

**THE ENVIRONMENT AS A DETERMINANT FACTOR OF THE
PURCHASING AND SUPPLY STRATEGY: AN EMPIRICAL
ANALYSIS**

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The environment as a determinant factor of the purchasing and supply strategy: an empirical analysis

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Abstract

The environment has been considered an essential variable to explain the strategic behavior of companies; however, few works have studied the role that environment plays in the formulation of strategies in the purchasing function. The objective of this work is to study the relationship between munificence, hostility, dynamism and complexity of the environment and the implementation of practices of evaluation, development, involvement and logistics integration of suppliers. Several hypotheses are formulated starting from different approaches and theories developed in the field of strategic management and operations management, and they are tested over a sample of 96 industrial companies with business activities in the northeast of Brazil. The results reveal a statistically significant relationship between the characteristics of the environment and the practices employed in the purchasing function, the hostility and the complexity of the environment being outstanding for their explanatory power.

Keywords

Environment, purchasing and supply strategy, purchasing and supply practices, munificence, hostility, dynamism, complexity.

1. Introduction

Although within the scope of strategic management the environment has been considered as a fundamental variable to explain the strategic behavior of companies (e.g. Miller and Friesen, 1983; Hambrick, 1983; Hrebiniak and Joyce, 1985), few works analyze the environment in the formulation and implementation of functional strategies (Ward et al., 1996).

In the last few years, the strategic importance of the purchasing function has significantly grown in industrial sectors (Gadde and Hakansson, 1994; Carter and Narasimhan, 1996). The identification of suppliers in the research of Porter (1980) as critical elements in the strategic analysis or in the success of the Japanese productive systems in the eighties has been noted as a driver of this larger recognition (Watts et al., 1992; Ellram and Carr, 1994). As a consequence, in the last two decades, many published works have addressed the identification of the determinants and consequences of the different options and strategic decisions used in the purchasing function. However, very few works have analyzed the determinant power of the environment in the formulation of the purchasing and supply strategy. Those works that have examined this role have centered on a single dimension characterizing the environment (e.g.

Paulraj and Chen, 2007) and have not attempted to discriminate those dimensions with a greater explanatory power.

The present work intends to contribute to the development of this field of research by jointly analyzing the relationship between four characteristic dimensions of the environment -munificence, hostility, dynamism and complexity- and the implementation of supplier development, evaluation, involvement and logistic integration practices. We have labeled these practices as 'advanced' because they represent strategic alternatives that break with traditional or competitive paradigms (Morris and Imrie, 1992; Lamming, 1993). Given the interest they have aroused and the competitive potential that has been attributed to them, it is especially interesting to identify in which contextual circumstances companies consider their implementation appropriate.

The remainder of this work is structured in 5 sections. In section 2, the main focus of the work is defined, conceptually developing the elements of the environment and the purchase and supply strategies to be considered in subsequent analysis. Section 3 provides a broader discussion of the different theories and approaches developed within the field of strategic management and in operations management literature, generating arguments that relate the environment with the purchasing and supply practices, and moving towards the stated hypotheses. Section 4 outlines the methodology used to test the hypotheses formulated and section 5 presents and discusses the research results. The paper closes with Section 6, which summarizes the main research conclusions.

2. The main focus of the work

Environment and strategy

The influence of the environment on the organizational operation has constituted one of the proposals of the contingency theory since its origin at the beginning of the 1960s (Burns and Stalker, 1961; Lawrence and Lorch, 1967; Thompson, 1967), although the initial research centered primarily on determining its effects on organizational structure rather than on competitive strategy. The relationship between strategy and organizational structure has also received critical attention as from the beginnings of strategic management as an academic discipline (Chandler, 1962; Rumelt, 1974). However, the relationship between the strategy and the environment of a company, denominated the 'third link' by Miller and Friesen (1983), has received attention from academics only after quite some time. Several research initiatives developed during the 1980s established the clear existence of important connections between the different dimensions characterizing the environment and the managerial strategy (e.g. Miller and Friesen, 1983; Hambrick, 1983; Hrebiniak and Joyce, 1985).

The inclusion of the environment as a fundamental element in the understanding of the formulation and the success of competitive strategy has also been boosted by the influence of the industrial economy in the development of strategic management as from the 1970s (Hoskisson et to the., 1999). The evolution of the paradigm structure-conduct-results (Bain, 1968; Mason, 1939), a fundamental pillar of the traditional industrial economy, and its application to the managerial gamut, has suggested the

existence of important links between the company strategy and the structure of its related industrial sector (Porter, 1981).

Until the 1990s, the works that studied the links between the environment and the company strategies had paid little attention to functional strategies. Having noted this limitation, several works studied the relationship between the environment and strategy in the scope of the production function (e.g. Ward et al., 1995, Ward et al. 1996; Ward and Duray, 2000), understanding that there should also be an alignment of the functional strategies with the environment surrounding the company. The influence of the environment on the configuration of the purchase and continuous supply strategies, however, has scarcely been explored. In recent years the purchasing function has received special interest in industrial sectors, no longer being considered a merely administrative component (Reck and Long, 1988; Spekman et al., 1992; Carter and Narasimhan, 1996; Trent and Monczka, 1998). However, little of the research has tackled the relationship between the characteristics of the environment and the strategic decisions taken to manage purchasing and supply activities. Existing research tends to focus only on one dimension of the environment and hence it is not possible to discriminate which aspects of the environment have the strongest explanatory power and which are less important.

Dimensions of the Environment

The competitive environment has been characterized in several ways and through multiple dimensions in strategic management (e.g. Dess and Beard, 1984; Miller and

Fritassem, 1983; Sharfman and Dean, 1991; Sutcliffe and Huber, 1998). In this work we focus on four of these dimensions:

- *Munificence*. This refers to the extent to which the environment presents competitive opportunities and favorable conditions for the company's growth;
- *Hostility*. This refers to the extent to which the actions and the behavior of present competitors in the environment influence and threaten the company;
- *Dynamism*. This refers to the degree of instability and turbulence of the environment.
- *Complexity*. This refers to the degree of heterogeneity or the diversity of factors, activities or situations faced by the company.

Although some authors have incorporated the concept of hostility within the munificence concept (Ward et al., 1995) and others have combined both concepts (Khandwalla, 1972; Sharfman and Dean, 1991), each idea represents different characteristics of the environment and other authors have considered them separately (eg. Sutcliffe and Huber, 1998). Both concepts tend, however, to be considered as indicators of the level of rivalry and competitiveness of the sector in which the company operates. On the other hand, dynamism and complexity are frequently associated with the uncertainty concept (Duncan, 1972; Dess and Beard, 1984) and, in this sense, their effects have often been analyzed jointly (Dess and Origem, 1987; Sia et al., 2004).

Purchase and Supply Strategies: advanced practices

Some authors view the predominant strategic planning process in the production function (see Leong et al., 1990) in the scope of the purchasing and supply function (Watts et al., 1995; González-Benito, 2007). In this sense, researchers distinguish two levels or components of the purchasing strategy: the chosen competitive priorities and the practices and programs used to reach these priorities. The current work focuses on the second level because it actually encompasses the strategic decisions taken by the company regarding supply.

In spite of the variety of strategic alternatives and possible initiatives that can be developed, in the last few years several notable practices have marked a departure from the formulas of supply known as traditional or competitive (Morris and Imrie, 1992; Lamming, 1993):

- *Supplier evaluation* (e.g. Carr and Pearson, 1999; So et al., 1999). Its objective is to garner information about the reliability and the capacities of suppliers so that selection does not rely solely on price as a determinant;
- *Supplier development* (e.g. Humphreys et al., 2004). This argues that as the company depends on its suppliers, it is appropriate to help selected suppliers solve their problems and improve their production capacity;
- *Supplier involvement* (e.g. Petersen et al., 2005). The central idea in this concept is leveraging the knowledge and capacities of suppliers in helping in project or product development or in the solving of production problems;

- *Supplier logistics integration* (e.g. Stank et al., 2002). The objective of this practice is to have the physical flow of supplies better fit the needs of the company, as if it were just one more production stage within the organization.

These practices, here denoted as ‘advanced’, have developed a new paradigm based on cooperation between suppliers and the generation of mutual trust, hence providing important interrelationships and complementarities that allow them to be studied under wider conceptual lenses such as those of Supply Chain Management (e.g. Croom et al., 2000; Ho et al., 2002), or JIT purchasing (e.g. Waters-Fuller, 1995; González-Benito and Spring, 2000; Kaynak and Hartley, 2006).

3. Influence of the environment on supply practices: working hypotheses.

Munificence and hostility

The munificence and hostility levels of the environment have been considered as intimately related to the abundance of resources (Sharfman and Dean, 1991) as well as to the rivalry and competitive intensity in that environment (Miller and Friesen, 1983). On the one hand, the reduced growth that characterizes munificent environments constitutes one of the structural factors that increase rivalry within an industrial sector (Porter, 1980). On the other hand, when resources are scarce and there are multiple candidates vying for them, an increase in aggressive and hostile behavior on the part of competitors is more likely, resulting in a threat to the company. The effect of munificence and hostility on the purchasing and supply strategy can, therefore, be

viewed as the effect that a shortage of resources and larger competitive intensity have on such a strategy.

An answer to the relationship between the rivalry and competition of an industrial sector and the behavior of the companies that compete in it can be found in the contributions of the industrial economy to strategic management, specifically in the model of competitive forces proposed by Porter (1980). Porter considers differentiation as an appropriate strategy to combat rivalry and competitive pressures in the sector, possibly authenticated by changes in products or in services. The company would end up in a monopolistic competition situation (Scherer and Ross, 1990). In other words, a company would opt for a market segment which would be more isolated from competitors' actions. It is reasonable to think, therefore, that the companies competing in low munificent or hostile environments have a greater interest in introducing changes that would allow them to differentiate and, therefore, reduce their vulnerability. Several researchers present this idea of change as a response to the threat represented by a shortage of resources and an increase in competitive intensity (ex. Yasai-Ardekani, 1989; Wiersema and Bantel, 1993). Companies that enjoy munificent or scarcely hostile environments, however, have fewer reasons to change their actions or modify their workflow and operations.

The advanced purchasing and supply practices can be viewed as the articulation of a differentiation strategy in the purchasing function. These practices represented, at the end of the 1980s and early 1990s, the surpassing of the traditional paradigm in purchasing and supply management. This traditional paradigm viewed purchasing management as a selection process based on prices. During this period, purchasing and

supply administration was considered, in most companies, an administrative activity whose main function was to obtain, at the best possible price, products that would fit a series of specifications totally controlled by the company (Ellram and Carr, 1994; Cavinato, 1999). The contribution of the purchasing department was limited to cost reduction. However, the development of advanced practices was parallel in time to the strategic recognition of the purchasing function and the dissemination of the idea that purchasing management can contribute to reaching other competitive objectives such as quality, flexibility or dependability, and thus support a differentiation strategy. The implementation of these practices could be considered, therefore, a natural reaction in the face of environmental hostility and/or low munificence that seeks to minimize through differentiation the threat these environmental conditions represent. We propose, therefore, the following hypotheses:

Hypothesis 1: The higher the munificence of the environment, the lower the implementation of advanced purchasing and supply practices in a company.

Hypothesis 2: The higher the hostility of the environment, the higher the implementation of advanced purchasing and supply practices in a company.

It is important to note that, in spite of the arguments, there is a certain controversy in the literature on the effect these adverse environments, hostile and/or low munificent, have on organizational behavior (Covin et al., 1999; Freel, 2005). Several works uphold a contradictory fact, arguing that, when resources are scarce, companies focus their energies on the reduction of costs, reducing the application of resources for innovation, and work toward more short-run objectives (Ward et al., 1995; Ward et al., 1996;

Zyglidopoulos, 1999). Therefore, testing these hypotheses will contribute directly to this existing debate.

Dynamism and complexity

Dynamic environments are characterized by frequent changes in external variables that affect the activity of the company. This usually entails greater difficulty in forecasting the future and greater uncertainty surrounding relationships with suppliers. On the other hand, complex environments are characterized by a great number of external variables that must be taken into consideration. Due to the limitations of human rationality and, therefore, the impossibility of identifying and analyzing all possible business contingencies, complex environments also involve increased uncertainty in supplier relationships. Therefore, dynamic environments and complex environments coincide in their capacity to generate uncertainty. The effect of this uncertainty on the purchasing and supply strategy chosen by a company can be examined from three perspectives: transaction costs theory, resource dependence theory, and operations management literature.

First, the theory of transaction costs (Williamson, 1975) establishes that the greater the uncertainty, the higher the costs of searching for information and entering into suitable contractual negotiation with suppliers in order to cover all possible contingencies. It also increases the control costs that exist behind the signature of the contract, because of the impossibility of exempting this from possible opportunistic behavior. Thus, transaction cost theory concludes that the internalization of transactions becomes more

advantageous as uncertainty increases (Williamson, 1979), or, in other words, manufacturing internally is economically more advantageous than external purchasing.

Yet in subsequent works, trust is recognized as a factor capable of minimizing company vulnerability in the face of uncertainty and reducing transaction costs without the need for resulting vertical integration (Chiles and McMackin, 1996; Williamson, 1991). The establishment of a relational or cooperative structure with suppliers supported by such a trust can alleviate the costs of information search, negotiation and control derived from the uncertainty generated by dynamic or complex environments. Although establishing cooperative relationships with certain suppliers limits the possibility of selecting the suppliers with the least cost, in this type of relationship the advanced purchasing and supply practices mentioned above are usually implemented, and they have the potential of generating technological, design or logistics improvements that incrementally compensate for this limitation. According to these arguments, the establishment of cooperative relationships constitutes an intermediate alternative between traditional relationships and a vertical integration that increases the level of uncertainty under which market transactions are still appropriate. There would be, therefore, a positive correlation between the uncertainty level and the degree of cooperation with suppliers (Fink et al., 2006) and, therefore, between the uncertainty level and the degree of implementation of the advanced purchasing and supply practices which are usually built over this cooperative base.

Second, the theory of resource dependence, developed initially by Pfeffer and Salancik (1978), suggests that organizations, to accomplish their activities, need access to resources that are not directly controlled by them internally. In other words,

organizations are not self-sufficient and depend on other external agents, which could be suppliers, buyers or competitors, in determining their own behavior. Despite this lack of resource control, organizations try to transform and control their external dependencies in an attempt to guarantee their survival and maintain greater autonomy (Pfeffer, 1987). In this sense, previous research has studied different strategies which provide the capability to alter these relationships, such as coalitions among companies (Pfeffer 1972; Burt, 1980) or joint ventures (Pfeffer and Nowack, 1976). In environments of high uncertainty, the control of these dependencies becomes more difficult and companies have to make a greater effort to restructure their relationships and establish stronger connections (Ulrich and Barney, 1984). In this sense, Paulraj and Chen (2007) argue that the establishment of cooperative relationships and increased interaction with suppliers constitutes a mechanism allowing for greater control of supply dependence and should thus be more frequent in environments of high uncertainty. Under this perspective, the implementation of advanced supply practices can be seen as an additional mechanism for facing the presence of uncertainty in dynamic and complex environments.

Third, the literature on operations management suggests that companies can adapt to the uncertainty of the environment, often generated by environmental dynamism or complexity, by increasing the flexibility of their production systems (eg. Swamidass and Newell, 1987; Prater et al., 2001; Chang et al., 2002; Llorens et al. 2005; Martínez and Pérez, 2005). Advanced supply practices contribute to increasing flexibility, thus allowing a faster development of new products, a reduction in supply interruptions, and greater capacity for supply chain adaptation to new circumstances and scenarios (Narasimhan and Dá 1999a, 1999b, 2000). With this perspective, the implementation of

advanced practices would be in the interest of the company so that they could heighten flexibility to more adequately face dynamism and complexity in the environment. The model presented by Chen and Paulraj (2004) is consistent with this reasoning, proposing environmental uncertainty as an explanatory element of supply chain management.

The arguments developed from these three perspectives suggest that, in dynamic environments and in complex environments, companies will have more interest in implementing advanced supply practices based on cooperation and benefit sharing, because, in this way, they can better face the existing uncertainty. This then suggests the following hypotheses:

Hypothesis 3: The higher the dynamism of the environment, the higher the implementation of advanced purchasing and supply practices in a company.

Hypothesis 4: The higher the complexity of the environment, the higher the implementation of advanced purchasing and supply practices in a company.

4. Methodology

Data

The population chosen to test the hypotheses was comprised of factories located in the Brazilian northeast, with 50 or more employees, in different industrial sectors: food and kindred products (SIC 20), apparel and other textile products (SIC 23), papers and allied

products (SIC 26), chemicals and allied products (SIC 28), and fabricated metal products (SIC 34). The starting information was obtained from the Industrial Guides that the National Confederation of the Industry (CNI) of Brazil makes available from their Federations.

As a first step, we contacted the purchasing manager of each company with the intention of sensitizing him/her about the importance of the study. As a consequence of these contacts, companies in operation for less than two years were excluded. In this process we also discovered that some industries, although located physically in the Northeast Area of Brazil, had their purchasing units in the head offices or in other areas. In these cases, we contacted the person responsible for purchasing in the area, asking that they provide information referring only to the investigated area. After this process the population study object was made up of 485 companies.

The data was collected by sending a postal questionnaire accompanied by a pre-paid envelope, to be answered by the person responsible for the purchasing department in all the companies. If companies so requested in the previous phone contact, the questionnaire was sent by electronic mail. In all the cases a cover letter was included explaining the objective of the study. In order to improve the answer rate, several calls were made to the companies that did not return the questionnaire after at least four weeks from the sending. This procedure, accomplished between January and August of 2007, allowed us to obtain a total of 108 answers. However, 12 questionnaires did not provide some important data, so the final total was 96 valid questionnaires, for an answer rate of 19.8%.

Measures

Dimensions of the environment. Purchasing managers were asked to rate on a 7 point Likert scale from 1 (not at all) to 7 (completely) the extent to which the statements included in Table 1 reflect the environment of their companies in recent years. The average of the first two items, referring to growth of demand and the existence of opportunities, and adapted from the scale used by Sutcliffe and Huber (1998), was used to measure the munificence of the environment. The following two, which refer to the intensity and depth of the threat represented by competitors' actions, were used to measure the hostility of the environment and they were adapted from the scale used by Miller and Friesen (1983). We also adapted from these authors the two items used to measure the dynamism of the environment, which focus on the frequency of change of customers' needs and competitors' strategies. The last three items, which refer to the diversity of demands, products and commercial strategies faced by the company, are used to measure the complexity of the environment and they were adapted from the scales used by Sutcliffe and Huber (1998) and Fuentes-Fuentes et al. (2004). All the items were subjected to a confirmatory factor analysis (see Table 1), which provided evidence of the validity and unidimensionality of the four dimensions considered.

Advanced practices in the purchasing function. Managers were asked to rate on a 7 point Likert scale from 1 (not at all) to 7 (completely) to what extent the statements in Table 2 describe the situation of their company. The first three items refer to the existence of systems of evaluation and assessment of suppliers. The following two refer to the existence of actions focused on the development of suppliers. The subsequent two

refer to the degree of involvement and participation of the suppliers in the design, development and improvement of products and processes. The last three refer to the level of logistics integration, this being understood as synchronization and mutual adaptation as regards the physical flow of supplies. The average of the items in each group was used then as a measure of the implantation of supplier evaluation, development, involvement and logistics integration practices, respectively. The results of a confirmatory factor analysis (see Table 2) provide evidence of the validity and unidimensionality of the constructs considered.

Analysis

The different hypotheses suggested require us to study the explanatory capacity of the environmental dimensions in the implementation of advanced practices in the purchasing function. Multiple regression analysis, considering each of the advanced practices as dependent variable and the distinct dimensions of the environment as independent variables, constitutes the most appropriate analytic technique for testing them.

To distinguish the effect of the characteristics of the environment from other effects produced by other contextual circumstances, three control variables are considered in the studied models:

- *Size of the company*, measured by the number of employees, and used to control the effect of economies of scale and the often greater availability of resources in large companies.

- *Seniority of the purchasing manager*, measured by the number of years this person has occupied the position, and used to control both the possible effect of experience in the implementation of new practices and the possible effect of the resistance that senior managers could show to the implementation of new practices involving important cultural changes.
- *Strategic integration of the purchasing function*, measured through a scale adapted from Carr and Pearson (1999), Narasimhan and Das (2001) and Chen and Paulraj (2004) and shown in Table 3. It is used to control the effect that the company's strategic consideration of its purchasing function can have on the implementation of more advanced practices and the allocation of resources that this involves.

As shown in Table 1, some dimensions of the environment show important correlations to each other. To avoid interpretation problems deriving from collinearity, we opted to study six regression models for each advanced practice as dependent variable. The first model includes the control variables exclusively as independent variables. The following four models incorporated, respectively, each of the dimensions of the environment. These models allow us to examine, in an independent way, the explanatory capacity of each dimension. In the sixth model all the dimensions of the environment were included, but their entry into the model was conditioned by a stepwise procedure. Thus, only those dimensions that are able to explain something about the implementation of an advanced practice which the other priorities cannot explain enter into the model. In other words, the procedure not only allows us to identify the dimensions of the environment that are capable of explaining a significant part of the implementation of advanced practices, but it also allows to identify which dimensions have a larger predictable power and to identify those for which this power is

not a consequence of the correlation maintained with other dimensions. Tables 4 and 5 present the results obtained from the estimation of these models.

5. Results and discussion

The results of the estimation of the models 1, shown in Tables 4 and 5, is statistically significant in three of the four dependent variables. Moreover, each of the control variables introduced shows significant explanatory power (with a confidence level of at least 90%) over at least one of the dependent variables, which demonstrates that its inclusion in the analysis was correct. The size of the company appears as a positive factor in implementing practices of supplier evaluation, supplier development, and in a weaker way, supplier involvement. This can be explained because many of these practices require investments and efforts in the development of procedures that pay off more quickly in larger companies. The seniority of the person responsible for purchasing shows a negative and significant effect ($p < .10$) on the implementation of logistics integration practices. This result supports the idea that senior managers' resistance represents a barrier to the transformation of the logistics system and that their substitution is necessary in many companies wishing to make this transformation. The strategic integration of the purchasing function seems to have the largest explanatory power of the three control variables. This result shows that the implantation of advanced practices is all the more favored the higher the strategic recognition of the purchasing function inside the organization. This recognition seems to translate into a decision to implant more sophisticated practices in the purchasing management and it can reflect a

larger capacity of the purchasing function to capture resources that allow it to develop new initiatives.

As regards model 2, the incorporation of environmental munificence as independent variable significantly increases ($p < .10$) the explanatory power of the model in the case of supplier development and logistics integration practices. The negative sign shown in both cases is consistent with the statement made in hypothesis 1, which is why we can consider it partially supported by our results. The hostility of the environment incorporated in model 3 turns out to be strongly significant ($p < .01$) for explaining the implementation of supplier development and involvement practices and, to a lesser degree ($p < .10$), the implementation of logistics integration practices. Therefore, hypothesis 2 is also partially supported by the analyzed data. The dynamism of the environment, considered in model 4, only significantly increases the explanatory power of the model in the case of practices of supplier development. The coefficient has a positive sign and offers partial support for hypothesis 3. Finally, the complexity of the environment considered in model 5 has a positive and highly significant ($p < .01$) effect on the implementation of evaluation practices and development of suppliers and, with a smaller significance level ($p < .10$), on the implementation of supplier involvement practices. The results obtained therefore also offer partial support for hypothesis 4. In general, it can be observed that all the dimensions of the environment exert a certain effect on the implementation of advanced practices in the sense announced by the hypotheses, but all the dimensions do not have a similar role in all the practices nor do they seem to have the same weight.

A transversal reading through models 2 to 5 shows that the implantation of supplier development practices is linked to all the dimensions of the environment, while the logistics integration practices are the ones more weakly predicted by the characteristics of the environment. Model 6 allows us to identify those dimensions with greater explanatory power. Regarding the evaluation of suppliers, this model does not contribute any additional information since only one dimension showed significant explanatory power in the individual analysis. As far as the implementation of supplier development practices is concerned, the complexity and the hostility of the environment enter into the model, which indicates that they are capable of explaining certain parts of the variation that cannot be better explained by the rest of the dimensions. As regards the involvement of suppliers and their logistics integration, hostility has great explanatory power. The hostility and the complexity of the environment stand out, therefore, for their explanatory power, while the munificence and dynamism, although related significantly with some practices in the sense foreseen, are not able to explain anything that the other dimensions are not able to explain.

Returning to the arguments used to expound the hypotheses, the results obtained allow us to make some appraisals. The argument developed to relate munificence and hostility with advanced purchasing and supply practices focused on considering that both dimensions reflect a shortage of resources and high competitiveness and that these two circumstances are equivalent. However, as Sharfman and Dean argue (1991), a situation of scarce resources is not necessarily associated with high competitiveness (the case of sectors with few competitors and high entry barriers), nor does a sector in growth, and with an abundance of resources and opportunity, lack competitiveness. Therefore, the effect of munificence -more closely linked to the shortage of resources- and the effect of

hostility – the expected consequence of greater rivalry and competitiveness- do not necessarily have to show similar effects to be present in the same circumstances. Although, as expected from the arguments used, munificence and hostility show a negative and significant correlation (see Table 1), they only share 26% of the variance. Brazil is a country that has been experiencing important growth in recent years, but it is also attracting numerous multinationals, which leads some companies to notice environmental munificence at the same time as environmental hostility. This reduces the negative correlation between the two variables and it explains that both characteristics of the environment show different effects. Thus hostility, which is what best reflects the level of competitiveness of the environment and the need to become different, is the one that shows greater explanatory power over the advanced practices of purchasing and supply.

The arguments developed to propose an effect of the dynamism and the complexity of the environment on purchasing and supply management were supported by the capacity of both characteristics to generate uncertainty. Since these two variables have different effects, their explanatory power does is not only based on this shared characteristic, but on other important aspects of each of these dimensions. In this sense, it is reasonable to think that companies subjected to a greater complexity have been dealing with many more variables (e.g. products, customers, strategies) and it is much more difficult to maintain thorough control of all of them. These companies may therefore be more inclined (1) to develop an evaluation system that will allow them to select the best suppliers and not to be so concerned about the daily control of supplies, (2) to foster the capabilities of their suppliers; and (3) to involve their suppliers in product and process design and development and problem solving in order to better confront the existing

complexity. Although dynamism generates uncertainty, it can also lead companies to show greater resistance to establishing links with suppliers to thus ensure the possibility of introducing drastic changes in its supply chain if the instability in the environment required it of them. This could explain why dynamism shows a smaller explanatory power than complexity.

6. Conclusions

In this work we have approached the relationship between the characteristics of the environment surrounding a company and the strategic decisions adopted in its purchasing function. Specifically, we have focused on the relationship between the munificence, hostility, dynamism and complexity of the environment and the implementation of supplier development, evaluation, involvement and logistics integration practices. It was observed that the different dimensions of the environment have a significant explanatory power over the several practices developed in the purchasing function, and that this one is different from those that have other internal variables such as company size, seniority of purchasing managers or the level of strategic integration of the purchasing function. The results, therefore, are consistent with the literature that attributes a fundamental role to the environment in explaining the behavior of companies (e.g. Miller and Friesen, 1983).

Two dimensions of the environment stand out for their influence on the development of advanced purchasing and supply practices: hostility and complexity. On the one hand, this leads us to think that companies which carry out their activity in very competitive

markets and with high rivalry levels view the implementation of advanced practices in the purchasing function as a way to protect against their competitors' hostility. On the other hand, it seems that the companies that work with and face a great diversity of products, customers or strategies are more prone to delegate and to seek support in their suppliers. Although the munificence and the dynamism of the environment are also important, they have a smaller relative weight. This seems to indicate, on the one hand, that companies do not respond to a shortage of resources and the scarcity of competitive opportunities with advanced practices of supply unless they are accompanied by greater competitiveness and rivalry in the markets. On the other hand, as transaction cost theory (Williamson, 1975) and the resource dependence perspective (Pfeffer and Salancik, 1978) suggest, the uncertainty of the environment seems to play an important role in the narrowing of relationships with suppliers, but the effect is smaller when this uncertainty is a consequence of dynamism than when it is a consequence of complexity. It is necessary, therefore, to distinguish the origin of the uncertainty in order to understand its effect on the behavior of the purchasing function

This work constitutes a first contribution to the study of the role carried out by the environment in the formulation and implementation of the purchasing and supply strategy, and as such it leaves open multiple alternatives for future investigation. It is important to delve further into the study of the relationship that the different defined dimensions of the environment have with other practices and strategic decisions of supply not considered in this work, as well as on other variables that characterize the behavior of the purchasing function. It is also important that besides the direct relationship, other potential moderating effects should be studied, such as the capacity of the environment to influence both the relationship between the implementation of

certain practices and the achievement of better performance, both in the purchasing function and in the organization as a whole, and the relationship between these practices and other organizational variables. This would lead to conclusions about the purchasing and supply strategies with the greatest likelihood of leading to success in each competitive environment.

Table 1: Dimensions of the environment: Confirmatory Factor Analysis and Correlations¹

	Average (S.D.)	F1 Munificence	F2 Hostility	F3 Dynamism	F4 Complexity
Demand for the products of our industry has been decreasing (INVERSE SCALE)	5.71(1.60)	0.47			
Investment and commercial opportunities have been unfavorable (INVERSE SCALE)	5.27 (1.59)	1.15			
Our main competitors' commercial actions have been very hostile (very intense competition)	5.14 (1.46)		.82		
Our competitors' commercial actions have been threatening our company in many aspects (price, delivery, service, quality, etc)	3.80 (1.68)		.48		
Customers' desires and preferences in our industry have frequently varied	4.04 (1.71)			.55	
The strategies and commercial actions of our key competitors have been varying very frequently	3.73 (1.32)			.68	
Customers' desires and preferences have been diverse and heterogeneous.	4.41 (1.59)				.62
It has been necessary to develop a wide range of products and productive methods/ processes to satisfy our customers	5.27 (1.67)				.79
It has been necessary to apply several commercial tactics/formulas to satisfy our customers' needs	5.27 (1.53)				.79
Goodness of fit	Recommended Values²				
$\chi^2 = 22.79$ (p=0.355)	p>0.05 ≤ 3	Correlations	F1		
$\chi^2 / d.f. = 1.085$	≥ 0.90		F2		
GFI = 0.953	≥ 0.80		F3		
AGFI = 0.900	≥ 0.90		F4		
TLI = 0.984	≥ 0.90				
CFI = 0.991	≤ 0.10				
RMSEA = 0.030					
** p < 0.01 * p < 0.05 + p < 0.10					

¹ Items measured on a 7 point Likert scale from 1 (does not at all describe the environment of the company) to 7 (it completely describes the environment of the company)

² Recommended values based on Chau (1997)

Table 2: Advanced Purchasing and Supply Practices: Confirmatory Factor Analysis and Correlations¹

	Average (S.D.)	F1 Supplier evaluation	F2 Supplier development	F3 Supplier involvement	F4 Logistics integration	
We monitor and register the deficiencies and flaws of our suppliers	5.18 (1.74)	0.69				
We demand quality certificates from most of our suppliers (e.g. ISO 9001)	4.41 (2.10)	0.78				
We evaluate in a continuous and systematic way the capacities of our suppliers (there are formal processes for that)	4.32 (1.98)	0.89				
We regularly organize training activities (courses, conferences) to help our suppliers to improve their supply capacities	2.76 (1.73)		.67			
Our technical staff visits the plants of our important suppliers and helps them to solve their problems	3.71 (1.90)		1.06			
Our key suppliers collaborate with us in the design and development of our products	4.80 (1.72)			.71		
Our key suppliers collaborate in the resolution of problems within productive processes	4.77 (1.68)			.91		
Our logistics activities are integrated with those of our key suppliers (e.g. standard containers, compatible equipments)	3.56 (1.96)				.84	
Our key suppliers have been adapting their delivery formats to our needs (e.g. packings, lot size, frequency)	4.68 (1.98)				.71	
We coordinate logistics flows with our suppliers to optimize the use of vehicles' capacity (shipment consolidation)	4.05 (1.84)				.49	
Goodness of fit	Recommended Values²					
$\chi^2 = 54.94$ (p=0.003)	p>0.05	Correlates	F1	.555**	.381**	.568**
$\chi^2 / d.f. = 1.894$	≤ 3		F2		.418**	.444**
GFI = 0.896	≥ 0.90		F3			.451**
AGFI = 0.803	≥ 0.80		F4			
TLI = 0.902	≥ 0.90					
CFI = 0.937	≥ 0.90					
RMSEA = 0.097	≤ 0.10					
** p < 0.01 * p < 0.05 + p < 0.10						

¹Items measured on a 7 point Likert scale from 1 (Does not at all fit the situation of the company) to 7 (Completely fits the situation of the company)

²Recommended values based on Chau (1997)

Table 3: Measure of strategic integration of the purchase function: Exploratory Factor Analysis ¹

	Average (S.D.)	Factor 1 Loadings
The purchasing department participates in the strategic planning process of the company	5.16 (1.69)	.741
The staff of the purchasing department has a good knowledge of the strategic objectives of the company	5.34 (1.45)	.848
The performance of the purchasing department is also measured in terms of its contribution to the strategic objectives of the company	5.03 (1.66)	.811
The training of the purchasing staff is guided by the needs derived from the strategic planning of the company	4.80 (1.65)	.797
The department of purchases formalizes a written long-term plan to develop and to support the general strategies of the company	3.76 (1.71)	.733
The plans of the purchasing department are regularly revised and adjusted to the variations in the company's strategic planning	4.43 (1.78)	.824

Explained variance: 62.95%; Cronbach's α : 0.880

¹Items measured on a scale on a 7 point Likert scale from 1 (Does not at all fit the situation of the company) to 7 (Completely fits the situation of the company)

Table 4: Regression of the advanced purchasing and supply practices on the dimensions of the environment: Supplier evaluation and supplier development

	Supplier evaluation						Supplier development					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	.265	.361	-.337	-.050	-1.186	-1.186	-.180	.908	1.479	1.225	1.990*	2.883*
Size	.457**	.460**	.442**	.451**	.474**	.474**	.405**	.434**	.371**	.384**	.426**	.396**
Seniority manager	.061	.063	.078	.070	.094	.094	.134	.159	.171	.166	.175	.201+
Strategic integration	.608**	.604**	.592**	.592**	.543**	.543**	.395**	.353**	.360**	.343**	.314**	.294*
Munificence	---	-.017	---	---	---	---	---	-.190+	---	---	---	---
Hostility	---	---	.151	---	---	---	---	---	.325**	---	---	.270*
Dynamism	---	---	---	.098	---	---	---	---	---	.324**	---	---
Complexity	---	---	---	---	.325**	.325**	---	---	---	---	.405**	.364**
R ²	.303	.303	.316	.308	.366	.366	.184	.209	.252	.246	.289	.334
F	13.300**	9.875**	10.521**	10.114**	13.127**	13.127**	6.926**	6.023**	7.658**	7.408**	9.237**	9.036**
ΔF (respect to model 1)		.024	1.826	.691	9.095**	9.095**		2.889+	8.225**	7.409**	13.376**	10.137**

+ p<0.10 * p<0.05 ** p<0.01

Table 5: Regression of the advanced purchasing and supply practices on the dimensions of the environment: Supplier involvement and logistics integration

	Supplier involvement						Logistics Integration					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Constant	3.359**	3.166**	1.449	2.955**	2.413*	1.449	2.393**	3.439**	1.631+	2.219*	1.579+	1.631+
Size	.229+	.224+	.179	.221+	.240*	.179	.154	.181	.134	.151	.164	.134
Seniority managers	.019	.015	.074	.032	.041	.074	-.231+	-.207+	-.209+	-.225+	-.212+	-.209+
Strategic integration	.151	.158	.100	.131	.108	.100	.403**	.363**	.383**	.394**	.366**	.383**
Munificence	---	.034	---	---	---	---	---	-.182+	---	---	---	---
Hostility	---	---	.478**	---	---	.478**	---	---	.191+	---	---	.191+
Dynamism	---	---	---	.125	---	---	---	---	---	.054	---	---
Complexity	---	---	---	---	.212+	---	---	---	---	---	.182	---
R ²	.048	.048	.203	.057	.078	.203	.145	.170	.170	.147	.168	.170
F	1.533	1.158	5.788**	1.384	1.922	5.788**	5.186**	4.665**	4.668**	3.906**	4.591**	4.668**
ΔF (respect to model 1)		.080	17.718**	.942	2.990+	17.718**		2.796+	2.809+	.199	2,543	2.809+

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