

STRATEGIC PROCESS IN OPERATIONS AND  
ENVIRONMENT DYNAMISM:  
A BRAZILIAN – SPANISH COMPARATIVE STUDY

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**Abstract**

The strategic process in operations (SPO) is influenced by the increasing environmental dynamism in the marketplace. Considering organizational knowledge as the support of the whole strategic process, managers may choose their objectives based on previous experiences. Manufacturing strategic process also allows the link between organizational knowledge and dynamic capabilities (Teece et al., 1997). Based on these aspects, this research replication presents a cross-country comparison focusing empirically some theoretical issues related to organizational knowledge and the SPO.

**Keywords**

Operations strategy, organizational knowledge, capabilities, environment dynamism.



## INTRODUCTION

The new competitive landscape faces greater complexity, fiercer competition and accelerating changes. Firms must constantly change, upgrade their products, and increase productivity to be able to compete in such a turbulent environment (Porter, 1990). They must increase their knowledge base at a faster rate than their competitors and apply this new knowledge to the development of new products and services. Experience shows that organizations failing to learn and change are not likely to succeed. Organizations need to be able to question their past. They need to innovate and be able to develop a sensibility to induce future environmental tendencies in aspects like lifestyle, technology, and consumer habits. Also, organizations must be willing to speculate and thrive in unknown or unfamiliar situations with ample margins of uncertainty.

In this context, environment conditions have been a key aspect in management theory and practice. The literature in corporate strategy has explored environment issues since the seminal contributions from authors like Kenneth Andrews. Nevertheless, studies linking operations strategy to the external environment are still scarce (Ward et al., 1995; Amoaka-Gyampah and Boye, 2001). Presently, the increasing environmental dynamism in the marketplaces influences the whole companies' processes and managerial practices as the strategic process in operations (SPO).

Manufacturing managers agree that achieving low cost together with high quality is not longer enough to guarantee success. Recent research indicates that the strategic view in operations has moved from a "market based" to a "knowledge-based view" of competition (Roth and Giffi, 1995; Amundson, 1998; Schroeder, et al. 2002). Strategic management needs to focus more on intangible assets and knowledge than on tangible assets, because most of the latter are either imitable or substitutable, which makes them unlikely sources of sustainable competitive advantage (Itami, 1987; Barney, 1991). This focus demands that functional areas of the firm, such as manufacturing, contribute to the ability to build new capabilities from organizational knowledge – that is, bringing in or creating new knowledge. The capacity to gain new knowledge is a sustainable competitive advantage for the firm (Kogut and Zander, 1992).

This research analyzed how the SPO in the context of the knowledge-based view (KBV) of the firm (Grant, 2002, Sveiby, 2001) is influenced by the environmental dynamism. In this context, manufacturing managers often are under pressure in order to find quick answers in highly complex environments. By considering organizational knowledge as the support of the strategic process, managers may choose companies' objectives based upon previous experiences and knowledge. In this manner, the SPO is a learning process and it enables the link between the existing organizational knowledge and dynamic capabilities (Tece et al., 1997).

We develop four constructs related to the SPO (internal knowledge, external knowledge, cross functionality and resource-based competency), test the scales that are related to the constructs, and test hypothesis related to differences in the SPO in industries located in two countries with different levels of environmental dynamism - Brazil and Spain. These countries face opposite situations. Although Brazil was among the countries of the world receiving a large amount of foreign investments in the 90's, its economy still has a low level of exports (less than 10% of Brazilian Gross Product). Spanish companies, on the other hand, have a greater global orientation due to its high business integration in the European Union. Even that, in both the cases high

levels of uncertainty are faced by the companies. In Brazil, foreign competitors and decreasing import taxes are making the competitive environment more complex. On the other hand, Spanish companies are spreading their markets into and out the EU. Latin America, including Brazil, is one the main Spanish targets in exports and investments (IBGE, 2001).

Based upon these issues, this paper evaluates possible variations in the SPO from a KBV approach, providing a cross-country comparison of Brazilian and Spanish manufacturers. The article is structured according to the following order. Section 2 presents the theoretical concepts relating the SPO to organizational knowledge. The third section discusses the research methodology. In the fourth section, we analyze the results found. Finally, we present the conclusions from this study in section 5.

## **1. THE KNOWLEDGE-BASED VIEW AND THE STRATEGIC PROCESS IN OPERATIONS**

### **1.1. Strategic Process in Operations**

Initially, manufacturing strategy studies defended the fit between business strategy and manufacturing strategy in order to reinforce competitiveness (Wheelwright, 1978). Other seminal articles on manufacturing strategy such as Skinner (1969), Wheelwright (1979, 1984) and Hill (1989) follow a hierarchical view of the formulation process, linking corporate and business strategies, competitive criteria (cost, quality, delivery and flexibility), and product and process decisions. This hierarchical orientation assumed a structured view of the process and a reactive position of manufacturing regarding the external environment. This orientation was clearly influenced by the traditional approach of strategic planning and has influenced some formulation tools proposed along the years, including Fine and Hax (1985), Platts and Gregory (1992), Slack (1994), and Menda and Dilts (1997).

Subsequent studies analyzed the process of manufacturing strategy formulation from a less structured approach. This orientation considered that the challenge for managers is more complex than the dichotomy between “weakness” and “strength” (Cheng and Musaphir, 1996). In this case, formulation process is considered as a sequence of decisions or consistencies in the company’s decisional behavior orientation. Examples of research of this orientation include Swamidass and Newell (1987), Anderson, Schroeder and Cleveland (1991), Voss (1992) and Papke-Shields, Malhotra and Varun (2002). A more dynamic view related to competence creation in production and operations systems is a current approach present in manufacturing strategy formulation literature. We may list Cleveland, Schroeder and Anderson (1989), Vickery (1991), Vickery and Droge (1993) and Miller and Roth (1994). Other studies following this approach also claim that the result of the process of manufacturing strategy is the capabilities creation resulting from the tangible and intangible resources (Zahra and Das, 1992; Hayes and Pisano, 1996; Tracey, Vonderembse and Lim, 1999). The influence of the environment in the SPO is evaluated in some articles, including Ward et al. (1995), Swamidass and Newell (1987), and Badri et al. (2000). These articles focus their analysis on aspects such as business costs, labor availability competitive hostility and government decisions. Differently, our analysis brings to the SPO a dynamic view, based on the idea of capability and knowledge creation.

## 1.2. The knowledge-based view

The emerging knowledge-based view of the firm is not a theory of the firm in a formal sense. It is more a set of ideas or streams of research about the existence and nature of the firm that emphasize the role of the knowledge. According to Grant (2002), these streams include the resource/capabilities analysis of the firm (Barney, 1986, 1991; Prahalad and Hamel, 1990; Grant, 1991), the “epistemology” (Polanyi, 1958; Maturana and Varela, 1980) and organizational learning (Levitt and March, 1988; Huber, 1991).

The KBV assumes a dynamic perspective, where organizations are continuously changing. This dynamic perspective provides an important contrast with traditional static perspective exemplified by usual approaches from economics including Porter-based models. The KBV allow us to relax our assumption that firms compete with identical products and moves us through the notion of industry or strategic groupings (Porter, 1980; Spencer, 1989) towards the notion of firms as uniquely evolved (Penrose, 1959).

At the foundations of the KBV is the differentiation between tacit and explicit knowledge. To Polanyi (1967), all explicit knowledge is rooted, i.e., necessarily depends on its application and understanding on tacit knowing. Explicit knowledge can be expressed in words and numbers and shared in form of data, scientific formulae, specifications, manuals and plans. Tacit knowledge is difficult to articulate and to transfer. Its existence is based on individual experiences. This difficulty to transfer is taken as an argument by the KBV to declare tacit knowledge as a sustainable competitive advantage.

Based on certain premises regarding the nature of knowledge and its role within the firm, this approach develops the concept of the knowledge creation process. Knowledge creation enhances the potential of the company to innovate (Von Krogh et al, 2001), and thus better adapt to changing environmental demands. Many researchers have stated that solving problems creates knowledge (see Jaikumar and Bohn, 1986; Hayes et al., 1988) and Perez Lopez, 1991). This conclusion implies that a organization may recognize and define problems, generate and applied knowledge to solve problems, and further generate new knowledge through the action of problem solving (Nonaka, et al., 2000). By knowledge creation through problem solving, a firm refines the understanding of its environment, increases its absorptive capability and improves its ability to react appropriately to future stimulus.

Individuals are the primary agents of knowledge creation and, in the case of tacit knowledge, are the principal repositories of knowledge. As individuals learning capacity is bounded, knowledge creation requires specialization. If producing goods and services requires the application of many types of knowledge, production must be organized so as to assemble these many types of knowledge while preserving specialization by individuals (Grant, 2002). Communication, collaboration and integration are required to maximize the synergy between the various interdependent parts (Moanert and Souder, 1990; Hitt et al, 1993). This tension between specialization and integration seems particularly salient to the problem of the KBV.

According to the above, the creation of knowledge in a firm is more than a collection of individual experiences. Senge (1990) considers that for organizational learning to take place, an alignment of the different individual learning processes is necessary in order to avoid wasting

energy. From the KBV, this requires a high degree of mutual involvement in problem recognition and problem solving processes. In a first step, partners must scan, notice and construct meaning about environmental changes. The recognition of the existence of a problem occurs when some stimuli indicate the need for new actions. This stimuli then leads to the second step, when partners jointly experience new work processes, tasks and technological characteristics., in order to solve a problem.

Von Krogh et al. (2001) propose an iterative and multistage process for knowledge creation that obligates individuals to spend considerable time together discussing and reflecting upon their experiences. They should observe how their colleagues solve tasks and interact with technologies, explain, and give sense to their own actions. Individuals must establish relationships via language and thought in order to coordinate their learning processes. Dialogue has been identified as a key aspect of this integrating process (Isaacs, 1993). The dialogue has been called "the language of learning" (Nonaka and Takeuchi, 1995).

Each individual exhibits a perception or personal image of the world, and these perceptions will affect the other individuals when they are shared during interaction. Individual knowledge needs to be disclosed, shared and legitimized in order to create organizational knowledge. Thus, organizational knowledge is the result of the construction and interaction of numerous perspectives during problem recognition and problem solving processes, including those ones related to strategy formulation and implementation.

### **1.3 Strategic process in operations, organizational knowledge and capabilities creation**

According to Probst and Büchel (1997), the creation of organizational knowledge requires three conditions:

- Communication, necessary for attaining a shared vision of reality and the actions that reality suggests.
- Transparency, since the communication processes and their results must be accessible and clear for all members from the company.
- Integration of knowledge. If knowledge is to be accessible for all members, internal processes must be able to fully integrate their individual knowledge into a structure where they can participate and enrich their own individual development.

Despite the importance of the two first aspects, we claim that integration of knowledge is a core aspect in the SPO. Nevertheless, the intangible nature of knowledge assets prevents knowledge from being completely diffused and subsequently used in the organization, unless the employees' mental models are simultaneously transferred. The mental model depicts the image of the world

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<sup>1</sup> The dialogue has been called "the language of learning" (Nonaka and Takeuchi, 1995).

that a person perceives and includes both the explicit and the implicit understanding of reality. The mental model provides the framework in which the new events are experienced and interpreted and through this mental model the individual determines how the important information concerning a certain situation is stored. In the SPO, a mental model may be comparable to “strategic thinking” (Mintzberg, 2000) – when companies’ members share a common strategic view. Effective changes in routines and decision processes will hardly take place in an organization if its members do not share strategic objectives.

As a result of knowledge integration, the SPO has at the same time a tacit (or non-formal) knowledge component, and an explicit (or formal) knowledge component. Manufacturing strategy studies have historically defended formal strategic plans (like Skinner, 1969; and, Hayes and Wheelwright, 1985) or formal methodologies (as Fine and Hax, 1985; Schoreder et al., 1992; and, Slack, 1994). In this research, we address the process of manufacturing strategy formulation within the description of Adam and Swamidass (1992): “Strategy planning deals with the structured as well as the unstructured process of strategy formulation” (p. 386). Put another way, SPO includes tacit as well as explicit knowledge.

According to Nonaka (1994) organizational knowledge can be created in four different ways. *Socialization* involves the sharing of tacit knowledge between individuals. One important point to note here is that tacit knowledge is exchanged through joint activities – by observation, imitation and practice – rather than through written and verbal instructions. The second mode of knowledge creation involves the use of social processes to combine the different explicit knowledge held by individuals. In this *combination* stage, individuals exchange knowledge through mechanisms such as meetings, presentations and telephone conversations. The third and fourth modes of knowledge conversion (*externalization and internalization*) are related to patterns of conversation involving tacit and explicit knowledge.

We identify the second type of knowledge creation (combination) in the SPO when a group of managers is updating formalized strategic plans. Knowledge conversion in this case happens through social processes of changes and combinations. Nonaka (1994) mentions meetings or computer networks as examples of this type of knowledge creation. On the other hand, when managers are working together, exchanging ideas and visions, we have the socialization type of knowledge creation.

During *internalization and externalization*, there is a wide exchange of different types of knowledge. These types of interaction “capture” an idea of complementary in knowledge interactions. In the strategic process, externalization also occurs during the formalization of the strategic plans in written documents.

Claiming that companies’ competencies are dynamic, they allow them to adapt to continuous changes in the marketplace (Tece et al., 1997). Dynamic capabilities mean that companies may shift their capabilities depending on the environmental pressures. Roth (1996) identifies strategic agility as the company’s ability to strategically change its competitive orientation following the changes in environment. Quick responses to changes in the environment and the process of value creation originate from the integration between manufacturing, R&D, marketing, finance and other company areas. Ward et al. (1994) showed the importance of the manufacturing proactiveness in the strategic process for competitiveness. According to them, manufacturing

participation in the choices concerning products and services, strategic focus, and budgets and investments may be a key aspect to build a competitive advantage based on dynamic capabilities related to operations.

Considering organizational knowledge as one of the most important resources for capabilities creation, companies may reach new performance patterns, choose new strategic focuses and continuously adapt and create their dynamic capabilities (Hayes and Pisano, 1996; Teece et al., 1997). Knowledge creates the company's ability to quickly adapt to the changes in the environment. Therefore a dynamic SPO requires a high level of knowledge integration to build dynamic capabilities.

#### **1.4 Constructs analyzed and hypothesis**

Considering that all these aspects are influenced by the environment context, we may evaluate the degree that the environmental changes affect managerial practices related to the SPO. Today companies are competing with other ones located in several parts of the world. This fact brings to the same competitive arena companies sometimes facing completely different environment conditions. Badri et al. (2000) claims that globally competing companies attempt to reach the largest number of consumers possible. At the same time, companies from different countries or regions have diverse levels of access to technology and dissemination of new managerial practices. Countries or regions with high market openness and global integration probably have easier access to new technologies and to advances in managerial practices. Similarly, different industries from the same country or region may present different levels of environment dynamism. Computers or machines industries are usual examples of highly dynamic industries while food, shoes or gear industries are examples of less dynamic industries.

At this point, the role of organizational knowledge in the SPO under distinct environmental conditions may be the key issue. How should manufacturing managers conduct the SPO in companies facing situations such as high level of economy openness? How does different environment dynamism influence the SPO? Since knowledge management is a critical to link environments conditions to the SPO, managers and researchers have lacked of models that they could use as guides. To help bridge this gap, our paper evaluates possible variations in the SPO from a KBV approach, providing a cross-country comparison.

Since knowledge management is a critical to link environments conditions to the SPO, managers and researchers have lacked of models that they could use as guides. To help bridge this gap, our paper evaluates possible variations in the SPO from a KBV approach, providing a cross-country comparison. Thus, we aim to analyze whether different constructs - internal knowledge, external knowledge, cross-functionality and resource-based strategy - related to the SPO are influenced by environment dynamism. We analyzed dynamism according to country exports level. We call it export-driven dynamism and it is related to the degree that the companies' competitive environment is integrated to international markets.



*Hypothesis*

- **Internal Knowledge**

The KBV of the firm suggests that internal knowledge, embodied within a firm's resources, is an important source of competitive advantage (Barney, 1991). However, in few firms manufacturing possess all the inputs required to for successfully exploit the internal resources. It depends on the ability of manufacturing to absorb what is going on in the business and act on that information with appropriate moves. This is specially critical in dynamic environment that there is a continuous change in the existing knowledge base. In this situations, manufacturing have been forced to maintain a wider range of skills to localizes knowledge flows inside the firm. (De Geus, 1988). According to this, we hypothesize that:

H1 –High levels of environment dynamism leads to high level of **Internal Knowledge**.

- **External Knowledge**

Organizations must develop the ability to perceive and understand their environment. To achieve this, organization members must build, share, and integrate a knowledge representative of reality. When the environmental conditions change, knowledge must be transformed in accordance with the new conditions. According to this, external knowledge is the manufacturing's ability to identify and to explore opportunities and threats in the marketplace. This type of knowledge analyzes the conditions from external environment seeking to identify opportunities and threats, allowing the company to adapt itself to the environment conditions. External knowledge leads to the ability that Roth and Miller (1998) called as "marketing acuity". Consequently, access to a broader knowledge base through external learning by examining the environment increases the flexibility of the firm, specially critical in a dynamic environment (Grant, 1996)We hypothesized:

H2 –High levels of environment dynamism leads to high level of **External Knowledge**.

- **Cross-Functionality**

Knowledge related to the strategic process should evaluate how to explore and integrate the manufacturing knowledge to the knowledge from other functional areas (or business units) in order to adapt to the environment. Cross-functionality is the degree to which manufacturing actively participates in the company's strategic process with other functional areas (Ward et al., 1995). Cross-functionality allows knowledge integration, which is one of the main sources of knowledge creation (Grant, 1996; Nonaka e Konno, 1995). Thus, cross-functional activities is a central orientation for the SPO from a KBV. Considering that many studies have stressed the importance of manufacturing managers in the strategic process (Hayes & Wheelwright, 1985; Ward et. al, 1995), when this environment is more dynamic, cross-functionality may improve company's responsiveness. This idea suggests that when companies are facing more dynamic environments, their SPO should be able to better integrate existing knowledge from different functional areas.

In this way, our hypothesis is:

H3 –High levels of environment dynamism leads to high level of **Cross-Functionality**.

- **Resource-Based Strategy**

Resource-based competency is the ability of manufacturing to decide based on the company's resources in order to build a competitive advantage. Current literature on manufacturing strategy has stated that the final results of the SPO have been related to capability creation. Even that many studies in following this orientation have proposed the idea of best practice, capability creation has a proposal of uniqueness, whose imperfect imitation and rareness are the central characteristics (Schroeder et al., 2002). We claim that resources will be able to quickly adapt company's strategy to the environment conditions. We may address the following hypothesis:

H4 –High levels of environment dynamism leads to high level of **Resource-Based Strategy**.

We aim to analyze whether these four constructs are influenced by industry dynamism. These constructs also let us compare what is the most important factor influencing managerial practice: environment dynamism of the industry or environment dynamism of the country? Upon this base, we analyze the competitive environment in both the countries based on the exports levels in each country. We call it as **exports-driven dynamism**. In this paper, we identify possible variations in the constructs related to a dynamic view of the SPO in different industries located in the two countries studied, which have different levels of exports orientation in their economies - Brazil and Spain. Thus, our analysis focuses a cross-country comparison covering all industries analyzed.

## 2. RESEARCH DESIGN

### 2.1 Sample characteristics

We used a quantitative approach to investigate the hypothesis related to environment dynamism and the SPO. The companies studied are located in Brazil and Spain. All companies have more than 100 employees, and belong to food, electronics, transport equipment and machine industries. This article presents the results from a sample of 78 Brazilian companies and 130 Spanish companies. Brazilian research was done through a questionnaire sent by mail to a randomly selected group from each industry; the response rate was 32,1%. The Spanish research was a replication of the Brazilian study. In the Spanish study, the firms were chosen at random and contacted by telephone; those that agreed to participate in the study received the questionnaires by fax or e-mail.

**Table 1. Industry sample distribution for each country**

Country	Brazil	Spain
Industry	Number of Respondents	Number of Respondents
Food	30	49
Electronics	12	19
Machines	23	39
Transport Equipment	13	23
TOTAL	78	130

### 2.2 Brazilian and Spanish contexts

Companies located in the state of Rio Grande do Sul compose the Brazilian sample. This is the southernmost state of Brazil and is strategically located in Mercosur. The total exports of the Brazilian economy is around US\$ 60 billions – this value corresponds to 8 % of Brazilian Gross National Product (IBGE, 2002). Recent Brazilian history (with clear market barriers) is a probable cause to the internal orientation in the Brazilian economy (Franco, 1999). The custom union of Mercosur, of which Brazil is the main economy, has faced a series of challenges during the last years such as Brazilian currency devaluation and the Argentinean economic crises.

In comparison, although the Spanish sample is equally distributed in the country, it is possible to identify some regional specialization, as is the case of the Valencian Community in the food industry and the Basque Country in machine industry. The Spanish economy's opening-up to the global market has generated an increasing dynamism in its national industry. Spanish export sales' share about the total export sales of the EU countries has continued to increase during the last years, until it reached 5% of total EU industrial export sales. The total exports of Spanish

economy is around 28% of the Gross National Product. This data shows the greater level of exports orientation of the Spanish economy in comparison to Brazilian economy.

### 2.3 Results

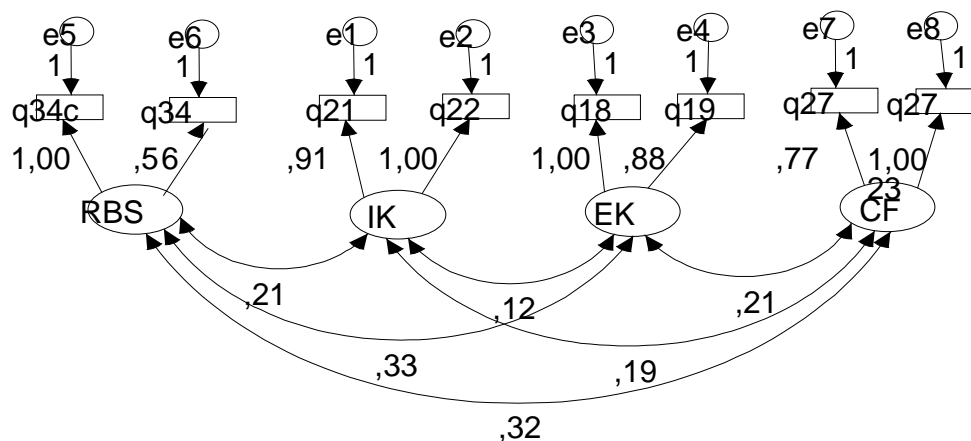
#### *Constructs validity and reliability*

We performed a Confirmatory Factor Analysis (CFA) in order to verify the issues related to validity and reliability of the constructs. As we have two independent samples (Brazil and Spain), we conducted the analysis in two steps: the first with the pooled sample and the second in order to verify the extent that the both samples have the same structure (Bollen, 1989).

We based our analysis on the following dimensions: reliability, unidimensionality and convergent validity. Figures 1 presents the set of items analyzed for the constructs in the pooled sample.

The CFA model for the pooled sample presents all the measures of goodness-of-fit at acceptable levels. It shows a Chi-squared equal to 28.32. GFI, AGFI, CFI and NFI indicate values above .91, as it is recommend. (Table 2) Convergent validity can be assessed through the individual items loading. The loading varies from .56 to .91 and all the loadings are statistically significant, confirming convergent validity.

**Figure 1 – Results of measurement model**



The first test in order to analyze form invariance ( $H_{form}$ ) between the two samples presented Chi-square equal to .31 and  $p < .33$ . All the fit values including GFI, AGFI, NFI and CFI are in adequate levels (from .91 to .96). Therefore, this first test indicates that the both samples present the same form (i. e. the null hypothesis of same form can not be rejected).

The second analysis evaluate the strengthen and direction of all relationships in both the samples, in order to verify whether they are the same. This is obtained fixing the scales at 1. All the fit values are also in the expected values (from .88 to .94). The null hypothesis of  $H_{IB}$  is acceptable since the Chi-square difference is equal to 30.77 and statistically significant. Therefore, the test onfirms that both samples have similar characteristics and can be analyzed jointly.

**Table 2 – General statistics for goodness-of-fit**

<i>Stand alone Indices</i>	
Chi-Square	28.32
Degrees of Freedom (df)	14
Probability Level	.014
Goodness of Fit (GFI)	.97
Adjusted Goodness of Fit (AGFI)	.91
Standardized RMR	.06
RMSEA	.07
<b>Incremental Indices</b>	
Normed Fit Index (NFI)	.91
Incremental Fit Index (IFI)	.95
Comparative Fit Index (CFI)	.95

From the analysis above, we identified the following constructs:

**Construct 1** concerns the *resource-based strategy*, integrating the following variables: manufacturing decisions related to creating resources not easily imitable by the competitors (RBS1), and manufacturing decisions related to providing characteristics in the products for which the customers do not easily find similar substitute (RBS2).

**Construct 2** is related to *cross-functional orientation*, including the following variables: cross-functional activities to make budget decisions related to long-term investments (CF1) and cross-functional decisions related to the business unit's growth strategy (CF2).

**Construct 3** concerns *external manufacturing knowledge*, and it is composed by the following questions: manufacturing knows the primary opportunities to be explored in the marketplace (EK1), and manufacturing clearly knows the performance of main competitors (EK2).

**Construct 4**, which is related to *manufacturing internal knowledge*, is composed by the following questions: manufacturing knows how to explore the company's internal resources (IK1), and manufacturing knows how to seek more integration with other company's areas to reinforce the internal resources (IK2).

**Table 3 - Tests of Invariance of Path model Across Calibration and Cross-Validation Samples**

	<i>H<sub>form</sub></i>	<i>H<sub>Iβ</sub></i>
Chi-Square	31.28	61.05
Degrees of Freedom (df)	28	34
Probability Level	.28	.003
Goodness of Fit (GFI)	.96	.94
Adjusted Goodness of Fit (AGFI)	.91	.88
Standardized RMR	.05	.33
RMSEA	.03	.06
<b>Incremental Indices</b>		
Normed Fit Index (NFI)	.92	.85
Incremental Fit Index (IFI)	.99	.92
Comparative Fit Index (CFI)	.99	.92

We should also consider that this is a cross-cultural survey and that may affect the understanding/application of some constructs or managerial practices. Considering these aspects, we may state that the questionnaire replication is at acceptable levels of reliability and validity.

The SPO model shows that a resource-based strategy is created from knowledge integration. Cross-functional orientation plays a central role in this process because it allows different functional areas tacit and explicit knowledge. In the SPO process, this means the manufacturing integration with other areas like marketing, R&D, finance, among others, in order to create formalized strategic planning or even the exchange of strategic information from the market or new products and services.

### Cross-country comparison

In order to study the influence of the environmental dynamism on the SPO, we based our analysis in what we call exports-driven dynamism. In this way, cross-country comparison analyzes the influence of the export orientation on the SPO constructs. The analysis of the environmental dynamism influence on the SPO constructs was conducted with a nonparametric test. We followed this orientation because the samples variances is not the same for all the constructs, specially Internal Knowledge (Table 4). Considering that nonparametric tests do not require assumptions about the shape of the underlying distribution (SPSS, 2002), Mann-Whitney test was used for a cross-country analysis with the four constructs identified.

**Table 4 - Test of Homogeneity of Variances**

	Levene Statistic	df1	df2	Sig.
IK	8,672	1	206	,004
EK	,001	1	206	,973
CF	2,009	1	206	,158
RBS	,015	1	206	,901

Shortly, knowledge integration during the SPO shows different patterns in the samples analyzed just for cross-functional orientation (Table 5). This construct presented a statistically significant result. The opening-up to the global market has obligated the Spanish firms to adopt more advanced management systems and to seek modern technologies.

In this case, the importance of knowledge integration was expressed when organizations face global competitiveness. In this way, increasing levels of export-driven dynamism may require

continuous effort to integrate knowledge in order to build up dynamic capabilities. This fact suggests the need for a mindset of manufacturing managers ranging the manufacturing active participation in company's strategic process with other functional areas and manufacturing's awareness of how to integrate companies' resources in order to build dynamic capabilities or competencies. Therefore, the results confirm our Hypothesis 3. It is worth to stress that even that environment influences SPO, the main aspects affected was internal - cross-functionality. These results may be explained through a detailed analysis of the dynamic competencies and the SPO. The creation of company's competencies needs a high interaction among the functional areas and a continuous knowledge exchange. External knowledge did not present any difference in the analysis done. In this sense, marketing acuity has similar levels, despite the country analyzed. Companies in all the industries are seeking to be aware of their external environment. However, depending on how the environment conditions are dynamic, companies need higher levels of responsiveness, obtained by cross-functional orientation. Finally, hypothesis 1, 2 and 4 were not confirmed.

**Table 5 - Nonparametrics Test Statistics(a)**

	IK1	EK2	RBS2	CF2
Mann-Whitney U	4577,00 0	4877,00 0	4621,00 0	3876,00 0
Wilcoxon W	7658,00 0	13392,0 00	13136,0 00	6957,00 0
Z	-1,217	-,467	-1,080	-2,879
Asymp. Sig. (2-tailed)	,224	,640	,280	,004

a Grouping Variable: COUNTRY



## CONCLUSIONS

This paper attempted to analyze the role of organizational knowledge in SPO under different environmental conditions. We analyzed two different situations related to environment dynamism, specifically related to the role of exports on this dynamism. Export-driven dynamism leads to higher levels of cross-functional orientation. This empirical finding confirms the current need for strategic quick responses supported by theoretical references related to knowledge creation in the current competitive landscape (Grant, 1996; Roth, 1996; Nonaka and Konno, 1998). Differences related to external knowledge or resource-based strategy were not found. This result suggests that even that the external environment presents higher competitive pressures companies should be aware about the market and be able to create the needed capabilities.

One of the limitations of this study is that the Brazilian sample is located in a specific region in Brazil and therefore some regional specific characteristics may be present. Another limitation was the application in two different countries of a questionnaire originally developed in one first language. Another limitation is the difference between the size of the samples analyzed, including industries and countries. These differences recommend additional caution to any results generalization.

Further studies may develop other analysis linking environment and other managerial processes and practices beyond the SPO. Possibilities to expand these first analyses include operations techniques (ISO, JIT, TQM) and other types of knowledge integration (concurrent engineering, value analysis, project teams, among others).

**QUESTIONS**

EK1 - Manufacturing clearly understands the primary opportunities to be explored in the marketplace.

EK2 - Manufacturing knows the performance of the main competitors.

IK1- Manufacturing knows how to explore the company's internal resources seeking for a competitive advantage.

IK2 – Manufacturing knows how to seek more integration with other company areas to reinforce the internal resources.

CF – Indicate to which extension the following activities are based on cross-functional activities:

1. Production and services decisions related to manufacturing strategies, marketing and R&D.
2. Budget decisions related to long-term investments.
3. Decisions related to the business unit's growth strategy.

RBC - Indicate to which extent the manufacturing strategy formulation is related to:

1. Providing characteristics in the products that are valued by customers.
2. Seeking competitive resources, which competitors do not have.
3. Creating resources not easily imitated by competitors.
4. Providing characteristics in the products, for which the customers do not easily find similar substitute.

**Scale**

Never	Rarely	Sometimes	Frequently	Always
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

## REFERENCES

- Adam, E.E., P.M., Swamidass 1992. Assessing Operations Management from a Strategic Perspective. In Voss, C.A. (ed.), Manufacturing Strategy-Process and Content, Chapman Hall, London.
- Amoako-Gyampah, K. & Boye, S.S. 2001. Operations strategy in an emerging economy: the case of the Ghanaian manufacturing industry, 19, 1, 59-80.
- Amundson, S. 1998. Relationships between theory-driven empirical research in operations management and other disciplines. Journal of Operations Management, 16, 341-359.
- Cleveland, G., Schoederer, R.G. E Anderson, J.C. 1989. A Theory of Production Competence. Decision Sciences, 20 (4), 655-668.
- Badri, M.A., et al. 2000. Operations strategy, environmental uncertainty and performance: a path analytic model of industries in developing countries, Omega, 28, 155-173.
- Barney, J. 1986. Strategic Factors Market: Expectations, Luck and Business Strategy. Management Science, 32, 1232-1241.
- Barney, J. 1991. The Resource-Based Model of the Firm: Origins, Implications, and Prospects. Journal of Management, 17, 97-117.
- Brandenburger, A.M. , H.W. Stuart Jr. 1996. Value-Based Business Strategy, Journal of Economics & Management Strategy, 5,1 Spring, 5-24.
- De Geus, A. 1988. Planing as learning, Harvard Business review, March-April, 2-6
- Dess, G., D.W. Beard 1984. D imension of Organizational Task Environment, Administrative Science Quarterly, 29, 52-74.
- FEE – Fundação de Economia e Estatística, Boletins Internos, 1997. Porto Alegre/RS, Brasil,.
- Fine, C.H., A.C. Hax (1985): Manufacturing Strategy: A Methodology and an Illustration Interfaces, 15, November-December, 28-46.
- Franco, G.H.B. 1999. O Desafio Brasileiro: Ensaio sobre Desenvolvimento, Globalização e Moeda, São Paulo: Editora 34.
- Grant, R.M., 1991. The Resource-Based Theory of Competitive Advantage: Implication for Strategy Formulation. California Management Review, 33, Spring, 114-135.
- Grant, R.M., 1996. Prospering in Dynamic-competitive Environments: Organizational Capability as Knowledge Integration. Organization Science, 7, 4, 375-387.
- Grant, R.M., 2002. The Knowledge-Based View of the firm. In C.W. Choo and N. Bon tis: The Strategic Management of Intellectual Capital and Organizational Knowledge. Oxford University Press.
- Hayes, R.H. 2000. Challenges posed to Operations by the New Economy, Proceedings of First World Conference on Production and Operations Management, Sevilla, 79-88.
- Hayes, R.H. & Pisano, G.P.1994. Beyond World-Class: The New Manufacturing Strategy. Harvard Business Review, 72(1), 77-86.

- Hayes, R., Wheelwright, S. & Clark, K.B. 1988. Dynamic manufacturing: Creating the learning organization. The Free Press, New York.
- Hayes, R.H., R. Wheelwright 1985. Competing through manufacturing, Harvard Business Review, January-February, 99-110.
- Hitt, M., Hoskisson, R. & Nixon, R. 1993. a mid-range theory of interfuncional integration, its antecedents and outcomes. *Journal of Engineering and Technology Management*. 10: 161-185.
- Huber, G.P. 1991. Organizational Learning: the Contributing Processes and the Literatures. *Organization Science*, 2, 1, 88-115.
- IBGE –Instituto Brasileiro de Geografia e Estatística 1997. [www.ibge.org.br](http://www.ibge.org.br).
- Itami, H. 1987. *Mobilizing Invisible Assets*. Cambridge, Ma: Harvard University Press.
- Isaacs, W.N. 1993. Dialogue, Collective thinking, and organizational learning. *Organizational Dynamics*, Autumn: 24-39.
- Jaikumar, R. & Bohn, R. 1986. The development of intelligent systems for industrial use: A conceptual framework. *Research on Technological Innovation, Management and Policy*. 3:169-211.
- Kogout, B. & Zander, U. 1992. Knowledge of the Firm, Combinative Capabilities, and the Replication of the Technology. *Organization Science*, 3, 383-397.
- Levitt, B. y March, J.G. 1988. Organizational Learning. *Annual Review of Sociology*, 14, 319-340.
- Malhotra, N. 1999. Marketing research: an applied orientation, Prentice-Hall Inc., New York.
- Maturana, H.R. & T.J. Varela 1980. Autopoeisis and Cognition, Reidl, London.
- MINER-Ministerio de Industria y Energía 1999. Informe sobre la Industria Española 1998-1999. Miner, Madrid.
- Miller, J.G., & Roth, A.V. 1994. A taxonomy of manufacturing strategies. *Management Science*, 40(3), 285-304.
- Mintzberg, H. 2000. Strategy Safari: A Guided Tour through the Wilds of Strategic Management, Bookman, Porto Alegre-Brazil.
- Moenaert, R. & Souder, W. 1990. An information transfer model for Integrating marketing and R&D personnel in new product development Projects. Journal of Product Innovation Management. 7, 91-107.
- Nonaka, I. 1994. A Dynamic Theory of Organizational Knowledge Creation *Organization Science*, 5, 1, 14-37.
- Nonaka, I., N., Konno 1998. The Concept of Ba: Building a Foundation for Knowledge Creation California Management Review, 40, 3, 41-53.
- Nonaka, I. Toyama, R. & Nagata, A. 2000. A firm as a knowledge-creating Entity: A new Perspective on the theory of the firm. *Industrial and Corporate Change*. 9 (1): 1—20.

- Papke-Shields, K.E., Malhotra, M.K. & Grover, V. 2002. Strategic Manufacturing Planning Systems and Their Linkage to Planning System Success, 33, 1.
- Penrose, E. 1959. The Theory of the Growth of the Firm. New York, Wiley.
- Pérez-López, J. 1991. Teoría de la acción humana en las organizaciones: La acción personal. Ediciones Rialp, Madrid.
- Porter, M.E. 1980. Competitive Strategy: Techniques for Analyzing Industries and Competitors. New York: Free Press.
- Porter, M.E. 1990. Competitive Advantages of Nations. New York: Free Press
- Polanyi, M. 1958. Personal Knowledge, Routledge-Kegan Paul, New York.
- Polanyi, M. 1967. The tacit dimension, Doubleday Press, Garden City, New York.
- Prahalad, C.K. & G. Hamel 1990. The Core Competences of the Corporation. Harvard-Business Review, May-June, 79-91.
- Probst, J.B. & Büchel 1997. Organizational Learning. Prentice Hall, GB.
- Roth, A. 1996. Neo-Operations Strategy in Handbook of Technology Management, McGraw-Hill, New York.
- Schoereder, R.G., T.N. Lahr, 1992. Development of Manufacturing of Manufacturing Strategy: A Proven Process. In ETTLIE et al (Eds.) The Research Agenda for the Next Decade, Kluwer Academic Publications.
- Schoereder, R.G., K.A. Bates & Juntilla, M.M. 2002. A Resource-Based View of Manufacturing Strategy and the relationship to Manufacturing Performance. Strategic Management Journal, 23, 105-117.
- Senge, P.M. 1990. The fifth discipline. Doubleday, New York.
- Skinner, W. 1969. Manufacturing-The Missing Link in the Corporate Strategy, Harvard Business Review, May-June, 5-14.
- Slack, N. 1994. The Importance-Performance Matrix as a Determinant of Improvement Priority, International Journal of Operations & Production Journal, 5, 59-75.
- Spencer, J.C. 1989. Industries Recipes: The nature and Sources of Managerial Judgement. Oxford: Blackwell.
- Sveiby K. 2001. A Knowledge-Based Theory of the Firm to Guide in Strategy Formulation. Journal of Intellectual Capital, 2, 4, 344-358.
- Teece, D., G. Pisano, A. Shuen, 1997. Dynamic Capabilities and Strategic Management, Strategic Management Journal, 18, 7, 509-533.
- Toffler, A. 1981. The Third Wave, Bantam Books, New York.

Tracey, M., Vonderembse, M.A. & Lim, J.-S. 1999. Manufacturing technology and strategy formulation: keys to enhancing competitiveness and improving performance. Journal of Operations Management, 17 (4), 411-428.

Vickery, S.K. 1991. A Theory of Production Competence Revisited. Decision Sciences, 22 (3), 635-643.

Vickery, S.K., Droge, C. E Markland, R.E. 1993. Production Competence and Business Strategy: Do They Affect Business Performance?. Decision Sciences, 24, 2, 435-455.

Von Krogh, G., I. Nonaka, M . Aben 2001. Making the most of your company's knowledge: A strategic Framework, Long Range Planning, 34, 421-439.

Ward, P.T., G.K. Leong, Boyer, K.K. 1994. Manufacturing Proactiveness and Performance Decision Sciences, 25, 3, 337-358.

Wheelwright, S.C., 1984. Manufacturing Strategy: Defining The Missing Link, Strategic Management Journal, 5, 77-91.

Zahra, E., S.R. Das, 1993. Building Competitive Advantage on Manufacturing Resources, Long Range Planning, 28, 2, 90-100.

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