

Barriers to innovation amongst small and medium-sized enterprises (SMEs) in Portugal

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Abstract: The importance of innovation on the survival and competitiveness of organizations is an undeniable fact. Small and Medium enterprises (SMEs) represent 99,99% of all Portuguese firms. This reality is shared by other European countries and therefore it is relevant to study their innovative behaviour and attitudes in order to achieve competitiveness and sustainability. The present study inquires about barriers to innovation, namely, what are the barriers faced by domestic companies, which barriers are easier to recognize and overcome and what is the level of importance they have on the firm point of view. The course of the investigation consists primarily in undertaking literature review on topics such as innovation, barriers to innovation, SMEs, strategy and competitiveness. The theoretical support, resulting therefrom leads to the building line of work that is embodied in two surveys. The results achieved made possible the creation of two new models of classification and segmentation of the barriers. The BARINOV Model that evidences the existence of internal or external barriers and flashes upon the concept of deviation barrier. The BARIFASE Model embodies the innovation process through three phases and evidences the occurrence of the barriers to innovation during these stages.

Keywords: SMEs; innovation; barriers to innovation; BARINOV Model; BARIFASE Model; Portugal.

1. Introduction

The importance of innovation for the survival and competitiveness of organizations is an undeniable fact. The explosion of shared information, the growth of a more globalized economy and the rising crisis has changed the rules. Innovation is fundamental on the quest of profitable and sustainable growth. So organizations need to innovate to face the current downturn and survive.

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 consistently provided, 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 forced to adapt rapidly, the speed and intensity of events make this concern a critical condition for the survival of businesses. The global markets and high-speed technological improvements have changed the competitive environment, making it more complex, more uncertain and forcing change in organizations.

Despite all this instability, economic crisis brings about opportunities as well as the need to adapt strategies and plan actions. Companies need to ensure that they are able to compete with emerging countries, that their products and services fit the market needs.

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.

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.

Companies should endeavour processes towards sustainable innovation. This road is long and difficult since the available resources, mainly financial ones, are more and more scarce. This scarcity of resources swells the need to develop strong investment returns that contribute to cost structures cut and trigger market innovative products and services. Despite the development of this effort there

is no guarantee that it is sufficient to achieve the competitiveness.

On this context remains to companies, almost exclusively, the pursuit of differentiation resulting from the practice of innovation (in any of its types), or more broadly, conducting proceedings of Research, Development and Innovation (RD&I). This broad need for innovation, supporting the diversification, that companies feel is also cause and effect of the reduction of product life cycles. Undoubtedly, companies must align innovation with its guideline and its strategic objectives.

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.

2. Literature review

The Portuguese entrepreneurial is mostly composed of small and medium-sized firms. SMEs are companies with fewer than two hundred and fifty employees, turnover of up to fifty million and balance sheet total less than forty-three million Euros, under the Commission Recommendation 2003/361/EC on the 6th May two thousand and three.

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, reflecting the national trend, by itself justifies the importance of this national study on SMEs. Moreover, supports the usefulness of the results emerging from the sample.

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.

Carayannis et al. (2006) mention that 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) organizations 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 favouritism, increasingly, to organizations 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 extraordinary challenges. The effects of the crisis will have an impact in the coming 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 labour productivity (GDP per hour worked) and labour utilization (hours worked per person employed). The erosion and deceleration of labour 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 is no exception to this. According to statistics from OECD 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 labour 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 have participated.

According to Hadjimanolis (2003), 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 (Stanislawsky & Olczak, 2010; Madrid-Guijarro *et al.*, 2009; Hadjimanolis, 2003; Piatier, 1984). 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 analysed. The study conducted for Accenture by the Economist Intelligence Unit (2007) over a population of 601 senior managers revealed the following barriers to innovation: (1) the necessities related to the frequency, timing and speed of innovation, (2) the organizational 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 organization. In addition to this, evidence, pointed out the following additional barriers to innovation reported in order of importance (highest to lowest importance within companies surveyed). Firstly, the organization seeks to follow the current line extensions rather than developing new business models. Next, the organization 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 organization does not include in the learning process the past error modified due to a growing aversion to risk on new ideas.

According to Madrid-Guijarro *et al.* (2009), the barriers to innovation that Spanish SMEs face are essentially the external environment, the human resources, the risk and financial position. The same authors conclude that the cost of innovation affects more the SMEs and that different barriers have different impacts on different types of innovation.

Segarra-Blasco, Garcia-Quevedo and Teruel-Carrizosa (2008) present barriers to innovation in Catalonia. The Barriers to innovation identified are divided between cost barriers, barriers of knowledge and market barriers. With regards to cost barriers are presented the high cost of innovation, and the lack of internal and external funds. The barriers of knowledge 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, to be precise the time of development of innovation, the risk aversion and the poor market knowledge (Tovstiga and Birschall, 2007).

The German reality shows as being the more frequent barriers: the low budget, the difficulty in recruiting adequate human resources, the bureaucracy and 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 the lack of time, inadequacy of the R&D activities, design and testing within the company, and also inadequate financial resources (Hadjimanolis, 1999). The author also identified the more expressive external barriers to innovation: the ease of copying the innovation, the government bureaucracy, lack of government support, lack of qualified human resources policies and 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; (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 (5) too many restrictions on the innovation.

The observation of the Portuguese business community in order to understand the longevity of companies allowed to establish the following barriers to innovation: the high economic cost and risk associated with innovation, lack of funding, organizational rigidity, lack of skilled human resources, lack of market information and technology, government regulation and weak capacity to approach the client (Silva et al., 2007), as well as the lack of cooperation with centres of learning (Vieira, 2007).

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 organizations 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 intends to answer the following questions: (1) What barriers to innovation do Portuguese enterprises face?; (2) What is the relevance of each barriers attributed to the barriers identified by the firms?; (3) How are the barriers classified and grouped?

The current study reports the results of a study that examined barriers to innovation among a sample of thirty-five Portuguese enterprises.

4. Methodology

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

The surveys were sent by mail 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. Later, looking at the innovation process compounded by three phases (conception, implementation and feedback), to declare in which of the phases are these obstacles more evident for the firm context. Finally, to compare the results to the ones obtained in the critical review of literature.

5. Results achieved

Lengthways the course of this investigation interesting results appeared 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% stated 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 five 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 with 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 the current economic environment, the limitation of monetary resources, the reduced risk-taking culture, the mechanical performances, the routine and cemented processes, the organizational and human resources resistance to change, the lack of incentives and compensation for innovation, the high cost of new tools and processes, the small size of the company and 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. As a result, many companies can understand the difficulty in managing the barriers for the reason that they do not depend on the performance of the company.

With this work, further than attaining the knowledge of innovation barriers at the studied companies, it is possible to categorize them in an alternative way through BARIFASE and BARINOV Models now developed which display different views of the classifications existing so far. The BARINOV Model stresses the awareness or not of the barriers to innovation by firms. This model points out the capacity of firms to identify correctly the barriers they face. Some companies cannot recognize the existence of barriers to innovation. In this case the barriers are not perceived, regardless of being internal or external. The other barriers are acknowledged by firms. Analysing the answers of the participants it is possible to perceive that some firms are mistaken about the origin of the barriers they face. Although recognizing the barriers (perceived barriers) and understanding well the split on internal and external barriers they advocate internal barriers has being born outside the company. By doing so, they downplay their existence, and do not set off mechanisms to avoid, minimize or eliminate them. On the other hand, some of the external barriers are considered to rise inside the organization. In this case, the effort carried out in order to treat, reduce or eliminate the barrier is of no value.

The usefulness of the model goes beyond the aforementioned characteristic and signs in the appearance of wrong-way (deviation) barriers. These represent a misreading of the source barrier. Therefore it may contribute to an effort to combat a barrier flagged as internal, but in genuineness external. In other words a totally pointless waste of resources. Or alternatively, the validation of a barrier to innovation as external, not being driven the mechanisms of correction, when in reality, it is internal and should be taken the decision on whether or not to fight it.

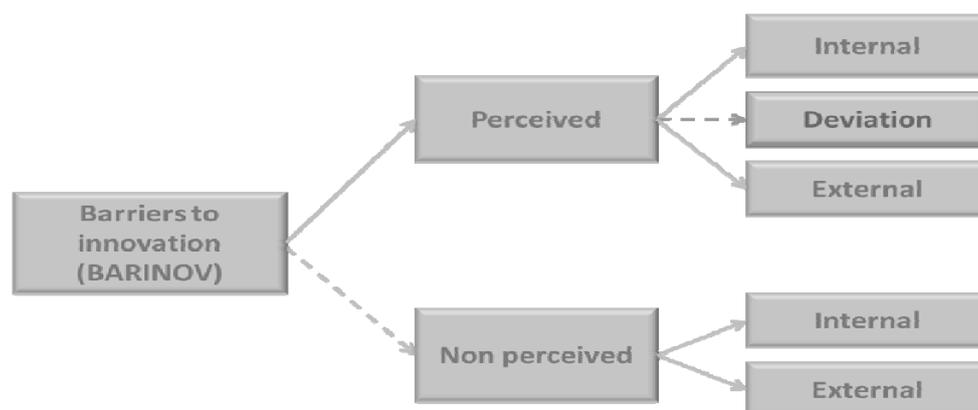


Figure 1: BARINOV Model

Beyond the model portrayed before the answers collected allowed the appearance of another model: the BARIFASE Model that targets this topic on a dissimilar prism. It conceptualizes innovation in a three-phase process and evaluates the most important phases in terms of appearance and

recognition of the barriers to the companies. These phases are labeled as: (1) perception, conception and ideation; (2) implementation and (3) feedback, control and performance. The first phase contemplates the creation of something that supports innovation, its embodiment. The second, named implementation exposes the diffusion of innovation through the organization and its frequent practice. At long last the third, consisting of monitoring and measurement, and if necessary or applicable, its correction or improvement.



Figure 2: BARIFASE Model

The usefulness of the BARIFASE Model consists of exposing the problem or retractor of the innovative process in different moments and allowing managers or decision makers to interpose in that specific moment and developing measures to promote innovation. This model evidences the possibility of taking care of innovation processes in the firm. If the problem arises along the first phase the company should promote the environment that promotes the birth of innovation. If, on the other hand, the retraction of innovation occurs during the implementation, the company must emphasize the benefits and need of the implementation of innovation, not only in favour of the company but of all her stakeholders. Lastly, if the third phase does not develop correctly the firm cannot grow and add value through its own performance. Knowing the stronger moment enables the firm to improve by innovating.

The results obtained from the participants showed that they feel the most the inhibition of innovation along the phase of conception and creation. Afterwards, the phase most significant hereafter is the third phase - feedback and improvement. These conclusions attained illustrate the difficulty to create or develop innovation and to recognize its application over the firm.

6. Conclusions

The results brought by this study revealed the barriers to innovation faced by the participants, namely the current economic environment, the limitation of monetary resources, the reduced risk-taking culture, the mechanical performances, the routine and cemented processes, the organizational and human resources resistance to change, the lack of incentives and compensation for innovation, the high cost of new tools and processes, 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 organizations 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 that external barriers to innovation are more difficult to overcome than internal ones.

In addition the BARINOV Model stresses the perception or not of the existence of barriers, it also exposes the capacity of understanding internal and external barriers and brings about the concept of deviation barrier, which in the limit represents a total waste of resources by the firm.

When regarding the BARIFASE Model it enables companies to treat the phase of the innovation process that is weaker for that specific company, and lightens the more important and profitable measures to be carried out.

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.

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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