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BARRIERS TO INNOVATION IN SMES: AN INTERNATIONAL COMPARISON

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Abstract: *The Portuguese business frame is mainly compounded of small-sized companies, namely small and medium enterprises, which represent 99.99% of all Portuguese firms. This reality is common to other countries and makes it relevant to study their behavior and attitudes towards competitiveness and sustainability. The present study proposes to inquire about the issue of barriers to innovation in the following circumstances: what are the barriers faced by domestic companies, how do they deal with and overcome them, and finally what is the importance of each barrier. The research identifies the main barriers in the companies surveyed which revealed as of extreme importance the current economic climate and showed the similarities between the barriers revealed in Portugal and barriers to innovation on other countries where similar studies occurred.*

Keywords: *Innovation Barriers; SMEs; Economic Sustainability; Portugal.*

1. Introduction

The importance of innovation for the survival and competitiveness of organisations is an undeniable fact. The explosion of shared information, the growth of a more globalized economy and the rising crisis has changed the rules. Companies must conduct innovation processes to ensure sustainability and promote prominent positions in their markets.

New technologies, new products, new services, whole new industries have emerged. Since the Industrial Revolution, businesses rely upon technology as a driver of their progress. Innovation, understood as the

sustainable implementation of improvements and new ideas, depends on other factors rather than this breakthrough technology, despite the fact that the technological improvements have provided consistently, in the past, opportunities from which were made and sold products and enhanced services (Dearing, 2000).

The economic environment is an ever-changing reality. Firms are driven to react as fast as they can as the speed and intensity of events make this concern a critical condition for their permanence in market. The global markets and high-speed technological improvements have changed the competitive environment, making it more complex, more uncertain and forcing change in organisations.

Crisis forces to peep into short-run problems, the immediate future. All the same, firms cannot forget that today's decisions have impacts on the future. Also true is the existence of more space for small and medium enterprises (SMEs) with innovative spirit, to stand out. The deepening crisis since 2007 and the competition in the current world market, where emerging economies grow faster than the others, require European countries to puzzle out products and services of higher quality and more innovative (Cordeiro, 2011).

Are companies prepared for this stage? What sustains the survival and sustainability of European SMEs, and especially the Portuguese ones?

Thus, the urgency and relevance for the companies, whatever the market in which they operate, to drive process improvements or changes involving their future sustainability is the current theme. The question that every business faces is in which way, using which tools

and applying what attitudes and actions, will promote this claim.

Overlooking at Portugal, the country never needed so much its firms to be able to compete externally. Enterprises know that the call for innovation is more intense than ever.

The paper is structured in the following way. First it is drawn a critical literature review on topics such as innovation and barriers to innovation. Then a description on the goals is made. Subsequently, the methodology followed is explained. The section presenting the results acquired comes after, revealing the firms innovative attitude and the barriers identified. Lastly the conclusions attained are disclosed.

2. Literature review

The Portuguese entrepreneurial is mostly composed of small and medium-sized firms. According to the European Commission 2003/361, SMEs are companies with less than 250 employees, turnover of up to 50 million and a total balance sheet less than 43 million euros.

According to the National Statistics Institute (INE, 2011), the number of non-financial corporations in Portugal at the end of 2009 was 1 060 906. Only 888 of them employed more than 250 workers (about 0.0837% of total). On the other hand, the number of companies that have less than 10 employees reaches 1 014 103 (95.59%). This data for the year 2009 reflects a national and international trend and supports the importance of this study on SMEs.

Schumpeter (1939) portrays the importance of innovation for long-term profitability, considering innovation as a process of "creative destruction." To the author innovation creates competitive advantage by avoiding changes in the achievement of the balance, through the destruction of businesses and business models.

According to Fernandes, Noronha and Nicolas (2002), the turbulence that characterizes the current socio-economic environment, driven largely by the imperatives of increasing innovation at various levels, maintains the most effective strategies of business as those that make the technology a privileged "weapon".

As Carayannis, Popescu, Sipp and Stewart (2006), SMEs are characterized by their ability to react quickly to changing market conditions, which represent a competitive advantage. In addition, SMEs are recognized by their growing participation in terms of employability and development of output. Notwithstanding that fact, SMEs suffer from lack of technology adoption as standard practice, despite their greater tendency for product innovation after applying technological innovation processes.

However, SMEs, according to previous authors, face critical economic challenges such as increasing competition driven by globalization, restrictions on access to finance, developed networks with foreign partners, imperfect access to the transfer of research results and technology, speed of change in the technological environment, and the uncertainty of sustainability.

For Tidd and Bessant (2009) organisations with more success in the market are leading innovation. Despite the competitive advantage could result from the size or ownership of assets, among others, there is favoritism, increasingly, to organisations that mobilize knowledge, technological skills and experience to the creation of novelty. This innovation is reflected in their offers and / or the way they create and integrate them in the product range. The theme of survival / growth raises the problem for established firms but provides a huge opportunity to rebuild the new rules of the game.

To Demirbas (2010) SMEs hold an important role in national economies because of their number and engaged workforce. However, despite recognizing its importance, some key barriers to innovation for SMEs prevent them to succeed in driving innovation processes.

Therefore the world faces enormous challenges. The impact of the crisis will extend over the next years. In general, the measurement of welfare is based on the Gross Domestic Product (GDP) per capita, and changes in welfare can result from changes in labor productivity (GDP per hour worked) and labor utilization (hours worked per person employed). The erosion and deceleration of labor productivity growth performance

is already a pre-crisis (2007-08), which makes it even more imperative for countries to find new and sustainable sources of growth.

Portugal follows the same trend. According to OECD statistics on Productivity (2009), between 2001 and 2007, GDP per capita grew, by about 0.3% annually between 2007 and 2008 and about (-) 0.3% per year. It could already be noticed, in labor productivity, from 2001 to 2007 the growing at an annual rate of 1.1%, while from 2007 to 2008 it grew by about (-) 1.4% per year. More even, the use of manpower, at an annual decrease of 1% between 2001 and 2007, and an increase of 1% from 2007 to 2008. This reading supports and corroborates the existence of resources accompanied by a low productivity promoted by their use.

Undoubtedly, innovation is a key required for improving productivity, growth and business sustainability. Given this environment, knowledge of the factors that lift innovation is the key. This study identifies and presents the barriers to innovation perceived and experienced by the Portuguese companies who participated.

To Pinheiro (2002) organisations dealing with change, uncertainty, instability, competition in a systematic way should be alert to breaking barriers and stimulating actions that maximize the opportunities for the emergence of innovations.

According to Smith (2005), innovation is something new. It's creating something new through processes of learning or knowledge. Madrid-Guijarro, Garcia and Auken (2009) found that innovation is widely recognized as a key factor in the competitiveness of nations and companies. Small businesses that do not embrace innovation in its business strategy take the risk of becoming uncompetitive due to their obsolete products and processes. Innovative companies are a prerequisite for a dynamic and competitive economy. For these authors, the importance of innovation is mounting as a result of increased global competitiveness, reduced product life cycle, increase of the technological capacity of companies and rapidly changing consumer requests. The study of innovation and innovative attitude of businesses is relevant in this

context as a critical factor for the sustainability and survival of businesses. It becomes even more important noticing the facts that prevent companies, even after recognizing this need to be innovative.

Hadjimanolis (2003) claimed that there are factors or constraints that inhibit innovation: barriers to innovation. The study of the barriers to innovation focuses on the problems that can occur throughout the complex and delicate process of innovation. These factors, which place obstruction or inertia in innovation, termed barriers to innovation, can arise for various reasons. The identification and categorization is fundamental since it will create mechanisms to reduce its existence, minimizing them, deleting them or converting them into facilitators of innovation.

For most authors their categorizations divide into internal and external barriers (Piatier, 1984; Hadjimanolis, 2003; Madrid-Guijarro, Garcia and Auken, 2009; Stanislavsky and Olczak, 2010). Internal barriers are those that arise inside the company and external barriers, those that arise from the external environment. This classification is also assumed in the course of this study.

Piatier (1984) describes the lack of government support as an important barrier to innovation in the European countries analyzed. The study conducted for Accenture by the Economist Intelligence Unit (2007) over a population of six hundred and one senior managers revealed the following barriers to innovation: (1) the necessities related to the frequency, timing and speed of innovation; (2) the organisational culture mutation and reducing time to market as a permanent challenge in the assumption of innovation objectives and (3) the Chief Executive Officers (CEO) of full age have a greater departure from the view against the goals of innovation and innovative capacity of the organisation. In addition to this, evidence, pointed out the following additional barriers to innovation reported in order of importance (higher to lowest importance within companies surveyed). Firstly, the organisation seeks to follow the current line extensions rather than developing new business models. Next, the organisation assigns top priority to short-term rather than long-term investments. Furthermore, opportunities to explore

untapped markets or areas die for lack of those who foster. Additionally, the entity seeks for the next "chicken with golden eggs" rather than pursuing a portfolio of opportunities. And finally, the organisation does not include in the learning process the past error modified due to a growing aversion to risk on new ideas.

Baraňano (2005) revealed two barriers to innovation when conducted a study on five Portuguese SMEs. The barriers are the lack of qualified human resources and a huge absence of external communication between the knowledge generators (Universities and Investigation Institutes).

Janeiro (2009) sentenced that some Portuguese firms face some obstacles. The crisis arrival and the difficulties that followed it brought about the question on why Portuguese firms react so late. Why do they not innovate? As the author states, they deal with some innovation barriers, as described: (1) the organisational structure, as well as the climate; (2) the culture and strategy resistance to change; (3) the tradition and cemented rules; (4) the market leadership and the absence of rethinking on it; (5) the additional work brought by change, and finally, (6) the weak repay on risk assumption. The same author reinforces that these barriers are cognitive and are not materially or technologically evidenced.

Fernandes, Noronha and Nicolas (2002), conducted a study that related the localization and innovation dynamic of SMEs in Portugal. The main barriers acknowledged were the structure of the Portuguese entrepreneurial, the low formal investigation due to paucity on human and financial resources.

Cardoso, Lima and Costa (2004), promoted a study on organisational barriers to the introduction of new technologies. The results reported in that study showed that the leading opposition to new technologies is structural in nature. So, innovation faces barriers not only inside but outside the organisation. In others words, the cost structure and also the consumers.

The observation of the Portuguese business community in order to understand the longevity of companies allowed to establish the following barriers to

innovation: (1) the high economic cost and risk associated with innovation; (2) the lack of funding; (3) the organisational rigidity; (4) the lack of skilled human resources; (5) the lack of market information and technology; (6) the government regulation and (7) the weak capacity to approach the client (Silva, Leitão and Raposo, 2007), as well as the lack of cooperation with centers of learning (Vieira, 2007).

According to Nabo (2008), innovation plays probably the most relevant play, in the context of economic and social development. Portuguese companies need above all, a culture of sustained innovation. While this does not happen, they should not be surprised to find that the majority of managers believe in the importance of innovation, but only 40% of them practice it.

The same study conducted by Strategos Iberica also revealed that 46.7% of enterprises recognize the future importance of innovation. For 40%, it is a survival condition, to 12.6% of the companies it is important and only 0.7% refer to it as not being a priority investment. In summary, this study demonstrated the need to work to systematize innovation, namely to meet the challenge of innovation with a structured approach that allows innovation to happen. The barriers to innovation, of greater expression, identified in the above study were the focus in the short term, the lack of a systematic approach, the lack of national culture of innovation, the lack of resources, the lack of metrics on the impact of innovation, the competition for resources within the organisation, the management that is not innovation-driven, the country and market size, the innovation as a consequence of R&D activities, the lack of incentives and the fear of failure.

Madrid-Guijarro, Garcia and Auken (2009), studied the barriers to innovation faced by Spanish SMEs. Those are: (1) the external environment; (2) the human resources; (3) the risk and (4) the financial position. The authors also conclude that the cost of innovation affects more, small and medium-sized enterprises, and that different barrier promote different impacts on different types of innovation.

Also referring to the Spanish reality, Segarra-Blasco, Garcia-Quevedo and Teruel-Carrizosa (2008) present

the barriers to innovation in Catalonia. The Barriers to innovation identified are: (1) cost barriers; (2) knowledge barriers and (3) market barriers. With regards to cost barriers are presented the high cost of innovation, and the lack of internal and external funds. The knowledge barriers are the lack of qualified staff, the low information on technology, the poor information about markets and the difficulty in finding partners. Finally, market barriers cited are the market dominance by the incumbent, the uncertainty of demand and lack of demand for innovation.

The UK companies face three main barriers to innovation: (1) the time of development of innovation; (2) the risk aversion and (3) the poor market knowledge (Tovstiga and Birschall, 2007).

The German reality shows as being the more frequent barriers: (1) the low budget; (2) the difficulty in recruiting adequate human resources; (3) the bureaucracy and (4) the poor cooperation between enterprises (Tiwari and Buse, 2007). Buse, Tiwari and Herstatt (2010) also emphasize the lack of the target market, bureaucratic constraints, and inability to find or decide for the better partner for strategic cooperation.

A study carried over SMEs in Cyprus showed the following conclusions: the internal most significant barriers are: (1) the lack of time; (2) the inadequacy of the R&D activities; (3) the design and testing within the company and also (4) the financial resources inadequate (Hadjimanolis, 1999). The author also identified the more expressive external barriers to innovation: (1) the ease of copying the innovation; (2) the government bureaucracy; (3) the lack of government support; (4) the lack of qualified human resources policies and (5) the bank lending.

Demirbas (2010) conducted a study on barriers to innovation in Turkey and reached some conclusions as follow. The entrepreneurs who are innovative are those with greater perception of barriers to innovation. The results show as barriers to innovation in Turkey: (1) the lack of state policies to support technology and R&D activities; (2) the negative impact of the economy in the level of investment; (3) the high cost of innovation; (4)

the lack of appropriate means of financing and (5) the lack of qualified personnel.

Necadova and Scholleová (2011) identified as barriers to innovation in the Czech Republic the items described: (1) the high cost; (2) the lack of specialists; (3) the payback period of investment extremely long; (4) the equipment technology; (5) standards and legislation; (6) lack of capital; (7) the lack of consumer response; (8) resistance to change; (9) the fear of risk; (10) ignorance of the market and (11) the infrastructure of the business.

According to Comtesse, Hodgkinson and Krug (2002) the Swiss business sector faces the following barriers to innovation. The cultural level, are: (1) risk aversion; (2) public complacency; (3) non-recognition of high-value innovation; (4) the provincialism and (5) closed networks. In educational level are: (1) the inability of framework tools for innovation in education; (2) limited human capital; (3) the absence of functional models and (4) the lack of entrepreneurial mindset. At the political level: (1) poor access to financing; (2) legal barriers; (3) insufficient political vision and growth; (4) the infrastructure and intellectual capital and underutilized and (5) too many restrictions on the innovation.

In France, as showed by Galia and Legros (2004), the Community Innovation Survey 2 pointed out nine innovation barriers. Namely, (1) the high cost on innovation; (2) the nonexistence of appropriate sources of funding; (3) the internal resistance to change in firms; (4) the too much relevance attributed to economic risk; (5) the lack of qualify personnel; (6) the insufficient information over technology; (7) the low information about the markets; (8) the level of legislation, regulations and standards, and (9) the lack of commitment of the costumer with new products.

Noting the Italian case, Iammarino, Sanna-Randaccio and Savona (2006), the barriers faced by firms are: (1) the lack of funding sources; (2) the excessive financial risk; (3) the innovation costs dimension; (4) the inexistence of qualified human resources; (5) the low information about the markets; (6) the scarce information on technology and (7) the rigid regulatory.

In Brazil, Mussi and Spuldaró (2008) studied the following barriers to innovation: (1) the risk associated with excessive specialization of human resources; (2) the super enhancement of production processes or services by its practitioners; (3) the limitation in the allocation of financial and human resources and also (4) the limitation on market access (for example concessions).

Alinaitwe, Widen, Mwakali and Hansson (2007) on their study about innovation barriers on the civil construction activity in Uganda, identified the following barriers described in importance order: (1) the domestic market dimension; (2) the security level; (3) the governmental intervention; (4) the taxing on new products or services; (5) the lack of accession to international markets and (6) the discouraging policies of labour mobility.

Lim and Shyamala (2007), found in Malaysia the same barriers to innovation as Silva *et al.* (2009), in Portugal.

Observing the Iranian case, Kamalian, Rashki and Arbabi (2011) unveiled as barriers to innovation: (1) the excessive economic risk; (2) the insufficiency of economic resources; (3) the unavailability of funds and (4) the high cost associated with innovation. The authors also divulged the lack of response by the consumers and the lack of qualified personnel.

3. Goals

Due to the great contribution of the innovative activities to firm competitiveness and success, it is of great interest to identify the barriers and obstacles that prevent innovation in firms.

The objective of studying the barriers to innovation relates to the discovery of its nature, origin and significance. It is equally relevant to group them and try to understand their effects on innovation processes. Even more important is to identify ways to mitigate their negative effect, enabling organisations to overcome the negative impact resulting from its existence. Having identified the barriers or inhibitors of innovation, it may take measures that will lead to their elimination, favoring the flow of innovation in the circuit of companies.

The present investigation pretends to answer the following questions: (1) What barriers to innovation do Portuguese enterprises face? and (2) What is the similarity between the innovation barriers disclosed by this research and the revealed in others studies that have been carried out before?

The current study reports the results of a study that examined barriers to innovation among a sample of forty five Portuguese firms.

4. Methodology

The data for this study was gathered from two questionnaires surveyed to a sample of forty five enterprises.

The surveys were sent by email to managers which answered the same way. In this questionnaire the firms were asked to present their perception about their own innovative attitude. The questions aimed at recognizing what prevents firms from innovating, if mainly internal or external factors. Subsequently the CEOs should point out what are the main refrains of innovation identified in the internal and external environment of the firm, in other words the innovation barriers faced. The studied firms were also asked to show what is easier to overcome if internal or external innovation barriers.

In the first questionnaire the main concern was not to influence the firms on their answers and letting them present their own convictions. The first group of questions intended to characterize the firms on dimension, geographic headquarters and activity. The dimension follows the European recommendation making it possible to compare the results with those obtained in others studies in other countries.

After collecting this data a second questionnaire was surveyed and the main goal was to determine if firms faced the barriers obtained in the first questionnaire and what level of importance, they recognized, as preventing innovation.

The sample is the same and the CEOs had to sentence if they felt the barrier and if so, what relevance (using a Likert scale) they recognize, so that the relevance of the barrier was known. Furthermore, firms were asked to

declare where they felt these barriers. At last, compare the results to the ones obtained in the critical review of literature.

5. Results

Lengthways the course of this investigation appeared interesting results on the topic of innovation. The surveys conducted counted with the participation of forty five companies. Four are large companies, eight medium-sized enterprises, twelve small companies and twenty one micro enterprises. The companies' headquarters are located in the cities of Braga (five), Bragança (two), Lisbon (one), Oporto (thirty six) and Viana do Castelo (one) and develop a wide variety of activities such as farm activities, wholesale traders, retail traders, manufacturers and service providers.

When asked about their attitude towards innovation, 53.3% state to hold it and 46.7% that they do not promote this innovative approach. Whether taking an innovative approach or not, companies have identified the most significant barriers to innovation faced. For 57.77% of those surveyed both the internal and the external barriers are significant, while 33.33% of the companies pointed out internal barriers as most important, and 8.88% declare to face only external barriers. Additionally, 80% of the companies said they were more successful in overcoming the internal barriers, this means facing and dealing with the barriers to innovation that emanate from within the company.

Fifty barriers named by participants were listed. The same sample of companies was asked to designate those which are recognized as obstructing the process of innovation and afterwards to provide them a degree of importance in obstruction. For this purpose we used a Likert scale of six levels (reduced, little, some, enough, lot and huge).

The more alluded barriers were: (1) the current economic climate; (2) the limitation of monetary resources; (3) the reduced risk-taking culture; (4) the mechanical performances; (5) the routine and cemented processes; (6) the organisational and human resources resistance to change; (7) the lack of incentives and compensation for innovation; (8) the high cost of

new tools and processes; (9) the small size of the company and (10) the owner's profile of leadership and risk taking.

Heeding the importance attributed to the barriers showed that those with higher degrees of obstruction to the recognition of innovation do not match with the most universally cited by the companies. However, a common factor to most difficult barriers to overcome is that they arise from the external environment of companies. This finding enables the firms to better understand the difficulty in managing the barriers for the reason that they do not depend on the performance of the company.

Overlooking at the international reality it is noticeable the existence of common barriers to innovation. When starring at the different studies conducted over the Portuguese reality the common barriers are: (1) the resistance to organizational change; (2) the resistance from human resources to change; (3) the high cost of innovation; (4) the scarcity of monetary resources; (5) the low risk taking culture and (6) the routine and cemented procedures and practices.

Extending the scope of analysis to the Spanish case the barriers shared with the present research are: (1) the lack of funding; (2) the low culture of risk assumption; (3) the resistance to change from human resources and (4) the high costs of new facilities and processes. Continuing this analyse to the French reality the (1) insufficiency of monetary resources; (2) the low risk taking culture; (3) the organisational resistance to change and (4) the high costs of innovation are the perceived barriers to innovation felt by the participators in this research and on the previous French studies. Going along with this comparison and observing the Italian case, the mutual barriers are: (1) the limited monetary resources; (2) the deficient risk culture and (3) the cost of innovation.

Stepping forward to Germany the only barrier to innovation that firms face as well as the Portuguese ones is the lack of monetary resources. Likely with Germany there is only one barrier common to those observed in the United Kingdom and in the present study, namely the low taking risk culture. In the Swiss

case, two barriers are shared with the current study, being (1) the lack of monetary resources and (2) the low risk taking culture. Concerning the Cypress reality only the inadequate monetary resources are pointed out just as in Portugal. The Turkish evidence disclosed three common barriers: (1) the limited monetary resources; (2) the absence of incentives to innovation and (3) the high cost of innovation.

To conclude the European round, examining the Czech Republic several barriers are faced by Portuguese and Czech companies, such as: (1) the limited monetary resources; (2) the low risk taking culture; (3) the organisational resistance to change; (4) the human resources resistance to change and (5) the high costs of innovation.

In what regards to countries outside Europe the most perceived barriers are: (1) the difficulty to lead with change in the organization; (2) the human resources to change; (3) the weak capacity to lead with risk and (4) the short funding.

Globally it can be concluded that there are huge similarities in the barriers observed through this study and others carried before in other countries. Furthermore it pointed out two different and new barriers: (1) the owner's profile of leadership and risk taking and (2) the actual crisis climate.

6. Conclusions

The results brought by this study revealed the barriers to innovation faced by the participants, namely the current economic climate, the limitation of monetary resources, the reduced risk-taking culture, the mechanical performances, the routine and cemented processes, the organisational and human resources resistance to change, the lack of incentives and compensation for innovation, the high cost of new tools, the processes and the small size of companies and the owner's profile of leadership and risk taking. It also allowed the acquaintance of barriers importance perceived by firms, and made it possible to understand that some factors born outside the firm are considered more difficult to overcome and the more important barriers that firms face.

Innovations reflect a critical way in which organisations react to the challenges they face. Knowing their perception of the innovation barriers is an undeniable advantage to promote their maintenance in the market. The results show that companies consider themselves not to be very innovative, that they essentially face internal and external barriers. And also those external barriers are more difficult than internal ones to overcome.

The conclusions reached by the study can help firms overcome problems along innovation process, give information for their CEOs to conduct innovation process in a different way, and help firms understand what is wrong in their innovation process. Mainly, what needs to be improved, where are they spending their resources sometimes without obtaining return, and what are the more frequent barriers they face. By doing so, they are free to spend their time and resources in other themes over the corporation. It also helps spreading innovation.

It can also be achieved that the barriers felt on the innovation process on different countries are similar.

Despite all the work that has been developed, the authors will extend the study to further SMEs and enlarge the sample in order to obtain other valuable information and continue lightning the innovation path.

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