



Strategies of Production in the Automobile Industry: a Multi-Case Study in Spain and Brazil

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Abstract

The aim of this paper is to identify and to analyze the manufacturing strategies of two supply chains of the automobile industry and the assemblers' influences on the other participants in each chain. Two plants of the same assembler, one in Brazil and the other in Spain and their suppliers, were analyzed, using questionnaires and interviews. It was observed that the competitive priorities of the suppliers are strongly conditioned to the strategy of the assembler, and the ordination of these priorities in the Brazilian case is different from that in the Spanish case. One of the reasons of this difference in the ordination of priorities of the Brazilian and the Spanish companies can be explained by the traditional competitive capabilities for exporting of the Spanish automotive industry, which inserts in the world market a larger percentile of production than the Brazilian industry. Even so it can be confirmed that in Brazil and Spain the inter-business relationships are suffering a transition of mass production, with conflicting relationships supplier-manufacturer, for a relationship of larger cognitive density, characteristic of the presuppositions of organization of supplies based on the model flexible production or lean manufacturing.

Keywords: *Manufacturing strategy, Automobile industry, Competitive priorities, Supply chain.*

Introduction

Competitiveness is a key-word in companies, government and society in general. Some industries, however, have a stronger dissemination of results in competitiveness than others and this implies in a greater social impact.

From this point of view the automobile industry is one of the most important industries because of its high index of participation in global flux of commerce. As an international oligopoly, with long tradition to influence commercial treats, this industry has been considered a critical point in national policies of industrialization.

The long term of invest maturation is one of the characteristics of the automobile supply chain. This feature forces the assemblers to adopt expansionist competitive strategies to face demand (COUTINHO *et al.*, 2002). In the lat years this situation has taken Brazil, a leading country in the number of companies with industrial plants, to a significant idle capacity as a result from invests of different companies.

Even with a favorable evolution of the internal consumption, so that there is in Brazil a use of the compatible working power with the industries of other countries, it will be necessary to achieve an exporter platform. In order for the national automobile industry to reach the global competitive success it is a necessary condition, although not sufficient, that the supply chains of the several assemblers here installed be globally competitive as well.

Inasmuch there is the need to look at the contemporary behavior of the world automobile industry, especially in similar situations to the Brazilian one, in other words, in that the expansion of the working power in the last years has been accentuated, but that on the other hand already possesses a strong exporter component. Spain fits in this situation. The fleet of vehicles in that country passed from 15 million to 26 million from 1991 to 2006, while in Brazil it was from 14 million to 24 million. The production of vehicles in Spain in 2006, however, was 3 millions, against 2,6 millions in Brazil (ANFAVEA, 2007 and ANFAC, 2007). In 2007 Brazil surpassed Spain's total production even exporting less than Spain. It happened because of the increasing national market. The Brazilian industry produced 2,977 million vehicles in 2007, and in 2008, its production was 3,220 million, which represents an increase of 8%. Between 2008 and 2011, the sector plans to invest 20 billion dollars in Brazil (ANFAVEA, 2009). In 2008, the Spanish industry produced 12% less than in



the previous year, 2007. It produced 2,889 million vehicles in 2007 and 2,541 million in 2008 (ANFAC, 2009).

According to Sáez (2003), the Spanish automotive industry, including the companies of car parts, is the main exporter section of Spain, representing over 25% of the total exports. Most of the Spanish production of vehicles is destined to the exportation, mainly to the European Union.

As in Brazil, the production of automobiles in Spain privileges the models of low cylinder capacity, in other words, it is focused on the service of a demand of automobiles of low price, whose contribution margins for the participants of the chain are small when compared with larger and more luxurious automobiles. For those circumstances and for the fact of the assemblers belong to the same multinational groups, the degree of technological development is very similar.

Although the Spanish automotive industry is the 3rd of Europe and 6th of the world in revenue and volume, the industry of car parts was submitted to a strong globalization process, and the import of components, located around 25% of the demand in 1985, rose to something around 74% in 2001. Although during this period the revenue of exports has duplicated, the commercial balance is negative since 1986 (SÁEZ, 2003). The multinational presence in the supply market for the assemblers is very strong, while to the replacement market the presence of Spanish companies is already very larger.

The Brazilian automobile industry has faced the challenges of the competition in a global dimension and going through important transformations since the beginning of the 90's and, mainly, after the implementation of Plano Real and of the adoption of a sectorial legislation denominated New Automotive Regime. Multinational assemblers, already installed in the country, retook their investments for the implantation of new plants and updating the already installed ones. The products and production processes were modernized, new administrative practices were adopted and the relationship among automakers and suppliers has been changed to a more collaborative pattern.

During this period Brazil got to overcome the difficulties imposed by the strategies of the multinationals, which gave preference to the oldest plants located in their headquarters, hindering the exports of countries of recent industrialization (RUIZ, 2003).

This process had an active participation of government, through

macroeconomic regulatory and policies, in particular the Automotive Sector Chambers of the Board which resulted in changes in rates of exports and taxes (ALMEIDA *et al.*, 2006).

In the segment of car parts the participation of international capitals was enlarged in the local production - through the acquisition of companies of national capital or of alliances with these companies - and the portion of imported components, with the consequent reduction of the market for companies of national capital. It began, like this, a movement of economical concentration in that segment, with the pressure, on one side, of the assemblers, that are reducing the number of direct suppliers, and with the peering of other, of the competition between national and international suppliers. This situation provoked the exit of several companies and practically forced the remainders to implement modernized processes, for service of the new demands of the enlarged group of assemblers.

It is part of such changes the introduction of new ways of organization in the production and in the work and the restructuring of the supply chains of components and parts of the main companies' assemblers. These strategies involve delegation of responsibilities to suppliers, which are responsible for tasks of design and manufacturing. In turn it increases their power within the supply chain (CARVALHO, 2008).

The aim of this paper is to identify and to analyze the manufacturing strategies adopted by companies belonging to two supply chains, one in Brazil and another in Spain, and discuss the influences exercised by the assemblers on their direct suppliers. The analyses were carried out using questionnaires and interviews in ten suppliers tier 1 in Brazil and thirteen in Spain.

Strategy of Production and Buyer-Supplier Relationship

The concept of Strategy of Production - SP is frequently attributed to the pioneering work of Skinner to whom "A Strategy of Production is a group of plans and policies through which the company tries to obtain advantages on their competitors and it includes plans for the production and sale of products for an united matter of consumers" (SKINNER, 1969, p. 139).

This author and others, such as Leong *et al.* (1990), Hayes *et al.* (2005), characterize Strategy of Production as a collection of individual decisions that affect the capacity of the company in finding their long term objectives.

According to these authors, the necessary competitive priorities to successfully compete should reflect the strategy of businesses and also to supply the criterion or mission that, together with the areas of decision, would be appraised. These priorities should guide all of the actions of the structural and infra-structural areas of decision.

The manufacturing strategy is constituted, therefore, of the plans, policies and programs of actions implemented by the company, more specifically by the function production (in the areas of decision and in the processes of businesses), so that the competitive priorities are reached.

Skinner (1969) developed a model in that through an analysis of the competitive atmosphere it is settled a competitive strategy or of businesses and this indicates the mission or manufacturing strategy. Such mission can be constituted in a choice taken regarding the levels to be reached of competitive priorities (or competitive dimensions) and as they will be reached.

Authors as Skinner (1969); Hayes and Wheelwright (1984); Fine and Hax (1985); Hill (1993) consider the following more important elements of the content of a manufacturing strategy:

- Priorities or competitive dimensions: They are the priorities of the function production, defined in agreement with the competitive strategy and in function of the accumulated competences in the function;
- Areas of decision or categories of decision: they are the main areas of decision included in the production and they are used as references for the long term definition of objectives.

The priorities or competitive dimensions should compose a solid group of priorities that will guide the programs to be implemented by the function production of a company. For Skinner (1969) the competitive priorities of the production are Cost, Quality, Flexibility and Services. Garvin (1993) proposes the following group: Cost, Quality, Flexibility, Delivery and Service.

The research findings suggest that world-class plants incorporate both strategic operations content and strategic operations processes, whilst low-performing plants do not (BROWN *et al.*, 2007). The task for the manufacture of a company would be to configure a production system that through a series of interrelated choices and internally solid, would reflect the priorities put by its strategy and competitive position.

The selection of the improvement programs itself, since it is not always at the same time possible or desirable the implementation of all, and the evaluation of the investments in advanced technologies of manufacture should be guided by a strategy for the manufacture. The improvement programs should not be thought as an end for themselves, but in terms of the trainings that they request and they create, constituting like these new abilities and potentiating for the companies new opportunities. (HAYES and PISANO, 1994).

The conception adopted is the one that the purpose of the strategic management should be the focalization of the resources of the organization in the construction of a maintainable competitive advantage on their contestants in one or more of the acting dimensions, in other words, in the case of the manufacture, that the company is better than most of their competitors at least in an important aspect of the manufacture, and that that advantage can be developed and sustained for the whole supply chain.

On the buyers-suppliers theme, since the 80's changes have been observed in the relationships among the assemblers of automobiles and their suppliers, many of which have been taking place under the influence of practices common of the Japanese industry. Womack and Jones (1994) propose that the beginnings of the lean production should be applied in the organization as a whole, growing up a lean company, in which the integration among the customers and suppliers is quite narrow. In that perspective, the operation of the productive section can be visualized as a transformation net and displacement of supplies from raw material to the delivery of the final product to the customer.

For Prochnik (2002) the chains are created by the vertical disintegration and technical and social specialization that live together simultaneously with competitive pressures for larger integration and coordination among the activities. That implies in the need of larger articulation among the agents belonging to the chain: in the administration of the chain of supplies - Supply Chain Management or simply SCM. According to Lung (2003), starting from the nineties there is a new movement of strategic rationalization in the world automobile industry, centered in the relationships inter-firms and in the coordination of the activities of the automotive system (assemblers and suppliers).

According to Gunasekaran *et al.* (2008) SCM has been considered



as the most popular operations strategy for improving organizational competitiveness in the twenty-first century and the automobile industry has been a paradigm for the issues related with the SCM. Researchers have been studying the relationship among assemblers and suppliers starting from the experiences of Toyota, proposing that the companies should abandon the traditional form of relationship (of purchase and sale, without collaboration) and to incorporate cooperative relationships of long period and with high interaction levels with their suppliers.

Although the cooperative model occupies great prominence in the discussions on improvements in the administration of the supply chain there are empiric evidences that show that the impact in practice is not generalized. During the nineties the great American and European manufacturers - GM and VW, respectively - have been reaffirming their traditional strategies of administration of supplies and the accomplished empiric studies indicate that the North American manufacturers have adopted the cooperative model for some relationships of supplies, however not for others. Studies of the automation section in United Kingdom have also indicated that the cooperative relationships can exist with some preferential suppliers, however, with others, the relationships are the traditional ones (DYER *et al.*, 1998).

Barros and Arkader (2004) show that the relationships manufacturer-supplier in the Brazilian automobile industry have developed into characteristics of the cooperative model with long term relationships and larger mutual dependence, however coexisting with disputes on issues of price and cost that create tensions in the relationship that can negatively affect the results of the chain of supplies.

Hald *et al.* (2008) use the theory on social change and their applicability to study the formation and development of customer-supplier relations. Propose a conceptual model of attraction among customers and suppliers. In this model the attraction is divided into three areas: value, trust and dependence. They discuss how the perceived value, trust and dependence influence the dynamics of the relationship.

In a research accomplished by Alves Filho *et al* (2003) on the chain of motors for automobiles in Brazil, it was verified that the strategies of the companies in the chain and the configuration of the chain (structures and relationships) interact and condition the path of changes that are or can be implemented in the companies and in the chain itself. The relationships

between each pair of companies in the chain and the forms of organization of the production adopted by those companies are conditioned by their strategies and by the configuration of the chain. It was also observed that the relationships of the assembler studied with its direct suppliers depended on the institutional characteristics of the supplier, of the transaction (involving the technological complexity of the component and the level of development), of the technological and productive capacities of the companies, of the relationships and of the history of the relationships among assembler and supplier.

For all this, the generic propositions related to the objectives of maximization of the value and minimization of the cost of the activities and processes in the chains of supplies, with the consequent reduction of the number of suppliers, larger integration with suppliers and customers, improvement of the flow of information, reduction of logistic costs and of lead-time, they are not simple, nor easily implementable, and the difference among the leaders and the followers is still very big (POIRIER *et al.*, 2004). That means that it is not easy to implement the concept of lean manufacturing along the whole chain of value starting from the assemblers, even if they are world leaders in the introduction of the associated techniques that form of organization of the production.

In the case of the automobile industry, according to Coutinho *et al.* (2002), the search for the reduction of costs took to the reorganization of the net of suppliers in several levels. In the first level they are those that participate more intensely in the production and in the development of the project, usually great corporations with internationalized competitive structure, having larger diversity of companies in the subsequent levels.

Even having in the reduction of costs their original motivation, the outsourcing activities today transcend this competitive dimension of the manufacture. It is sought to do with that several participant companies of the chain exercise their distinctive competences in the sense of generating competitive advantage for the chain as a whole.

According to Volpato (2003), besides the rationalization of the production or of the processes of production of components, the competitive atmosphere of the automobile industry in the last years has requested a rationalization in the interaction among firms in the chain of supplies. The author enhances the restructuring of the supply chains and especially of a part of the suppliers of first level (first tier), that started to have more strategic



roles for the technological, financial and organizational performance in the automotive chains.

The coordination of supply chains became, therefore, strategic and quite a complex activity, because, in spite of certain world tendencies - global platforms, outsourcing, global sourcing, follow sourcing, industrial condominiums, concentration, specialization and internationalization of the section of car parts, hierarchical suppliers of components etc...; the supply chains in the sector present quite different characteristics among countries and even inside of each country. One of the differentiation elements, with special interest for this work, is exactly the strategies of supplies and of relationships with suppliers adopted by the assemblers and, in that context, the manufacturing strategies implemented by assemblers and suppliers.

Given the variety of components involved in the production of motors and of automobiles and given the heterogeneity of the chains of supplies (of their structures and of the relationships among companies in the chains), it can be expected that the manufacturing strategies adopted by assemblers and for suppliers, conditioned by their own competitive strategies, for the characteristics of the chains and for the local industrial conditioning factors, have different roles and impacts also in the coordination of the chains and in their acting levels.

In different national and industrial contexts and composing supply chains with structures and relationships among different assemblers and suppliers, which are the manufacturing strategies adopted by the companies and what kind of relationships there are among them? In this paper they are considered as possible competitive dimensions as for the content of a manufacturing strategy the cost, the quality, the flexibility, the delivery and services.

Multi-Case Study and Methodological Aspects of Research

According to its objectives, this research can be classified as exploratory and explanatory. The empirical studies were intended to describe the situation found in companies, based on the theoretical framework developed here. With regard to the approach of the problem, this research can be classified as predominantly qualitative. First it was done a review of the literature on strategy of production and models of customer-supplier relationship. Were subsequently conducted the case studies with first tiers suppliers of automotive

industry, including technical visits, questionnaires and interviews, involving 13 Spanish and 10 Brazilian companies, which agreed to collaborate. The data collection was conducted among 2007 and 2008, and all of the companies that were contacted answered to the questionnaires.

This means a multi-case study, that seeks investigate contemporary phenomena within its real life context, especially when the boundaries among them are not clearly defined. As recommended by Yin (2001), this methodology is referred to current issues and situations where the researcher only observes the facts and tries to understand them, to systematize them. The data collection techniques used questionnaires with closed questions and a semi-structured interview with open questions (based on a methodology developed by Mirada and Parra, 2000) so that the interviewer was free to develop toward each situation better. Interviews were conducted with professionals in the management level in the areas of production, logistics, product development or human resources, depending on the availability.

The questionnaire includes the following contents:

- General information about the company: who are its clients, number of employees, etc.
- Which are the production priorities of the company: Price, Quality, Flexibility, Deliveries, and Services.
- Which are the action programs adopted to reach the priorities listed above:
 - Programs to improve quality, Reduction in the number of defects, Reduction in Costs, Increase in Productivity, Reduction in set up time, Improvement in production flux, Stock reduction, Development of Suppliers, Reduction in cycle time and Development of leadership and teams of high performance

In summary, this is a primarily qualitative research, with a strategy for obtaining information based on analysis of primary data analysis and on-site interviews with professionals in these companies.

Manufacturing Strategies in Brazil

Initially the competitive priorities of the assembler are presented,

followed by the manufacturing strategies of their suppliers.

Competitive Priorities of the Assembler

In the case of the Brazilian assembler of motors, starting from interviews accomplished with production managers, it was identified the following sequence of competitive priorities, using the established dimensions by Garvin (1993): cost reductions, improvements in quality and increase of flexibility.

- **Cost:** From its implantation, the assembler began a process of nationalization of the components used in its production, seeking mainly the reduction of costs. The use of a larger number of national parts and the implementation in a way of administration of supplies that reduces stocks and logistic costs it was possible to decrease the expenses with components, contributing to the reduction in the cost of materials.

It implanted internally a program of continuous improvements in production cells, with reduction of stocks in process and investments in the progressive reduction of the cost of materials.

- **Quality:** The main objective of the company is the quality of its product. This concern is reflected in the demand in the level of quality of its suppliers. The assembler considers that it has a partner relationship with their suppliers, because it supports, when necessary, the activities of development of products and processes, the implantation of quality systems and the resolution of problems in the suppliers.

Besides, it has been trying to implant quality programs, mainly those focused to the certifications, in order to refuse reduction and re-work for the auditing and development of suppliers.

With these actions, the assembler reached significant improvements in some indexes of the quality. For instance, there was 2% of production rejected in the beginning of the production of the factory and it decreased to a very inferior value to this; and the number of motors returned by the customers also decreased. The optimum quality, although it requests constant attention, no longer belongs to the group of priority objectives.

- **Flexibility:** The studied assembler implemented a series of changes to make possible the production of a larger group of families of motors in relatively small lots. Besides structural changes in the assembly line and of the use of equipment with relatively loud level of automation, changes were made in the organization of the work (as implantation of a bank of hours) and in the administration of the logistics (as the implantation of an external JIT).

In the last years, the search for the dimension flexibility, mainly in the mix of products and in the production mix, has been more visible. It started to produce more types of motors in smaller amounts, pulling transformations in the supply chain that also turned more flexible.

Manufacturing Strategies of Suppliers of the Brazilian Assembler

Among the ten analyzed suppliers are some that supply items held as important ones. Such suppliers, however, are very different in what they refer to the produced parts, size, technology domain and origin of the capital. Roughly, however, they could be classified in two types: (1) the big ones, multinationals, with strong technological capacity, and (2) the small ones, of national capital and, relatively, little technological capacity. There is still the Company B, which does not fit in the two previous groups, because it is of great load, possesses strong technological capacity and the origin of its capital is national.

Concerning the relationship manufacturing strategies, as already said previously, the assembler has as priorities, the cost, the quality, and the flexibility. Table 1 gathers the main information of the studied suppliers.

It can be observed that most of the studied suppliers include among their priority dimensions the reduction of Cost, the optimum Quality and the Delivery in the amounts and right periods. It can be thought that these are basic dimensions (qualifiers), that all the suppliers should assist, but they are being reinforced also by market conditions and for the specific strategy of the assembler.

The flexibility can be a priority for some suppliers in function of their own policies or of the model of production organization used as reference. It is observed that the demands done by the assembler as, for instance, the auditing, the recommendations and their manufacturing strategy condition manufacturing strategies of the suppliers. The greater the influence the smaller

the technological capacity, the smaller is the load of the supplier, the greater is the production portion that the supplier destines to the assembler and the greater is the “partnership” degree among both.

Table 1- Priorities and Action Programs of the Brazilian Suppliers

Suppliers	Production Priorities	Main Action Programs
A	Q, D, C	1, 2, 3 e 7
B	C, Q, S	1, 3, 4 e 7
C	Q, C, D	1, 3, 5 e 8
D	Q, D, C	1 e 6
E	C, Q	1, 5 e 6
F	C, D, Q	2, 6 e 9
G	C, Q, D	4, 6 e 9
H	C, D	4, 6 e 9
I	D, F, Q	1 e 6
J	Q, F	6

Production Priorities: Cost (C), Quality (Q), Flexibility (F), Service (S) and Delivery (D)

Action Programs

1. Programs to improve quality.	6. Improvement in production flux
2. Reduction in the number of defects	7. Stock reduction
3. Reduction in Costs	8. Development of Suppliers
4. Increase in Productivity	9. Reduction in cycle time
5. Reduction in set up time	10. Development of leadership and teams of high performance

It is verified that the small suppliers and of national capital (as the companies A, D and I), mainly have to accept the recommendations done by the assembler.

These companies have as main priority of the production the quality, because they invest in certifications ISO and VDA, in partnerships for the

accomplishment of tests and for development of new products, they try to reduce the level of refusals to assist the recommendations of the assembler and become A level suppliers in the classification of the assembler.

As for the Delivery, for demand of the assembler, these companies started to work with supply JIT (before the daily amounts were constant), so they maintain stocks for prompt delivery. The assembler does not maintain stock of the items supplied by them.

The reduction of costs is a concern, given the evaluation that the competitors - of larger load - have smaller production costs and the assembler forces to obtain lower prices.

In the cases of larger suppliers, that in general assist several assemblers, their strategies should be in general compatible with their customers' demands, but their self-determination power is considerably larger. In these cases, the emphasis in quality or in flexibility, for instance, depends more on how the companies perceive the market and their competences in long/medium term and, also, on how they incorporate the model of flexible production.

The companies in that group have technology and quality recognized in the market. These companies have as main priority of the production the quality or the cost, followed by delivery and flexibility. For the quality they implanted techniques such as QFD, Statistical Control of process, the norms ISO 9001 and 14000, QS 9000, and VDA. The companies also consider as very important the improvement of the quality of their suppliers and some developed programs together with their suppliers.

Regarding Cost, the companies implemented programs to reduce production costs. They reduced costs of materials, with overhead, they reduced break even points and they tried to maximize their cash flow. They also implanted Control of Costs ABC and they monitored the levels of productivity of the factory.

As for the dimensions Delivery and Flexibility, the companies reduced the time of production, they reduced the time of set up and they implanted systems JIT/Kanban. In general, the average size of lot of production of the product also decreased significantly. Some also implanted Flexible Systems of Manufacture and flexible cellular layout.

Some of these companies adopted the workers' rotativity among



workstations, also seeking to flexibly use of the work force. They invested in training on several quality tools, they look for the workers' larger involvement with the quality and the participation in these (Kaizen program) in the continuous improvement of the products and processes. This contributes to the reduction of refusals and re-work and, consequently, to the decrease of costs.

Company B, which is relatively big and of national capital, assists the demands of the assemblers, but apparently has a peer relationship with them. The changes in its strategy have no direct relation with the supplying to the assembler, and it defines its strategic efforts by itself, presenting a similar behavior to some of the multinational companies of the sample.

It is observed that, through direct or indirect mechanisms, the strategy of production of the assembler is a strong conditioning for the manufacturing strategies of the suppliers, being practically decisive in the cases of the companies of smaller load in the sample.

Manufacturing Strategies in Spain

Initially the manufacturing strategies of the assembler of Spain are presented, and to follow a synthesis of the strategies of thirteen of its suppliers.

Competitive Priorities of a Spanish Assembler

In the case of the assembler of automobiles in Spain, using the same variables defined for the priorities of the production in Brazilian companies, the same dimensions were also identified as the most significant - Flexibility, Quality and Cost, although disposed in a different way.

- **Flexibility:** The prioritization of flexibility is current among other factors, for the increase of the number of releases. This may lead to a situation of trade-off between the scale need and of presentation of new products. There is, however, a reduction in time of development of new models and decrease in the influences of the variable size of the plant in the profitability, that minimize this situation.

It can be considered that the competition today is based simultaneously in the standardization and in the moduling allied to the innovation for different products. The search for productivity to maintain the margins has been translated in crescent increase of the importance of the suppliers, that in general act today around 70% of the value of the

vehicle. It is reserved to the manufacturers mainly the project, the production of motors, the production and assembly of some great parts and subsets, the painting of the truck and the final assembly. (SÁEZ, 2003).

- **Quality:** One of the mechanisms technique dissemination related to the lean manufacturing for the suppliers of the chain is the best documentation of products and processes as it is dictated by the certification needs. This is a common situation to all the participants of the supply chains of the automobile sector. The incorporation of techniques related to the Administration of Quality provides a homogenization of administration aspects of the productive processes.

The main improvement programs point to a strong reduction in the number of refusals and re-work that reach the suppliers through processes of qualification of suppliers and developed by the assemblers.

- **Cost:** The increase in efficiency has been provoked mainly by the use of techniques of lean manufacturing, besides the use of common platforms among several models and even among different brands;

Another important factor is the reduction of the aggregated value in activities of assemblers, that transfer the responsibility to the suppliers of first level, mainly the systemist ones (Tier 0,5), in other words, the suppliers of modules. This situation increases the importance of the negotiation among manufacturers and suppliers, giving more associative characteristics, but with strong emphasis in the reduction of costs;

There is still a fast incorporation of new technologies, besides commercial ones (e-commerce). This commercial issue is brought up in the strong action that the Spanish assemblers are imposing to their suppliers in order to promote coalitions and acquisitions to increase the scale and consequently to promote a reduction of costs on the top of the chain.

Manufacturing Strategies of Suppliers of the Spanish Assembler

The Spanish suppliers of first level belong to multinational companies



or they are groups of Spanish capital that have international presence. They have centers of P & D as one of the central characteristics the formation of cooperation alliances among companies, through joint-ventures, commercial agreements, acquisitions, etc.

The priorities of production and the main programs of action of those suppliers are presented in Table 2.

Table 2 - Priorities and action programs of the Spanish suppliers

Suppliers	Priorities of production	Main programs of action
A'	F, Q e D	2 e 9
B'	F, Q, D e C	2, 3, 4, 5 e 6
C'	F, Q, D e C	2, 3, 4, 6 e 9
D'	F, Q, D e C	3, 4, 7, 8 e 9
E'	Q	1
F'	F, Q, D e C	1, 2, 4, 7, 8, 9 e 10
G'	F, Q, D e C	1, 2, 4, 8, 9 e 10
H'	F, Q, D, e C	1, 2, 3, 4, 6, 8, 9 e 10
I'	F, Q, D, C e S	1, 2, 3, 4, 7 e 9
J'	F, Q, D e C	2, 3, 4, 5, 8, 9 e 10
K'	F, D, C e S	3, 4, 5, 7 e 9
L'	F, Q, C, D e S	1, 2, 3, 4, 5, 6, 7, 8 e 10
M'	F e C	3 e 9

Production Priorities: Cost (C), Quality (Q), Flexibility (F), Service (S) and Delivery (D)

Action Programs

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- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Reduction in the time of development of new products 2. Reduction in the number of defects 3. Reduction in Costs 4. Increase in Productivity 5. Reduction in set up time | <ol style="list-style-type: none"> 6. Improvement in production flux 7. Stock reduction 8. Development of Suppliers 9. Reduction in cycle time 10. Development of leadership and teams of high performance |
|---|---|
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The priorities of the production highlighted by the supplying companies follow, in a general way, the main defined priorities for the assemblers. As the companies belong to different corporations, it is natural that when compared to the assembler, they have given a larger prominence at the dimension cost, because they have to accomplish contracts that promote a great pressure on the prices. But this is also a form that the suppliers found to increase their margin, already reduced by the same pressures.

It should be observed that several priorities are simultaneously pursued, leaving behind the traditional vision of trade-offs among the several priorities. The exceptions represented by the companies E' and M' they are moved by the understanding, on the one hand by those companies, that in that specific priority the same ones are in a situation of competitive disadvantage when compared with the contestants, taking them to have a larger focus in the short term to solve specific problems that can prevent them in the dispute of a future supply.

The analysis of the improvement programs reveals, as expected, an expansion of the techniques of lean manufacturing along the supply chain. The lean manufacturing in the manufacturing companies and in the ones that compose their nets of suppliers, demand new and growing quality requirements, price, technical capacity, etc. regarding the practices of purchases and supply. In Spain and elsewhere and even in Brazil, there is a strong tendency towards outsourcing, establishment of long term partnerships, reduction in the number of suppliers and larger integration among the several levels, promoting JIT delivery and forming parks of suppliers and use of logistic operators with consequent accentuated stock reduction.

The manufacturers exercise growing pressure on primary suppliers in order to reduce costs, and these do the same on secondary suppliers and so on. This pressure also occurs regarding other competitive priorities such



as time of delivery, flexibility as for the size of the lot, quality, etc. Therefore, there is a constant pressure in order to introduce innovations that provide reduction of costs without trade-offs regarding the other priorities, or at least with minimization. The need for capital to finance this process is one of the reasons of the current tendency of reduction of the number of suppliers, mainly primary suppliers.

It is noticed, that the ordination of priorities in the Brazilian case is different from the Spanish case, because in the Brazilian chain the main pointed priority is Cost and in the Spaniard it is Flexibility.

The predominant ordination of the competitive dimensions (Cost, Quality and Flexibility) for the Brazilian assembler and for most of their studied suppliers suggests that there are pressures in the economical and technological atmosphere for the reduction of costs and improvement of the quality, consequences of the economical instability, of the high interest rates, of the foreign competition in the internal and external markets and of the demands of quality of the domestic and international assemblers. On the other hand it suggests that there is still not enough pressure to increase flexibility and to improve services. The dimension Flexibility is pointed as important for the Brazilian assembler, that has been enlarging its line of products, but some of the suppliers have opted to maintain stocks of finished products, instead of enlarging their production flexibility.

For the Spanish assembler and for most of its suppliers the predominant ordination of the competitive dimensions (Flexibility, Quality and Cost) suggests that these companies have already reached an appropriate level of Quality and Costs, and they are aiming at Flexibility some improvement in the results of the companies.

One of the points that can contribute to explain the search for flexibility, besides the globalization, is the moment of transformation faced now by the net of distributors in that country, with a strong tendency of coalitions and incorporations. This tendency is motivated by the assembler that considers that distributors that work with larger scale can pass to the other units of the chain part of their margins, or reduce the prices to enhance the participation in the market.

Conclusion

As a leading industry in the creation and diffusion of technical and

organizational innovations, it would be expected and indeed this is what happens, that the multinational assemblers have a development characterized by the homogenization of the production techniques at the same time in that they use the existent competitive advantages in the countries where they are established, mainly those of low cost of work force.

Besides, there was the problem of lack of scale of the new producers, worsened by impositions of nationalization degrees that generated very high production costs. Starting from the eighties, with the introduction of techniques of lean manufacturing, it was possible to produce small lots of components and products with profitability. This made possible the technical development of plants installed at emerging countries. New forms of organization of the production request new forms of relationship with suppliers. Since the nineties it can be confirmed that the inter-business relationships are suffering a transition of mass production, with conflicting relationships supplier-manufacturer, for a relationship of larger cognitive density, characteristic of the presuppositions of organization of supplies based on the model flexible production or lean manufacturing. It is experienced a heterogeneous reality, being considered the organization of the chains of supplies in the world automobile industry, where plants of several assemblers try to establish vertical relationships (occasionally in consonance with global strategies) more appropriate to the conditions of the industries and of the local markets and following predominantly the principles of the lean manufacturing. The assemblers, in the role of organizers of the supply chains, have tried to compensate the retraction of the profitability with the reduction and sharing of costs with the other links of the automotive chain. This has taken to the extension of the strategies of the assemblers for their suppliers, in the search of a management strategically aligned of the supply chain, although the current conditions for that are still quite limited.

The difference in the ordination of priorities of the Brazilian and the Spanish companies can be explained by the competitive capacity of the Spanish automotive industry, that puts at the world market a percentile of production much larger place than the Brazilian industry, for being most of its production of vehicles destined to the export. Besides, the flexibility is intimately linked to Cost, because it means larger competence in production and distribution in smaller scale, what is also important in Spain due to the moment of enlargement of the European Community with the entrance of Eastern European countries. It is foreseen that a process that is called of industrial "de-localization" in Spain, should happen, this is: the transference of



part of the production to those countries. As the Spanish automobile industry is centered in the production of popular cars, the same profile of consumption of the new incoming models, it should be the country that will feel most of the effects of the enlargement of the European common market in this economical section.

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