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The positive moderating effect of absorptive capacity on R&D investment: the case of Argentina's ict firms

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ABSTRACT

The model analyzes the positive moderating role of absorptive capacity (ACAP) in the innovative outcomes of the firms. It focuses on ACAP as a moderating variable of the innovative efforts that firms develop or have the chance of incorporating from outside and not just as an antecedent of the innovation results. The empirical evidence collected comes from a study conducted on 189 SMEs working in IT services in Argentina and the results prove the main hypothesis of how ACAP is a positive moderating factor of the innovative effort of firms, even in the case of the connections created by their the participation in international networks not having a high correlation. Some suggestions for policymaker managers and future lines of research are provided.

Key words: absorptive capacity, innovation, internationalization, networks, innovative result.

INTRODUCTION

The growth of the internationalization of SMEs has become a world tendency favored by the development of communications, information management and transport technologies (Navarrete-Hinojosa et al. 2016). For this reason an increasing number of SMEs are entering world markets under different modalities (Lau and Lo 2015, Kotabe et al. 2014).

Internationalization demands that SMEs keep up with a high competitive level. For this reason, they are forced to put a lot of effort into R&D to have access to resources that are additional to the ones that they have, such as disruptive technologies, production forms, commercialization and/or distribution, qualified staff and, in general, any other resource that will allow them to beneficially use the external knowledge available (Chiva et al. 2014, Chetty and Stangl 2010, Porter 1998, Dunning 1995).

Management becomes a key factor to sustain an innovative process that will allow SMEs to be internationally competitive (Tsai 2014, Baum et al. 2000). In this sense, inter-organizational networks have a favorable impact in the innovative process, boosting their international performance according to the size and level of internationalization which they have (Ghodbane and Affes 2016, Guler and Nerkar 2012, Cavusgil and Knight 2009, Oviatt and McDougall 2005). On the other hand, there is empirical evidence concerning the positive

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influence of ACAP (Cohen and Levinthal 1990) on the innovative process (Kohlbacher et al. 2013) and its direct relation with the internal effort put into R&D (Ebers and Maurer 2014, Bertrand and Mol 2013). The influence of ACAP related to innovative results has been studied in regional systems (Navarrete-Hinojosa et al. 2016, Lau and Lo 2015) and its positive moderating effect has been proved.

This paper explores the causal relations that the variables mentioned have had with the international performance of SMEs from the IT services business in Argentina. At the beginning of the 2000s they managed to introduce themselves into foreign markets motivated by the advantage of a favorable exchange rate that boosted the objective quality of their assets and services. This advantage was sustained until 2007 when these enterprises could not keep their international competitiveness up to date (Barletta et al. 2013). Given the circumstances mentioned, it should be understood that there are causes that sustain the international competitiveness that could be related to ACAP.

Both the positive relation of the networks in the innovative process and the impact of ACAP as a moderating variable are justified in several papers. In Guler and Nerkar (2012), Chetty and Stangl (2010) and Oviatt and McDougall (2005) there is evidence of the impact of the networks and in Ghodbane and Affes (2016), Kotabe et al. (2014), Tsai (2014), Aljanabi et al. (2014) and Kohlbacher et al. (2013) of the positive moderating effect of ACAP. Nevertheless, no evidence exists of the causal relation between both variables in connection with the IT services SMEs with regard to their process of internationalization. The results obtained in this study show the favorable influence of the inter-organizational networks which are larger and have and have a higher level of internationalization on the innovative process of SMEs from the IT services business in Argentina and of the positive relation with ACAP as a moderator.

LITERATURE REVIEW AND RESEARCH HYPOTHESES

INVESTMENT IN R&D AND INNOVATIVE RESULT

Innovation is a multidimensional process that essentially implies novelty (Chetty and Stangl 2010) and was also defined at the OECD in (2005) as the "implementation of a new product or service or their significant improvement, a better or improved process or marketing method or a new organizational method in business practices".

Innovations that involve a novelty (radical) and the ones that imply an improvement (incremental) are based on their own knowledge as well as other knowledge that is external to them and to the one that the company accesses and benefits from. Traditional theories on the influence of external knowledge in the innovative process of companies (Bell 1995, Knight and Cavusgil 1996) explain this by using the example of allowing companies to acquire additional resources and capacities that, when properly managed, translate into a growing participation of the innovative results in the total sales. This fact can be verified, especially, in those SMEs with less possibilities of access to strategic resources and, for this reason, it is in these companies where the external knowledge acquires a bigger influence in the innovative process (Achcaoucaou et al. 2014, Chetty and Stangl 2010, Johanson and Vahlne 2009, Oviatt and McDougall 2005).

One of the main objectives of the SMEs is, indeed, to manage the access to complimentary resources such as qualified staff, disruptive technologies, new production forms and any other that allows using beneficially the external knowledge available. (Chiva et al. 2014, Tsai 2014, Chetty and Stangl 2010, Baum et al. 2000, Porter 1998, Dunning 1995). The interest of the SMEs for seizing these external sources of knowledge through the interaction with the environment is reflected in the theory called closed innovation (Chesbrough et al. 2006, Chesbrough 2003). The

theory presents the idea that, with the purpose of generating an additional value, companies can and must use either their own ideas or ideas from other companies that can be obtained through external channels (Necoechea-Mondragón et al. 2016, Hervas-Oliver et al. 2012, Murovec and Prodan 2009, Chesbrough 2004, Meeus et al. 2004, Nonaka and Takeuchi 1995).

Companies that have an open attitude toward innovation have a double benefit: the learning process itself and the possibility of obtaining more secure grounds of development of the innovative process (Love et al. 2014). Benefits are enhanced if they adopt a proactive attitude and manage relations that can act as a complement to the benefits expected by the company.

INTER-IRGANIZATIONAL NETWORKS AND INNOVATIVE RESULT

The access to knowledge from external sources is critical for the innovative process (Trantopoulos et al. 2017) and these external sources act as enablers of the learning processes implied in the development and support of such relations (Gibb et al. 2016). Luo and Bu (2017) state that those companies that conduct a "compositional" internationalization strategy by means of the development of collaborative networks and international partnerships obtain a better result.

The size and the level of internationalization of these networks are two factors of particular importance (Guler and Nerkar 2012, Cavusgil and Knight 2009, Zucchella and Scabini 2007, Oviatt and McDougall 2005, Zahra and George 2002, Coviello and Munro 1997, 1995). The intensity of the connection between the nodes of the network (Zahra and George 2002) is a determinant factor of the importance of the role which they have in the own innovative process (Coviello and Munro 1997, 1995). Usually networks are constructed from personal relations that are promoted with the aim of obtaining basic knowledge as well as resources that are not available for the company and which will allow maintaining a competitive advantage (Herstad et al. 2014, Bertrand and Mol 2013, Chetty and Stangl 2010, Johanson and Vahlne 2009, Kogut 2000, Birley 1985).

Chen and Wang (2008) point out that personal relations developed inside the company (internal networks) as well as the existing ones with other strategic partners (external networks) add value to the process. The internal networks allow the interchange and transfer of knowledge between the members of the company (Coleman 1988) whereas the external networks represent the social capital that can be exploited by the company in its relation with the other partners in the network (Gellynck et al. 2007, Burt 1992).

The size of the network allows establishing relations with different actors, improving and increasing the benefits derived from the network itself and enhancing the advantages of each bond (Feng-Jyh and Yi-Hsin 2015). Demirkan and Demirkan (2012) and Brink (2017) show that the intensity of connections as well as the heterogeneity of knowledge and experiences lead to innovation. The strength of a big size network is given by the innovative potential (Demirkan and Demirkan 2012, Guler and Nerkar 2012) where strong and weak networks are configured.

The positive impact of the connections of the international networks derives also in an easier and faster access to new knowledge (Zhou et al. 2007). Stoian et al. (2017) show networks help the process of accumulation of information concerning foreign markets, which is vital for international success. The own process of internationalization, understood as "an integrated group of strategic decisions and operations that allow the establishment of worldwide stable connections by means of a process (conscious and intentional) of growing international involvement of the company" (Welch and Luostarinen 1988), denotes the possibility of

obtaining new ideas in different contexts than the original one.

Jones et al. (2011) and Rialp et al. (2012, 2002) contribute to this vision and explain how networks and social capital are positively influenced by the internationalization. In the same way, companies with founders or entrepreneurial teams with international experience improve the process of internationalization and seize more intensely the available resources (Oviatt and McDougall 2005, Shrader et al. 2000, Reuber and Fischer 1997).

ACAP AS A MODERATOR OF THE INFLUENCE OF THE INTER- ORGANIZATIONAL NETWORDS IN THE INNOVATIVE PROCESS

The concept of ACAP introduced by Cohen and Levinthal (1990) has been verified, used and discussed by different authors through subsequent years (Lane et al. 2002, Zahra and George 2002, Lane and Lubatkin 1998) This concept exhibits a significant importance to analyze the business ability of seizing the external knowledge, combining it with its own domains and generating a dynamic learning and feedback that favor the innovative process and subsequently the maintenance of competitive advantages.

So, ACAP refers to the ability to recognize the value of the new knowledge that is external to the firm by assimilating it and applying it to business opportunities and has 3 basic dimensions: 1) the recognition of the value of the external knowledge, 2) its assimilation, and 3) its application and its transformation into business opportunities. A higher level of ACAP allows the company to be more proactive and innovative as it is prepared to detect and seize the opportunities presented in the environment.

Lane and Lubatkin (1998) moved further than the 3 basic dimensions of the original construct by adding the idea of the "relative absorptive capacity". They define this concept within the framework of the relation between companies rather than the relation between companies and the market. They conclude that the ACAP of a "sender" company to a "receiver" one is based on the dimensions mentioned before but adjusted to the new context. That is to say, it is necessary to adjust: 1) to the new knowledge offered, 2) to the organizational structure, and, 3) to the dominant logic in such a way that it allows its utilization.

Zahra and George (2002) introduce a conceptual extension of the construct, according to which ACAP constitutes "a group of organizational routines and strategic processes by means of which companies acquire, assimilate, transform and exploit knowledge with the intention of creating value". The construct becomes, then, characterized by 4 dimensions instead of the original three: 1) acquisition, 2) assimilation, 3) transformation, and 4) exploitation or use of the external knowledge. These 4 dimensions are, in turn, grouped into 2 components: 1) the potential absorptive capacity (acquisition and assimilation of knowledge coming from external sources), and 2) the realized absorptive capacity (transformation and exploitation of knowledge through business opportunities carried out by the company).

The intensity of ACAP measured with regard to the investment in R&D has been developed in Hervas-Oliver et al. (2012) and Cepeda-Carrión et al. (2012) link it to the organizational design. Roberts et al. (2012) relate it to systems of information management, Camisón and Forés (2011) to the capacities of internal creation of knowledge, Lev et al. (2009) to the influence of the environment, Todorova and Durisin (2007) to practices for social integration, Kostopoulos et al. (2011) to the level of externalities and Escribano et al. (2009) evaluate the participation in professional associations. Camisón and Forés (2014) gather precedents in the relation between R&D and ACAP setting the scene for future investigations, Tsai (2009) connects them to the studies on technological innovation

and Guler and Nerkar (2012) collect data from the pharmaceutical industry.

The aforementioned contributions facilitate the perception of ACAP as the ability of a company determined by two types of factors: 1) the ones managed by the company itself and 2) those that are external to the company and are the result of the interaction with other companies. We can conclude then, that the expenses in R&D and the international experience of the company in building the networks are key factors in the process. The investment in R&D aligns the whole organization in the innovative effort as it improves the abilities of its own participants by creating better potential conditions for the future, as described in Lane and Lubatkin (1998) and in Yipeng (2017).

The importance of human capital in the construction of ACAP is also described in Cerrato and Piva (2012) who recognize, through empirical results that the level of such capital and the presence of foreign investments in SMEs influence positively their innovative result and internationalization. In the same way, Yao and Chang (2017) show in their study how individual characteristics contribute to the development of ACAP, Onkelink et al. (2017) account for the need for companies that search for a quick internationalization to have a high level of qualified staff to increase their general productivity and innovative aptitude.

The experience that the company could have developed through their activities in foreign markets with suppliers, clients, competitors or any other agent favors their own ACAP (Gibb et al. 2016, Dermikan and Dermikan 2012, Oviatt and McDougall 2005, Coviello and Munro 1995). A key indicator that shows the international aptitude of the company is the participation of exports in the total sales. Their importance shows how, as time passes by, the experience gathered in such markets provides a feedback in the process of building opportunities in foreign markets (Souchon and Diamantopoulos 1996). Additionally, Cortez-Verdu and Reinert (2015) point out that regular exporters keep more inter-organizational relations than occasional exporters and that they implicitly strengthen the innovative process.

Firms with little experience in foreign markets, due to low levels of exports, for example, generally pay less attention to the new information about foreign clients and other agents in the destination countries, even though this is something of significant importance (Bertrand and Mol 2013).

It could be stated that the articulation of these 4 abilities mentioned by Zahra and George (2002) (acquisition, assimilation, transformation and exploitation) conforms a dimension of ACAP to develop innovations and that the participation of the company in bigger and internationalized inter-organizational networks is a factor that favors the access to a new and enhanced knowledge of their innovative process, which will be moderated precisely by the ACAP that it will be able to develop.

ACAP AS A MODERATING VARIABLE

ACAP is used in different research papers about business management as an independent variable (68% according to the review from Jiménez et al. 2012) or dependent variable (24%) and to a lesser extent, as a moderating (5%) or control variable (3%) Most investigations are focused on the manufacturing business (Jiménez et al. 2012) and only 10% on companies from the service sector with an emphasis on those related to IT (55%)

When the ACAP is used as a moderating variable, the dependent variable tends to be the innovative result of the company such as presented by Murovec and Prodan (2009), Zahra and Hayton (2008) and Lane et al. (2002). The contributions where the ACAP is used as a moderating variable is verified in Kohlbacher et al. (2013), who explore the impact of ACAP on the innovation in a business cluster in Central Europe and Aljanabi et al. (2014)

relate the organizational factors of support to a group of IT companies from Kurdistan with technological innovation. Tsai (2014) proves the moderating influence of the ACAP in the international expansion of companies from emerging economies in his study of 200 Taiwanese companies and Kotabe et al. (2014) in an examination conducted on 108 senior executives in China. In Guimaraes et al. (2016) the results indicate that the ACAP has a magnifying effect on the success factors of the innovative process.

Since the appearance of the ACAP construct it has been considered as an independent, dependent, and moderating or control variable in studies related to R&D results (Jiménez et al. 2012). Even though investigations that use other measures such as the effort of the company to improve their learning process (Kim 1998), the experience companies accumulated in the potential or effectively realized ACAP (Jansen et al. 2005) or the networks with clients that the companies exhibit have been developed (Eriksson and Chetty 2003), the component of R&D prevails, however, as the measure mostly used in the different known investigations. This dominance is justified, for example, when the effort in R&D has a ratio that is higher than 60% of the use (in a direct way or combined with other components), as is shown in the 312 specific investigations carried out by Jiménez et al. (2012).

Kohlbacher et al. (2013) show empirical evidence of the impact of ACAP on the innovative process and they link it to the level of dynamism and competitiveness of the cluster with which the ACAP is related. Likewise, Bertrand and Mol (2013) point out that ACAP, favored by the internal effort put into R&D, generates bigger connections with foreign suppliers, conducting this way to positive results with regard to product innovation. Ebers and Maurer (2014) support the validity of the hypothesis on the 2 components of ACAP quoted by Zahra and George (2002), that is to say, the potential and the realized CA, and they also provide the evidence that each of them affect the results of the process in a different way.

Lau and Lo (2015) have investigated the regional systems of innovation and the ACAP related to the innovative results. They explore the relations of the 4 dimensions of ACAP suggested by Zahra and George (2002) with the sources of information of the regional initiatives for innovation, the intensive services of business knowledge and the sources of information derived from the value chain, reaching the conclusion that they help to get a better performance of innovation. It could be said that one adequate measure, accepted and verified by empirical studies on ACAP, is comprised of the efforts and resources affected to R&D and to the level of internationalization of the company.

Considering the consequences of the described variables in the innovative process, the following hypotheses are being formulated (see Figure 1):

H1: There is a positive relation between the effort the company puts into innovation and its innovative result.

H2: There is a positive relation between the size and the level of internationalization of the inter-organizational networks in which the company participates and its innovative result.

H3: The absorptive capacity of knowledge of the company moderates the existing relation between the inter-organizational network of the company and its innovative result.

The graph shows that both investment in R&D and International Networks are causes of an improvement in competitiveness (expressed in Innovations). However, the impact of these variables is moderated by the ACAP.

METHODS

This investigation relies on a quantitative study conducted on IT services firms from Argentina based on a fieldwork whose aim was to gather information

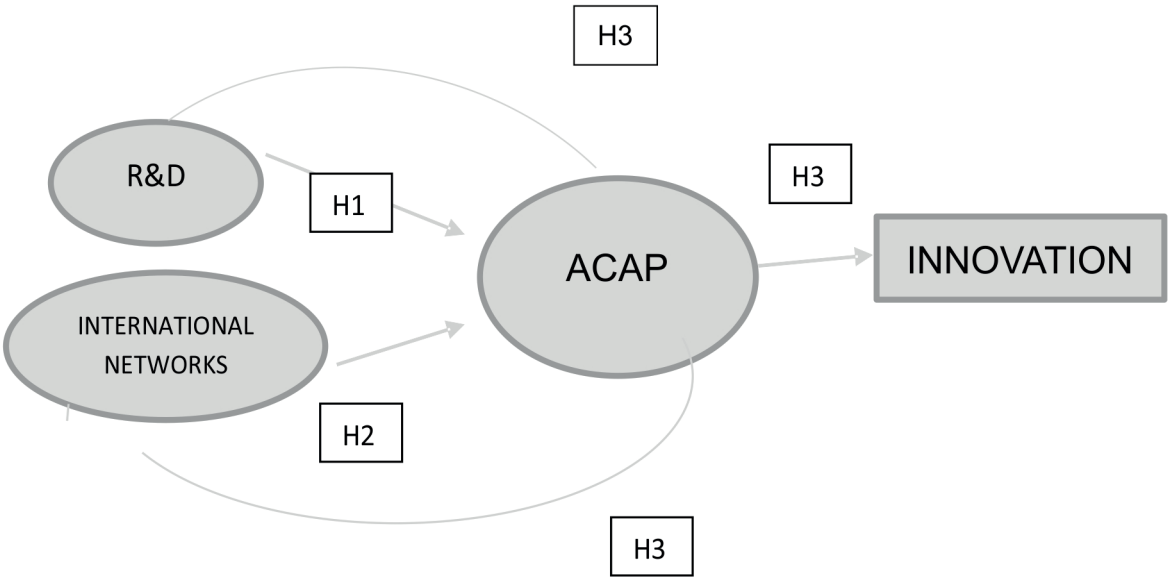

Figure 1 - Model and relationship between variables.

to this business activity (study conducted by researchers from the National University of General Sarmiento, Buenos Aires, Argentina, in 2011 and the use of their data was authorized by their main researcher, María Florencia Barletta). The tool used was a structured questionnaire supported by the dynamics of a personal interview.

Data collection that was further processed with the help of statistics software accumulated a total of 944 variables (software used was IBM SPSS Statistics 23.0). For the analysis of correlation we have applied Pearson´s Correlation Coefficient. Causal relations were established in the design of the questionnaire and the variables within the theoretical level. Afterwards, we proceeded to conduct an estimation by means of an analysis of multiple linear regression.

DEFINITION OF VARIABLES

The dependent variable is the *result of the innovative process* measured by the percentage share of the products or services with radical or increased innovations in the total sales of the period considering the 3 previous periods, which is in line with what Cassol et al. (2016), Kampik and Dachs (2011), Tsai (2009) and particularly Boschma and Weterings (2005) proposed, by analyzing 265 Dutch IT Services companies. Others like Ahuja and Katila (2001) and Hagedoorn and Cloodt (2003) define it starting from the number of patents obtained by the company within a certain period of time.

The independent variables adopted for this inquiry are: 1) the *innovative effort*, considered starting from the internal expenses in R&D related to the sales of similar period, and 2) *the connection to international networks* in which the company participates.

The study of the performance or *innovative effort* that starts from the expenses SMEs of IT services business devote to R&D is brought up by Romijn and Albaladejo (2002), who analyze the formal and informal technological efforts in R&D. Boschma and Weterings (2005) consider the innovative productivity defined as the quotient between the sales of new products developed by the company and the efforts in R&D as a dependent variable. Also, Sharma et al. (2016) contribute with evidence on the relation between expenses in R&D and the innovative result.

The *connection with international networks* related to the results of the innovation is described in Garriga et al. (2013) and Patel and Chrisman (2014) who provide empirical evidence about this. They also prove that the characteristics of the networks sometimes contribute to improving the innovative process as a whole. The evidence of the positive influence of the international networks in the innovative result can be also found in Chetty and Stangl (2010), Oviatt and McDougall (2005) and in Coviello and Munro (1995, 1997), among others.

MODERATING VARIABLE

The use of ACAP as a moderating variable in empirical investigations where the dependent variable is the innovative result of the company can be verified in Kohlbacher et al. (2013), Murovec and Prodan (2009) and Lane et al. (2002) and more recently in Aljanabi et al. (2014), Tsai (2014), Kotabe et al. (2014), Leal-Rodríguez et al. (2014), Lau and Lo (2015), Ferreras-Méndez et al. (2015, 2016), Llopis and Foss (2016) and Guimaraes et al. (2016).

In this study, the ACAP was estimated starting from: 1) the qualifications of the human resources, and 2) the international profile of the business management.

The first indicator describes the level of *qualification of the personnel* in the company, considering for this purpose the number of employees with complete university or superior education (Romijn and Albaladejo 2002, Barletta et al. 2013), including graduates and post graduates. This indicator is on the same level as the proposals exposed in Jacobsson et al. (1996), Alegre and Pasamar (2018) and particularly Onkelink et al. (2017) who support that a strategy for fast internationalization needs staff with high degrees of training to be able to increase the general productivity (Yao and Chang 2017 and Necoechea-Mondragón et al. 2016).

The second indicator considers the level of the *international management* derived from the participation of international capital or directors in the management and the increasing involvement with international networks. The first case considers whether in recent periods (within the 3 previous years) the firm has kept close relations with an international business group and in the second case the flow of international commerce within similar periods and measured through exports are taken into account.

Raff and Wagner (2014) have proved that firms in hands of foreign owners export more products and to a larger number of countries. More recently, Odlin and Benson-Rea (2017) supported this argument showing that the group management of business relations with foreign clients allows SMEs to avoid the direct competition with big companies and to keep other competitors out of their position within the network. Bertrand and Mol (2013), Tsai (2009) and Eriksson and Chetty (2003) relate the export performance with the formal and informal connections the company has with clients, suppliers, competitors and/or science and technology institutions from other countries. Cortez-Verdu and Reinert (2015) claim that regular exporters keep a chain value with suppliers and clients that motivates them to become more active in international markets.

DATA ANALYSIS

The study gathered information from 189 firms working in the IT services business out of 250 selected from a total of 1800 surveyed in Argentina through Business Associations (Barletta et al. 2014) and governmental offices. The companies are distributed according to the geographic diversity of the activity in the country where they are located (Hitt et al. 1997).

The indicators of major relevance obtained were the results of the *innovative process*

(innovations in the total of sales), *the innovative effort* (investment in R&D) and *the connection with international networks* (quantity of ties that the company keeps). The pertinent indicators to evaluate the ACAP were the *qualification of the human resources* (expressed in the participation of staff with university level) and the *international management* derived (participation of capitals or international managers on the one hand and *exports* as the representation of the continuous connection to foreign networks, on the other).

The hypotheses were verified using the multiple hierarchy moderating linear regression technique. The correlation of the independent variables was proved through both bivariate correlation and the method of inflation factor of the variance to check that the resulting estimators of such a regression would not be affected by the presence of multicollinearity problems.

EMPIRICAL RESULTS AND DISCUSSION

The descriptive variables considered in the present study are shown in Table I:

The first empirical verification evaluated the impact of the *innovative effect* over the *result of the innovative process (InnPrR)* (Tables II and III) and subsequently the impact that assumes the connections with international networks *(CNe)* (Tables IV and V).

Tables II and III show a high correlation, meaning that the (InnPrR) are explained largely

TABLE I
Variables involved according to the N filtered.

Variables	H	N	Mean	S.d.
Result of the innovative process	Participation of innovations in sales	19	2.334.919,15	5.079.338,61
			288.652,01	1.282.020,07
Innovative effort	Investment in R&D	18		
		9	0.86	1.343
Connection with international networks	Number of networks the company belongs to	18		
		9	24.58	66.16
			57.88	139.48
ACAP:				
Qualifications in HR (Total number of employees)	Employees with university level	18		
		4		
		18	7.02	23.77
		7		
			2.033.612,51	14.831.868,98
International management:	a) Foreign capitals or managers	18		
	b) Exports	8		
		18		
		9		

TABLE II
Correlation: innovative effort and result of the innovative process.

Correlation Innovative Effort – Result of the Innovative Effort		Participation of Innovations in total sales	Investment in Research and Development (R&D)
Innovative Result	Pearson´s Correlation	1	0.765
	N	189	189

TABLE III
Linear regression between innovative effort and result of the innovative process.

Model	R	R-Squared	Corrected R-Squared	Common estimation mistakes
1	0.765	0.586	0.574	1.00775

TABLE IV
Correlation: connection with international network and result of the innovative process.

Connection with International Network – Result of the Innovative Process		Participation of innovations in total sales	Number of International Networks the company belongs to
Innovative Result	Pearson´s Correlation	1	0.234
	N	189	189

TABLE V
Linear regression between connection with international networks and result of the innovative process.

Model	R	R-Squared	Corrected R-Squared	Common estamition mistake
1	0.234	0.055	0.050	4.950.892,76

(76.5%) by the Innovator Effort (InnEf) carried out by the company through the investment in R&D. Tables II and III express a low correlation between the number of international networks to which the company belongs to (Ne) and the InnPrR and they practically do not have any incidence in their results (a little more than 2%).

Even though there are correlated differences of each of the variables, both have a positive impact on *the InnPrR.* The analysis of how they are influenced by the ACAP should follow. With that purpose, and before establishing the estimation using the model of *Multiple Linear Regression*, the level of associativity between the *InnPrR* and the different control variables was analyzed in search of possible problems of collinearity. To that effect, it was verified that there are no significant relations between the indicators that can cause such problems (see Table VI).

As there are no signs of collinearity problems and once the significant correlation of the *InnEf* has been verified, the multiple linear regression, starting from a prediction of 22.6% (Table III) between the independent *(InnEf)* and dependent *(InnPrR),* show the following results at the moment of considering the moderating variables (see Table VII and Figure 2):

- Qualification of personnel in Human Resources: 79.9%
- International Management - International Capitals or Managers: 77.2%
- International Management - Exports: 80.7%
- The inclusion of the three variables delivers an estimation of: 82.5%

This way a very strong and significant correlation is proved between all the variables, including the moderating ones, each of these latter improves the prediction. The best result is observed when they act simultaneously (81.5%). This way, the *InnEf* is favored by the absorptive capacities of the companies that are measured through the aforementioned indicators. On the other side, the multiple linear regression that starts from a prediction of the 2.12% between the independent variable *Connection to international networks*, and the dependent one, the *InnPrR,* shows these other indicators:

- Qualification of personnel in Human Resources: 57.7%

TABLE VI
Collinearity – tolerances.

	Connection with International Networks	Participation of Innovations in Sales	Number of Employees with University Level	Total Exports	Participation of International Capitals or Managers
Result of the Innovative Process	0.826	0.412	0.628	0.854	0.826

TABLE VII
Linear regression between innovative effort plus moderator variables and result of the innovative process.

Model	R	R-Squared	Corrected R-Squared	Common estimation mistakes
1	0.815	0.665	0.624	0.94714

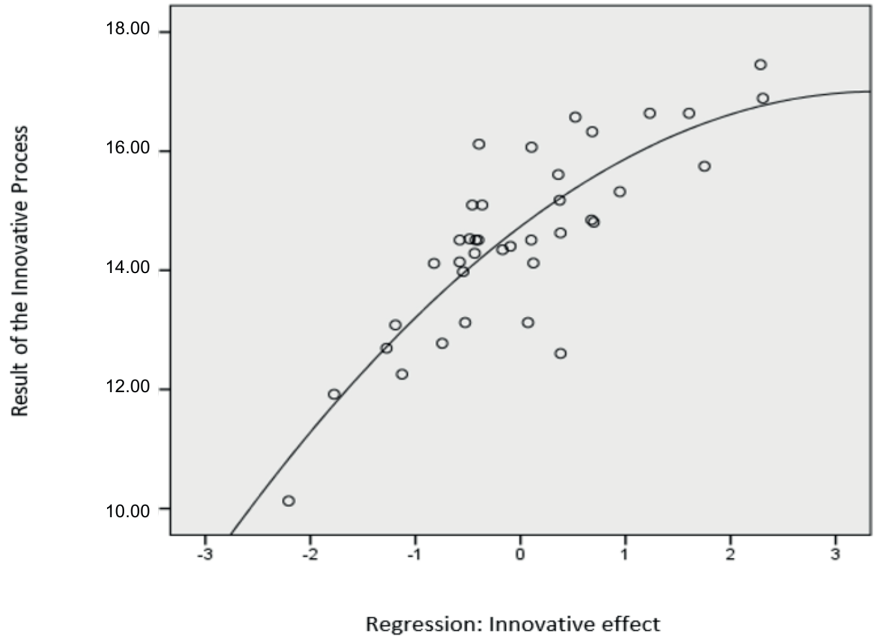

Figure 2 - Interaction between innovative effort plus moderator variables and result of the innovative process.

- International Management – International Capitals or Managers: 21.7%
- International Management - Exports: 42.5%
- The inclusion of the three variables delivers an estimation of: 58.7%

CONCLUSIONS

This work contributes to the research carried out in regional systems of innovation and to the influence of ACAP with regard to innovative results. The results obtained have implications for all SMEs working in the IT business and also in the process of design of policies that support the development of their competitiveness. It as well enables checking importance to favor ACAP through qualified human resources, international management promoted by foreign capitals or managers and a continuous current of commercial relations with foreign agents through exports, which also grants value to the internal knowledge available.

Evidence to be pointed out is the intensification which ACAP acquires when the different variables used to estimate it act together, showing that there is a positive relation between them that confirms the existence of different dimensions which are implicit in the very concept of ACAP. The results of the empirical models verify the main hypothesis, that is to say, how ACAP positively moderates the company's innovative effort, as well as the connections created by its participation in the international networks, even when this last variable does not have a high correlation in the kind of companies studied. For this reason, a need to go deeper into the verification arises. This would be done through investigating the size and the intensity of the connections with the nodes that shape the international networks (Oviatt and McDougall 2005, Demirkan and Demirkan 2012). Recent improvements (Navarrete-Hinojosa 2016, Lau and Lo 2015) suggest the significant role which what Oviatt and McDougall (2005) call "brokers" or "intermediaries" play in promoting the access to networks. To that effect, the role of the public agencies and universities in the construction of the inter-organizational networks opens the need to explore those roles in detail.

Similar to the "brokers", the role of the "gatekeepers" (Cohen and Levinthal 1990) should be also investigated in the detection of external knowledge that is useful for the SMEs of this area of expertise and which favors their ACAP. The relevance of the qualified human resources or those that have more or less intense and continuous connections with foreign markets in the construction of networks is clear, but there is new evidence related to the mechanism with which IT services SMEs (Barletta et al. 2013) can increase and improve the spreading of the external knowledge to which they have access.

In the end, and similar to what has been pointed out by Gallouj and Savona (2009), the analysis of the results presented makes it necessary to consider the specifications of the sector and the territory (country) where the companies are located so that relevant limitations can be taken into account and new doors can be opened to new questions and future lines of research, allowing questions to be formulate about the reciprocal analysis between the moderating effect of ACAP and the innovative process (Aljanabi et al. 2014), and the dynamics of the introduction of new members or changes in the relations that characterize the networks in which they participate (Huggins and Johnston 2010).

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