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for innovation
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Absorptive capacity and cooperation evidence in innovation from public policies for innovation

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Abstract

Purpose – The purpose of this paper is to better understand whether firm cooperation and absorptive capacity foster success in seeking public financial support for innovation activities and, by doing so, how they contribute to innovation output.

Design/methodology/approach – The authors therefore extend the existing literature focusing on the effects of cooperation and absorptive capacity on specific public financial support for innovation activities in Portuguese firms from local or regional government, central administration and the European Union by using available data from the Community Innovation Survey CIS 2010 and the application of logistic regression models. The empirical analysis enabled a better understanding of the positive relationship of the variables that determine the form of public financial support in the integration of incentives within firms to stimulate innovation.

Findings – Therefore, as the level of absorptive capacity in Portuguese firms increases, so does the demand for benefits from public financial support to stimulate innovation from the European Union also increases. The same analysis, now considering the determinant cooperation, notes the positive effects of institutional sources of information and cooperation, in the propensity for seeking public financial incentives from the Central Administration and the European Union. As for internal information and cooperation sources, they are positively related to the integration of incentive measures from the local or Regional Administration and Central Administration.

Originality/value – The paper presents results that allow us to propose some suggestions that both the firms and those responsible for the implementation of public policies can undertake to increment innovation performance.

Keywords Cooperation, Innovation, Absorptive capacity, Public policies

Paper type Research paper

1. Introduction

Given the performance conditions of firms in an increasingly global market, it is becoming more and more critical for policymakers to strengthen and differentiate economy and market trends by defining public policies that stimulate innovation and prove to be effective in achieving new impulses leading to competitive advantages and economic growth. It is therefore essential to understand the determinants of innovation performance and the consequent business expansion. The interest in absorptive capacity has grown significantly over the past three decades, and continues to do so today (Apriliyanti and Alon, 2017; Gao *et al.*, 2017), although several recent works have examined the multidimensionality of absorptive capacity (Apriliyanti and Alon, 2017; Gao *et al.*, 2017; Martinkenaite and Breunig, 2016).

Innovation policies formally emerged in the 1980s as a solution to economic stagnation based on an inevitable strengthening of firms' and organizations' competitiveness. After a conjuncture driven by globalization that allowed a more efficient working method in addition to technological innovation in an attempt to extend performance to other areas and forms of intervention that would dictate social change.

Hence, new models of governance emerged in the majority of developed countries, with the intention to progress efficiently, based on the implementation of incentive policies to innovation generation (Hartley *et al.*, 2013). That way:

> The will to build an economy based on knowledge and innovation has justified the commitment of many countries, including Portugal, to establish policies to stimulate R&D business investment (Carvalho *et al.*, 2013, p. 1).

Although SMEs are crucial in the global economy, as reflected in the OCDE/European Communities (2005) report, when it was revealed that the vast majority of the total volume of worldwide business is done through SMEs, and they make up over 95 per cent of all the companies in the world, with 99 per cent of the world's population depending on SMEs. The OCDE/European Communities (2005) gives the example that in the EU in 2003, 99.8 per cent of the companies were SMEs with fewer than 250 workers. In line with this research, IAPMEI, a Portuguese agency that supports SMEs and Innovation, published a statistical study which revealed that in Portugal, 99.9 per cent of businesses are SMEs, represent 77.6 per cent of jobs (3,071 million) and produce 54.8 per cent of the total volume of business in the country.

Given this framework guided by innovation as a key element for firms alongside a set of incentive measures, it is also relevant to grasp the connection between business dynamics and public guidelines and policies.

The main objective of this paper is to better understand whether firm cooperation and absorptive capacity foster success in seeking public financial support for innovation activities and, by doing so, how they contribute to innovation output.

The main objective of this paper is to study the impact of cooperation and absorptive capacity in public policies for innovation and answer the following research question:

RQ1. What is the relationship between cooperation and absorptive capacity and the effect on seeking public financial support for innovation activities?

According to CIS 2010, "the innovation cooperation is active participation with other enterprises or institutions on innovation activities" (CIS, 2010, 11). Cooperation with enterprises within your enterprise group, clients, suppliers, competitors, consultants and commercial labs, universities or other higher education institutions, government, public or private research institutes.

The innovation cooperation may stimulate the innovative process of firms. According Cohen and Levinthal (1989, 1990) and Lundvall (2010), the cooperation established among partners is characterized by a relatively open information exchange, and such an information flow may stimulate innovative activities. To do this, firms need to increase the relationships with external partners to seek external knowledge that feeds "absorptive capacity". As argued by Cohen and Levinthal (1989, 1990), the absorptive capacity is the ability of a firm or organization to understand the valuable contribution of external knowledge and apply it internally for the firm to improve internal capacities.

For the purpose of this research, it is considered that public policies are measured by public financial support from the local/regional administration, the Central Administration and the European Union, based on the data resulting from the Community Innovation (CIS 2010). Also, the proposed conceptual model considers the application of the logistic regression model, assuming that public policies are the dependent variable under the influence of the independent variables *cooperation* and *absorptive capacity*, showing that the implementation of public policies can undertake to increment innovation performance.

As innovation is a central concept for the growth of the economy, it is also a source of competitiveness among firms and a factor of differentiation between competitors (Schumpeter, 1934; Tushman *et al.*, 1997). Thus, to be able to make an important contribution to the research on best management practices, it is necessary to know and understand the concept of innovation (Van de Ven *et al.*, 1989; Leifer *et al.*, 2000).

Besides this first introductory section, the paper is composed of four sections. In Section 2 there is a brief literature review with a reflection concerning the impact of cooperation and absorptive capacity in public policies for innovation. Section 3 presents the methodological approach of this study. Section 4 contemplates data analysis, results and discussion. Section 5 presents conclusions and future work.

2. Literature review

In the 1980's, Rothwell (1986, p. 35) highlighted the fact that empirical evidence showed that innovation policy would not turn out to be a mere economic and technological process, but would assume, instead, a supremacy that would establish it as "a political, institutional, and cultural mechanism." It should be noted that innovation policies have been experiencing considerable adaptations with regard to R&D business activities, vastly associated "to the leadership role that many governments have in this area, with highly relevant strategic, budgetary, and economic implications" (Carvalho *et al.*, 2013, p. 33) even while acknowledging the existence of a widespread tendency to implement policies, adjusted to the intensity of R&D activities and to a stance taken by governments to implement measures to stimulate innovation (Carvalho *et al.*, 2013).

Lundvall (2010) mentions the importance of public policies in the recent economic action plan where an interest has emerged for the transfer of science policy to innovation policy, with a more effective approach to the importance of the economy's innovation performance. According to the author, the relationship between innovation policy and economic theory has strengthened, which allows, from those responsible for implementation of public policies, the display of a more agile posture leading to the pursuit of measures to stimulate the emergence of new ideas and also to an innovation performance.

With regard to the promotion of public policies, the importance of local government units is widely considered by the European Commission in what concerns their role as intermediaries between the national and sub-regional levels, as well as other agents such as local authorities, universities and firms, among others (European Commission, 2010). Thus, public policies are formalized by the priority given to the transfer of technology from local

scientific institutions (mainly universities) to local industry [especially small and medium enterprises (SME's)] (Carvalho *et al.*, 2013; Vecchiato and Roveda, 2014).

Furthermore, the establishment of cooperation networks between universities, laboratories, research centers, financial institutions and organizations tends to enhance the emergence of new knowledge-based firms (Flanagan *et al.*, 2011) and reduce innovation processes, as supported in the measures of innovation motivate policies.

SME's, the most significant part of Portugal's business fabric–characterized by being a "small open economy with a scientific and technological system which remains fragile, despite profiting from considerable improvements" (Monteiro-Barata, 2005, p. 301), need to adapt to a changing and evolving market scenario. It also demands facing this reality as a firm challenge, with an active industrial perspective, as well as of the functioning and dynamics of the market where the firms operate.

Admitting that innovation public policies include incentive and public financial support measures, according to Otero *et al.* (2014), the firms' access to that public financial support to stimulate innovation assumes cooperation with external partners as one of its top priorities. Furthermore, the authors mention that the influence of public policies is one of the factors determining the innovation performance of firms. Therefore, public financial support guaranteed under the implementation of innovation public policies, that the core of the strategic priorities of developed countries, given the importance of business support, especially for SMEs as well as the multinationals investing in these countries (Wonglimpiyarat and Khaemasunun, 2015).

This public funding strategy is precisely, according to the authors, deeply related to cluster policies and "triple helix". The latter, based on the model of the Triple Helix proposed by Etzkowitz (2008), assigns a prominent emphasis to network interactions between "firms–government–universities" to facilitate conditions for the efficient course of innovation processes, mainly in knowledge-based societies (Wonglimpiyarat and Khaemasunun, 2015). The representation of the model through the intersection of three circles intends to justify the fact that the boundaries of each of these assume some flexibility, so that each of the elements, "firms–government–universities", has the capacity to influence the operation mode of the other parties; even the activity of each will change with time (Etzkowitz, 2008; Coenen and Moodysson, 2009).

Regarding this model, Wonglimpiyarat and Khaemasunun (2015, p. 1) carried out a study that allowed them to analyze the public funding system in China, sustained precisely on a "triple helix" policy, which led to the attainment of results of the country's innovation performance level when compared to those of the USA and revealed the development of an innovation system "through market mechanisms with strong 'triple helix' interactions, particularly in existing clusters." Thus, according to the authors, this study provides information "which is useful to other emerging economies to use as public policy intervention guidelines towards boosting their innovation financing systems".

Authors such as Teixeira and Fortuna (2004) and Aranguren and Larrea (2011, p. 572) claim that the concept of public innovation policies cannot be dissociated from the need for specific training of policymakers involved in measures to stimulate innovation, that being "the focus defined in the process of politic learning as a determining factor for the emerging policy." Nevertheless, the same authors also state that this approach, focused on the training and knowledge of political agents, is coated in complexity and some limitations regarding knowledge, which also reflect the importance of operational involvement of firms and organizations, turning subjective individual knowledge into collective results.

Public innovation policies thus reveal a contemporary perspective of promoting innovation and acknowledge its relevance, centralizing in it the dynamics of regional/

national development. Thus, any public policy will only be successful to the extent that their results fulfill their purposes (Qian and Haynes, 2014). In short, the ability to identify and assess competitive advantage resulting from innovation performance is highly important for both the firms themselves and the politicians who must direct their measures to the enhancement of this performance (McGuirk *et al.*, 2014).

2.1 Cooperation

It was with the Lisbon Strategy, in 2004, that national strategies based on public innovation policies were largely driven by cooperation with the aim of promoting and stimulating an economy based on a more dynamic knowledge base, increased competitiveness, the ability to promote sustainable economic growth, labor market orientation, territorial cohesion and respect for the environment (Nikulainen and Tahvanainen, 2009), which denotes a commitment of regional governments – all of which is now widely recognized by the European Commission (Laranja *et al.*, 2008). Given this approach to cooperation, it is clear that the existence of a critical mass is essential to acting strategically and in an integrated and targeted way toward competitiveness, searching as well for solutions that will address common problems. Cohen and Levinthal (1990) and Cassiman and Veugelers (2002) allege that cooperation for innovation must be inherent to the existence of an absorption capacity directed to the advantage of the firms in acquiring and assimilating more and more knowledge that, most of the time, is the result of spillover effects, which leads to increased profitability and positive returns obtained by cooperation, basically, in what concerns R&D activities.

It is understood, however, that business cooperation, in the field of innovation, means active participation in R&D activities and other technological innovation projects between firms. But it does not necessarily mean that both cooperation partners get immediate benefits with measurable results, as a result of that cooperation (Tether, 2002).

Thus, the practice of cooperation between firms and organizations oriented to the search for solutions with collective impact has been the subject of much attention, both in the field of research and in the practice of organizational management (Nohria and Eccles, 1992). Therefore, cooperation, based on the establishment of cooperation networks, appears promising in the field of activity of enterprises and their external relations, by requiring firms to work in partnership and direct connection, exchanging resources and assets, so as to achieve common objectives.

Thompson (2003) defends that the main purpose of cooperation networks at the firm level is precisely to unify efforts to achieve an efficient integration in the competitive environment, which underlies the dynamic structures supported by harmonized, that also decentralized initiatives, allowing them to profit from this concentration of cooperative efforts. He also states that cooperation should be understood as a combination of joint initiatives, in a repeated manner, supported by strategic relationships with dynamic limits and interconnected agents.

Regarding the implementation of innovation processes, cooperation is one of its determinants, as it is assumed as a collective strategy between firms and organizations, which necessarily leads to increased competitiveness and economic growth of firms, regions and countries. The theme has also raised significant interest in the field of research, particularly regarding the relationship between cooperation as a determining factor of firms' innovation performance (Amara and Landry, 2005; Faems *et al.*, 2005; Otero *et al*, 2014). According to Otero *et al.* (2014), there are two reasons for the existence of cooperation in the field of innovation:

(1) The reduction of costs and risks associated with innovation processes (Hagedoorn, 1993; Tether, 2002) and risk reduction is the most important factor of cooperation in R&D initiatives.

(2) A shared search for resources and the amalgamation of the abilities involved in innovation processes (Hagedoorn, 1993).

Hence, it is clear that firms can benefit greatly from cooperation strategies involving new knowledge, and more and better information on new opportunities and cooperation areas. Thus, those responsible for the implementation of public policies should seek to establish cooperation strategies as well as specific incentives for the various regional agents involved in different networks (Felzensztein and Gimmon, 2008). The economy, when based on networking, clearly incorporates a non-hierarchical cooperation mode, sustained on trust, which also involves innovation networks that play the role of intermediary between the market and the hierarchy (Karlsson and Westin, 1994).

The emergence of this new trajectory of cooperation is directly related to an increased capacity of exchanging information in a context of globalization, which facilitates all interaction between agents, firms and organizations (Norris *et al.*, 2000). Despite the contributions of authors in the recognition of the importance of cooperation in innovation process, it is important to highlight the motivation that cooperation according to the firms' sizes allows. SMEs choose for network cooperation partners, aiming to fill in their limitations, which can, for example, be associated with the lack of R&D departments or innovation resources. Also, other authors confirm that the size of the firm is decisive when regarding innovation (Pires *et al.*, 2008).

Love *et al.* (2014), when focusing their analysis on the added value of external information sources in the internal knowledge of the firm, refer to the concept of "dynamic complementarities", i.e. the authors associate this concept with positive returns as a result of the increase of an activity in another complementary activity.

According to the working model of dynamic complementarities (Figure 1):

The benefit of adding a new activity does not depend simply on what the firm currently does, but also on what it did in the past: it is about adding something to an existing strategy (Love *et al.*, 2014, p. 1774).

This approach is, inherently, a dynamic analysis, which requires a circuit of information that enables the strategy and the firm's choices over time, which allows to add reference to *the relevance of cooperation partners to which one*, who represent the content of sources of information and external knowledge. This mutual effort is also highlighted in Schmiedeberg's (2008) study, whose analysis is part of the innovation processes and, more specifically, regarding the performance of R&D activities. It is therefore necessary to stimulate entrepreneurial innovation activity and to increase innovation performance to resort to external sources of information and knowledge. Businesses that choose not to enhance their internal resources and knowledge base with the assistance of potential knowledge from external sources are those that demonstrate a latent fragility, which is reflected in a lower capacity to innovate (Ritter and Gemünden, 2003).

2.2 Absorptive capacity
Cohen and Levinthal (1990) state that absorptive capacity is the ability of a firm or organization to understand the valuable contribution of external information and apply it internally for innovation's sake. In other words, absorptive capacity is all about the way a
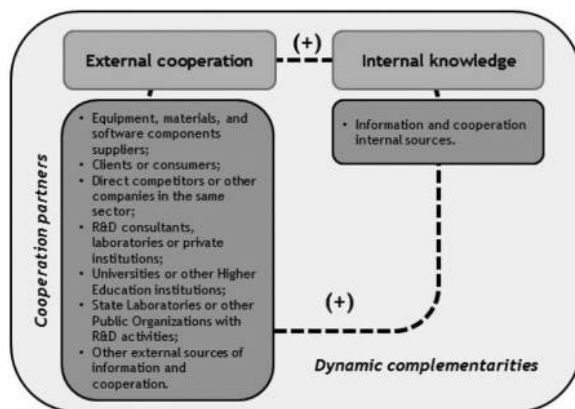
Source: Self-elaboration

Figure 1.
Dynamic
complementarities

firm manages external knowledge and information. In other words, it is the ability to acquire, transfer, update, renew and apply knowledge (Cohen and Levinthal, 1989). These authors also state that organizations with an effective level of absorptive capacity are those with a high level of knowledge that allows them to identify the importance and relevance of new sources of information, as well as to assimilate it, which in turn determines new knowledge with added value for their respective areas of expertise (Cohen and Levinthal, 1990).

Cohen and Levinthal (1989, 1990) are, themselves, considered pioneers in the analysis of absorptive capacity which, since then, has emerged in research related to the ability of firms to acquire, assimilate and manage measurable and marketable results associated with the acquisition of new knowledge originating outside the firm, which can be translated as absorptive capacity (Tsai, 2001; Zahra and George, 2002; Lev *et al.*, 2009; Lichtenthaler, 2009).

According to González-Campo and Ayala (2014, p. 280), there is a link between innovation and absorptive capacity by firms taking into account "the combination of innovative character and its culture with other internal and external resources and capabilities create a greater ability to innovate." This, according to Zahra and George (2002), leads to innovative responses to emerging needs of firms by virtue of the development of a dynamic capacity, the so-called absorptive capacity. Thus, the absorptive capacity of firms, organizations and territories has an underlying process of innovation which comprises identifying, assimilating, transforming and exploiting knowledge from external sources (Cohen and Levinthal, 1990). According to Tortoriello (2015), the concept of absorptive capacity is implicit in the recognition of the importance of external knowledge to trigger innovation in a firm, assuming that there is a relationship between investment in R&D activities and absorptive capacity.

Other literature of absorptive capacity highlights there cognition of the importance that is attributed to the external environment and the knowledge that it may happen, as well as to the way that it encourages firms and organizations to develop and stimulate this ability. Cohen and Levinthal (1990), in particular, report that such incentives are part of the following factors:

- external funding to support R&D activities; i.e. public policies to stimulate innovation;
- s*pillover* effect regarding the articulation between internal and external knowledge;

- reduction of learning expenses; and
- increase in external technological knowledge at the disposal of firms and organizations.

Despite much academic research pointing to a positive relationship of network performance in the innovation routine of firms and organizations, there are also contributions from authors who claim that both networks and absorptive capacity have a different ability to influence performance in terms of innovation (Goldsmith and Sporleder, 1999). Tushman and O'Reilly (2002) and Winter (2006) even state that the most important source of competitive advantage of firms is the ability to create innovation.

2.3 Conceptual model
The objective of the present paper is to contribute to the analysis of public policies, particularly concerning public financial support for innovation activities associated with cooperation and absorptive capacity, as displayed in Figure 2. All the data were obtained from CIS 2010, i.e. the official statistical information from the Community Innovation Survey.

3. Methodology
3.1 Data
The data used in this research are secondary data, collected through a survey that consisted of a questionnaire named Community Innovation Survey (CIS 2010) between July 2011 and April 2012. In Portugal, the survey was conducted by GPEARI (Department of Planning, Strategy, Evaluation and International Relations) in collaboration with INE (National Institute of Statistics), according to EUROSTAT's methodological specifications, concerning innovation activities in Portuguese firms.

This research was conducted with recourse to the Community Innovation Survey 2010 (CIS, 2010). The database corresponds to approximately 37 per cent of the entire universe; that is, from a total of 24,772 universe firms, 9,245 questionnaires were sent for the realization of the survey sample of CIS 2010.

To obtain the sample from the CIS 2010, 9,245 inquiries were sent to the total of 24,772 universe firms. In this work 3,406 firms were considered, covering the entire available data. It should also be noted that 20 per cent of firms that participated in this investigation and have technological innovation activities, cooperate with other institutions, which of these, 14.3 per cent state that have as the main cooperation partner of the suppliers of equipment, materials, components or software, appearing then clients or customers with 12.5 per cent (CIS methodological, 2010).

3.2 Method
In the present investigation, we intend to study public financial support for innovation activities as a process influenced by a set of factors. Faced with such a scenario, it is therefore considered data that allow the characterization of firms and territories, and more
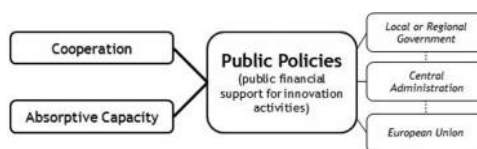

Figure 2.
Research conceptual model

specifically data to obtain results associated with the innovation of firms on the national level. It is therefore a quantitative method for data collection, leading to an empirical basis that allows the analysis of the importance of the determinants of public financial support for the development of innovation activities in Portuguese firms, using the available data from the CIS 2010 and the application of statistical patterns through logistic regression models.

3.3 Variables

3.3.1 The variables associated with cooperation. To this determinant we add three variables, presented as a scale chart comprising the following results, in accordance with the degree of importance: irrelevant/not used = 0; low = 1; medium = 2; and high = 3. For internal sources, the variable takes the value "0" if it is considered to be irrelevant and "1" if it is considered to be highly relevant. There are three types of cooperative relationships with relevant external partners, according to the respective sources of information (market sources, institutional sources and other sources), as well as internal sources.

3.3.2 The variables associated with absorptive capacity. In the existing literature, several ways to operationalize the absorptive capacity are adopted, but in no case can it be said that there is a preponderance of one method over another (Escribano *et al.*, 2009). Approaches to measure the absorptive capacity can be quantitative, such as studies carried out by Cohen and Levinthal (1990), Tsai (2001) or Cassiman and Veugelers (2002), or qualitative, for example, studies carried out by Jansen *et al.* (2005). Because there is plenty of research and lack of consensus on the method to be used in the absorptive capacity study, and following the criteria argued in the definition of other variables, without, however, there being a consensus that guides the analysis for concrete variables (Escribano *et al.*, 2009), it was chosen to adapt the present investigation to the literature review and data obtainable at CIS 2010 (GPEARI-MCTES). Zheng *et al.* (2014) argues that for the need to emerge new models, which will contribute to affirm the potential of companies, in what confers to their innovative performance. This category of research is determined by the technological effort of the firm to develop some of the following innovation activities: R&D activities within the firm (intramural), external acquisition of R&D (extramural) and the approximate percentage of employees with higher education. It is, therefore, a constructed variable that combines the investment in innovation activities with the level of staff with higher education. Acknowledging the diversity of empirical investigations that have focused on the analysis of absorptive capacity, without, however, the existence of a general concurrence to guide the analysis to concrete variables (Escribano *et al.*, 2009), the researchers chose to adapt this research to the literature review and data obtainable from the CIS 2010. Therefore, it was decided to transform the variable ratio into a categorical variable format, considering seven levels or ranks, as executed in the CIS 2010, when approaching the estimated percentage of employees.

4. Analysis and discussion of the results

Considering the characteristics of the Portuguese business fabric, where most firms are of small dimension, the results may be related, perhaps, to the reluctance or resistance that authors such as North *et al.* (2001) associate with the management of small businesses when resorting to external assistance, in particular incentives from public policies.

Indeed, the importance of the analysis of public policies is also supported by North, *et al.* (2001), advocating a growing concern in recognizing the role of public policies on the importance of innovation to the competitiveness of countries and regional economies, including the level of specific support for firms and especially SMEs.

Given the aforementioned facts, it was chosen to proceed with the application of the logistic regression model for each type of Public Financial Support, as presented in Table I, which presents the results of the application of the regression logistic model to public policies.

The final model's results present all the statistically significant estimates of regression parameters at 0.05 significance level, having used Wald's statistic as test statistic. Regarding the adjustment quality of the final model, the results demonstrate the predictive ability of the public financial support model: Local and Regional Administration is of 97.5 per cent; public financial support – Central Administration is of 78.3 per cent; and public financial support – the European Union is of 90.8 per cent. These are the results obtained from the comparison between the response variable values predicted by the models and those observed.

The chi-square test statistic takes the value of 20.101 in the case of the model of public financial support – Local and Regional Administration; of 334.581 regarding the model of public financial support – Central Administration; and of 193.711 in the case of the model of public financial support – the European Union. For each model, the test values are lower than the 0.05 significance level. Also, the statistics of the log-likelihood present results that confirm the global significance of the models when compared to the null model, more specifically of 767.826 regarding the model of public financial support – Local and Regional Administration; of 3,371.6 in the case of public financial support – Central Administration; and of 1,891.921, regarding the model of public financial support – the European Union.

The data obtained and presented in the table in regard to public policies at the level of *Local or Regional Administration* confirm that there is a high quality of adjustment in the final model and that no more than the factor related to cooperation undertaken with partners of *Internal sources of information and cooperation* has a positive and significant effect on the demand of benefits from public financial support. Thus, firms that carry out cooperation with partners of internal information and cooperation sources are more likely to benefit from such incentives than those who do not have this kind of cooperation. This significant effect is evidenced by the ratio of the value of the benefit associated with the variable (0.408).

These results may be supported by Silipo (2005), whose research defends the positive effects of the sources of information and cooperation on innovation incentives. Such is also supported by Otero *et al.* (2014), who state that firms' access to public financial support intended to stimulate innovation, assumes cooperation as one of its top priorities. Fritsch and Stephan (2005) also justify that measures taken at the regional level to encourage innovation represent very relevant advantages for businesses. The results show that the remaining variables do not present statistical significance in the model related to public financial support at the level of *Regional and Local Administration*; hence, nothing can be concluded about the effect of these determinants in the search for benefits from this type of public financial support.

The following model of analysis concerns the public financial support – *Central Administration*. In the analysis of variables associated with absorptive capacity, there is record of positive and significant effects on the demand of benefits from public financial support to stimulate innovation regarding R&D intramural activities with a positive effect evidenced by the value of the point estimate of the associated parameter (0.155) and the ratio of the benefit associated with the variable (1.168) and also R&D extramural activities, with a positive effect evidenced by the value of the point estimate of the associated parameter (0.058) and the ratio of the benefit associated with the variable (1.060).

The results achieved show that firms that invest more in R&D activities are more likely to resort to public financial support from *the Central Administration*. The connection

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| | Public policies | | | | | | | | | | | |
| Independent variables | Public financial support – local government and regional | | | | Public financial support – central administration | | | | Public financial support – EU | | | |
	B	S.E.	Sig.	Exp (B)	B	S.E.	Sig.	Exp (B)	B	S.E.	Sig.	Exp (B)
Absorptive capacity												
Employed persons with higher education	−0,071	0,07	0,33	0,931	−0,016	0,03	0,56	0,984	0,12	0,04	0,002	1,127
Intramural R&D activities	0,026	0,04	0,54	1,027	0,155	0,02	0,00	1,168	0,14	0,02	0,000	1,156
Extramural R&D activities	0,064	0,05	0,19	1,066	0,058	0,02	0,00	1,060	0,10	0,03	0,000	1,102
Cooperation												
Institutional sources of information and cooperation	0,129	0,23	0,57	1,138	0,681	0,08	0,00	1,976	0,68	0,11	0,000	1,975
Sources of information and market cooperation	0,615	0,42	0,14	1,849	0,051	0,17	0,76	1,053	−0,46	0,25	0,062	0,632
Other sources of information and cooperation	−0,499	0,27	0,07	0,607	−0,192	0,11	0,07	0,826	0,18	0,16	0,260	1,192
Internal sources of information and cooperation	0,896	0,27	0,00	0,408	0,335	0,09	0,00	1,397	−0,13	0,13	0,327	0,877
Constant	*−3,403*	*0,29*	*0,00*	*0,033*	*−2,279*	*0,13*	*0,00*	*0,102*	*−3,65*	*0,20*	*0,000*	*0,026*
Model fit quality												
Correctly predicted (%)	97,5%				78,3%				90,8%			
Chi square	20,101	0,005			334,581	0,005			193,711	0,000		
Log likelihood	767,826				3371,6				1891,921			
Number of cases	3406				3406				3406			

Capacity and cooperation evidence

Table I.
The results of regression logistic model for the public policies

between the propensity for the firm to benefit from *the Central Government* with the qualification of its own employees has no statistical significance. Therefore, the results indicate that nothing can be concluded about the effect of this determinant's (employees with higher education) propensity to resort to public financial support from the *Central Administration*. Also, the variables associated with the implementation of cooperation with partners as sources of market information and cooperation and other sources of information and cooperation have not shown significant results in statistical terms, so nothing can be concluded about the effect of these determinants in the model under observation. Firms that cooperate with partners connected to *Institutional sources of information and cooperation* and *Internal information and cooperation sources* have a greater propensity to benefit from such incentives than those who do not engage in such cooperation. This significant effect is proven by the point estimate of the associated parameter (0.68) and the ratio of the benefit associated with the variable (1.976), regarding *Institutional sources of information and cooperation* and by the point estimate of the associated parameter (0.34) and the ratio of the benefit associated with the variable (1.397) regarding *Internal information and cooperation sources*. Therefore, firms that engage in cooperation with institutional partners and consider their internal sources are more likely to benefit from public financial support from the Central Administration than those that do not.

The last model of analysis is that concerning the public financial support – *the European Union*. In this case, by analyzing the determinant absorptive capacity, the results displayed a widespread positive and significant effect of all variables considered in this determinant, namely, the variable of *employees with higher education*, evidenced by the point estimate of the associated parameter (0.12) and the ratio of the benefit associated with the variable (1.127); the variable *R&D intramural activitie*s, confirmed by the point estimate of the associated parameter (0.14) and the ratio of the benefit associated with the variable (1.156); and the variable *R&D extramural activities*, confirmed by the point estimate of the associated parameter (0.10) and the ratio of the benefit associated with the variable (1.102).

As the absorptive capacity of firms increases (according to the pre-established variables), so does the demand for benefits from public financial support for the integration of innovation stimulus measures from *the European Union*, i.e. through so-called EU funds.

These results are corroborated by authors like Watkins and Paff (2009), who claim that measures to encourage innovation in enterprises result in an increase in their ability to understand and absorb knowledge relevant to the activity of firms.

Lane *et al.* (2001) and Abecassis-Moedas and Mahmoud-Jouini (2008) claim that faced with a recent context where firms operate in a global-scale, knowledge-intensive business environment, it is imperative that firms resort to incentives that will enable them to raise their level of knowledge and increase their innovation performance.

Finally, analyzing the variables associated with cooperation in the framework of public financial support – *the European Union* – one may observe, by the results in Table I, that the cooperation undertaken with partners of *Institutional sources of information and cooperation* has a positive and significant effect on the demand of benefits from the financial support of the *European Union*, as demonstrated by the point estimate of the associated parameter (0.68) and the value of the ratio of the benefit associated with the variable (1.975). This means that firms that establish relationships with universities and other institutions of higher education are more likely to benefit from such incentives than those who do not have this type of cooperative relationship. Therefore, as business cooperation with institutional partners increases, so does the demand for the implementation of public policies to stimulate innovation from *the European Union* in proportion to the benefits associated with each of the variables (because of the advantage associated with the variable, *Exp (B)*). Such is

supported by Aranguren and Larrea (2011), who claim that public policies refer to an interactivity in its formulation and implementation that requires a way of acting in cooperation with the beneficiaries, thus acknowledging the relevance of training, learning and knowledge shared between those who implement policies and those benefiting from them, essentially firms.

In Table II, we may find the summary of the results of the application of the logistic regression model, according to the variables related to cooperation and absorptive capacity, considering public policies as a dependent variable.

5. Conclusions

Cooperation that acknowledges partners belonging to internal sources of information and cooperation reveals a positive relationship with the demand for benefits from public financial support, either from local and regional administration or Central Administration. Cooperation with partners belonging to institutional sources of information and cooperation displays a positive connection with the demand of the benefits from public financial support of the Central Administration and the European Union.

Absorptive capacity that includes the variables employees with higher education, R&D intramural activities and R&D extramural activities registered a positive and significant effect on the demand of benefits from the EU's public financial support, which is supported by the review of Wonglimpiyarat and Khaemasunun (2015) when referred to China and the USA. R&D intramural activities and R&D extramural activities displayed a positive and significant effect on the demand of benefits from public financial support from the Central Administration.

Finally, the empirical analysis of public policies for innovation has allowed a clear understanding of the influence of cooperation and absorptive capacity as determinants of public financial support. The analysis enabled, thus, to acknowledge a positive relationship of the variables that determine absorptive capacity in the integration of incentives within

Independent variables	Public financial support – local government and regional	Public financial support – central administration	public financial support – EU
Absorptive capacity			
Employed persons with higher education			✓
Intramural R&D activities		✓	✓
Extramural R&D activities		✓	✓
Cooperation			
Institutional sources of information and cooperation		✓	✓
Sources of information and market cooperation			
Other sources of information and cooperation			
Internal sources of information and cooperation	✓	✓	

Table II.
Summary of the results of logistic regression for the analysis of public policies

firms and, also, in the form of public financial support to stimulate innovation from the European Union.

The same effect regarding absorptive capacity is likely to be verified without, however, considering the effect of employees with higher education, as that variable did not denote statistical significance. Therefore, as the level of absorptive capacity in Portuguese firms increases, so does, with different advantages according to the variables, the demand for benefits from public financial support to stimulate innovation from the European Union, to the detriment of uncooperative firms that do not bet on the increase of their absorptive capacity. The same analysis, now considering the determinant cooperation, highlights the positive effects of Institutional sources of information and cooperation, in the propensity for seeking public financial incentives from the Central Administration and the European Union. As for internal information and cooperation sources, they are positively related to the integration of incentive measures from the local or regional administration and Central Administration.

The findings of this research allow us to propose some procedures that both firms and those responsible for the implementation of public policies can undertake to increment innovation performance:

- recognize the relevance of the practice of cooperation and integration in cooperation networks, with external partners, in a perspective of sharing resources and synergies with complementarity of offer, translated in scale dividends and competitive advantages recognized in a globalized market;

- regard the qualification of the firm's human resources not only of major importance to its personnel but also as an element of the innovation process, in a perspective of involvement of human potential to increase absorptive capacity and optimize the choice of the most useful knowledge to innovation performance;

- implement policies to stimulate innovation that are used as a production guideline to external geographic markets, i.e. to develop innovation initiatives with a differentiator potential, enabling, in a perspective of internationalization, the establishment of goods and services produced in Portugal;

- promote a set of measures to stimulate innovation, locally or regionally, that would leverage the potential identity of each region, at all levels of innovation – product, process, organizational and marketing;

- redirect public policies from the European Union by introducing measures to boost innovation processes and reverse firms' proneness to not innovate; and

- develop inclusion practices regarding knowledge sharing that will enable the involvement of small businesses in innovation processes.

This results confirm the results obtained by Jansen *et al.* (2005) that are refer to the market of USA; by Wonglimpiyarat and Khaemasunun (2015, p. 1) refered to economies of China and USA; also corroborates the study of Zhao and Anand (2009) about the Chinese market. This conclusions are also in accordance with the ones obtained by Griffith (2000) related to R&D investment of the US market.

The lack of data based on the geographical scope analysis (NUTIII) has limited the study of "regional atmosphere innovation". Despite attempts to obtain data related to the "MUNICIPALITY" field in the Community Innovation Survey (CIS 2010), access to them became unviable. In future studies, one suggests the research of innovation performance at both regional and national levels, dissociating the data by NUT III, assuming the same determinants hitherto considered.

References

Abecassis-Moedas, C. and Mahmoud-Jouini, S.B. (2008), "Absorptive capacity and source-recipient complementarity in designing new products: an empirically derived framework", *Journal of Product Innovation Management*, Vol. 25 No. 5, pp. 473-490.

Amara, N. and Landry, R. (2005), "Sources of innovation as determinants of novelty of innovation in manufacturing firms: evidence from the 1999 statistics Canada innovation survey", *Technovation*, Vol. 25 No. 3, pp. 245-259.

Apriliyanti, I.D. and Alon, I. (2017), "Bibliometric analysis of absorptive capacity", *International Business Review*, Vol. 26 No. 5, pp. 896-907.

Aranguren, M.J. and Larrea, M. (2011), "Regional innovation policy processes: linking learning to action", *Journal of the Knowledge Economy*, Vol. 2 No. 4, pp. 569-585.

Carvalho, L., Costa, T. and Caiado, J. (2013), "Determinants of innovation in a small open economy: a multidimensional perspective", *Journal of Business Economics and Management*, Vol. 14 No. 3, pp. 583-600.

Cassiman, B. and Veugelers, R. (2002), "R&D cooperation and spillovers: some empirical evidence from Belgium", *American Economic Review*, Vol. 92 No. 4, pp. 1169-1184.

Coenen, L. and Moodysson, J. (2009), "Putting constructed regional advantage into Swedish practice", *European Planning Studies*, Vol. 17 No. 4, pp. 587-604.

Cohen, W. and Levinthal, D.A. (1989), "Innovation and learning: the two faces of R&D", *Economia Journal*, Vol. 99 No. 397, pp. 569-596.

Cohen, W. and Levinthal, D.A. (1990), "Absorptive capacity: a new perspective on learning and innovation", *Administrative Science Quarterly*, Vol. 35 No. 1, pp. 128-152.

Escribano, A., Fosfuri, A. and Tribó, J. (2009), "Managing external knowledge flows: the moderating role of absorptive capacity", *Research Policy*, Vol. 38 No. 1, pp. 96-105.

Etzkowitz, H. (2008), *The Triple Helix University–Industry–Government Innovation in Action*, Routledge, London.

European Commission (2010), *Regional Policy Contributing to Smart Growth in Europe2020*, European Union, Brussels.

Faems, D., Van Looy, B. and Debacker, K. (2005), "The role of interorganizational collaboration within innovation strategies: towards a portfolio approach", *Journal of Product Innovation Management*, Vol. 22 No. 3, pp. 238-250.

Felzensztein, C. and Gimmon, E. (2008), "Industrial clusters and social networking for enhancing inter-firm cooperation: the case of natural resources-based industries in Chile", *Journal of Business Market Management*, Vol. 2 No. 4, pp. 187-202.

Flanagan, K., Uyarra, E. and Laranja, M. (2011), "Reconceptualising the 'policy mix' for innovation", *Research Policy*, Vol. 40 No. 5, pp. 702-713.

Fritsch, M. and Stephan, A. (2005), "Regionalization of innovation policy–introduction to the special issue", *Research Policy*, Vol. 34 No. 8, pp. 1123-1127.

Gao, S., Yeoh, W., Wong, S.F. and Scheepers, R. (2017), "A literature analysis of the use of absorptive capacity construct in IS research", *International Journal of Information Management*, Vol. 37 No. 2, pp. 36-42.

Goldsmith, P. and Sporleder, T.L. (1999), "Analyzing foreign direct investment decisions by food and beverage firms: an empirical model of transaction theory", *Canadian Journal of Agricultural Economics*, Vol. 46 No. 3, pp. 329-346.

González-Campo, C.H. and Ayala, A.H. (2014), "Influencia de la capacidad de absorción sobre la innovación: un análisis empírico en las mipymes colombianas", *Estudios Gerenciales*, Vol. 30 No. 132, pp. 277-286.

IJIS

Griffith, R. (2000), "How important is business R&D for economic growth and should the government subsidise it?", available at: http://discovery.ucl.ac.uk/14922/1/14922.pdf (accessed 18 April 2017).

Hagedoorn, J. (1993), "Interorganizational modes of cooperation", *Strategic Management Journal*, Vol. 14 No. 5, pp. 371-385.

Hartley, J., Sørensen, E. and Torfing, J. (2013), "Collaborative innovation: a viable alternative to market competition and organizational entrepreneurship", *Public Administration Review*, Vol. 73 No. 6, pp. 821-830.

Jansen, J.J.P., Van den Bosch, F. and Volberda, H. (2005), "Managing potential and realized absorptive capacity: how do organizational antecedents matter?", *Academy of Management Journal*, Vol. 48 No. 6, pp. 999-1015.

Karlsson, C. and Westin, L. (1994), "Patterns of a network economy – an introduction", in Johansson, B., Karlsson, C. and Westin, L. (Eds), *Patterns of a Network Economy*, *Springer*, Berlin, pp. 1-12.

Lane, P.J., Salk, J.E. and Lyles, M.A. (2001), "Absorptive capacity, learning, and performance in international joint ventures", *Strategic Management Journal*, Vol. 22 No. 12, pp. 1139-1161.

Laranja, M., Uyarra, E. and Flanagan, K. (2008), "Policies for science, technology and innovation: translating rationales into regional policies in a multi-level setting", *Research Policy*, Vol. 37 No. 5, pp. 823-835.

Lev, S., Fiegenbaum, A. and Shoham, A. (2009), "Managing absorptive capacity stocks to improve performance: empirical evidence from the turbulent environment of Israeli hospitals", *European Management Journal*, Vol. 27 No. 1, pp. 13-25.

Leifer, R., McDermott, C.M., O'Connor, G.C., Peters, L.S., Rice, M.P., Veryzer, R.W. and Rice, M. (2000), *Radical Innovation: How Mature Firms Can Outsmart Upstarts*, Harvard Business School Press, Boston.

Lichtenthaler, U. (2009), "Absorptive capacity, environmental turbulence, and the complementarity of organizational learning processes", *The Academy of Management Journal*, Vol. 52 No. 4, pp. 822-846.

Love, J.H., Roper, S. and Vahter, P. (2014), "Dynamic complementarities in innovation strategies", *Research Policy*, Vol. 43 No. 10, pp. 1774-1784.

Lundvall, B.Å. (2010), "Políticas de Inovação na economia do aprendizado", *Parcerias Estratégicas*, Vol. 6 No. 10, pp. 200-218.

Martinkenaite, I. and Breunig, K.J. (2016), "The emergence of absorptive capacity through micro–macro level interactions", *Journal of Business Research*, Vol. 69 No. 2, pp. 700-708.

McGuirk, H., Lenihanb, H. and Hart, M. (2014), "Measuring the impact of innovative human capital on small firm¨s propensity to innovate", *Research Policy*, Vol. 44 No. 4, pp. 965-976.

Monteiro-Barata, J. (2005), "Innovation in the portuguese manufacturing industry: analysis of a longitudinal firm panel", *International Advances in Economic Research*, Vol. 11 No. 3, pp. 301-314.

Nikulainen, T. and Tahvanainen, A. (2009), *Towards Demand Based Innovation Policy? The Introduction of Shocks as Innovation Policy Instrument*, Research Institute of the Finnish Economy (ETLA), *Discussion Paper, NO. 1182*, Helsinki.

Nohria, N. and Eccles, R.G. (1992), *Networks and Organizations: Structure, Form, and Action*, Harvard University Press, Cambridge.

Norris, M., West, S. and Gaughan, K. (2000), *E-Business Essentials Technology and Network Requirements for the Electronic Marketplace*, John Wiley & Sons Inc., EUA.

North, D., Smallbone, D. and Vickers, I. (2001), "Public sector support for innovating SMEs", *Small Business Economics*, Vol. 16 No. 4, pp. 303-317.

OCDE/European Communities (2005), *Oslo Manual – Guidelines for Collecting and Interpreting Innovation Data*, 3rd Ed., OECD, Paris.

Otero, G.B., Lavía, C.M., Albizu, E.G. and Olazarán, M.R. (2014), "Políticas públicas y cooperación con agentes externos en procesos de innovación: estudio comparado de pymes industriales en tres sistemas regionales", *Revista De Direccion y Administracion De Empresas*, Vol. 21, pp. 1-20.

Pires, C., Sarkar, S. and Carvalho, L. (2008), "Innovation in services – how different from manufacturing?", *Service Industries Journal*, Vol. 28 No. 10, pp. 1339-1356.

Qian, H. and Haynes, K.E. (2014), "Beyond innovation: the small business innovation research program as entrepreneurship policy", *The Journal of Technology Transfer*, Vol. 39 No. 4, pp. 524-543.

Ritter, T. and Gemünden, H.G. (2003), "Interorganizational relationships and networks: an overview", *Journal of Business Research*, Vol. 56 No. 9, pp. 691-697.

Rothwell, R. (1986), "Public innovation: to have or to have not", *R&D Management*, Vol. 16 No. 1, pp. 25-36.

Schmiedeberg, C. (2008), "Complementarities of innovation activities: an empirical analysis of the German manufacturing sector", *Research Policy*, Vol. 37 No. 9, pp. 1492-1503.

Schumpeter, J.A. (1934), *Theory of Economic Development: An Enquiry into Profits, Capital, Interest and the Business Cycle*, Harvard University Press, Cambridge, MA.

Silipo, D.B. (2005), "The evolution of cooperation in patent races: theory and experimental evidence", *Journal of Economics*, Vol. 85 No. 1, pp. 1-38.

Teixeira, A. and Fortuna, N. (2004), "Human capital, innovation capability and economic growth in Portugal, 1960-2001", *Portuguese Economic Journal*, Vol. 3 No. 3, pp. 205-225.

Tether, B. (2002), "Who cooperates for innovation and why: an empirical analysis", *Research Policy*, Vol. 31 No. 6, pp. 947-967.

Thompson, G.F. (2003), *Between Hierarchies and Markets: the Logics and Limits of Network Forms of Organization*, Oxford University Press, Oxford.

Tortoriello, M. (2015), "The social underpinnings of absorptive capacity: the moderating effects of structural holes on innovation generation based on external knowledge", *Strategic Management Journal*, Vol. 36 No. 4, pp. 586-597.

Tsai, W.P. (2001), "Knowledge transfer in intra-organizational networks: effects of network position and absorptive capacity on business unit innovation and performance", *Academy of Management Journal*, Vol. 44 No. 5, pp. 996-1004.

Tushman, M.L., Anderson, P. and O'Reilly, C.A. (1997), "Tecnhology cycles, innovation streams, and ambidextrous organizations: organizational renewal through innovation streams and strategic change", in Tushman, M.L. and Anderson, P. (Eds), *Managing Strategic Innovation and Change*, Oxford, New York, NY, pp. 3-23.

Tushman, M. and O'Reilly, C. (2002), *Winning through Innovation*, Harvard Business School Press, Boston.

Van de Ven, A.H., Angle, H.L. and Poole, M.S. (1989), *Research on the Management of Innovation*, Harper & Row, New York, NY.

Vecchiato, R. and Roveda, C. (2014), "Foresight for public procurement and regional innovation policy: the case of Lombardy", *Research Policy*, Vol. 43 No. 2, pp. 438-450.

Watkins, T.A. and Paff, L.A. (2009), "Absorptive capacity and R&D tax policy: are in-house and external contract R&D substitutes or complements?", *Small Business Economics*, Vol. 33 No. 2, pp. 207-227.

Winter, S. (2006), "The logic of appropriability: from Schumpeter to arrow to Teece", *Research Policy*, Vol. 35 No. 8, pp. 1100-1106.

Wonglimpiyarat, J. and Khaemasunun, P. (2015), "China's innovation financing system: triple helix policy perspectives", *Triple Helix, Springer Open Journal*, Vol. 2 No. 5, pp. 1-18.

Zahra, S.A. and George, G. (2002), "Absorptive capacity: a review, reconceptualization, and extension", *Academy of Management Review*, Vol. 27 No. 2, pp. 185-203.

Zheng, M., Yang, C. and Li, L. (2014), "Technology spillovers network, absorptive capability, and innovation", *International Journal of China Marketing*, Vol. 5 No. 1, pp. 75-83.

Zhao, Z.J. and Anand, J. (2009), "A multilevel perspective on knowledge transfer: evidence from the Chinese automotive industry", *Strategic Management Journal*, Vol. 30 No. 9, pp. 959-983.

Further reading

Becker, W. and Dietz, J. (2004), "R&D cooperation and innovation activities of firms—evidence for the German industry", *Research Policy*, Vol. 33 No. 2, pp. 209-223.

Lane, P.J., Koka, B.R. and Pathak, S. (2006), "The reification of absorptive capacity: a critical review and rejuvenation of the construct", *Academy of Management Review*, Vol. 31 No. 4, pp. 833-863.

Stead, H. (1976), "The costs of technological innovation", *Research Policy*, Vol. 5 No. 1, pp. 2-9.

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