
Economic crisis effects on SME dynamic capabilities

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Abstract: Based on dynamic capabilities theoretical framework, this research sought to understand the implications of the recent economic crisis on the capability of developing new products by Portuguese SMEs. Specifically, we assessed how this capability was affected by variables such as entrepreneurship, innovation capacity, the knowledge accumulation, and partnerships. The hypotheses were tested using two samples, one before the crisis, with 180 and another with 105 respondents, applied during the crisis (2012). Results reveal that during the crisis SMEs were more objective and effective in the use of their resources and capabilities. In particular, was found that during the crisis the entrepreneurship, innovation capacity, accumulation of knowledge and partnerships, have an impact on the capability of developing new products. Before the crisis, only entrepreneurship and knowledge accumulation have affected this capability.

Keywords: dynamic capabilities; economic crises; SMEs; entrepreneurship; innovation capacity; partnerships; knowledge accumulation.

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1 Introduction

In the short term, the economic crisis has dramatically reduced the interest of companies to invest in innovation (Archibugi et al., 2013). However, while in most of the companies, innovation investment decreased as a result of the economic crisis, a minority chose to do exactly the opposite, increasing their expenditure on innovation (Stadler et al., 2013). Other authors look to practices of companies that follow an 'innovative behaviour', before and during the economic recessions (Kanerva and Hollanders, 2009). These authors, by analysing the data of innobarometer for Europe, found no association between the size of the company and the reduction of investments, in line with the results obtained by Antonioli et al. (2010) which demonstrate that most innovative SMEs are comparable to large firms during economic crisis situations. Kanerva and Hollanders (2009) studies also demonstrate that most innovative enterprises keep on investing in innovation, also, during the economic crisis.

In addition, when more young companies are facing issues in their internationalisation processes, they tend to reduce expenditure in innovation but, also, to look for new opportunities by encouraging entrepreneurship processes within the company (Filippetti and Archibugi, 2011) and to maximise partnerships potential (Glattstein and Lei, 2014).

This research theoretical framework is supported by the resources based view theory (RBV). This approach is amplified, in its evolutive perspective, by dynamic capacities perspective (Blome et al., 2013) and aims respond to a lack identified in the literature. Macher and Mowery (2009) consider that although there is a strong theoretical and conceptual progress in the field of dynamic capabilities, to understand the basis for a sustainable competitiveness, there is a lack of studies developed in crisis contexts.

Easterby-Smith and Prieto (2008) consider that there are few empirical studies identifying the interaction of mutual reinforcement between knowledge management and dynamic capabilities. "The lack of explicit connection that we noticed between dynamic capabilities and knowledge management can be related to the distributed nature of the adoption of strategies in the business community" (p.245).

This subject is particularly relevant in Portuguese context, as the economic crisis has strongly contributed to the bankruptcy and loss of competitiveness of a significant number of Portuguese companies, being SMEs those more affected. Although the theoretical field of RBV and dynamic capabilities has been the subject of a vast field of empirical research (e.g., Danneels, 2008; Ambrosini, et al., 2009; Cabanelas, et al., 2013) to our best knowledge, research on the effect of the crisis on competitive factors still needs further investigation. Previous research addressed specific topics during crisis

periods. Glattstein and Lei (2014) analysed the role of partnerships on financial intermediaries. Archibugi et al. (2013) studied the effect of economic crisis on firm's innovation investment and Filippetti and Archibugi (2011) on the national innovation systems. Yang and Hsieh (2013) focused on the organisational knowledge and resource mobilisation.

Dynamic capabilities have direct influence in the development of competitive advantage, and contribute to the achievement of sustainable competitive differentiation, allowing, this way, companies to overcome their competitors (Eisenhardt and Martin, 2000; Teece, 2007). The achievement of higher levels of performance requires the development of new products, processes and the implementation of new organisational business models (Teece, 2007). Then, will be important for this research to understand the implications of dynamic capabilities for new products development.

2 Theoretical framework

The entrepreneurial competitiveness is an important subject, brought to the academic debate by Porter (1980, 1985). However, this author perspective presents some limitations due to his strategy approach be based just on the market, neglecting the company characteristics, as suggested by the resources based vision theory (RBV) (Barney, 1991; Prahalad and Hamel, 1990; Grant, 1991; Wernerfelt, 1984). This theory emerges as an alternative, and by being centred in the company, provides a framework for the development of competitive advantage. In its initial approaches, RBV focuses attention on the heterogeneity of resources as they represent the origin of its strengths and weaknesses (Barney, 1991; Wernerfelt, 1984). In this understanding Powell (1992), Bates and Flynn (1995) consider that RBV is based on the generation of a sustainable competitive advantage and on the economic value of resources, which must be unique, difficult to imitate, not easily replaced and obtained in the market. Thus, the RBV is based on the acronym VRINA (the resources should valuable, rare, inimitable, non-substitutable and adaptive). Later, other researchers have focused on the configuration of the resources (cf. Eisenhardt and Martin, 2000; Teece, 2007). In fact, the simple existence of heterogeneous resources may not be sufficient to justify competitive differentials between companies. The difference is most the result of how the resources and capabilities are developed, configured and operated (Allred et al., 2011). Once assured VRINA characteristics, companies must strategically develop their resources and capabilities, allow the maximisation of its competencies and distinctive features, in the best possible way, so to create a sustainable competitive advantage (DeSarbo et al., 2006). This approach may be understood in its dynamic (Chaharbaghi and Lynch, 1999).

The research on dynamic capabilities is rooted in RBV (Macher and Mowery, 2009) is having an increasing number of contributions since Teece et al. (1997) basilar article allowed the affirmation of this concept in the international panorama of research. Is a research subject with rapid evolution (Oliver and Holzinger, 2008) and well established in the researchers' agenda (Zahra et al., 2006).

Among those several studies published on this subject, some authors have been criticising the dynamic capabilities approach as uncompetitive, vague or tautological (Williamson, 1999; Kraatz and Zajac, 2001). This originates the responses of those academics defending this approach (among others, Eisenhardt and Martin, 2000).

The dynamism explanation has different approaches (e.g., evolutionary economy). However, the dynamic capabilities management theoretical relevance is related to the sustainability and competitive advantage in rapidly changing environments (Teece et al., 1997; Zahra et al., 2006). Teece (2007) consider dynamic capabilities as “the capacity of a company to integrate, build and reconfigure internal and external expertise to face contexts that change rapidly” (p.516). For such, can be materialised through processes or routines, allowing to combine, transform or renew the resources of an organisation in new strengths and in accordance with markets evolution (Eisenhardt and Martin, 2000). Based on VBR, the dynamic capabilities approach assumes that most valuable capabilities are those unique to each company, and developed over time. Are not able to be acquired in the market (Makadok, 2001) and resulting from an evolution, on the basis of the evolution of decisions and of lifelong learning time (Ambrosini et al., 2009).

In the field of capacities resource reconfiguration, dynamic capabilities play an important role (Teece et al., 1997; Eisenhardt and Martin, 2000; Winter, 2003). Zahra et al. (2006, p.912) “distinguish substantive capabilities (used to solve a problem or obtain a result) from the dynamic ability to change or reconfigure existing substantive capacities, which we denominate as the dynamic capabilities of the company.” Dynamic capabilities are the nuclear factors of change on the basis of the organisation’s resources (Winter, 2003), capabilities of highest level promoting the changing in common capacities or substantive capabilities (Zahra et al., 2006). Eisenhardt and Martin (2000) they use the term capacities, Zollo and Winter (2002) refer dynamic capabilities as being routines dedicated to the modification of the operational routines. Danneels (2008) uses the term second-order competencies because their ability to build new skills. The same author defines dynamic capabilities as the competence to build new skills, based on the looming that the accumulation of new resources allows new organisational competencies, being this form of organisational learning, suggesting a connection between the evolution of dynamic capabilities and mechanisms of learning (Zollo and Winter, 2002).

Eisenhardt and Martin (2000) have enumerated several dynamic capabilities, among others, routines of product development, strategic decision making, routines for replication and negotiation.

For the purposes of this research, we will adopt the specification of Macher and Mowery (2009). These authors consider dynamic capabilities to include the strategic and organisational processes, namely, the development of products, strategic alliances, entrepreneurship, innovation and knowledge management.

In this study we aim to confirm five hypotheses:

H1: The higher the entrepreneurial capacity, the greater the capacity for development of new products.

According to Stevenson and Jarillo (1990) the economic crisis enhances the ability of companies to develop strategies and search of new opportunities. For Shane and Venkataraman (2000) entrepreneurship must have two complementary approaches: the path of opportunities and the existence of the organisation of individuals with entrepreneurial skills.

For Newey and Zahra (2009) the need to develop dynamic capabilities is more urgent when the operational capacities react to a rigid form before ‘exogenous shocks’ as economic crises. According to these authors, depending on the sector of activity, the cycles of interaction between dynamic capacities and the operational, allows

reformulating the organisational routines and the implementation of new strategies. In fact, the role of the knowledge and individual skills, are crucial to the organisational strategy (Barney, 1991). Wright et al. (1994) added the motivation to this catalogue of competencies. Later, Dabu (2008) specified the need to consider also the entrepreneurship, completing the proposal of Barney (1991). In this context, the entrepreneur role in a business context is related to the knowledge creation and other competencies, contributing, positively, to the identification and exploitation of new business opportunities (Davidsson and Honig, 2003).

The role of entrepreneurship, in the social and economic development, is essential in the new products development process and production (Zott and Amit, 2007). These business processes can occur at the individual levels, team, organisation, inter-organisational or sectorial (Hoskisson et al., 2011). The development of strategies based on inter-organisational cooperation (networks or alliances), the connection to higher education institutions, the access to venture capital and the way the country stimulates the entrepreneurship, are key factors to assess new business opportunities (Hoskisson et al., 2011). For Chadwick and Dabu (2009) dynamic capacities resulting from the way, ventures act when working in environments of uncertainty. The entrepreneurial businesses with an open-minded approach, creates, define and exploit new opportunities, allowing organisations gain value and be ahead of competitors (Zahra et al., 2006). Whereas entrepreneurship may be considered as a process through which the individuals exploiting new opportunities (Stevenson and Jarillo, 1990), we may understand that the way opportunities are perceived by the entrepreneur, allows a better or worse evaluation of the competitive changes within a sector, influencing the launch of new products (Hoskisson et al., 2011).

H2: The greater the innovative capacity, the greater the capacity for development of new products.

In competitive markets, the capacity to innovate is essential for the organisation competitiveness. Macher and Mowery (2009) refer that R&D practices are key for the organisation's sustainability, in particular in the new product development process. According to these authors, the existence of suitable procedures together with best practices in organisational behaviour and the management of information technology are the basis for the organisational learning. Essentially, by having an effective integration between new knowledge creation and codification, based on the formal mechanisms of learning and assimilation (Zollo and Winter, 2002), becomes possible a better sharing of encoded knowledge throughout the organisation. Those organisations with more agile and flexible structures may have an advantage in contexts of constant change, and, this way, to profit from new market opportunities (Stadler et al., 2013). In more traditional sectors of activity, during the economic crisis period, there is a tendency for organisations to suspend, or even abandon, ongoing innovation projects, as a way to reduce costs. This will contribute to the organisation weakness (Stadler et al., 2013).

A way of circumventing the risks and the investment associated with the innovation is the establishment of alliances, which according to Jiang et al. (2010) allow

- 1 The sharing of complementary skills, costs, and risks, so to reduce projects costs and uncertainty.
- 2 The access or acquisition of the capabilities and knowledge necessary for the pursuit of innovation.

For Jiang, et al. (2010) a higher intensity of the alliance is positively associated with higher rates of growth and survival, as well as to higher levels of innovation.

Depending on the level of innovation wanted, there are diverse possibilities of partnerships, that could be between big multinationals companies, public and private companies, and between companies and non-profit organisations such as universities and government entities (Jiang et al., 2010). Due to the uniqueness of each company, partnerships arising from different sets of resources and capabilities (Barney, 1991). In the case of non-profit organisations, universities and government entities alliances, they may provide access to new research, enabling access to new knowledge that, in a medium term, may allow the company supplant their competitors (Santoro and Chakrabarti, 2002). These innovation partnership possibilities allow limiting the risk of dependence but increases the requirement of coordination that not all the smaller firms have (Jiang et al., 2010).

Innovation is essential for competitiveness, not only, but also, during economic crisis periods. In the dynamic capacities context, the linkage between innovation and the development of new products involves the introduction of organisational routines specifically for the process of innovation management (Pavitt, 2005), be developed internally (organic development) or the result of partnerships (external development).

The development of dynamic capabilities implies the establishment of active approaches related to innovation (Macher and Mowery, 2009) considering the following hypothesis:

H3: The higher the ability of knowledge accumulation, the greater the capacity for development of new products.

According to Macher and Mowery (2009) the accumulation of knowledge is the process by which the organisations determine the effectiveness of certain organisational approaches and communicate this information to the entire organisation. These authors argue that two approaches should be considered: multifunctional teams (working groups); joint development of people and of knowledge.

The competitive development based on the accumulation of knowledge considers the principle of co-evolution as a central dynamic capacity for knowledge management (Easterby-Smith and Prieto, 2008). This principle of co-evolution is particularly relevant in this study since there is a path of dependencies that must be considered by the organisations to harden their sources of competitive advantage to resist in economic crises (Helfat and Peteraf, 2009).

The principle of co-evolution is also important due to the accumulation of knowledge and innovation. Stadle et al. (2013) analysed high innovative organisations noting persistence is an important characteristic. Newey and Zahra (2009) consider that organisations need to be able to recognise the strategic value of new knowledge, now how to assimilate and apply in new business, either through the development of new products or by managing the current portfolio. Specifically, organisations should be able to develop four key competencies on knowledge: acquisition, assimilation, processing and exploitation.

The ability to learn allows organisations to overcome the crises more effectively. Yang and Hsieh (2013) argue that crises do not repeat for same reasons. So, a specific solution for one crisis may not be able to be applied directly in another one, implying the ability for radical changes in the organisational routines.

Individuals are crucial in the accumulation of knowledge. It is through the development of routines and collective abilities, that organisations may achieve sustainability and competitive advantages in VBR (Barney, 1991). However, the dependency from individuals takes some risk, since there are negative competitive consequences due to loss of key employees to the competition when key employees leave for competitors (Aime et al., 2010).

In the context of crisis, the possession of knowledge relevant to the business becomes essential for the dynamism, since organisations tend to base their competitive performance in the way the current knowledge is used (Haas and Hansen, 2004). The knowledge depends on the circumstances of each task, suggesting the importance of including a dynamic looming in how is managed, shifting the emphasis from the acquisition of resources to the optimisation of the one existing (Grewal and Slotegraaf, 2007).

According to this framework, the accumulation of knowledge and learning represent essential processes for competitiveness in times of crisis, encompassing activities such as creation, development, retention and the transfer of knowledge (Chiva, 2005; Easterby-Smith and Prieto, 2008). The accumulation of knowledge is a dynamic process of strategic renewal, involving the normal tension between the creation of new knowledge (exploration) and use the existing knowledge (exploitation) (Crossan et al., 1999). In both situations, the accumulation of knowledge process may result from partnerships, merger or acquisitions, or the recruitment of qualified staff, in what Zahra and George (2002) classified as ‘absorption capacity’. Can also result from organic growth by implementing diverse mechanisms for intra-organisational knowledge sharing (Tsai, 2002).

In this vision, the accumulation of knowledge is fundamental for the development of competitive capacity, in particular, through the development of new products. So, the following hypothesis should be considered:

H4: The greater the degree of partnerships development, the greater the capacity of new products development.

Eisenhardt and Martin (2000) consider that dynamic capabilities are the result of concrete strategic and organisational processes, as partnerships, that create competitive advantages for organisations, especially in dynamic markets, through the development creating value strategies. The organisations use partnerships to accumulate knowledge and resources, start new ventures and enter into new market segments (Hoskisson et al., 2011).

Access to resources is essential to achieve competitive advantage (Allred et al., 2011). However, is not sufficient, since it is key to ensuring the effective management and exploitation of these resources so to create unique capabilities (Barney, 1991; Teece et al., 1997). The resources reconfiguration not always depends on from internal sources and may be a result of establishing partnerships (Eisenhardt and Martin, 2000). In fact, the analyses of the relevant literature on this subject, reveals that the terms as ‘coordinate’, ‘combine’ and ‘integrated’ are essential to the resources and capabilities approach (Barreto, 2009). This suggests that organisations must develop partnerships (Allred et al., 2011). The use of partnership allows develop new business and reach new markets, through the abolition of resources gaps and the development of complementarities with partners, motivating higher levels of corporate entrepreneurship. (Hoskisson et al., 2011).

The studies presented by Glattstein and Lei (2014) demonstrate that those organisations establishing more partnerships are able to develop additional dynamic capabilities. These authors refer that organisations developing partnerships may even profit from economic crisis periods to strengthen their capacities. Also enables the development of unique competitive advantages, not easy to replicate, since partnerships combining various complementary competencies (Wang and Wei, 2007). During adverse contexts to consider partnerships as strategic, allows the accumulation and the use of resources to boost competitiveness, but, with the constant need of monitoring the relationship (Sirmon et al., 2007).

Partnerships are developed to access resources that are not available internally. But, it is not always possible to consider that these new resources may start being an integral part of the company's internal resources (Cui et al., 2010). Managers should consider the internal development of resources as an alternative (Cui et al., 2010).

For Hoskisson et al. (2011), due to the small nature of SME's, it is not always possible to develop internally the resources needed to profit from new business opportunities. In these cases, partnerships could be the solution to obtain external resources (Madhok and Tallman, 1998). This is one of the reasons why networks of collaboration are being increasingly understood as an important element of entrepreneurship (Hoskisson, et al., 2011).

Cui et al. (2010) consider that the establishment of multiple connections between partner companies enhances the level of collaboration and the accumulation of experience, leading to the development of inter-organisational routines and the absorption of new knowledge

By resuming the literature reviewing, we may say that the development of partnerships is fundamental for organisations to access new resources and complementary skills, providing access to new markets and/or new products. Also, the implication of partnerships in the entrepreneurship and innovation. For these reasons, we believe that partnerships are essential for SME's to overcome situations of economic crisis, and the following hypothesis could be stated:

H5: There are significant differences between the companies in the context of crisis and those operating in a favourable environment in how dynamic capabilities affect the capacity for new products development.

This last hypothesis aims to understand if the reflections made in the previous sections may vary during economic crisis situations when compared to contexts of stability. It is possible that companies, during the crisis period, may adopt different strategies (Stadler et al., 2013).

3 Method

First, a literature review was performed based on search words as 'entrepreneurship', 'knowledge management', 'alliances team' and 'innovativeness'. The conceptual model was developed subsequently as the basis for the questionnaire construction. This was based on the collection of measurement instruments available in the bibliography.

The questionnaire was pre-test by four entrepreneurs aiming to validate questions meaning and identifying response difficulties. On the basis of the comments received, a final version was developed.

Since was intended to evaluate the impact of the economic crisis in the organisations, a longitudinal study was conducted. As such, the questionnaire was first applied in 2009, in Portugal, in paper format, distributed in hand or sent by email, during a period of three months. The same questionnaire was applied, the second time in 2015 (after Portuguese economic crisis), with the same procedure, during a period of two months. The confidentiality was guaranteed. On both cases, a convenience sample was obtained using snowball method.

The operationalisation of variables considered in the conceptual model was achieved by using a Likert scale of 5 points (1 = much worse; 5 = much better). The questionnaire is presented in Appendix 1.

The entrepreneurial capacity was measured by using the model proposed by of Hult et al. (2003) with four questions aim to valuate the organisation pro-activity, innovation time to market, projects pioneering when compared to competitors and the responsiveness among other organisations/stakeholders.

The innovation capacity was measured by using the model proposed by Tanriverdi (2005) with five questions aim evaluate the innovation time of acceptance, the generation of innovative ideas for products and services and the encouragement for innovation.

Tanriverdi (2005) model was also used to measure the accumulation of knowledge. In this case with twelve questions aim to valuate the integration of relevant knowledge in the organisation, the integration of knowledge from customers and the transfer of relevant knowledge to business practices.

Table 1 Sample characteristics

<i>2009 sample (N = 180)</i>	<i>%</i>	<i>2015 sample (N = 105)</i>	<i>%</i>
Dimension		Dimension	
Less than nine employees	16%	Less than nine employees	15%
10 – 49 employees	22%	10–49 employees	17%
49 – 99 employees	27%	49–99 employees	35%
More than 100 employees	35%	More than 100 employees	33%
Number of years of activity		Number of years of activity	
Less than three years	15%	Less than three years	12%
3–5 years	25%	3–5 years	23%
6–10 years	27%	6–10 years	31%
More than 11 years	33%	More than 11 years	34%

To measure partnership was used the model proposed by Kale et al. (2000) with five questions aim to valuate the partnership support based on mutual trust or personal friendship and the level of interaction between the partners.

Finally, the development of new products was measured by using the model proposed by Kusunoki et al. (1998) with eleven questions aim to valuate the creation of products or concepts lead time, the improvements in production technologies, among others.

Target population was managers of Portuguese SMES from Lisbon and other regions in centre of the country. Was considered a convenience sample, having been surveyed, in

the first stage (2009) 180 respondents and, in the second (2015) 105. The sample characteristics are presented in Table 1.

4 Results and discussion

We have started by verifying correlations before the crisis (Table 2). We find that entrepreneurial capability and knowledge accumulation are significantly correlated with new product development performance. Considering the before crisis scenario, this supports the hypothesis 1 and 3, considering that firms with better entrepreneurial capability and knowledge accumulation have higher new product development performance. Observing the entrepreneurial capability, our findings are in line with those from Zott and Amit's (2007) regarding the entrepreneurship scroll in new product development and the implementation of innovative production methods. Findings on the positive interaction effects of knowledge accumulation are coherent with those from Crossan et al. (1999) that innovative practices are central both for knowledge exploration and exploitation.

However, in our findings, is in evidence that innovation capability and alliances are not correlated with new product development before the crisis, not supporting our hypothesis 2 and 4. These findings are distinctive from those of Macher and Mowery (2009) and may reflect the individualistic way of doing business in most Portuguese SME's.

Table 2 Descriptive statistics and correlation matrix (before crisis)

	\bar{X}	The s.d.	A	Entrepreneurial capability	Innovation capability	Knowledge accumulation	Alliances team
New product development performance	3.64	0.49	0.87	.21**	.04	.24**	.03
Entrepreneurial capability	3.4	0.56	0.8		.52**	.47**	.12
Innovation capability	3.4	0.51	0.77			.48**	.04*
Knowledge accumulation	3.3	0.53	0.94				.16*
Alliances team	3.2	0.52	0.84				

Note: * $p < 0.05$ and ** $p < 0.001$ (two-tailed Fisher's test).

Results obtained during the economic crisis are shown in Table 3. Unlike before crisis, we find that all constructs are significantly correlated with new product development performance. Furthermore, during the economic crisis, SME's have developed better capabilities in the four areas, supporting our hypothesis 1, 2, 3 and 4.

This improvement of organisational capabilities (before/during the economic crisis) suggests a greater dynamism in a context of uncertainty as referred Chadwick and Dabu (2009). Results demonstrate a higher level of entrepreneurship that will contribute positively to the identification and exploitation of business opportunities. Also, improves the capacity of responding to the development of operational capabilities, with a much higher flexibility than before crisis context.

The role of innovation is also higher, suggesting a major focus, mainly, at the organisational structure and responsiveness, levels. As referred by Stadler et al. (2013), a more agile and flexible structure allows obtain best results in contexts of constant change, take advantage of new market opportunities and overcome existing barriers placed to innovation.

Results are significant regarding the role of alliances. This is important for SME's since allows the sharing of knowledge and complementarity competencies, that may contribute to the development of unique competitive advantages, difficult to replicate. Results in line with findings from Jiang et al. (2010), Wang and Wei (2007) and Cabanelas et al. (2013).

Table 3 Descriptive statistics and correlation matrix (during crisis)

	\bar{X}	<i>The s.d.</i>	<i>A</i>	<i>Entrepreneurial capability</i>	<i>Innovation capability</i>	<i>Knowledge accumulation</i>	<i>Alliances team</i>
New product development performance	3.5	0.8	0.98	.77**	.76**	.73**	.66**
Entrepreneurial capability	3.5	0.84	0.89		.82**	.66**	.69**
Innovation capability	3.5	0.82	0.91			.66**	.68*
Knowledge accumulation	3.3	0.85	0.97				.60**
Alliances team	3.3	0.8	0.98				

Note: * $p < 0.05$ and ** $p < 0.001$ (two-tailed Fisher's test).

Table 4 Results of regression analyses (before / during economic crisis)

	<i>Entrepreneurial capability</i>		<i>Innovation capability</i>		<i>Knowledge accumulation</i>		<i>Alliances team</i>	
	<i>Before</i>	<i>During</i>	<i>Before</i>	<i>During</i>	<i>Before</i>	<i>During</i>	<i>Before</i>	<i>During</i>
	0.77***	0.21***	-	0.76***	0.73***	0.24***	-	0.66***
	(0.05)	(0.08)	-	(0.05)	(0.06)	(0.09)	-	(0.07)
Constant	2.95***	0.96***	-	0.91***	0.75***	2.86***	-	1.47***
	(0.29)	(0.17)	-	(0.17)	(0.22)	(0.3)	-	(0.23)
R2	0.03	0.59	-	0.58	0.53	0.05	-	0.44
F test	4.76	223,03	-	-220.82	157.74	6.11	-	72.97

Notes: Smr regression coefficients are shown in the table. Standard deviations are in parentheses. *** $p < 0.01$ (two-tailed Fisher's test).

By applying regression analyses, we were able to verify significant differences before and after the economic crisis (Table 4). With the economic crisis, SME's have developed a greater effectiveness in the use of their capacities. These suggest the validation of hypothesis 5.

5 Conclusions

5.1 Theoretical contributions

This research proposes new contributions to the theory. There are limited recent studies on this subject that consider the recent economic crisis and a before/during crisis comparative analysis.

The differences found when analysing the two samples are relevant. Before the crisis was observed a greater concentration of the studied capacity on mean values, a reality less evident during the crisis, when organisations with smaller capacities when with partnerships with others, generate superior capabilities.

Important conclusions are also obtained by the hypotheses verification. We propose evidence regarding the variables articulation and how they contribute to new products development capacities. The results showed that during the crisis, SME's are more focused on the use of its resources and capabilities, probably, due to the less effectiveness of existing strategies to face adversity, declining in demand and the increase of taxation.

In particular was verified that the innovation capacity and the establishment of partnerships, began to have an influence on the ability to develop new products, not happening before the crisis. Also, the increase of the entrepreneurial spirit and accumulation of knowledge on new product development wasn't due to higher investments, but to the improvement, in the way, these capabilities were used. The average values obtained were not very different in the two samples, however, when we analysed the B value in the regressions analysis, is verified a significant increase in the influence of independent variables on the ability to develop new products.

From the theoretical framework used – dynamic capacities – this study verifies that SME's were able to reformulate features and capabilities in order to become more objective and effective in investments, becoming more dynamic and responsive in contexts of economic crisis.

5.2 Managerial implications

Results show that during economic crisis organisations have become more objective on the use of their capabilities, in particular the ones related to entrepreneurship, innovation, and knowledge accumulation. Also, the development of partnerships is considered to be important in the strategic planning, especially as may contribute to foster innovation and improving new product development processes.

As such, strategic formulation should incorporate both formal and informal mechanisms fostering a more innovative and entrepreneurial organisational culture. Simultaneously, the organisational processes should incorporate knowledge accumulation routines. They contribute to reduce organisational dependence of individual knowledge. Furthermore, the external link with partners reinforces knowledge acquisition and accumulation through collective innovation platforms such as open innovation or collaborative design thinking.

5.3 Limitations and further research

The models presented don't aim to explain all the SME's reality. In fact, other independent variables could have been considered as, among others, the capacity to export, strategic planning, marketing or organisational capacity. We know, not empirically, that these variables are referred as gaps to fulfil in SMES and it would be highly relevant to bring evidence on these. Also, despite the sample have reached a reasonable number of responses, there are limitations regarding the generalisation of the results.

For future research, will be relevant to have a fine-tuning analysis by sector of activity, findings in this study may vary from the sector of activity, and test the model with a larger sample.

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Appendix 1

Questionnaire items

A Product development

- 1 Ability to develop new products/services
- 2 Development of new products/services to contribute toward investment in R&D projects ...
- 3 Studies of the creation of new products/services
- 4 Successful launches of new products/services
- 5 The development effectiveness of products/services to meet the needs of customers

B Entrepreneurship

- 1 Responsiveness among other organisations/stakeholders
- 2 Speed in the introduction of new products and services in the market
- 3 Proactiveness in projects of high risk
- 4 Degree of initiative in efforts to optimise the possibility to explore new opportunities

C Innovation

- 1 Rapid acceptance of technical innovations, based on the search results
- 2 Constant generation innovative ideas for products and services
- 3 Rapid uptake of innovation in the management of programs/projects
- 4 Penalising people for new ideas that do not work
- 5 Encouragement of innovation

D The accumulation of knowledge

- 1 Creation of skills and operational knowledge and R&D applicable in various business units (BU)
- 2 Transfer of operational knowledge and R&D relevant applicable in various UN
- 3 Integration of and operational knowledge of relevant R&D of several UN so as to create new products/services
- 4 Change of operational policies and R&D based on lessons learned in other UN

- 5 Creation of skills and knowledge of marketing applicable to various UN
- 6 Transfer of relevant knowledge about customers between the UN
- 7 Integration of knowledge about customers of UN to obtain new perspectives of customers
- 8 Change of policies and marketing processes and product of UN to obtain new perspectives of customers
- 9 Creation of skills and knowledge management measures applicable in various UN
- 10 Sharing of best practices in management between the UN
- 11 Integration of policies and relevant management processes in various UN
- 12 Change of policies and management processes on the basis of lessons learned in other UN management

E Performance in product development

- 1 Development costs
- 2 The effectiveness of investment in development
- 3 Delivery deadlines
- 4 Ease of transfer for the production phase
- 5 Precedence of marketing
- 6 Product cost
- 7 Improvement in the quality of the product/feature
- 8 Improvement in the product technology
- 9 The level of innovation in the technologies of the product
- 10 The level of innovation in the product as a whole
- 11 Creation of new product concepts

F Relational capital

- 1 Close interaction between the various levels between the partners of the alliance
- 2 Mutual respect the various levels between the partners of the alliance
- 3 Confidence level at various levels between the partners of the alliance
- 4 Friendship level at various levels between the partners of the alliance
- 5 Reciprocity between the partners of the alliance