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Organizational learning and performance: Relationship between the dynamic and the operational capabilities of the firm

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This paper analyzes the relationship between organizational learning mechanisms, normally regarded as dynamic capabilities, and the operational flexibility of the firm, considered as an operational capability, within the context of the measurement of firm performance. Organizational learning is a dynamic process which enables the firm to adapt to changing environments, so making it easier for it to change established behaviour patterns and routines. This dynamic capability is therefore directly related to organizational routines and the operational processes that underlie these routines, and the objective of this study is to analyze this relationship and its effect on firm performance. To this end, we carried out an empirical study to test the relationships proposed in our model. Our most important findings were firstly that there is a link between the dynamic and the operational capabilities of the firm, and secondly that the development of dynamic capabilities will result in improved firm performance.

Key words: Organizational learning, dynamic capabilities, operational capabilities, business performance.

INTRODUCTION

With the appearance of the resource-based view (Penrose, 1959), companies began to be considered as a set of resources and capabilities that produced competitive advantages (Wernerfelt, 1984; Peteraf, 1993; Barney, 2001). However this theory has been questioned due to its static nature and because it does not take into account the influence of the dynamism of the environment (Eisenhardt and Martin, 2000). The idea of capabilities as being the result of the action of resources applied to the firm combined with the processes carried out by it (Grant, 1991), led to the appearance of the dynamic capabilities theory (Teece et al., 1997; Makadok, 2001), which corrected some of the shortcomings of the resource-based theory, when it came to explaining their true influence on the development of competitive advantages and, in consequence, on improved firm performance.

The dynamic capabilities theory proposed that the main source of competitive advantages lay in the capabilities obtained by a firm from the restructuring of its organizational skills and routines (Cepeda and Vera, 2007; Barba-

Sánchez and Atienza-Sahuquillo, 2010). Dynamic capabilities enable firms to create new products and processes and respond to changing market conditions (Helfat, 1997). Capabilities are therefore produced through mechanisms for the coordination and integration of activities and processes, and are the fruit of the collective learning produced or acquired by the firm's different individual assets (Hafeez et al., 2002; Alipour et al., 2010). In order to understand the nature of dynamic capabilities, it is necessary to differentiate between the different processes and routines developed by companies. On this question, certain authors (Zollo and Winter, 2002; Peng et al., 2008) propose that a distinction should be made between dynamic and operational capabilities. Dynamic capabilities are those that bring about the changes in the processes applied by the firm, while operational capabilities are those relating to the way it functions or operates (Zahra et al., 2006). For its part, organizational learning is defined as a specific process that underlies all dynamic capabilities (Winter, 2003), which is responsible for the positive development of the firm's capabilities (Easterby-Smith and Prieto, 2008). From this point of view, organizational learning is the motor that drives the dynamic capabilities of the firm to structure and guide the operational capabilities of the

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firm towards the obtaining of competitive advantages (Zollo and Winter, 2002). Given that the development of operational capabilities is a consequence of well-established learning processes in the organization, this article tries to establish a positive relationship between the capability for organizational learning and the operational flexibility of companies, while also analyzing the influence of these variables on firm performance. The relationship between the variables proposed in our paper tries to advance in the empirical demonstration of the link between the development of dynamic capabilities and firm performance put forward in the theoretical framework of many different research studies (Prieto and Easterby-Smith, 2006; Cepeda and Vera, 2007). Although there is extensive literature on the study of dynamic capabilities, many aspects of the relationship between these capabilities and the performance of the firm have yet to be analyzed.

In order to analyze the relationship between dynamic capabilities and performance, we began by analyzing the influence of organizational learning and collaborative know-how on the development of a very specific type of capability, namely operational flexibility. Operational flexibility is created in organizations that are learning-orientated, which guarantees them the capability to respond to changing situations in the environment (Jaworski and Kohli, 1993). This enhanced capacity to adapt to a changing environment created by operational flexibility must result in reduced losses in terms of time, effort, cost or performance (Upton, 1995). This last premise, the relationship between operational flexibility and performance, therefore becomes the ultimate objective of our proposed research, once the prior influence of organizational learning capability on said flexibility has been demonstrated. For these purposes, we will be carrying out an empirical study on the role of organizational learning in the theoretical research field of dynamic capabilities, and how this learning capability has a positive influence on operational flexibility, which leads to improved firm performance.

THEORETICAL FRAMEWORK

Organizational learning and its relationship with dynamic capabilities

Organizational learning processes are directly responsible for the development of different kinds of organizational routines, some operational and some dynamic, in which the latter are responsible for the process of modification of the former (Zollo and Winter, 2002). From this perspective, dynamic capabilities are behaviour patterns with which the firm systematically adjusts its operational routines, so as to increase its effectiveness. Learning processes can therefore be categorized as part of a firm's dynamic capabilities (Chen, 2005; Collis and Montgomery, 2008).

Organizational learning processes can be approached from various different perspectives, such as the resource-based view (Barney, 1991), the dynamic capabilities theory (Teece et al., 1997; Eisenhardt and Martin, 2000), or theories based on knowledge management (Nonaka, 1994; Gholipour et al., 2010). When trying to analyze the processes that bring about change in organizational routines, our base theory will be that of dynamic capabilities, which establishes that the learning process is based on repetition, experimentation and identification of new opportunities (Teece et al., 1997), and is one of the most closely related factors to future firm performance (Fugate et al., 2009).

In addition, when we study the influence of organizational learning on firm routines, we will be focusing on the learning gained from the relationships entered into by companies, which results in the increase of certain organizational capabilities (among others Inkpen and Dinur, 1998; Uzumeri and Nembhard, 1998; Simonin, 1999; Saarenketo et al., 2004). In this context, the alliances established between firms play a key role in their organizational learning capability (Botha and van der Waldt, 2010). The strategies followed by firms when establishing business alliances are amongst the most effective methods of accessing new knowledge (Reuer and Zollo, 2000). When it comes to building an alliance between companies, previous experience in similar alliances plays a crucial role (Simonin, 1997). Collaborative know-how is the sum of a variety of skills developed over time as a result of the firm's collaborations with other companies, and this set of skills is improved and augmented by the effects of experience (Simmers, 2004). Know-how is a tacit concept inherent in all processes and is responsible for the ability of the dynamic capabilities to reorganize firm resources (Wang and Ahmed, 2003). It can therefore be argued that collaborative know-how is a specific type of knowledge acquired by the organizations, which has a positive influence when it comes to entering into alliances both in the present and the future, and has a direct effect on the development of all the processes carried out by the organizations (Bustinza et al., 2010). In short, this set of organizational learning mechanisms arising from collaborative relationships between companies are typical examples of dynamic capabilities as they form part of the firm's management of its strategic alliances (Eisenhardt and Martin, 2000). However, these mechanisms, like all other dynamic capabilities, do not have a direct effect on firm performance, and instead generate alternative resource configurations (Zott, 2003).

The role of flexibility in organizational routines

A firm's set of operational routines is made up of the organizational processes and routines formed and shaped by organizational learning mechanisms (Cepeda and Vera, 2007). The updating and adaptation of operational

routines is therefore the result of the direct effect of the learning generated by firms, and is established as a process of evolution of the firm's dynamic capabilities (Zahra and George, 2002; Zahra et al., 2006). From this perspective, the generation of new knowledge will be a key capability in the reorganization of corporate processes and routines (Gold et al., 2001). Within operational capabilities, this paper analyzes the role of operational flexibility as one of the variables most closely related to the capacity of the firm to adapt when faced with uncertainty in the environment in which it operates (Schmenner and Tatikonda, 2005). According to the different theories that analyze firm resources, operational flexibility is a capability that is related to the explicit resources and competences of companies (Mills et al., 2003). Within the context of our analysis of the acquisition of new knowledge through the learning mechanisms developed in alliances entered into with other companies, it is necessary to determine the role played by operational flexibility, which is understood as the capacity to adapt in operational terms to the uncertainty or risks created by the establishment of said alliances. In general terms, operational flexibility reduces the vulnerability of companies to the uncertainty of the environment in both the short and the long-term. This strengthening of the firm through increased flexibility over different time-spans is directly related to its improved performance (Arias-Aranda et al., 2010).

Operational flexibility reduces the short-term vulnerability to problems such as changes in the volume of the services provided or problems arising in the scheduling of these services (Jack and Raturi, 2002). In the same way, long-term operational flexibility enables the firm to adapt better to variations in customer needs or technological changes that accelerate the obsolescence of its processes (Eppink, 1978; Hatum and Pettigrew, 2006). Changes in the firm's environment can create temporary fluctuations in operational levels of activity. In these cases, flexibility becomes a competitive tool that enables firms to respond quickly to variations in external demand (Schilling and Steensma, 2001). When designing production processes or processes for providing services, a certain degree of flexibility must be built into the system to enable the firm to respond well to the different external sources of variability (Harrigan, 1980). Flexibility is therefore the ability of firms to react swiftly when faced with situations of uncertainty in the environment, by deploying a complete set of resources and capabilities that allow it to cope with the situation successfully (Volberda, 1996; Germain et al., 2001). The availability of the resources and their successful coordination ensure that the levels of operational flexibility are the right levels for the different situations that may arise (Fredericks, 2005). This in turn means that the organizational learning capability and the know-how developed within companies are vitally important elements for operational flexibility, due to their influence on the organization of the resources and capabilities that firms develop and deploy. Finally, this

capacity to adapt is related to improved performance levels, because it reduces the effects of the uncertainty and the variability inherent in business activity in a changing environment such as the present one.

CONCEPTUAL MODEL AND HYPOTHESES

The relational capital view establishes that business alliances are a source of organizational learning and produce and maintain know-how for the firm (Kale et al., 2000). In addition, an organization that learns is an organization that can develop the necessary skills to create, acquire and transfer knowledge in such a way as to alter its behaviour (Garvin, 1993), and this is why the structure of this kind of organization is designed in such a way as to ensure that this process of organizational learning is genuinely effective (Slater and Narver, 1995). Due to its multidimensional nature, organizational learning will cover the multitude of sub processes related to the acquisition and dissemination of the available information, including the general process of interpretation of this information (Sinkula, 1994). Learning capability is conceived as the effort required to articulate and codify the relevant collective knowledge to perform complex tasks within companies, so that these tasks can serve as a base for the development of new skills, which enable companies to reorganize their routines (among others Normann, 1985; Senge, 1990; Day, 1991; McKee, 1992; Wick and Leon, 1993; Winter, 2003; Alipour et al., 2010). This capability becomes a determining factor for the success of companies competing in global markets such as today's, which means that if the firm does not possess this capability, it may face enormous difficulties (Prahalad and Hamel, 1990; Nonaka and Takeuchi, 1995). Numerous research studies have shown the effect of organizational learning mechanisms on the dynamic capabilities of the firm through the assimilation and the generation of new knowledge (Salvato, 2003; Verona and Ravasi, 2003; George, 2005). To summarize, organizational learning capability is one of the mechanisms that produces new knowledge, so enabling companies to better understand the new situations that bring about change in processes and routines at an operational level (Akgün et al., 2006). It can therefore be argued that the use of learning mechanisms leads to the development of the organizational routines that form part of the firm's operational processes, thereby influencing operational flexibility over different time-spans, which can be expressed in the following hypothesis:

H₁: The organizational learning capability is positively and significantly related to the level of the firm's operational flexibility in both the short and long term.

In this way, the generation of new resources is a key factor in the reorganization of the resources and capabilities

developed by companies. These new resources are generated essentially through two kinds of clearly distinct processes, namely the combination and the exchange of new knowledge (Nonaka, 1994). This combination and exchange of knowledge can only be achieved through the firm's relational capital, i.e. the set of current and potential assets that companies develop through their network of business relationships (Nahapiet and Ghoshal, 1998; Roth and Kostova, 2003). The establishment of business alliances is one of the most effective means of generating new knowledge (Das and Teng, 2000; Teng and Das, 2008). In addition, prior experience in collaborative relationships substantially increases the possibility of benefitting from any new relationships established (Powell et al., 1996). In the same way, certain relationships in which the main objective of the alliance is to enable the firm to acquire new knowledge, take on a strategic nature and become essential mechanisms for obtaining new resources (Grant and Baden-Fuller, 2004). The success of those alliances in which the main objective is to enable the firm to acquire new knowledge is related to previous experience of such alliances (Simonin, 1997). In the same way, it can be argued that those organizations that are capable of successfully maintaining their business alliances develop the necessary know-how to ensure that their future collaborative relationships are also more effective. This knowledge acquired in the firm's collaborative relationships has a direct, positive impact on operational routines (Eisenhardt and Martin, 2000), so enabling the firm to adapt more easily to changing market situations, or in other words, increasing its operational flexibility. For all of the above reasons, we can state that:

H₂: The collaborative know-how is positively related to their short and long-term operational flexibility, in such a way that the greater the know-how, the greater its effect on flexibility.

Finally, the restructuring of the firm's operational resources and capabilities forms a base from which it can build a competitive advantage (Pavlou et al., 2008). The operational capabilities are made up of the set of skills planned to develop effectively the operational routines of the firm, and operational flexibility is one of the skills most likely to be reorganized by the evolution of dynamic capabilities (Pagell and Krause, 2004). If we assume that dynamic capabilities are intermediate processes that are not related to the acquisition of skills and instead are used to reorganize existing skills (Eisenhardt and Martin, 2000), we would be justified in arguing that the firm develops its competitive advantages through the reconfiguration of its operational capabilities (Pavlou and El Sawy, 2006). This is the mechanism that articulates the relationship between organizational learning and operational flexibility, leading to improved performance arising from the benefits obtained from the correct management of the knowledge acquired by firms (Fugate

et al., 2009). In view of the above, the effect that these dynamic capabilities have on the firm's operational flexibility serves as a base for the development of a competitive advantage. We can therefore propose that:

H₃: The operational flexibility of the firm in the short and long-term is positively related to its performance, in such a way that the greater the flexibility, the better the performance.

The different hypotheses we propose and the representation of the relationship between the variables presented therein can be seen in Figure 1, which also shows all the representative dimensions of the constructs used in this study.

METHODOLOGY

Universe, sample and type of research

The target population was made up of service-sector companies located in Spain with more than 20 employees following the basis of the guidelines indicated in the revised version of the OECD (Organization for Economic Co-operation and Development) 'Oslo Manual' (OECD-EUROSTAT, 1997). These firms were selected using the DICODI (Directory of Counsellors and Directors) 2006 - 2007 business directory, which offered a total of 12,587 companies. The statistical analysis of the data was carried out using the SPSS 15.0 for the validation of the scales and exploratory factor analysis, while the EQS 6.1 programme was used for the formulation of a model of structural equations, the tools chosen for the process of gathering and processing the data, and for the analysis of the relationships between the variables proposed in our study. A pilot questionnaire was drawn up in order to analyze the clarity and the suitability of the questions for our objectives, and we performed interviews to test the measurement instrument selected by checking their suitability for the purposes for which they were designed. The small errors that were detected were corrected and two batches of questionnaires were sent out. The first batch had 1,000 questionnaires and a second batch with a further 1,000 questionnaires was sent out later minus the 123 valid questionnaires obtained from the first batch. In total we received 213 valid questionnaires, making a response rate of 11.35% (Table 1). The questionnaires were sent to senior managers whose positions in the firm enabled them to respond accurately to the questions we were asking them. We believe that they have information from a wide variety of departments, and that they have the right characteristics to evaluate the variables proposed in this study (Baer and Frese, 2003).

Measurement instrument

Organizational learning capability

After performing a review of the most important scales used in the study of organizational learning, we decided to use the scale created by Kale et al. (2000) which is made up of 4 items measured on a Likert Scale of 1 to 7 ranging from "Totally Disagree" to "Totally Agree".

The study of the main components produced the results we expected, one single component, while the exploratory factor analysis confirmed that all the indicators showed acceptable inter-item (above the advisable limit of 0.3) and item-total (over 0.5)

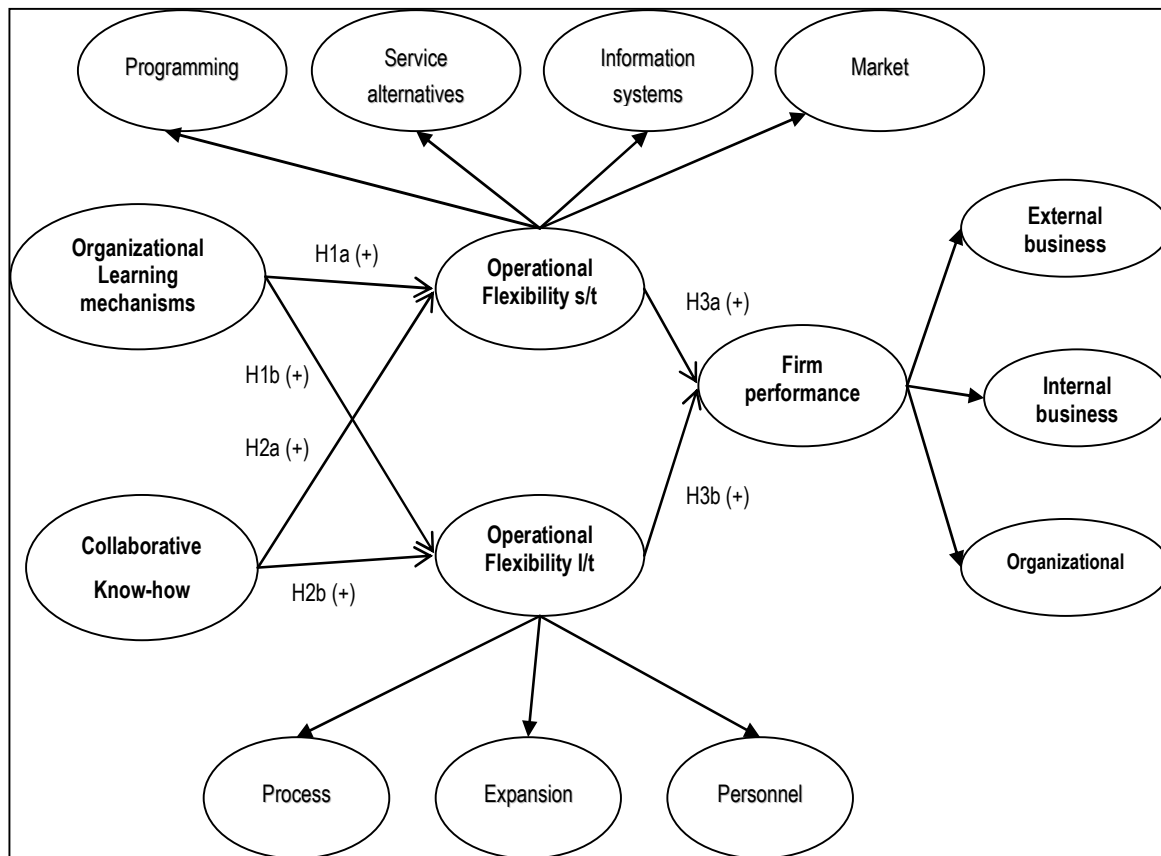


Figure 1. Analysis of the relationship between the organizational learning mechanisms, operational flexibility and business performance.

Table 1. Technical specifications of the sample.

Universe	Service-sector companies with more than 20 employees
Geographical Area	Spain
Methodology	Structured questionnaire
Population	12,587 companies
Size of the sample	N=213
Design of the sample	Random selection without replacement of units

correlation levels, thereby establishing the uni-dimensionality of the items selected which made a confirmatory analysis of the scale advisable. This analysis showed the internal consistency of the scale (Table 2), with Cronbach's $\alpha = 0.933$ which is above the figure of 0.7 normally considered as the lower limit for this indicator Hair et al., (2001).

Know-how in collaborative relationships

We used the scale developed by Simonin (1999) to try to establish

a relationship between prior experience in business alliances, the success of current alliances, and the general know-how acquired in alliances established by the firm. Collaborative know-how is essential for those wishing to manage a broad portfolio of allies, and offers companies the chance to benefit from the resulting inter-firm relationships (Powell et al., 1996). In fact, in some cases a lack of prior experience is the main source of problems in such alliances and therefore also one of the main reasons why they fail (Lei and Slocum, 1992; Lei et al., 1996).

Prior experience leads to the appearance of a distinctive form of know-how that allows firms to get more out of subsequent alliances

Table 2. Analysis of the reliability and the factor loads of the indicators being studied.

Construct/items	Average	D.S.	Initial model		Final model		Composite reliability	Variance extracted
			Load factor (t-values)	R ²	Load factor (t-values)	R ²		
Org.Learning							0.835	0.559
LEARN1	4.843	1.620			0.967(18.215)	0.764		
LEARN2	4.829	1.605			1.006 (20.971)	0.844		
LEARN3	4.681	1.673			0.995 (18.099)	0.759		
LEARN4	4.872	1.709			1.011(19.194)	0.752		
C. Know-How							0.945	0.591
KEA1	5.157	1.315			0.958 (15.308)	0.696		
KEA2	5.122	1.372			0.969 (14.769)	0.655		
KEA3	5.250	1.347			1.060 (15.495)	0.813		
KEA4	5.206	1.461			1.048 (14.865)	0.675		
KDU3	4.951	1.399			1.000 (16.495)	0.726		
KDU4	4.843	1.409			1.007 (17.929)	0.726		
KDU6	4.838	1.455			1.018 (18.710)	0.696		
KDU7	4.877	1.522			0.990 (17.827)	0.603		
KDU8	4.907	1.402			0.986 (19.073)	0.703		
KEX1	4.613	1.463			0.893 (14.627)	0.569		
KEX2	4.049	1.488			0.955 (13.318)	0.629		
KEX3	4.505	1.500			1.069 (14.135)	0.775		
O. Flexibility								
Short term							0.930	0.629
ALT1	4.059	1.874			1.002 (4.475)	0.525		
ALT2	3.976	1.788			1.126 (4.589)	0.550		
ALT3	3.946	1.670			0.930 (5.816)	0.552		
SIST1	4.451	1.647			1.028 (16.935)	0.660		
SIST2	4.559	1.655			1.126 (16.265)	0.784		
SIST3	4.838	1.772			0.968 (13.021)	0.505		
MER1	3.652	1.702			0.708 (3.481)	0.652		
MER2	3.613	1.773			1.244 (3.348)	0.742		
Long term							0.857	0.602
EXP5	4.127	1.602			0.882 (5.124)	0.570		
EXP6	4.284	1.508			1.042 (5.018)	0.898		
PER1	4.015	1.611			0.924 (5.522)	0.498		
PER2	4.225	1.511			1.121 (5.700)	0.666		
Performance							0.921	0.596
NIN1	5.108	1.301			1.134 (19.388)	0.778		
NIN2	5.181	1.244			1.049 (19.686)	0.728		
NIN3	5.240	1.330			1.001 (18.480)	0.580		
NIN4	5.299	1.225			0.872 (18.790)	0.518		
NEX1	5.343	1.259			1.034 (17.871)	0.874		
NEX2	5.338	1.297			0.967 (17.805)	0.720		
ORG1	4.897	1.499	0.657 (13.428)	0.237				
ORG2	3.917	1.521			0.799 (19.630)	0.534		
ORG3	4.539	1.516			1.011 (20.037)	0.565		
ORG4	4.665	1.490	0.976 (11.210)	0.129				
ORG5	4.297	1.509	0.872 (12.896)	0.289				

^aAll load factors are significant for a level of p 0.01.

(Simonin, 1997). The understanding of the transfer mechanisms and processes that underlie collaborative relationships favours a greater absorption of knowledge. For all these reasons, we proposed a 7-point Likert Scale (1= Very low level of know-how, 7= Very highly-developed know-how) in order to quantify the degree of know-how required to be successful in collaborative relationships.

When we perform the principal component analysis to determine the dimensionality of the scale, four dimensions appear which are subject to the measurement of the respective inter-item and item-total correlations. These measurements were not satisfactory for one of the components, Factor 2, or for one of the indicators, item KH9, and we therefore decided to eliminate them. The three dimensions that in the end were validated were given the names EXANTE ($\alpha = 0.905$), DURING ($\alpha = 0.917$) and EXPOST ($\alpha = 0.849$) in relation to their position in time with respect to the collaborative know-how they contribute. The values obtained for composite reliability (above the limit of 0.7), and average variance extracted (greater than 0.5) show the internal consistency of the scale (Table 2).

Operational flexibility

In this case, we used a 7-point Likert Scale (1 = "totally disagree", 7 = "totally agree") adapted on the basis of research by Arias-Aranda (2002). The analysis of the uni-dimensionality of the scale did not throw up any problems, with the different items showing a satisfactory factor load with regard to their corresponding factors. The internal consistency of the indicators and the analysis of the reliability led us to remove the dimensions entitled Programming and Process, and the indicators EXPA1, EXPA2, EXPA3 and EXPA4, due to inter-item and item-total correlation problems within the flexibility scale in the long-term. We obtained a Cronbach's Alpha value of 0.764 which confirmed the necessary internal consistency of the scales used to represent this construct (Table 2).

Business and organizational performance

The first thing to point out in this section is that business performance is considered as the best instrument for finding out if the decisions taken by companies have been the right ones (Neely, 2005). Research by different authors has shown that subjective measurements of performance like those used here are just as valid as quantitative performance measures (Dess and Beard, 1984; Ittner and Larcker, 2003). Other studies have shown that the two measurement instruments produce similar results (Venkatraman and Ramanujam, 1986; Fynes and De Búrca, 2005). This performance measurement scale is made up of various dimensions of business performance which seek to show whether the firm's strategy has been reflected in the objectives it sets itself, and its organizational performance, in relation to the gains achieved in terms of its presence in current and future markets, (Venkatraman and Ramanujam, 1986; Abernethy and Lillis, 1995; Kaplan and Norton, 2006).

As in the other cases, we used a 7-point Likert Scale ranging from "Totally Disagree" to "Totally Agree". Principal components analysis revealed the presence of three components, and it was necessary to eliminate the items RORG 1, RORG 4 and RORG 5 due to the problems of consistency of these indicators ($R^2 < 0.05$). The values for composite reliability, average variance extracted and Cronbach's $\alpha = 0.847$ were within the limits for the internal consistency of the scale (Table 2), and showed that it was a suitable instrument for the measurement of business performance.

RESULTS

The results obtained using the structural equations

approach between the variables we are studying are presented in Table 3. In order to assess the goodness of fit of the model, we followed the recommendations made by Hair et al. (2001), who stated that three different kinds of indicators must be taken into account: measurements of absolute goodness, incremental goodness and parsimony. In relation to the first group of indicators, and in order to begin our analysis of the model, we selected the Goodness-of-fit Index (GFI), the root mean square error of approximation (RMSEA), and the root mean residual (RMR). In the first case we obtained a GFI of 0.960, which was within acceptable levels as it was higher than the figure of 0.9 established as the reference point for acceptability. For the RMSEA, which is an indicator based on the expected error of approximation based on the degrees of freedom shown by the equations in the model, values of between 0.06 and 0.08 are considered acceptable, and our value of 0.072 was within this range. Finally we obtained an RMR of 0.044, which was below the maximum limit figure of 0.05 and therefore also indicates an acceptable level of fit.

In addition, in order to find out if our proposed model had an acceptable level of incremental goodness of fit, we compared it with other possible models that could be formulated, in general and in our case, such as the so-called "zero model". In most cases, indicators with values of over 0.90 are considered as acceptable and representative of an adequate level of fit. The values obtained for the different indicators are above this limit (CFI=0.923, NFI=0.906, NNFI=0.916 and AGFI=0.903), which shows that the incremental goodness of fit is also acceptable.

Finally, as for the measurements that analyze the parsimony of the model, the only correct indicator to be analyzed is the value of the Normed Chi-Square χ^2 , which is suitable for this kind of model as it is not a nested model. The values considered acceptable for this indicator fall within the range from 1 to 3, and on occasions values of 5 can occur. In our case, we obtained a value of 1.260, which indicates that this part of the goodness-of-fit analysis has also produced satisfactory results, as the values fell within the acceptable range.

The results obtained in the goodness-of-fit analysis are consistent with our hypotheses, and confirm that there is a positive influence between the variables to which they refer (Figure 2). After analyzing the data, we discovered that the results were in line with the general study hypotheses proposed above, such that we can state that both the organizational learning capability and the know-how developed during previous collaborative relationships have a positive, significant influence on operational flexibility, and that there is also a positive influence between said flexibility and business performance.

DISCUSSION

The results indicate that all the hypotheses are supported.

Table 3. Indicators of the goodness of fit of the different constructs and of the model of relationships.

Type of fit	Indicator	Nomen	Acceptance range	Learn	Know	Flex	Perform	Model
Absolute	Chi-Square likelihood	CMIN	Offers significance test	9.427 (p = 0.109)	149.803 (p = 0.110)	40.153 (p = 0.221)	45.845 (p = 0.175)	287.381 (p = 0.465)
	Goodness-of-Fit Index	GFI	> 0.900	0.979	0.904	0.953	0.946	0.960
	Root Mean Square Error	RMSEA	0.050-0.080	0.076	0.078	0.073	0.079	0.072
	Root Mean Residual	RMR	< 0.050	0.015	0.042	0.038	0.044	0.044
Incremen	Compared Fit Index	CFI	> 0.900	0.989	0.944	0.952	0.966	0.923
	Normed Fit Index	NFI	> 0.900	0.986	0.919	0.921	0.947	0.906
	Tucker-Lewis Index	NNFI	> 0.900	0.988	0.928	0.930	0.954	0.916
	Adjusted Goodness Fit	AGFI	> 0.900	0.916	0.912	0.907	0.916	0.903
Parsimony	Normed Chi-Square	CMINDF	Range (1-5)	4.713	1.011	2.362	2.697	1.260

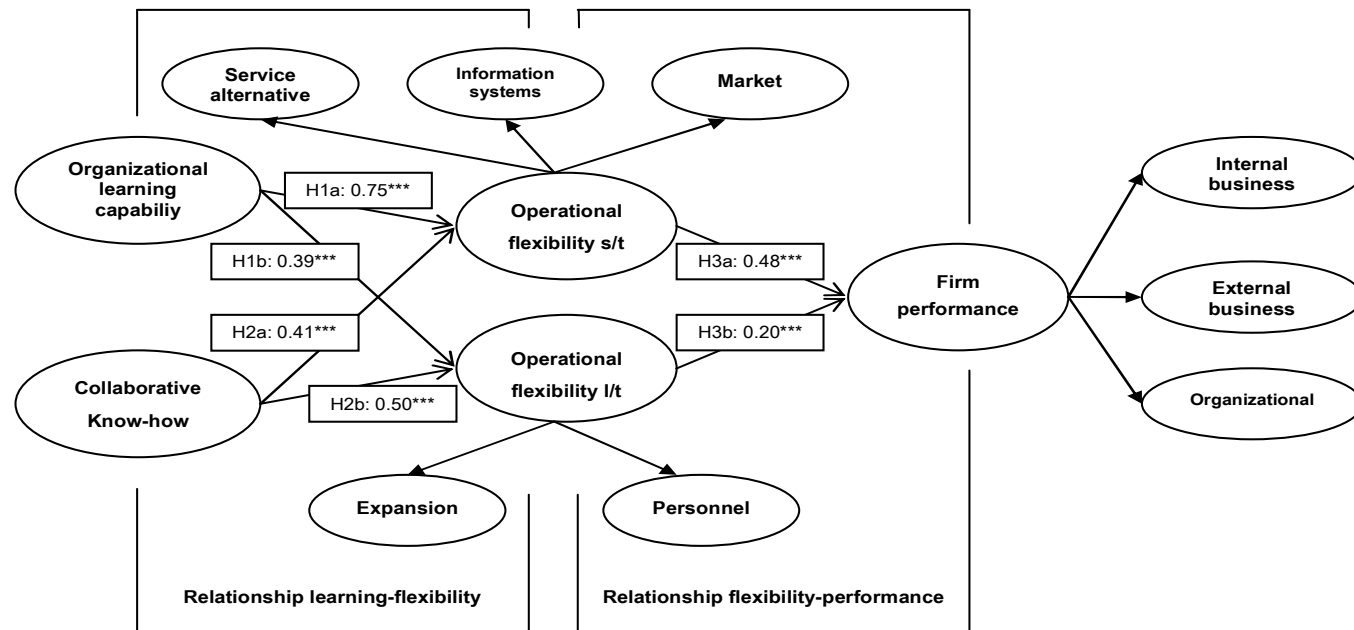


Figure 2. Estimation of the model using structural equations. $\chi^2 = 287.381$; d.f = 228; GFI = 0.960; RMSEA = 0.072; RMR = 0.044; CFI = 0.923; NFI = 0.906; NNFI = 0.916; AGFI = 0.903; $\chi^{2/d.f} = 1.260$. ***p<0.001, **p<0.01, *p<0.05.

The goodness-of-fit indicators for the model cannot be improved, which confirms that our model has proved suitable for the analysis purposes for which it was designed. The hypothesis about the relationship between organizational learning capability and operational flexibility established a positive relationship between these variables, such that the greater the organizational learning, the greater the operational flexibility. The analysis of the data gathered in the survey and the corresponding validation of the measurement scales indicated that it was impossible to ensure the reliability of the dimension "Process" corresponding to Long-term Flexibility, as there were problems with the statistical significance of its indicators. The other indicators produced satisfactory results, so enabling us to accept Hypothesis 1. From the point of view of the general theories underlying this hypothesis, i.e. the Dynamic Capabilities Theory and Relational Capital view, we found that the greater the organizational learning capability and the know-how arising from collaboration relationships, the greater the capacity of the firm to perform more complex tasks, so enabling them to reorganize their organizational routines and increasing the operational flexibility required to enable the firm to adapt to changing market conditions. Flexibility enables the firm to adapt to changing market conditions, and therefore the more flexible the firm is, the greater its capacity to respond, and the better it will perform. Due to increasing competition, companies are obliged to achieve their objectives whilst using fewer resources. The best use of available resources implies an increase in the capability to adapt to the environment, a capability that is strengthened by organizational learning. With regard to the hypothesis about the influence of know-how in collaborative relationships and operational flexibility in the short and long term, once we have established the importance of the organizational learning capability in the development of organizational routines that improve the operational flexibility of the firm, the analysis of the results we obtained shows that Hypothesis 2 can also be accepted.

According to the theories on which our research is based, business alliances enable companies to create competitive advantages based on their capacity to access the knowledge thereby producing significant complementarities between the partners. This enables companies to maintain and sometimes even increase their prior knowledge. Success in collaborative business relationships therefore generates sufficient valuable knowledge to enable firms to increase, via their organizational routines, their level of operational flexibility. Our results allow us to state that collaborative know-how is valuable both when it is related to organizational learning gained from previous (ExAnte dimension) and present (During dimension), collaborative relationships and from the analysis after the event of the implications that past relationships have on the establishment of future collaborative relationships (ExPost dimension). The analysis of

the data relating to Hypothesis 3 revealed that there was a positive, significant relationship between operational flexibility and business performance. The re-configuring of the firm's operational routines is a key means of obtaining competitive advantages which result in improved business and organizational performance.

Conclusions

In this research we have explored the relationship between organizational learning capability and performance, articulated via the influence of the former on the firm's routines and processes. After analyzing the results obtained, we found that learning capability is a key factor in the design of organizational structures, as it reconfigures the firm's operational routines and increases its capacity to adapt. This capacity to adapt represented by operational flexibility is an important source of competitive advantage and therefore leads to improvements in the firm's performance. Another important aspect of this work is the empirical support provided by the dynamic capabilities theory as a source of competitive advantage. Learning and know-how are considered as dynamic capabilities which a number of authors (Zollo and Winter, 2002; Pavlou and El Sawy, 2006; Easterby-Smith and Prieto, 2008) cite as determining factors in changing the operational capabilities and processes used by companies. They also state that the vehicle by which competitive advantages are obtained is the relationship between the firm's dynamic and operational capabilities.

In addition, this study demonstrates not only that this relationship between the different types of capabilities within the firm exists, but also that it generates competitive advantages due to the increase in flexibility viewed as a capability of the firm to adapt to its environment (Pagell and Krause, 2004). It is this capability to adapt to and respond to complex unforeseeable situations that provides the basis for the competitive advantage which enables firms to achieve a higher level of performance. In this context, those organizations that are able to learn effectively will be able to change their operational routines, so increasing their business and organizational performance (Germain et al., 2001). As far as collaborative know-how is concerned, the application by firms of the learning arising from past experiences in collaborative relations is important when it comes to managing business alliances. In this sense, the knowledge acquired through collaborative relationships is the basis of the firm's relational capital and one of the origins of the change in the firm's operational routines (Gholipour et al., 2010). This knowledge enables the firm to change and adapt these processes and routines and increases its flexibility.

In summary, this study shows the positive, significant influence that the capability for organizational learning

and know-how in collaborative relationships has on operational flexibility in both the long and the short term. This effect of dynamic capabilities on operational capabilities redesigns the firm's processes and routines, so facilitating its adaptation to change and its flexibility. In this context of an improved level of adaptation to changes in the business environment, the firm acquires the necessary competitive advantage to enable it to achieve higher levels of performance.

LIMITATIONS

Although we have established important relationships between the variables we have analyzed, our results should be interpreted with a certain degree of caution due mainly to the fact that this study is of an exploratory nature, and it therefore seeks in essence to reveal the existence or not of inter-relationships between the variables. In addition the information obtained presents the views of just one member of the firm, and the firms all belong to the service sector, which is a limitation in itself.

Furthermore, as this is a transversal or static kind of analysis it does not capture the dynamic nature of the factors that determine the relation between the variables that influence operational flexibility. This means that although the relations are significant, it has not been proved that the variables we have selected are the most influential of all the possible factors. In spite of these limitations, the empirical work we have done may be considered both valid and useful given the diversity of the data used and the fact that the interpretation of this data is reasonable for the hypotheses we proposed. As a whole, the study is a step forward in the process of articulating the relationship between dynamic and operative capabilities, and the improvement in the firm's performance.

ACADEMIC IMPLICATIONS AND FUTURE LINES OF RESEARCH

From an academic point of view, the main implication of this study is that through the mechanisms of organizational learning it is possible to understand complex, new situations, thereby producing ideas that allow us to change existing behaviour and routines. As the evolution of organizational routines is the result of established learning processes within the organization, organizational learning capability has a direct relationship on the level of operational flexibility reached. In order to increase the competitive advantage to be obtained from the available resources, the firm must strive to create as much organizational learning as possible, given that knowledge is an important resource and learning a valuable capability. The firm's organization chart must be designed in such a way as to protect its key knowledge, while at the same time seeking to establish business

alliances as a means of producing new knowledge. It is here that the firm's learning capability plays a decisive role, as does the collaborative know-how it has accumulated, as both of these variables will enable the firm to develop internal routines that allow it to adapt better to its environment, as a result of a higher level of implicit operational flexibility, so increasing organizational and general business performance. As regards possible future lines of research, it would firstly be of great interest to study the relationship between the exogenous variables analyzed in this article, namely organizational learning and collaborative know-how, and the other perspectives from which to study the concept of flexibility, namely its structural and strategic side and meta flexibility. It could also be interesting to assess the role played by other dimensions of knowledge management in the relationships established in this paper, and to extrapolate the conclusions obtained here to manufacturing companies, analyzing the differences in the results compared to the service sector, the sector we studied here.

REFERENCES

- Abernethy MA, Lillis AM (1995). The impact of manufacturing flexibility on management control system design. *Account. Org. Soc.*, 20(4): 241 - 258.
- Akgün AE, Lynn GS, Byrne JC (2006). Antecedents and consequences of unlearning in new product development teams. *J. Prod. Innov. Manage.*, 23(1): 73 - 88.
- Alipour H, Davabi K, Mehrabi Z, Moshtaghi M (2010). The role of knowledge management in the achievement of competitive advantage: A case study of Iran Alborze Insurance Company in Western Mazandaran. *Afr. J. Bus. Manage.*, 4(7): 1346 - 1350.
- Arias-Aranda D (2002). Relationship between operations strategy and size in engineering consulting firms. *Int. J. Serv. Ind. Manage.*, 13(3): 263 - 285.
- Arias-Aranda D, Bustinza OF, Barrales-Molina V (2010). Operations flexibility and outsourcing benefits: An empirical study in service firms. *Serv. Ind. J.*, 31(11). Forthcoming.
- Baer M, Frese M (2003). Innovation is not enough: Climates for initiative and psychological safety, process innovations, and firm performance. *J. Organ. Behav.*, 24(1): 45 - 68.
- Barba-Sánchez V, Atenza-Sahuquillo C (2010). Integration of the environment in managerial strategy: Application of the resource-based theory of competitive advantage, dynamic capabilities and corporate social responsibilities. *Afr. J. Bus. Manage.*, 4(6): 1155 - 1165.
- Barney JB (1991). Firm resources and sustained competitive advantage. *J. Manage.*, 17(1): 99 - 120.
- Barney JB (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *J. Manage.*, 27(6): 643 - 650.
- Botha E, Van der Walde DLR (2010). Relationship antecedents that impact on outcomes of strategic stakeholder alliances. *Afr. J. Bus. Manage.*, 4(8): 1629 - 1638.
- Bustinza OF, Molina LM, Gutierrez-Gutierrez L (2010). Outsourcing as seen from the perspective of Knowledge Management. *J. Supply Chain Manage.*, 46(3): 23 - 39.
- Cepeda G, Vera D (2007). Dynamic capabilities and operational capabilities: A knowledge management perspective. *J. Bus. Res.*, 60(5): 426 - 437.
- Chen G (2005). Management practices and tools for enhancing organizational learning capability. *Adv. Manage. J.*, 70(1): 4 - 35.
- Collis DJ, Montgomery CA (2008). Competing on resources. *Harv. Bus. Rev.* 86(7/8): 140 - 150 + 162.

- Das TK, Teng B (2000). Instabilities of strategic alliances: An internal tensions perspective. *Org. Sci.*, 11(1): 77-101.
- Day GS (1991). Learning about markets. Marketing Science Institute report number 91-117. Cambridge, MA: Marketing Science Institutes
- Dess GG, Beard DW (1984). Dimensions of organizational task environments. *Adm. Sci. Q.*, 29(1): 52 - 73.
- Easterby-Smith M, Prieto IM (2008). Dynamic capabilities and knowledge management: An integrative role for learning? *Br. J. Manage.*, 19(3): 235 - 249.
- Eisenhardt KM, Martin JA (2000). Dynamic capabilities: What are they? *Strat. Manage. J.* 21(10-11): 1105 - 1121.
- Eppink DJ (1978). Planning for strategic flexibility. *Long Range Plann.*, 11(4): 9 - 15.
- Fredericks E (2005). Infusing flexibility into business-to-business firms: A contingency theory and resource-based view. *Perspect. Pract. Implications*, 34(6): 555 - 565.
- Fugate BS, Stank TP, Mentzer JT (2009). Linking improved knowledge management to operational and organizational performance. *J. Oper. Manage.*, 27(3): 247 - 264.
- Fynes B, De Búrca S (2005). The effects of design quality on quality performance. *Int. J. Prod. Econ.*, 96(1): 1 - 14.
- Garvin DA (1993). Building a learning organization. *Harv. Bus. Rev.*, 16(3): 78 - 91.
- George G (2005). Learning to be capable: Patenting and licensing at the Wisconsin alumni research foundation 1925-2002. *Ind. Corp. Change.*, 14(1): 119 - 133.
- Germain R, Dröge C, Christensen W (2001). The mediating role of operations knowledge in the relationship of context with performance. *J. Oper. Manage.*, 19(4): 453 - 469.
- Gold AH, Malhotra A, Segars AH (2001). Knowledge management: An organizational capabilities perspective. *J. Manage. Inf. Syst.*, 18(1): 185 - 214.
- Gholipour R, Jandaghi G, Hosseinzadeh SA (2010). Explanation of knowledge management enabler as a latent variable: A case study of SMEs in Iran. *Afr. J. Bus. Manage.*, 4(9): 1863 - 1872.
- Grant RM (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. *Calif. Manage. Rev.*, 33(3): 114 - 135.
- Grant RM, Baden-Fuller C (2004). A knowledge accessing theory of strategic alliances. *J. Manage. Stud.* 41(1), 61 - 84.
- Hafeez K, Zhang Y, Malak N (2002). Core competence for sustainable competitive advantage: A structured methodology for identifying core competence. *IEEE Trans. Eng. Manage.*, 49(1): 28 - 35.
- Hair JF, Anderson RE, Tatham RL, Black W (2001). *Multivariate data analysis*, Prentice-Hall Pearson Education, London.
- Harrigan KR (1980). Strategy formulation in declining industries. *Acad. Manage. Rev.* 5(4), 599 - 604.
- Hatun A, Pettigrew AM (2006). Determinants of organizational flexibility: A study in an emerging economy. *Br. J. Manage.*, 17(2): 115 - 137.
- Helfat CE (1997). Know-how and asset complementarity and dynamic capability accumulation: the case of R and D. *Strat. Manage. J.* 18(5): 339 - 360.
- Inkpen AC, Dinur A (1998). Knowledge management processes and international joint ventures. *Organization Science* 9 (4), 454 - 468.
- Iltner CD, Larcker DF (2003). Coming up short on nonfinancial performance measurement. *Harv. Bus. Rev.*, 81(11): 88 - 95.
- Jack EP, Raturi A (2002). Sources of volume flexibility and their impact on performance. *J. Oper. Manage.*, 20(5): 519 - 548.
- Jaworski BJ, Kohli AK (1993). Market orientation: Antecedents and consequences. *The Journal of Marketing* 57(3): 53 - 70.
- Kale P, Singh H, Perlmutter H (2000). Learning and protection of proprietary assets in strategic alliances: Building relational capital. *Strat. Manage. J.* 21(3): 217 - 237.
- Kaplan RS, Norton DP (2006). *Alignment: using the balanced scorecard to create corporate synergies*, Harvard Business School Press, Boston.
- Lei D, Slocum JW (1992). Global strategy, competence-building and strategic alliances. *Calif. Manage. Rev.* 35(1): 81 - 97.
- Lei D, Hitt MA, Bettis R (1996). Dynamic core competences through meta-learning and strategic context. *Calif. Manage. Rev.*, 35(1): 81 - 97.
- Makadok RJ (2001). Toward a synthesis of the Resource-based and Dynamic-capability views of rent creation. *Strat. Manage. J.*, 22(5): 387 - 402.
- McKee D (1992). An organizational learning approach to product innovation. *J. Prod. Innov. Manage.*, 9(3): 232 - 245.
- Mills J, Platts K, Bourne M (2003). Competence and resource architectures. *Int. J. Oper. Prod. Manage.*, 23(9): 977 - 994.
- Nahapiet J, Ghoshal S (1998). Social capital, intellectual capital, and the organizational advantage. 23 (2): 242-266.
- Neely A (2005). The evolution of performance measurement research. *Academy Manage. Rev.*, 23(2): 242 - 266.
- Nonaka I., Takeuchi H (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*, Oxford University Press, New York.
- Nonaka I (1994). A dynamic theory of organizational knowledge creation. *Org. Sci.*, 5(1): 14 - 37.
- Normann R. (1985). *Developing capabilities for organizational learning*. In: Peanings, J.M. (Eds.) Jossey-Bass, San Francisco.
- OECD-EUROSTAT (1997). *Proposed Guidelines for Collecting and Interpreting Technological Innovation Data*. Oslo Manual. OECD, Paris.
- Pagell M, Krause DR (2004). Re-exploring the relationship between flexibility and the external environment. *J. Oper. Manage.*, 21(6): 629 - 649.
- Pavlou PA, El Sawy OA (2006). From IT leveraging competence to competitive advantage in turbulent environments: The case of new product development. *Inform. Syst. Res.*, 17(3): 198 - 227.
- Pavlou PA, Dimoka A, Housel TJ (2008) Effective use of collaborative IT tools: Nature, antecedents, and consequences. *Proceedings of the 41st Annual Hawaii International Conference on System Sciences*, Hawaii.
- Peng DX, Schroeder RG, Shah R (2008). Linking routines to operations capabilities: A new perspective. *J. Oper. Manage.*, 26(6): 730 - 748.
- Penrose ET (1959). *The Theory of the Growth of the Firm*, Oxford University Press, New York.
- Peteraf MA (1993). The cornerstones of competitive advantage: A resource-based view. *Strat. Manage. J.*, 14(3): 179 - 191.
- Powell WW, Koput KW, Smith-Doerr L (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Adm. Sci. Q.*, 41(1): 116 - 145.
- Prahalad CK, Hamel G (1990). The core competence of the corporation. *Harv. Bus. Rev.*, 68(3): 79 - 91.
- Prieto IM, Easterby-Smith M (2006). Dynamic capabilities and the role of organizational knowledge: An exploration. *J. Inform. Sys.* 15(5): 500 - 510.
- Reuer J, Zollo M (2000). Managing governance adaptations in strategic alliances. *Eur. Manage. J.*, 18(2): 164 - 172.
- Roth K, Kostova T (2003). The use of the multinational corporation as a research context. *J. Manage.*, 29(6): 883 - 902.
- Saarenketo S, Puumalainen K, Kuivalainen O, Kyläheiko K (2004). Dynamic knowledge-related learning processes in internationalizing high-tech SMEs. *Int. J. Prod. Econ.*, 89(3): 363 - 378.
- Salvato C (2003). The role of micro-strategies in the engineering of firm evolution. *J. Manage. Stud.* 40(1): 83 - 108.
- Schilling MA, Steensma HK (2001). The use of modular organizational forms: An industry-level analysis. *Acad. Manage. J.*, 44(6): 1149 - 1168.
- Schmenner RW, Tatikonda MV (2005). Manufacturing process flexibility revisited. *Int. J. Oper. Prod. Manage.*, 25(12): 1183 - 1189.
- Senge PM (1990). *The fifth discipline: The art and practice of the learning organization*, Currency Doubleday, New York.
- Simmers CA (2004). A stakeholder model of business intelligence. *Proceedings of the 37th Hawaii International Conference on System Sciences*, Hawaii.
- Simonin BL (1997). The importance of collaborative know-how: An empirical test of the learning organization. *Acad. Manage. J.*, 40(5): 1150 - 1174.
- Simonin BL (1999). Ambiguity and the process of knowledge transfer in strategic alliances. *Strat. Manage. J.*, 20(7): 595 - 623.
- Sinkula JM (1994). Information processing in the learning organization. In: Achrol, R. and Mitchell, A. (Eds.). *Enhancing knowledge development in marketing*, American Marketing Association, Chicago,

pp. 442-443.

- Slater SF, Narver JC (1995). Market orientation and the learning organization. *J. Mark.*, 59(3): 63 - 74.
- Teece DJ, Pisano G, Shuen A (1997). Dynamic capabilities and strategic management. *Strat. Manage. J.*, 18(7): 509 - 534.
- Teng BS, Das TK (2008). Governance structure choice in strategic alliances. *Manage. Decis.*, 46(5): 725 - 742.
- Upton DM (1995). Flexibility as process mobility: The management of plant capabilities for quick response manufacturing. *J. Oper. Manage.*, 12(3-4): 205 - 224.
- Uzumeri M, Nembhard D (1998). A population of learners: A new way to measure organizational learning. *J. Oper. Manage.*, 16(5): 515 - 528.
- Venkatraman N, Ramanujam V (1986). Measurement of business performance in strategy research: A comparison of approaches. *Acad. Manage. Rev.*, 11(4): 801 - 814.
- Verona G, Ravasi D (2003). Unbundling dynamic capabilities: An exploratory study of continuous product innovation. *Ind. Corp. Change*, 12(3): 577 - 606.
- Volberda HW (1996). Toward the flexible form: How to remain vital in hypercompetitive environments. *Org. Sci.*, 7(4): 359 - 374.
- Wang CL, Ahmed PK (2003). Organisational learning: A critical review. *Learn. Org.*, 10(1): 8 - 17.
- Wernerfelt B (1984). A resource-based view of the firm. *Strat. Manage. J.*, 5(2): 171 - 180.
- Wick CW, Leon LS (1993). *The learning edge: How smart managers and smart companies stay ahead*, McGraw-Hill, New York.
- Winter SG (2003). Understanding dynamic capabilities. *Strat. Manage. J.*, 20(10): 991 - 995.
- Zahra SA, Sapienza HJ, Davidsson P (2006). Entrepreneurship and dynamic capabilities: A review, model and research agenda. *J. Manage. Stud.*, 43(4): 917 - 955.
- Zahra SA, George G (2002). Absorptive capacity: A review, reconceptualization, and extension. *Acad. Manage. Rev.*, 27(2): 185 - 203.
- Zollo M, Winter SG (2002). Deliberate learning and the evolution of dynamic capabilities. *Org. Sci.*, 13(3): 339 - 351.
- Zott C (2003). Dynamic capabilities and the emergence of intraindustry differential firm performance: insights from a simulation study. *Strat. Manage. J.*, 24(2): 97 - 125.