative in the sense that they begin with an already understood world”, which is always subjective. Therefore, it is the perceptions of individuals or teams of individuals, which lead to the transformation of objectively available information into uniquely possessed subjective knowledge in the sense of Hayek (1948). Although Hayek’s initial focus was information contained in prices, he later on focused on the generation of new knowledge which emerges as a result of adjustment processes in costs and prices (Witt, 2013). In terms of competition as a discovery procedure (Hayek, 1978), new technological knowledge can emerge (Witt, 2013). Innovation competition can therefore be a third type of competition after prices and costs, where new knowledge

emerges. Not price or cost competition, but this technological knowledge is important for an economy in the long run (Lehmann-Waffenschmidt, 2008) since the final state of increasing national competitiveness in the classification of Porter (1990) is the innovation-driven economy, where the following stage of wealth-driven economy is a state of ultimate decline (Porter, 1990). Based on the discussion on evolving markets, it can be said that they are the outcomes of contingent events and the interactions of market entities that have both fluid and stable characteristics at the same time. This leads to the consideration that contingency is not present on the market-level only, but has deeper roots in business conceptions that shape the market, and perceptions that are even more deeper than business conceptions and new knowledge that is institutionalized in business conceptions.

3.2 Contingency of Business Conceptions

Since more than 50 years, management literature emphasized that business conceptions are contingent (Woodward, 1958, 1965; Lawrence & Lorsch, 1986; Perrow, 1967). Both optimal leadership decisions (Baraz & Sakar, 2011) and innovation management (Van de Ven et al., 2013) are contingent to the internal and external factors influencing the organization, and only the “right” match of them can lead to success. A milestone in this stream of research is the contribution of Lawrence & Lorsch (1986). In this contribution, authors primarily focused on the fact that there is no single way of successful organizational performance. Both differentiation of organizational units and their integration for acting as a single organization are observable in different patterns due to environmental uncertainty (Van de Ven et al., 2013).

A recent categorization of contingent context variables by Tidd & Bessant (2014) suggests that sector, size, national systems of innovation, life cycle, degree of novelty and role played by external agencies are all related to managing innovation on an organizational level, which may affect the market shaping practices. They are in line with the previous research on contingency theory of organizations implying that “organizations are more effective when the design of their structures and processes (...) match (...) their environmental demands.” (Van de Ven et al., 2013, p. 402). Hagberg & Kjellberg (2010) advise to focus on the heterogeneity of actors when applying market shaping principles to market practices, since knowledge discovery is driven by individuals. For answering the question of in which contexts agents vary from each other, the authors focus on the constitution of market agents, i.e. what they are made of, their programs of action and capacities. These variations point out to how the agents perceive their social environments in their own cognitive frameworks.

Agents can be seen as hybrid collectives (Hagberg & Kjellberg, 2010), meaning that their constituting properties emerge during human action by associations with their social environment, including human and non-human interactions, which may have unintended consequences and constitute the spontaneous order in the Hayekian framework (Hayek, 1982). Number of elements, durability of associations and the associative structure constitute together an agential configuration (Hagberg & Kjellberg, 2010). They can vary over time as a result of the relations keeping them together (spanning from highly temporary to highly durable) and their interconnectedness (highly connected means

that the failure of any constituting element affects the performance). Individuals may have programs of action to shape markets (Hagberg & Kjellberg, 2010). These programs need the translation of knowledge, which emerges as a result of the cognition of the actors, into other forms – the key aspect is whether the actors act in the ways as others expect them to do so. Variation can be seen in the number of programs (some only focus on one market practice, others not), their conformity (some stay focused on their initial program, others change it) and articulation (some may articulate the program of action, others not).

The heterogeneous character of the programs of action is associated with the individual capabilities of agents, the third category of variation. Not only the fulfillment of the expectations of the others is important, but also whether the actors are capable of performing these programs (Hagberg & Kjellberg, 2010). Furthermore, spatial and temporal restrictions (some agents are fixed in a location, and they can only make one market practice at a time) and reflexivity of agents (making use of the past experiences to modify their responses) are also categorized within the capabilities of agents. The real reason behind these three types of variation is the contingent character of social environments (Baldus, 2006). Whereas the model of Tidd & Bessant (2014) lists the contingent factors of the organizational level, the model by Hagberg & Kjellberg (2010) can be used to understand how these factors in turn shape configurations of agents, their behavior and capacities – in general, conceptions on an organizational level (Witt, 1998). Conceptions can be seen as the translation of new knowledge into a cognitive-organizational framework to act on the marketplace; the market

actors do not shape the market directly with the new knowledge they possess, but rather through the actions of their firms.

Hence, the organizational aspects of market shaping are reflected in all aspects of market plasticity (exchange objects, market actors, market structures, market institutions and market practices), and according to Cordes et al. (2010) there is a relationship between the business conceptions, the changes in business environment and the evolution of markets. According to Witt (1998), conceptions “are necessary for organizing otherwise meaningless or ambiguous information into significant agendas and action plans” since they build common cognitive frameworks of interpretation in organizations; and therefore, variations in environmental factors and configurations of agents together build business conceptions that are contingent in their character. It was found out by management literature decades ago that there is not a single way of organizational success, and the subjective nature of business conceptions is necessarily capturing this issue by emphasizing the cognitive frameworks, which build on non-pre-determined principles of perception and action (DiIorio, 2015).

3.3 Bridging the Gap

A generally accepted evolutionary economic framework of analysis is hitherto not available, since this discipline is “a patchwork of different approaches” (Witt 2014, p. 647). The Schumpeterian analytical framework by Dopfer et al. (2004) is based on three dimensions, the so called micro-meso-macro framework, where the process of analysis starts with knowledge (micro dimension), at which “one or more of the agents (...) produce and introduce into the market a new consumer item or new production

technique” (Dopfer, 2005, p. 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 framework can be interpreted as an attempt to link micro and macro dimensions by introducing the meso dimension, the capabilities.

However, the author’s research focuses on a different path than the Schumpeterian one. It aims to focus on Hayekian evolutionary economics by considering recent developments in neuroscience, which support the hypotheses Hayek (1952) mentioned in his contribution to theoretical psychology. In other words, whereas the framework of Dopfer et al. (2004) provides the building blocks of the Schumpeterian economy, the framework that will be proposed here aims to bridge the gap between the Schumpeterian evolutionary economics and evolutionary market shaping by providing the building blocks of the Hayekian evolutionary economics – of Hayek, the economist, and Hayek, the psychologist. To be more precise, the aim is to bridge the gap by describing the evolutionary process in an analytical framework that connects decision making in human mind to decision making on the marketplace, two parallel processes with similarities, as it was suggested by Butos (2003).

Hayek (1948) differentiates between information and knowledge. Information is described as objective and external, knowledge comes into existence by the perception of human mind and the interpretation of objective information in the own cognitive model of a person. Knowledge is therefore subjective in its nature. Rizzello & Spada (2013) interpret this distinction 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 authors, knowledge generation is based on the “complex interaction between external information, mental structures, and their modifications as a consequence of past information” (Rizzello & Spada, 2013, p. 303). From the psychological perspective of Hayek (1952), perceptions 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, perception differs since they have different previous experiences. The aspect of perceptions as the stage prior to knowledge is not explicitly integrated in the convenient framework of evolutionary economics. This lack of integration of perceptions in the models of evolutionary economics is nevertheless an important gap in the models and methods of this discipline. According to Rizzello (2004), if the outcomes of path dependence need to be analyzed and understood, perceptions and learning processes of market actors are the key to understand how “very strong rigidities are created which lead to trapping states, and self-reinforcing mechanisms” (p. 266). Such a trapping state can be the existence of a dominant design (Utterback & Suarez, 1995) in a market, which dominates other products of the same market segment and becomes a standard. One such example is the battle between the two standards in the market for video cassettes, which ended in the lock-out of the Beta format and VHS becoming the dominant standard, even though the Beta format was technologically more superior than the VHS format (Weiner, 2005).

A recent field of research is on market plasticity (Kjellberg et al., 2012). Kjellberg et al. (2012) make use of market practices to justify the existence of markets; they say that “working markets are always in the making”. They conclude that the research shall focus on exploring new fields of market practices, such as the evolution of market practices. Emphasizing the evolution of market practices with the example of a product innovation and the corresponding market shaping activities in the nascent phases can contribute to the understanding of shaping a new market. This is in line with a new research direction aiming to re-connect marketing to markets for a detailed, in-depth understanding of market emergence (Araujo et al., 2010). Concluding this discussion, it can be said that the contingency of markets and contingency of business conceptions are bridged by the decision making of human mind, which transforms the objectively available information to subjectively available knowledge.

4. A CONCEPTUAL MODEL OF EVOLUTIONARY PRODUCT DIFFERENTIATION AND MARKET SHAPING

4.1 Initial Thoughts

The conceptual model presented here aims to introduce a suitable framework allowing to analyze the contingent character of markets, and how they are shaped by human action. The process of product innovation and market shaping is not smooth due to the obstacles to complete knowledge, as it was stated by Toral (2013) regarding the early phases of market emergence and its conflictive, uncertain, nature. According to Loasby (2003, p. 2), these are (1) insufficiency of induction, (2) complexity, (3) the

limits of human cognition, (4) exogenous change, (5) interdependence of individual initiatives and (5) conflicting ideas and purposes. As Loasby (2003) concludes, reaching the true knowledge is never possible due to these obstacles, but subjective knowledge on how people organize their subjective knowledge can be and shall be organized.

For this purpose, a number of assumptions need to be taken for conceptualizing the process starting with perceptions and ending with shaping a new market (although the process is circular and evolutionary, and “ending” only means that market will continue to evolve according to the same pattern). In line with Loasby (2003), (1) it is assumed that “all action is decided in the space of representations”. According to Teubal & Zuscovitch (1997), the market shaping process starts with the presence of search activities and discriminating capabilities. This means that human brain and sensory inputs / outputs emerging in human brain is the representation on which innovative ideas are found, since product innovation and market shaping both go back to human action, the decisive factor between any spontaneous order (Hayek, 1982). As Loasby (2003) puts forward, (2) “viable processes must operate within viable boundaries”, indicating that a separation of the way human mind generates a new idea, the emergence of an innovation and shaping a new market segment need to be integrated to one framework – since all three have the common denominator of knowledge. The framework of the author is a four dimensional one (nano-micro-meso-macro).

Furthermore, frameworks (3) need to persist and (4) even if they may be evolving in an open loop system, decisions need closure (complete

or incomplete) (Loasby, 2003). A closure can be defined as properties constituting “a constant conjunction of events” (Foss, 1994, p. 26) in e.g. experimental situations. In case of incomplete closure, human mind develops an interpretative framework (Kelly, 1963 cited from Loasby, 2003) “by a mixture of unconscious accretion and deliberate thought” (Loasby, 2003, p. 12). The development of an interpretative framework is a contingent issue, since it involves the subjective interpretation of events, which depends on the previous experiences of that particular person (Fuster, 2011). This can be seen in business conceptions Witt (1998) and also the way how NPD evolved from very sharp “Go/Kill” binary decisions to more flexible, fluid and contingent decision stages (Cooper, 1994). In the sense of Kirzner (1997, p. 72), this development can be seen as a “midway between deliberately produced information in standard search theory, and that of sheer windfall gain generated by pure chance”.

Defining an institution as “the frameworks and procedures in common use within any group” (Loasby, 2003, p. 12), (5) economic processes are associated with institutions that need to be considered for analysis (Loasby, 2003). These can be formal but also informal institutions, since market shaping involves the type of corporate culture, which can in turn influence how a certain market evolves (Cordes et al., 2010). Causes of change in institutional and cognitive frameworks therefore need to be part of the analysis (Loasby, 2003). Furthermore, (6) economic processes evolve over time and (7) their analysis requires “a variety of levels and timescales” (Loasby, 2003, p. 13). Time is, according to Kirstein (2016), the only medium in which economic processes progress and

novelties emerge, which differentiates the past from the future – and a notion that differentiates evolutionary economics from other disciplines because of the explicit integration of irreversible time to its framework of analysis. Based on these initial thoughts, a framework will be proposed by the author.

4.2. The Framework

The framework has the following building blocks: The nano dimension comprises perceptions (or cognition) of actors, corresponding to the existence of the pre-understanding being the basic to any knowledge process in human mind in the sense of Hayek (1952), Lavoie (1991), Oguz (2000), and Fuster (2011). This is the dimension where individual knowledge is generated, which is based on the subjective, individual pre-understanding of the actors, also called pattern recognition based on perceptions. In terms of Nenonen et al. (2014) the cognition of market actors consisting of their mental models, their learning processes (and the corresponding organizational routines), their strategies, motives and initiatives (and the corresponding resources) correspond to their plastic character.

The micro dimension corresponds to the use of individual, tacit knowledge with the help of rules, routines and interactions to generate a novelty (Teubal & Zuscovitch, 1997) that corresponds to quasi-knowledge in the sense that it is generated by catalytic interactions and “cannot be disembodied from the particular circumstances and conditions associated with its generation” (Butos, 2003, p. 105). In the Hayekian (1948) context, this may correspond to prices “not have been inferred beforehand and (...) unique to the specific framework in which those interactions exist, the sequence of those interactions, and (...) the specific rules

and routines" (Butos, 2003, p. 105) but also to the technological knowledge (Witt, 2013) which has been neglected in the original Hayekian framework. Also Nenonen et al. (2014) point out to the evolutionary framework, particularly to the Kirznerian and the Hayekian approaches of how exchange objects can be identified as a notion in market plasticity.

The meso dimension focuses on the capabilities of actors; this is the point where formulating business conceptions play a role in the sense of Witt (1998): As it is known that human mind selects information based on cognitive cues going back to the existing patterns in the memory, the social environment in terms of business conceptions can provide a common cognitive framework for those belonging to the same business, hence, helping to organize "otherwise meaningless or ambiguous information into significant agendas and action plans" (Witt, 1998, p. 162). In terms of Hagberg & Kjellberg (2010), what makes the capabilities subjective is the agents themselves, and the variation can be seen both in their programs of action, their individual capabilities and the relationships keeping an organization together, whereas market practices in sense of Nenonen et al. (2014) can correspond to the meso dimension, since when a market takes a new form, plasticity in market practices correspond to a "change in the routinized actions", although no clear distinction can be made between market actors and market practices due to the subjective role of the capabilities, and especially due to the role of mental models and learning processes of group of actors.

The macro dimension corresponds to the knowledge becoming an artefact; this corresponds to the creation of a new market segment in the sense of Jaworski et al. (2000), which is not the

result of intended design, but intended human action with an unintended consequence (Hayek, 1982). On the level of markets, the competition is based on artefacts which can be products or methods, but this is only the stage that can be reached via knowledge generation and use of capabilities towards market shaping (Kamtsiuris, 2002). In the framework of Nenonen et al. (2014), the directly observable notions of market institutions and market structure may correspond to the macro dimension, since the latter may both cover a change in the number of market actors and the emergence of a new market segment, when a market takes form, whereas the former notion may include the introduction of a product standardization when a market takes a new form.

The framework does not end when the novelty becomes an accepted artefact in the market; the artefact is furthermore shaped by the market and changes its form. The dynamics of the framework can be described in detail:

4.2.1 The Nano Dimension: Perceptions

The starting point is the differentiation between information and knowledge. Information is objectively available in an evolving economy, and only with the subjective interpretation of the actors, the information can be transformed into knowledge (Hayek, 1948; Rizzello & Spada, 2013). Perception means that actors classify the world into categories, which emerge as a result of the relationships of association and these associations are formed over lifetime (Fuster, 2011). Associations are formed "by synaptic changes between simultaneously activated neuronal assemblies" (Fuster, 2011, p. 6) leading to the formation of perceptions. As a result, when an actor is confronted with a new experience, this new perception is shaped by previous

perceptions (i.e. memory) in which he thinks of previous experiences, and tries to associate the recognized experience with previous experiences that resemble the features of this particular experience. This process can be described as “pattern recognition”, or “recognition of recurring patterns”, meaning that the result would be individual knowledge, mainly tacit knowledge (Butos, 2003). This dimension is in line with two Hayekian works: Hayek (1948) in the sense of differentiating between information and knowledge, and Hayek (1952) in the sense of pattern recognition as the starting point of the generation of new knowledge.

4.2.2 The Micro Dimension: Knowledge

Individual knowledge can be transformed into market quasi-knowledge (Butos, 2003) by means of practices, rules and routines. This transformation process (in case of technological knowledge) may involve an exchange object in the sense of Nenonen et al. (2014): On this level, technological knowledge can be observed in terms of an interplay between fluid and stable elements; taking form corresponding to its introduction as a new (or at least modified) exchange object, and retaining form corresponding to the exchange object becoming a “commonly accepted object of exchange”. Due to this interplay between fluidity and stability, which is not restricted to exchange objects only (Nenonen et al., 2014), the use of technological knowledge for the transformation towards market quasi-knowledge needs flexibility, as it has been captured by the NPD models focusing on more flexible phases (Avlonitis & Papastathopoulou, 2014).

4.2.3 The Meso Dimension: Capabilities

Transforming technological knowledge into

market quasi-knowledge (Butos, 2003) is more than the launch of a new product; as it has been shown previously by Cordes et al. (2010), business conceptions can shape how a market evolves. Hence, business conceptions determine how heterogeneous market practices will be (Hagberg & Kjellberg, 2010). In line with Witt (1998), a business conception provides grounds for the joint achievement of targets based on the technological knowledge which builds the competitive advantage of the organization; therefore, it is the leadership and the communication processes which shape the joint cognitive framework of the members of the firm to contribute to the success of the firm. As suggested by Nenonen et al. (2014), not only individual actors have learning processes, but also groups of actors, where business conceptions become a part of these learning processes. In terms of Fuster (2011), perception-action cycles of the members of the firm must overlap so that a shared interpretation pattern can occur, which is a challenge from the perspective of management.

4.2.4 The Macro Dimension: Artefacts

On the level of markets or market segments, the competition is in terms of artefacts (Kamtsiuris, 2002), where the new market segment is an unintended consequence of human action. The contingent context variables listed by Tidd & Bessant (2014) can be helpful for understanding how the competition of artefacts can develop based on the conceptions the firms active in competition choose (Hagberg & Kjellberg, 2010). At the end, a standard can exist as the dominant design dominating all other artefacts (Utterback & Suarez, 1995). Early entrants can show higher levels of survival but since a dominant design does not need to be the technologically superior

alternative, it is possible that the dominant design can be e.g. not very user friendly. In any case, the emergence of a new market segment is contingent, since human decisions always have alternatives, and the fact that an artefact can dominate other artefacts also points out that the new market segment does not need to take a pre-determined form; it can have alternatives that could have been realized, but were not. Neither it has to be the case that a better situation emerges in comparison to the previous situation, when the irreversibility of time (Kirstein, 2016) is considered. As suggested by Rizzello (2000), “the result is only one among the many possible outcomes”. It is contingent.

4.3 Theoretical Description and Critical Observations

The general description of the model can be described and characterized as follows. In the sense of Teubal & Zuscovitch (1997), market actors are in a competitive, differentiated market with heterogeneous users. The market has no standardized products to offer to the users; rather, producers need to offer a new and differentiated product for each user depending on their needs. The producers can observe what users need. Users may know what they need, but they may not necessarily know how the needs can be transformed into new technological knowledge, since a successful “coupling of technology to needs” (Teubal & Zuscovitch, 1997, p. 272) is the result of search activities and discriminating capacities.

Each new customer is a challenge for the search activities of producers, who try to understand different needs of heterogeneous users and associate these to their known, previous experiences related to the customer needs. In

the absence of a standardized product, where they develop a new product for each of their customers, these previous experiences can form a recognized pattern in the mind, leading to a need for a standardized product for all customers, if customer needs resemble each other which is reflected as a recognized pattern in human mind. The new product can build on previous knowledge of available products, but due to its standardizing character, it leads to the emergence of a new product (Goertzel, 1994) and by this duality, it can be characterized with what Jaworski et al. (2000) described as a common use of the strategies of “market driving” and “driven by the markets”. Hence, new knowledge starting as a process innovation for the existing market (with differentiated products for each customer) can in turn shape a new market, becoming a product innovation for that particular market. This is in line with the results of both Teubal & Zuscovitch (1997); Grupp (1997); the latter pointed out to the fact that a process innovation for a certain market can be a product innovation for another market.

Within this model, in the first step, the producers perceive needs of the heterogeneous customers, and in the second step, they think of previous experiences in order to associate the recognized, perceived information with these in terms of patterns. This is not an initiated step, but it rather occurs within the perception-action cycle (Fuster, 2011), which is the interplay between the individual and the environment throughout the life. In other words, new knowledge only comes into existence as a result of the interpretative cognitive framework of an individual as a result of perceptions and the pattern recognitions. A pattern emerges implying that different users have similar needs, and instead of offering a

differentiated product to each customer, a single product can be developed to satisfy all customers' needs. This pattern may develop within the process of the user-need determination (Teubal & Zuscovitch, 1997) as a sequential process of determining the product class, the function of the desired product class and the features determining function performance.

The tacit, personal knowledge (where it can be also "personal" in terms of a group) will be transformed into a product in terms of the codification of the knowledge where a successful interaction between users and producers is assumed, since the recognized pattern of similar user needs is based upon the observation of user needs. Hence, the process evolves from the tacit knowledge into explicit knowledge by means of codification, where an exchange object emerges. Heterogeneity of user needs cannot be eliminated forever, since the preferences of users may change and evolve into different directions over time. However, temporarily these differences can be eliminated with the introduction of the new exchange object (Teubal & Zuscovitch, 1997). Hence, a new market emerges out of the old one, leading to the duality of "market driven" and "market driving" strategies (Jaworski et al, 2000). The exchange object, a standard product, can be interpreted as a radical innovation which generates a new product class (Teubal & Zuscovitch, 1997). This product eliminates user differences and subhierarchies of old products, hence generating a new hierarchy and a new product class with minor product improvements, or to a differentiated market where user differentiation stays in the foreground and leads to two differentiated product-type subhierarchies (Teubal & Zuscovitch, 1997).

During the transition of tacit to codified knowledge,

the need for establishing an organization arises, through which the new knowledge can be institutionalized. Regardless of the number of developers, business conceptions (Witt, 1998) are needed for giving a common interpretative framework to the persons associated with the organization. As shown by Cordes et al. (2010), this dimension can shape how a certain market segment evolves, since corporate culture and its evolution has an effect on the performance of the firms, especially the internal capabilities of firms. Hence, even though the stylized case is the emergence of a new market, in which the standardized product is placed as the product innovation shaping this particular market, there is a possibility of the product innovation being unsuccessful, or even the fact that the market evolving into a different one because of the corporate culture of the pioneer firm bringing an innovation to the market. In which direction the evolution from tacit knowledge to the possible emergence of an artefact goes, cannot be pre-determined, since it is an evolutionary process associated with the emergence of novelties in form of new knowledge, and how this new knowledge shapes the market. However, it can be said that even a successful process shaping a new market does not end, when the market begins to emerge, but rather continues as market shapes the product innovation that generated it.

Even though this model introduces a missing notion to the literature of evolutionary economics, with which the emergence of new knowledge and how new knowledge shapes a new market can be explained, it is still restricted with the assumptions provided by Teubal & Zuscovitch (1997). Furthermore, it must be pointed out that the issue of perceptions is not a static issue, meaning that cognitive networks

through which the pattern recognition is realized, are formed spontaneously by relational encodings, where the items associated with the past experiences of the brain involve knowledge that is “dispersed and distributed in the cerebral cortex much as it is in the marketplace among individuals” (Fuster, 2011, p. 9). Therefore, the model does not provide a way of showing how to organize certain phenomena in such a way in order to generate the desired new knowledge by means of perception, “because each person will associate that particular stimulus to his own class of stimuli, which obviously differs from that of everyone else” (Rizzello, 2000, 141). Nevertheless, the managerial implication of Drucker (2008) to work on the perceptions still keeps in validity, and as it was shown by Erkut (2016b), it can be associated with providing the conditions of knowledge generation. A further point that needs to be highlighted is the use of the four-dimensional model explaining an evolutionary process from perceptions to the emergence of a new market segment is its use and validity in different contexts other than that of Teubal & Zuscovitch (1997) with a focus on product standardization. The use and the validity in different contexts need further theoretical investigations, experimental tests and empirical analyses.

5. CONCLUSION

For a developing field of economics such as evolutionary economics, it is a challenging task to find common ground for the future theoretical development. The framework presented here makes an attempt into this direction – it minds the gap between product innovation (driven by the Schumpeterians) and market shaping (driven by the market plasticity approach) traditions and aims to close it with the Hayekian theories

of knowledge generation in human mind and on the marketplace. This is relevant for two reasons:

First, it takes the traditional example of a market shaping case and analyses its behavioral foundations. This is both in line of a practical perspective by Drucker (2008) who said that management must put more effort for understanding and shaping perceptions, and in line of a theoretical perspective of open innovation (Chesbrough, 2003) and innovation as a spontaneous order a la Hayek, where recent contributions in the latter case (Arena & Larrouy, 2015 and Olivia, 2015) focus on combining Hayek’s psychological work with his economical works. This is the main theoretical contribution of the study – introducing a nano dimension of perceptions, which is the opening door to knowledge generation for NPD. Second, it provides a missing link between observing economic change in a non-pre-determined way (in the sense of evolutionary economics) and innovative tendencies from a behavioral perspective, going back to Hayek’s central psychological work (1952) to explain these behavioral tendencies and decisions by pattern recognition.

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