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Understanding the Knowledge - Opportunities - Entrepreneurship Mechanism

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Abstract

The development of entrepreneurial mindset is a challenge and a goal which requires an in-depth investigation of the learning processes in meta–level, because the key factors are related to meta-cognitive processes and procedures on motivation and behavior. The purpose of this paper is towards understanding the knowledge – opportunities – entrepreneurship mechanism and therefore the role of opportunities in the entrepreneurial process. This paper aims to consider that the concepts developed in this literature can be treated equally well both as topics on entrepreneurial behavior and as a mental exercise in the cognitive science, pedagogy and philosophy of brain. The author accepts that cognitive mechanisms reinforce individual's existing knowledge base and makes it one of the most important elements contributing to the opportunity identification. So, through a process of logical inference addresses some questions related to the opportunity – entrepreneurship action relationship.

Keywords: Knowledge, Opportunities, Entrepreneurship Mechanism

1. Introduction

Understanding how opportunities come into existence is a necessary element towards understanding entrepreneurship because opportunities discovery/creation is a process that has been one of the most critical factors for entrepreneurial activity. This process permeates entrepreneurs to exploit 'new' and 'not new' ideas. It also organizes new actions, whether these actions are intra-organizational goal setting or introduce new products and services. Literature on entrepreneurship motives and entrepreneurs' characteristics argue that, in general, entrepreneurial activities occur when opportunities and individuals overlap (Shane and Venkataraman, 2000).

Considering the importance of entrepreneurial initiatives, several researchers committed themselves to identifying and understanding the process (i.e. why, when and how) that entrepreneurs discover or create and exploit opportunities. Theories on

entrepreneurial opportunities imply a paradigm referring to human behavior and within this framework they describe concrete entrepreneurial actions, considering that individuals differ in aspects such as alertness, knowledge and need for achievement (Kirzner, 1973; Schultz, 1975; Shane, 2000; McClelland, 1965).

Investigations on opportunities creation led some researchers to postulate that entrepreneurs seem to use a cause-effect process, whereby, through their knowledge or expertise, they make choices based on a set of alternatives and estimates of the consequences which lead to particular actions. Going still further, they argue that the 'opportunities – action process' may not be linear but rather one in which both intrapersonal and interpersonal aspects are involved and "cognitive and social" processes interrelate to regulate the decisions an entrepreneur makes. Opportunities show entrepreneurs "what to do and when to do it". So, the issue is associated with the ability of individuals to discover or create opportunities, which are the same thing as setting the supply of entrepreneurs as well as the quality of this supply.

This paper considers that the concepts developed in this literature can be treated equally well both as topics on entrepreneurial behavior and as a mental exercise in the cognitive science, pedagogy and philosophy of brain. Since an opportunity can be found in *'lots of places and for lots of reasons'* (Plummer, et.al., 2007), the present author accepts that cognitive mechanisms in general (i.e. a learning process) reinforce individual's existing knowledge base and makes it one of the most important elements contributing to the opportunity identification. So, the paper is a conceptual paper and through a process of logical inference addresses some questions related to the opportunity – entrepreneurship action relationship. It also sets the stage for future research pointing out that there is an inherent complexity in the development of a theory on the origins of entrepreneurial opportunities. Consequently, as a conceptual paper, it follows a methodology based on epistemological analysis of the existing literature on the subject, using views and arguments borrowed from psychology, pedagogical science and economics which are already put forward by other researchers. Also this conceptual paper contributes to the existing literature by examining the relationships between knowledge - opportunities - entrepreneurship Mechanism, extending previous literature on the possible relationships between knowledge, opportunities and entrepreneurship mechanism.

The remainder of the article is structured as follows: section 2 presents the theoretical overview about learning and Acting. Section 3 provides the mechanism of opportunity recognition. Section 4 reports issues about Entrepreneurial Education. Section 5 provides the Behavior and entrepreneurship action and finally, we offer our concluding comments in section 6.

2. Learning and Acting. Some theoretical overview

Older and recent studies on the factors influencing entrepreneurial action have developed a theoretical framework providing a better understanding of the multidimensionality and the dynamic effects of the entrepreneurial process and entrepreneurial strategy formation. This framework forms a theory on entrepreneurship which explains how entrepreneur's development path is shaped and how entrepreneurial ideas are born and flourish.

The entrepreneurial process involves all functions, activities, and actions associated with perceiving opportunities and creating organizations to pursue them (Bygrave, 2004). Therefore, theories on entrepreneurship propose 'cause – effect processes' and determine all incentive factors which influence this process.

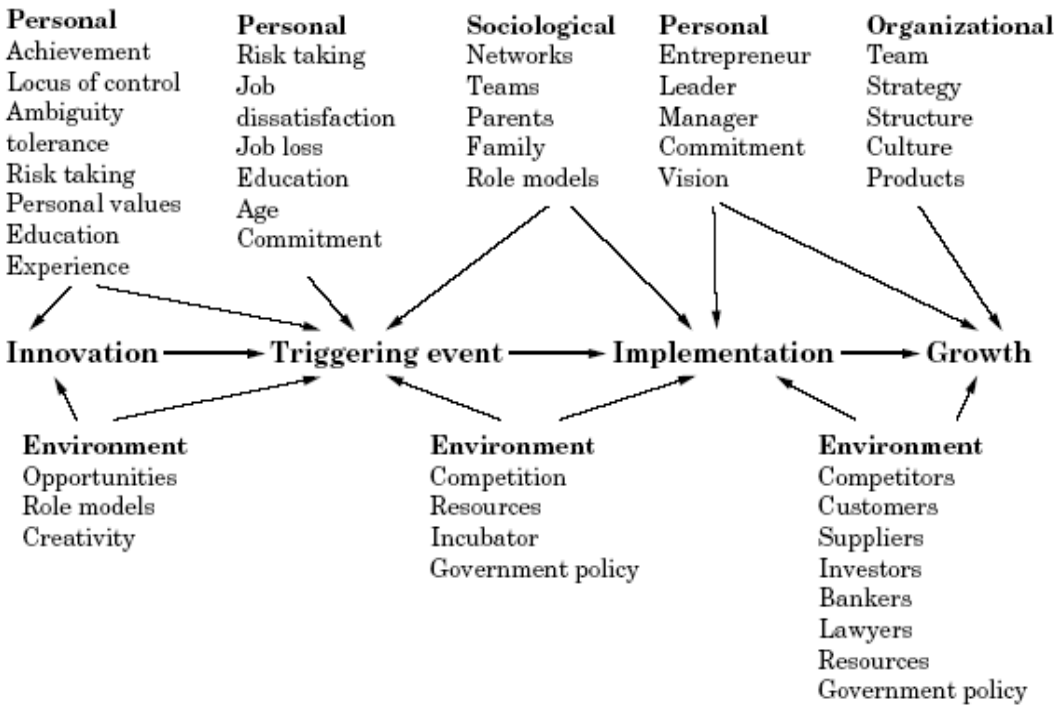
Below, we present a selection of these proposals:

1. The level of skills possessed by individuals in a labor market area and the associated labor market of employment are important factors in accounting for the spatial variations in the rate of new firm formation (Cross, 1981).
2. Skilled manual workers are more prone to establish their own firms than unskilled or semi-skilled workers as they have acquired the necessary problem solving skills (Lloyd and Mason, 1983).
3. Managerial experience in relation to educational attainment (Gudgin et al., 1979).
4. Managerial experience and higher levels of education can be directly associated with higher levels of entrepreneurship (Storey, 1982; Vivarelli, 1991).
5. These qualifications and managerial expertise create in fact more successful firms (Cooper, 1973; Gudgin et al. 1979; Lloyd and Mason, 1983).

6. Prior knowledge about a market increases the probability of entrepreneur to identify an entrepreneurial opportunity (Shane, 2000, 2003).
7. Experience by previous jobs is the most common source of new business idea (Cooper et al., 1991).

The figure below summarizes all factors influencing entrepreneurial process, according to the literature.

Incentive Factors influencing Entrepreneurial process



Source: Adapted from Moore, 1986.

However, although researchers propose several characteristics for entrepreneurship quality accomplishment, one can observe that all of them bear a common characteristic: '*specific knowledge and prior experience leading to high quality entrepreneurial skills'* (Vliamos, 2009).

However, these incentive models are essentially static in nature, in the sense that they rely on *knowledge* which is a static concept (Best, 1992). They do not take into account *how* knowledge is generated and acquired by the individual entrepreneur and how he makes decisions about actions which shape his entrepreneurial course, i.e. an active process (Hebb, 1949).

Kirzner (1973) in particular, asserts that entrepreneurs are economic agents whose actions are the result of the harmonious cooperation of two factors: a pull factor (profit) and a push factor (alertness). Individuals stay alert guiding their alertness towards fields of interest related to their prior knowledge. This view implies an indirect relationship between prior knowledge and alertness, although there hasn't been any specific reference to the exact sense of 'prior knowledge'. It was only Shane (2000) who at the beginning of the last decade defined prior knowledge as the sum of all knowledge that an individual may possess at a given moment in time. This definition is not operational at all as it does not facilitate any test in experimental environment which tries to determine the influence of *all* knowledge on entrepreneurial discovery. A more recent study treats prior knowledge as '*the receipt of information prior to a specific event'* (Arentz et al., 2013, p. 462). This implies that information is an input in the process of learning that results to knowledge. So, differences in manners in which individuals acquire and transform information (learning asymmetries) have different results on the ability to identify opportunities.

This view seems to fit Holcombe's (2003) position that entrepreneurial activity leads to the emergence of new entrepreneurial opportunity and this helps with the investigation of the origins of opportunity. Prior entrepreneurial activity is the source of entrepreneurial opportunity (1). This statement summarizes what Plummer et. al. (2007, p. 364) characterize as the dominant theoretical framework applied to entrepreneurship research today: the individual-opportunity nexus (ION) (Shane and Venkataraman, 2000, p.218). The ION framework deals with questions related on 'how, by whom and with what consequences opportunities … are discovered, evaluated and exploited'. It argues that opportunities emerge from market disequilibria and people's asymmetries in expectations, beliefs and knowledge. Central to this idea is that not all opportunities for profit are entrepreneurial opportunities as the latter necessitate the

discovery of 'means-ends relationships'. Having said this, questions arise as to the emergence of opportunities, the special features of individuals who discover and exploit them and the actions taken towards this end. (Kirzner, 1973; Shane and Venkataraman, 2000).

In Plummer et. al. (2007, p. 365) we find that

> *''Eckhardt and Shane (2003) refer that several researchers have gone further in identifying several factors able to make opportunities to emerge:*
> *(a) Information asymmetry (Kirchner, 1973),*
> *(b) Exogenous shocks (Schumpeter, 1934),*
> *(c) Changes in supply (i.e. new inputs, new organizing methods and production processes, and products) (Schumpeter, 1934),*
> *(d) Changes in demand (i.e. shifts in culture, perceptions, tastes and preferences (Kirchner, 1979; Schumpeter, 1934),*
> *(e) Market disequilibria (Holcombe, 2003),*
> *(f) Enhancement of production possibilities (Holcombe, 2003),*
> *(g) Prior entrepreneurial activity (Holcombe, 2003).*

By analogy, Corbett (2007, p. 114) citing Hayek (1945), refers that differences in the prior distribution of information in society, result in knowledge asymmetries between individuals. And he concludes '*that knowledge asymmetries exist because learning asymmetries exist. By acquiring information and transforming information in fundamentally different ways,* [it results in] *differences in knowledge that each* [individual] *can use to uncover opportunities'* (p.114). Thus, learning and knowledge asymmetries bring dynamism into the analysis. This is a feature that incentive models listed above lack. The lack in dynamic elements makes them unable to describe the factors that influence individual entrepreneurship's development path. *Changes in thinking* are the main element which permits entrepreneurs to justify their decisions and form their views and judgments concerning their actions.

Recent theoretical research (Vliamos and Tzeremes, 2009) argues that entrepreneurial action is a unique process for each entrepreneur. This study utilizes the concept of *evolutionary epistemology* in a methodological framework which considers knowledge

as a product of changes and selection of processes which characterize evolution (2). Evolutionary epistemology is concerned with problem-solving and error elimination procedures under various forms of selective pressure. Knowledge grows by conjecture and refutation and substantially contributes to the production of new theories which in turn lead to new knowledge and new ideas (3). So, as Popper explains in his evolutionary epistemology theory, since knowledge results in the evolution of better and better theories, adapted through natural selection, they give better and better information about reality (4). Further, we can treat information as an input to knowledge. And since this holds true any acquisition of information by an individual is subjectively 'digested' and processed in one way or another and therefore influences entrepreneurial action in different and sometimes quite distinct ways. In that way entrepreneurship could be successful in the sense that it creates new products, employment, profits, wealth accumulation. However, sometimes it could be unsuccessful leading to business failures. That is, some knowledge may lead to entrepreneurial discovery, while some other may not. Therefore differences in knowledge have different impact across individuals as regard opportunities recognition. In Kirzner's work (2005) knowledge leads to opportunities recognition through the process of alertness.

3. The mechanism of opportunity recognition

A widely accepted definition of entrepreneurship states that opportunities and individuals overlap and produce entrepreneurship. This implies that opportunity recognition is a necessary, distinctive and fundamental entrepreneurial characteristic and most of the times it is the starting point of entrepreneurial action (Gaglio, 1997; Kirzner, 1979; Stevenson and Jarillo, 1990; Venkataraman, 1997). So, entrepreneurship theories state that the successful entrepreneur identifies opportunities where other people see only problems (Ireland et al., 2003; Gaglio and Katz, 2001; Mariotti and Glackin, 2010). Within this conceptual framework, some authors (e.g. see Wickham, 2006) also assert that since an entrepreneur is also a manager (he exercises *entrepreneurial management*) he has to focus on opportunities that are *potentially* valuable and that can be exploited in practical business terms to yield sustainable profits. Along these lines, opportunities are viewed

> *as potentials that come into existence in the external world as a result of changes in the conditions of the society* (Baron and Shane, 2008, p. 84).

Therefore some authors treat an opportunity as an *idea* which works in a business environment:

> *Opportunities emerge from changes in economic, technological, governmental, and social factors*… and that *… when entrepreneurs notice links or connections between these changes, ideas for new ventures may quickly follow* (Baron and Shane, 2008,p. 13).

Some others believe that opportunities might be *problems* (i.e. noticeable circumstances)

> *That seek solutions coming from changes in situations, inventions of something new, necessity to beat competition and, finally, technological changes* (Mariotti and Glackin, 2010, p. 16).

Others, describe opportunities as

> *a favorable set of circumstances that creates a need for a new product, service or business*. (Barringer and Ireland, 2006, p. 28).

So, at any given social and/or economic environment, opportunities 'exist out there' and remain in the dark till somebody traces them and brings them into light by making them ready for exploitation.

However, discovering opportunities to develop a product or service 'not-yet-in-existence' and subsequently creating a venture is a multifaceted endeavor (Corbett, 2007). Therefore, opportunities may be 'discovered' by (a) information that people collect which enables them to build a specific kind of knowledge and (b) the relevant knowledge they acquire that enables them to become entrepreneurs. This implies that more specific knowledge (we call it 'higher knowledge') results to accumulated experience which in turn leads to more and better business opportunities identification.

But as individuals differ among themselves in various aspects such as alertness, knowledge and need for achievement (Kirzner, 1973; Schultz, 1975; Shane, 2000; McClelland, 1965) they acquire and transform information and knowledge in distinctly different manners (Allinson and Hayes, 1996; Kolb, 1984). This means that there has been a growing recognition of heterogeneity among individuals as to their ability in opportunity identification.

An additional explanation about this heterogeneity might be due to the fact that among entrepreneurs there are different degrees of business ownership experience, although there is inconclusive evidence relating this experience to subsequent opportunity identification behavior. (Ucbasaran et al., 2009). There is no doubt that experience can promote or retard opportunity identification and success or failure of past business ownership experience influences subsequent behavior. However, they argue that there is an optimal level of prior business ownership experience associated with superior business opportunity identification and exploitation outcomes, as follows: Experienced entrepreneurs identify more business opportunities, albeit at a diminishing rate as their experience increases. Also, the greater the extent of business ownership experience, the more innovative has been the exploited opportunity, while business failure experience does not stimulate exploitation of innovative opportunities. Further, if failure experience relatively overwhelms more positive experience, the failure experience can reduce the subsequent number of identified opportunities.

The element of subjectiveness seems to be very strong in these arguments. Not only prior knowledge but also how this knowledge is conceived by human capital is the factor that shapes the opportunity identification process. The ability to acquire skills and knowledge brings human capital into the center place of the models developed to explain entrepreneurial behavior. *Education* can be an important source of knowledge, skills, problem-solving ability, motivation, etc. (Davidsson and Honig, 2003).

4. Entrepreneurial Education

During the 40s, F. Hayek in his seminal paper in American Economic Review (1945) explored the role that dispersed knowledge, disequilibria and false prices play in originating entrepreneurial opportunities. Since then, current theoretical and empirical

work in entrepreneurship suggests that the function of cognitive mechanisms interact with the individual's existing knowledge base to constitute important pieces in the puzzle of opportunity identification. A lot of experimental work has been undertaken focusing on the relation of prior knowledge and opportunity identification.

> *An entrepreneur's prior knowledge and experience play an important role in his ability to identify and exploit entrepreneurial (profit) opportunities…* in the sense that …*knowledge and experience* [reinforce] *his ability to direct his gaze to a specific field in which he may identify and exploit entrepreneurial opportunities* (Arentz, et al., 2013, p. 462).

We argue here, that entrepreneurial ability and, hence, process and action is the product of entrepreneurial education (learning process and knowledge) and special kind of knowledge that can be taught in classrooms and/or can be acquired by experience in the market. Both, *knowledge* and *learning* change the way of thinking, shape mindsets and determine behavior. In this way, people become equipped to respond to *ideas* and notice *circumstances,* which they call *opportunities*. Studies (e.g. by Corbett, 2005) have explored the relationship between the learning process and opportunity identification:

> *the investigation of how learning affects opportunity identification is important because, depending on how individuals use their knowledge, it can be either a bridge on the road to entrepreneurship or a detour that takes them on a fruitless path* (Corbett, 2007, p.98).

The present study takes into account the pedagogical findings referred to above, according to which individuals acquire and transform information and knowledge in distinctly different manners. It builds on a theory borrowed from psychology that an individual's ability to identify opportunity depends not just upon knowledge but also upon the way how they acquire and transform their information and knowledge, i.e. learning. So, learning and knowledge are the main attributes that determine how entrepreneurs justify their views (or even their beliefs) and make decisions about actions. This position implies that the art and science of entrepreneurship is an object of curriculum, and there has been a whole body of proposals developed to accommodate it (5). These observations are vital to investigate, formulate and evaluate a knowledge based oriented process in a problem-solving framework. Now, by accepting that

opportunity (a) is a favorable set of circumstances that creates a need for a new product, service or business, and that (b) it arises mainly by specialized knowledge and information that people can find, perceive and acquire, we end up with the view that *entrepreneurial action is based not only on the quantity of domain-relevant knowledge but also on the way this knowledge is organized to become more functional and efficient.*

Therefore, we argue that the emerging 'knowledge-based view' on entrepreneurship action can be thought of being an extension of the 'resource-based view' as it represents a confluence of long established interests in uncertainty and information with several streams of newer thinking about the nature of entrepreneurship. So, we easily accept that *knowledge and the learning process are the basic sources of opportunities identification* and as such they are the most strategically important of firms' resources. At the same time, knowledge is central to several quite distinct research traditions, notably organizational learning, the management of technology, and managerial cognition (6).

King and Kinchener (2004, p.5) make three observations to describe how knowledge is generated and how people perceive it:

(a) There are striking differences in people's underlying assumptions about the nature and origins of knowledge;

(b) These differences in assumptions are related to the way people make and justify their own judgments about ill-structured problems; and

(c) There is a developmental sequence in the patterns of responses and judgments about such problems.

Therefore, we conclude that the entrepreneurial process, which is mainly a human behavior, is knowledge-based oriented process. This process involves all functions and activities associated with perceiving opportunities and creating organizations to pursue them (Bygrave, 2004). So, these three observations are vital for formulating, evaluating and investigating this process.

Research undertaken in various European Universities (Tegtmeier, Vliamos, et al, 2009) supports the validity of entrepreneurial education. Distinguished scholars based

their views on these findings and agreed that entrepreneurship can be taught as part of a systematic curriculum in classrooms like any other topic on administrative and business studies (Knight, 1991; Kuratko and Hodgetts, 1995). A more recent research undertaken by a team of experts under the present author (Vliamos, et. al, 2003) among 164 young entrepreneurs in the Region of Thessaly in Greece identified three types of factors which affect entrepreneurial action. These factors facilitate the *development of the idea* and foster entrepreneurial *action*. The study concluded that factors like *education, learning process, former experience* and *skill acquisition* (the authors call them 'type A – factors') can be taught in classrooms, while others, like those of *economic and social environment* (type B– factors) as well as *psychological factors* such as *tendency for independence* and *the like* (type C – factors) concern initiatives not entirely controlled by the individuals and can be only partially caused by external influences. Therefore, entrepreneurship can be developed within broader pedagogical programmes of academic and vocational training and amplify the capacities that individuals already bear (Gnyawali and Fogel, 1994) (7).

Conceptual problems which might arise in entrepreneurial pedagogy can be overcome by the use of the concept of *'readiness'* in the process of development of the curriculum (8). In the present context the concept of 'readiness' is not limited to the concept of capacity only, but it takes a broader, more flexible and dynamic (rather than static) meaning, oriented towards 'process' and the continuous evolution and mobility. This approach allows us to reach the complex conception of the dynamic process of learning at a higher level. It also requires an understanding of the differences between *emotional, volitional* and *cognitive* structures of personality and intelligence (Snow, et al., 1996; Ruohotie & Koiranen, 2000).These three types of intellectual functioning are considered as interactive elements that define human intelligence and personality. Human personality itself refers to all those factors that distinguish a person as an individual, a special human being. On the one hand, it includes the ability *to undertake* activities that are difficult, complex, demanding, targeted, socially remarkable and original and on the other, the ability to *complete* these activities in situations that require concentration and control of his emotions. These two types of skills have to do with quality elements which are identified in entrepreneurial knowledge. Maybe that is why some admit that entrepreneurship is neither a profession nor a career, but "*a cognitive, emotional and volitional process that aims to increase values through*

creation, revitalization and / or development'' (Ruohotie and Koiranen, 2000). This definition refers to views that have been considered essential to entrepreneurial learning as modes of action, feeling, perception, communication and organization. Assuming that the man is a living being who comes to interaction with the world, then he causes a confrontation with the world. This is how concepts, feelings and interests arise. And in this process knowledge is created and controlled by its consequences. So, emotional, volitional and cognitive structures are combined in a dynamic and interactive process resulting in the formation of values which are key elements to the development of views (9).

5. Behavior and entrepreneurship action

The literature reviewed so far, implies an important question which can be expressed in two different ways: (a) *do some people need to find opportunities to act entrepreneurially* and (b) *why some people are more entrepreneurs than others.* The second question implies another one: *To be an entrepreneur how necessary is first, to identify and then to exploit the opportunity?* If we accept that opportunities identification is the key factor to entrepreneurship the two questions have definitive answers, i.e. those who recognize and exploit opportunities are better entrepreneurs than the others who cannot identify them. It is certain that opportunities induce entrepreneurial actions. However, Bjerke & Karlsson (2013, p.6) argue that,

> *''the desire to start a business comes more often before the emergence of a business opportunity and the opportunity recognition presupposes the existence of (1) a good business plan, (2) the possession of entrepreneurial skills and (3) rationalization of entrepreneurs''.*

In line with this argument, the present paper asserts that identifying and exploiting opportunities is different from behaving and acting entrepreneurially. It is easier for the experienced entrepreneurs to trace an opportunity and turn it into action, while this does not normally apply to non-experienced and novice ones. This implies that usually entrepreneurship mindset and skills are the necessary elements for entrepreneurial activities and they, in turn, are the necessary elements for spotting opportunities.

This position fosters the argument developed above, that (a) higher knowledge and (b) the ability to acquire information is needed. However, not only knowledge but also continuous education, *a learning process,* i.e. what we have called *dynamism in process,* leads to *expertise* (Corbett, 2007). By definition then,

> *''Experts possess a greater quantity of domain-relevant knowledge than do novices. However, it is not merely the fact that experts have more knowledge that is important; field and laboratory research studies have found (and it is more crucial) that experts have their knowledge more organized in ways that make the way to specific information more accessible, functional and efficient''* (Bedard and Chi, 1992).

Therefore they perform better than novices in domain-related tasks. This kind of knowledge results in problem-solving behaviors, which lead to problem representations, problem-solving strategies and a better quality of decisions. However, Bedard and Chi (1992) conclude that one of the characteristics of expertise is that it is task specific, in the sense that if the acquired knowledge through a learning process (information flow) contributes in making individuals experts in one domain (i.e. high level proficiency in one domain, in authors' terminology) then the transfer of information in other domains will not help to attainment of the same level of proficiency in those other domains. Within a specific domain though, there is transfer from one task to another without any reduction to the level of proficiency of the individual. Since learning results to the construction of conditional rules in one task, then the transfer of learning from one task to another means the construction of a different set of conditional rules and this weakens individuals' ability and efficiency to identify entrepreneurial opportunities. This implies that the learning process should be designed to fit specific curricula which in turn fit specific tasks.

6. Conclusion

The development of entrepreneurial mindset is a challenge and a goal which requires an in-depth investigation of the learning processes in meta–level, because the key factors are related to meta-cognitive processes and procedures on motivation and behavior. These processes being the core of entrepreneurial pedagogy, aim at influencing the values and attitudes of the individual. This assumes the deep

understanding and support of active participation on the part of the individual in the learning process (the ultimate application of methodological individualism), which involves research on self-regulatory processes and auto-reaction (Masui and De Corte, 2008; Ruohotie, 2000).

This paper's contribution is towards understanding the knowledge – opportunities – entrepreneurship mechanism and therefore the role of opportunities in the entrepreneurial process. But the deep understanding of a phenomenon as complex as opportunities discovery or creation, it is necessary not only to place it within a conceptual or theoretical framework that can describe the phenomenon adequately, but this framework should be empirically validated, through systematic investigations that look at the nature of phenomenon and its outcomes. These investigations should use case studies that include field research in cognitive and pedagogical sciences through epistemological approaches, as well as data analysis and their statistical relationship. Epistemological approaches would investigate the origin, nature, methods, and limits of human knowledge and how this can be used to form mindsets, behaviors and decision making processes. That is, looking at it from the point of view of the individual – entrepreneur, the undergoing research should rely on pedagogical approaches which would provide the chance to the individual to make inferences on how he could reveal opportunities which will lead to entrepreneurial action. Investigations through case studies will help to gain a deeper understanding of the role of opportunities in entrepreneurial decision making.

The implications and possibilities for pursuing research on opportunities identification and their relation to knowledge and entrepreneurship action are far-reaching. Clear understanding of this mechanism, offers the possibility of helping to understand the way that make people think and act entrepreneurially. Furthermore, findings from further research may offer potential intervention for those seeking to increase the quality of their entrepreneurial action and expand their activity to gain benefits in the twenty first century.

7. Notes

1. A similar idea, although it goes much further, has been recently developed by Acemoglu and Robinson (2012) who argue that technological breakthroughs are realized through innovation, ' ... spearheaded by new entrepreneurs and businessmen eager to apply their new ideas' (p. 32). By the same line of argument they further assert that it is striking that in USA innovators have been people 'from all sorts of background and all walks of life, not just the rich and the elite' (p. 33).

2. This term was first used by Donald Campbell to characterize Karl Popper's 'Epistemology' in order to point out the fact that Popper's theory on human knowledge was constructed on Darwinian evolution of natural selection. In Popper's own words, epistemology is the English term for the theory of knowledge, especially the scientific knowledge. It is a theory that tries to explain the status of science and the growth of science. (Karl Popper 'Open Questions on Quantum Physics', Public Lecture given in Bari, Italy on May7, 1983). His theory encompasses all forms of learning and problem-solving in the sense that every organism, from the amoeba to Einstein, is constantly engaged in problem solving.
Epistemology, therefore, is a meta-theory of the scientific approach since its object of study is not reality (this is the study matter of sciences) but sciences themselves. Epistemology is the study of knowledge and justified belief. As the study of knowledge, it is concerned with the following questions: What are the necessary and sufficient conditions of knowledge? What are its sources? What is its structure, and what are its limits? As the study of justified belief, epistemology aims to answer questions such as: How we are to understand the concept of justification? What makes justified beliefs justified? Is justification internal or external to one's own mind?
Understood more broadly, epistemology is about issues having to do with the creation and dissemination of knowledge in particular areas of inquiry. As a theory of knowledge it contrasts with most theories of knowledge that are concerned with the foundations of belief or the probability of theories. 'The Stanford Encyclopaedia of Philosophy'.

3. The central motif of Popper's evolutionary epistemology is the four-step problem-solving schema:

$$P \rightarrow TS \rightarrow EE \rightarrow P$$

The starting point is a problem, which evokes tentative solutions. These are subjected to the process of error elimination by way of critical discussion and experimental testing. In the course of these activities new problems emerge.

4. G. Tarozzi A. van der Merwe (eds.), 'Open Questions on Quantum Physics', May 1983, p 395 – 396.

5. For an excellent collection of pieces of the relevant literature, see Kyro & Carrier, 2005.

6. Moreover, the issues which concern the knowledge-based view extend beyond traditional theories of strategic management, strategic choice and competitive advantage, and address some other fundamental issues of the theory of the firm, notably the nature of coordination within the firm, organizational structure, the role of management and the allocation of decision-making rights, determinants of firm boundaries, and the theory of innovation (Grant, 1996).

7. It is known that potential entrepreneurs bear certain characteristics which are acquired either by birth or during the first years of their life (Sexton, 1982).

8. Although the definition of 'readiness' varies depending on the context in which it is used, traditionally it is defined in terms of skills and characteristics of students who relate to the specific curricula and seek the conquest of cognitive objectives, as defined by those programs (La Paro and Pianta, 2000; Lewit and Schurann Baker, 1995). Readiness is also seen as a skill set, as a process, as a set of relations and as a multidimensional construct which relates to the family, school and social environment (Blair, 2002). Professor Paula Kyro of Aarhus University made some very useful comments on this topic at an earlier draft and helped me shaping my mind. I thank her a lot.

9. I am very grateful to my good friend Professor Paula Kyro for making clear all these concepts for me during a long discussion at Université de Paris Dauphine one afternoon after a PEER meeting:
The cognitive structure contains elements that assist knowledge in two ways: It specifies (a) how these concepts are linked and (b) the ability to apply this knowledge.
The volitional structure is divided also into two parts: motivation and will. Motivation includes setting the goals pursued, the need to achieve results, fear of failure, self-esteem and consolidation of faith in abilities of the individual. Will includes perseverance, desire for learning, completion of the learning process, effort, and inherent processes of obedience to the settings as well as the various assessments and audit strategies. So, both factors are essential in entrepreneurship education. From a social perspective, the volitional structure dictates the 'orientation' of us to the goal.
Finally, the emotional structures contain two features, as well: temperament and emotion. The first lasts longer, many times throughout the life of the individual and contrary to the second, it does not depend on the current situation of the individual. If emotional structures are in all situations and every person has his own idiosyncrasy that does not depend on the current situation, then you cannot isolate the elements from the learning situation. For example, research on fear of failure showed that it is deep-rooted in the concept of emotion and temperament. Similarly, the need for achievement may also be considered from the perspective of emotional structures. At a deeper level, emotional structure is associated with values and perceptions. That is, what we think of as valuable guides in our lives, the willingness and interest in learning. Therefore, the emotional structure is as fundamental to learning as it is the volitional.

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