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Supply network management in the Brazilian automotive industry

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The paper presents some results and conclusions of a two-year research project encompassing ten interacting companies belonging to the Brazilian automotive supply network. The goal of the research is to explore current practices in terms of the commercial relationship between them. Specifically, the attention was focused on identifying whether there are relevant imbalances in terms of bargaining power so that the overall performance of the supply network as a whole is jeopardised. Some interesting conclusions could be drawn from this exploratory study. Perhaps the most important is the clear indication that the issue of supply network management is neglected among the analysed companies. The emphasis has almost exclusively been placed on the relationship with immediate customers and suppliers. This can run important risks for the competitiveness of the Brazilian automotive industry. Some causes of the negligence with the theme are discussed and some simple corrective measures are proposed, based on some more contemporary contributions found in the recent literature and in some practices identified in Brazil outside the automotive industry.

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Introduction

Many studies have been carried out on the production systems of the automotive industry, industrial relations and the reasons for which a certain country or company is or is not competitively successful. The different surveys, no matter how different their methods and conclusions may be, invariably show that the companies which belong to this industry have been operating in an environment growing more competitive. In answer to competitive pressures and to consumer market demands, the companies are undergoing organisational changes, re-analysing their activities and establishing new practices, such as focalization, globalization and a new standard of relationship with their commercial partners – suppliers and customers (Jones *et al.*, 1997; Law, 1991).

Jones (1990) shows that, due to the new trends (globalisation, focalisation, partnerships), companies are starting to analyse more carefully the dynamics and complexities of the networks and chains within which they operate, since no company acts on its own: all of them, in one way or another, have their suppliers and customers. There is therefore a growing need for a better understanding of how the supply network operates with the main objective of attaining more competitive service levels and products for the end customer. Thus, the importance of the concept of managing the supply network is acknowledged, according to which companies must start to think and act considering the supply network in which they operate as a whole. The global network's performance, and not that of isolated companies (the "links" in the chain) is responsible for the efficiency in attending to the needs of the end customer and his willingness to continue to purchase both at present and in the future. Therefore, it is crucial that each company understands its role and its power for contributing towards the network's performance as a whole as well as the role of its partners, so that eventually they can find ways and means to conform a more appropriate pattern of decision making for the network, in order that they all can better fulfil their role for the network performance.

The world's car industry has been the object of various large studies (e.g. the one reported in Oliver *et al.*, 1995; Womack *et al.*, 1990), in an effort to understand the differences in performance and to discover the behaviour which, in relation to the supply network, most contributes towards this differentiation. In relation to the Brazilian car industry, however, little has been developed in regard to the view of the network as a whole or in connection with recommending which would be the best relationship between companies. This subject is of vital importance to the present Brazilian economy which is striving to become competitive on a worldwide scale. Thus an interest was born in developing this study, exploratory in nature, which lasted two years and covered a specific segment of the Brazilian car industry which is briefly reviewed below.

A brief overview of the Brazilian automotive industry

Having produced 1.804 million units in 1996, Brazil is among the ten largest auto manufacturers in the world. Table I shows the evolution of the Brazilian automobile production levels in recent years.

In social terms, the automotive industry has a fundamental role in Brazil. The total yearly invoice amount of the automobile assemblers alone represent around 13 per cent of the Brazilian gross national product (1996). The assemblers employ some 105,000 people (auto parts manufacturers employ twice as many), levering, according to the Brazilian association of auto assemblers, something like 5.5 million jobs in the economy (Anfavea, 1996).

Productivity in the Brazilian auto industry has grown substantially in recent years. An indicator, yet maybe oversimplified, is the rate "vehicles produced in one year over number of employees", which went from 7.9 in 1985, to 15.6 in 1995.

The following auto assemblers have manufacturing operations in Brazil (1996): Fiat, Ford, General Motors, Volkswagen, Toyota (light commercial vehicles), Mercedes-Benz

(buses, lorries and light commercials), Scania (lorries) and Volvo (lorries).

A booming market, improvements in levels of quality and productivity and the recently achieved economic relative stability (Brazilian inflation rates have been reduced from three-digit figures to a one-digit figure during the last three years) have attracted the interests of numerous other assemblers, which have announced plans to establish operations in Brazil.

Recently, seven manufacturers announced their decision to start operations in Brazil: the Korean Asia Motors, the French Renault, the German Mercedes-Benz (now for making cars) and Audi, the Japanese Honda and Toyota and the North-American Chrysler. The grand total of the announced investments of these new comers reach US$3.4 billion. This total does not include investments planned to be made by the assemblers who are already established in Brazil. According to the consulting firm Arthur D. Little, these will invest an additional $9.4 billion in expansion and modernisation of their current plants between the year 1997 and the year 2000.

If the plans are actually realised, the seven new assemblers will be responsible for 15 per cent of the Brazilian vehicle production forecasted for the year 2000 of 2.5 million units (Anfavea, 1996).

Although some islands of excellence can be found in the Brazilian automotive industry as a whole, there still appear to be severe imbalances between the level of performance of different actors – some companies are technologically and operationally world class, whereas other firms seem to be in a stage of development which could be dangerously insufficient to face the demands of the future.

In 1993, for example, when the Brazilian internal car market demand started to boom after more than a decade of renitent recession, the supply networks of the Brazilian automotive industry found difficulty in responding to the increase in demand with a corresponding increase in production levels. This difficulty apparently was not caused by lack of production capacity neither of the assemblers nor of the first-tier (assembly) suppliers for the assemblers (both were operating at levels which were lower than the production levels of the early 1980s). A preliminary analysis indicated that both tiers – assemblers and their first-tier suppliers – were facing shortages of parts supplied by the second-tier suppliers, apparently weak links (or maybe a weak tier?) in the network. These were the ones who were having difficulties in increasing their production capacity levels. The difficulty of the national automotive industry as a whole in responding quickly to the growing internal demand caused a serious imbalance between supply and demand of cars in Brazil, creating pressure on automobile prices to increase, representing therefore a dangerous risk to the economy stabilisation plan, which had recently been implemented by the federal government. The government then counter reacted (in order to preserve the plan) accelerating the reduction (formerly planned to be more gradual) of car import taxes. The aim was to re-establish the balance between supply and demand and therefore hold prices down. The result was an "invasion" of imported assembled cars which put the national assemblers in a rather delicate position. Although having known for some time that the opening of the Brazilian market to imported cars would eventually come, the assemblers had planned their investments to become more competitive against them according to a time scale consistent with the one previously announced by the government (more gradual) for the reduction in import taxation. The reaction of the assemblers was immediate: they started to put pressure on the government in order that the barriers against imports were raised again, to ensure a certain level of protection which they had enjoyed until then. This was not a very comfortable position to come public since the whole country seemed to be already convinced that exaggerated market protection was bad for the Brazilian economy. Immediately a question came to mind: why has all this happened this way? The aforementioned chain of facts seemed to be an indication that some weak links in the global supply networks were possibly jeopardising their overall performance threatening their very strategic future position. Thinking logically, it would be much less stressing for the assemblers if they had been able to respond to the market growth in the first place. If so,

Table I
Evolution of the Brazilian car production in recent years (figures in thousands)

Year	Car production in Brazil	Car production worldwide	Production Brazil (per cent)
1986	1,056	45,233	2.3
1987	920	46,042	2.0
1988	1,069	48,359	2.2
1989	1,013	49,248	2.1
1990	914	48,554	1.7
1991	960	46,928	2.0
1992	1,074	48,088	2.2
1993	1,391	46,785	3.0
1994	1,581	49,500	3.2
1995	1,629	50,008	3.3
1996	1,812	51,548	3.5

Source: Brazilian Association of Auto Assemblers Web Site http://www.anfavea.com.br

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prices would not go up and the government would keep their plans of a gradual reduction of import taxes, giving assemblers more time to adapt to the new performance standards required by a globalised world. Why were they not able to respond? Was there a strategic mistake? If so, whose responsibility was it? Could it have been avoided, by looking more carefully after weaker links of their supply networks? If so, what can be done (and by whom) in order to avoid it happening again?

With these questions in mind, the authors, in 1994, set off research which lasted two years and which is described in the next sections of this paper.

The research objectives

In this research work the role of the companies of a specific section of the supply network of the Brazilian car industry is analysed. The object is to discover which roles are performed today by the so-called strong links[1] (represented by the assemblers, the sub-assembly suppliers and the large raw material suppliers, generally larger companies) and the weak links (in this case suppliers of components to sub-assembly suppliers, frequently smaller companies) in the supply network process. Exploring the various different roles played by the strong links has as an objective to identify their potential in changing the behaviour of collaborating with the weaker links. In fact, if the management of the supply network as a whole must be found, in those cases in which there is no ownership or hierarchical ascendancy over all its links, it appears to be plausible to admit that the stronger links, with greater potential bargaining power[2], are more capable of inducing changes in the behaviour of the weaker links (by means of shaping attitudes or even by means of giving financial or technological help, for instance) than the other way round. In other words, the initiative to manage the supply network should, supposedly, come from the most powerful links in the network which are the ones who hold power to actually make things happen. According to Hines (1994), the supply chain can be an important source of competitive advantage to any company willing to devote time and effort to supplier co-ordination and development. Are the Brazilian automotive supply networks strong links willing to devote time and effort in that direction? Do they play that role today? If so, how do they do it? Do they believe that role should be played by them? These are some of the initial questions considered in this research work.

Brief literature review

Dilworth (1992), Houlihan (1988), Macbeth (1987) and Slack (1991) believe that leading companies contingently use different methods to improve their competitiveness. In this respect, an important characteristic is that the company recognises that it is part of a supply network which is also made up of its customers, its customers' customers (and so forth), its suppliers, its suppliers' suppliers (and so forth), as well as being conscious of the interdependency of all their operations. Flaherty (1996) adds that as individual operations performance improved internally with the operations management innovations during the 1980s, the importance of transportation and lags between operations in the supply chain grew substantially.

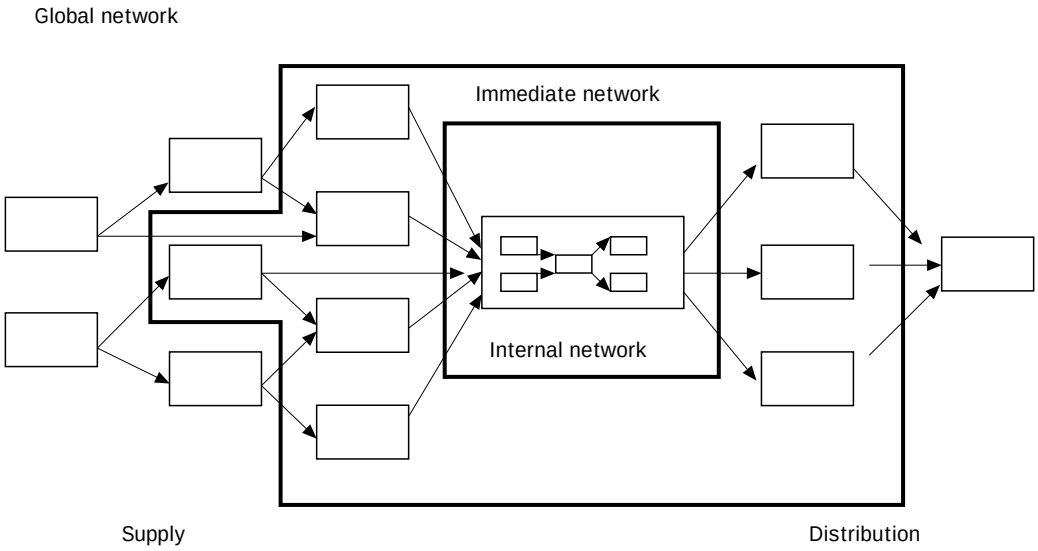
The management of the supply network is defined by Jones (1990) as the management of the flow of goods and services valued by the end customer, from the source of the raw materials until the product is effectively in the hands of the end consumer. That flow of goods and services can cross several borders, such as between departments (within the company), between companies or even between regions and countries. Slack (1991) classifies the supply network in three levels: the overall network; the immediate network of customer-supplier relationships; and, finally, the internal network, with the flow of information and materials between departments, cells or operating sectors. See Figure 1.

The global supply network

According to Flaherty (1996), worldwide, strategic managers seem persuaded that there are large gains to be made by considering the supply chains as a whole, especially perhaps in international supply chains and networks. With the management of the overall network some benefits arise as pointed out by Jones (1990) and Slack (1991):

- Focus on service to the end customer – since suppliers traditionally work based only on orders and forecasts of their immediate customer (not necessarily the end customer), there can be significant deviations in relation to the performance of the network from the end customer's point of view, caused by, for example, stocking policies and local strategies which aim to optimise the operation of links and not the overall optimisation of the network, with an evident negative effect on the sustained competitiveness of the overall network. It is necessary not to forget that the sum of the optima of the parts cannot surpass the optimum of the whole. The analysis of the

Figure 1
Internal, immediate and global supply networks



internal supply network (between departments or sectors of the company) escapes the scope of the survey.

- Identification of the key participants – in an effort to understand the network better as a whole, it is possible to identify and examine those links in the network that best contribute to give the end customer the type of service that he/she values, as well as to find possible links which, when they do not comply adequately with their role, hinder the general performance of the network. This identification can lead to finding ways and means to alter the level of contribution of the links to the overall performance of the network, making them change their behaviour by various means.

More recently, Jones *et al*. (1997) adds to these points, stating that focusing on the whole chain is just the first step; focusing on the product is the second and focusing on the flow of value creation, and not on the more traditional performance measurement of departments and firms, is the third. This means understanding perfectly what parcel of the value created to the end customer (in terms of quality, time, flexibility, service or other) is under the responsibility of what link of the supply network.

The immediate supply network

In a supply network, of all the customer/supplier links, the most important for most of the companies are those with their own immediate suppliers and customers. It is of little use to have a perfect understanding of the overall network if the immediate links are neglected. However, to know how the overall network operates allows for a more effective management of the immediate links (Slack, 1991).

In Shapiro's (1985) cited in Macbeth (1987) words, referring to survey carried out within leading companies, "the companies [surveyed] … that were most efficient, were efficient thanks to their ability to become more competitive by strategically establishing important relationships with suppliers … which allowed their companies to compete efficiently in a fundamental way".

According to Speckman (1988), supply practices change slowly because the customers, in general, are reluctant to modify set behaviours and views. Harmon (1994) points out that the benefits of a partnership with suppliers are immense. However, in most companies the relationship between customer and supplier appears to be one of far from mutual trust. According to this author, in the majority of cases, the agenda with suppliers is limited to qualifying and evaluating the supplier by his results or performance using established criteria (by means of a checklist).

According to Merli (1991), co-makership is a new reasoning in the management of suppliers. Understood as a development of the customer-supplier relationship, it is considered today a priority factor in industrial strategy, according to the author. Merli (1991) focuses his analysis exclusively on the relationships with the suppliers of the immediate network, although he draws attention to the strategic importance of the supply management. The author states as the main components of this new type of relationship: the common management in business procedures, the strategic and technological evaluation of suppliers, the

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product and process co-design, the business partnership with the most important suppliers, the increase of synchronised supplies and the overall quality assurance systems.

The immediate network management in the car industry

Lamming (1993) shows that within the car industry the technical changes, linked to the market changes and to the technological or scientific innovations, are giving the vehicle assemblers a wealth of opportunities for variety and the launching of new products, but they should not be the only ones involved. Consequently, suppliers are facing demands from their customers to play new roles, which go from the partial processing of items to the design, production and assembly of subsets. Therefore, in these circumstances, the author believes that success depends on the nature of the relationship between the suppliers and their customers. Lamming's (1993) study is one of the main contributions to the analysis of the relationship between car components' manufacturers and their customers, the car assemblers, as well as taking into account other components of the overall supply network. The tools developed by this author were used as a basic reference for the development of the research tool of the present study. To analyse the relationship between companies, Lamming (1993) uses different factors which include the nature of the competition, the basis for purchase decisions, the interchange of data and information, administration of the level of capacity, delivery practices, position regarding price, quality, research and development (R&D) and the level of pressure in the relationship. The result is a classification of the phases[3] which the relationship between suppliers and customers of the car industry went through since the beginning of the century, as well as formulae for a relationship model (called by him, lean supply) which, according to the author, will be necessary for the companies in order to face future challenges in a globalised market.

Few studies have been published in Brazil, and those mainly by Brazilian authors, with emphasis on the analysis of the overall supply network. In most of the studies, the authors present a partial approach, concentrating on the direct relationship of the companies with their immediate suppliers. Amato (1993), for example, in a study which surveys most of the studies that have been carried out in Brazil, analysing the supplier-customer relationships, comes to the conclusion that the Brazilian relationship model cannot be inserted in what presently is called a partnership. The author prescribes some points which would be important for it to become a partnership, but does not analyse the roles of the different actors at the different supply levels. Thus, a blank appears in Brazilian literature concerning the methods and empirical studies that cover the management of the supply network beyond the immediate network's limits. One interesting initiative which has been followed up by academics and practitioners alike is the new supply network organisation which the Volkswagen plant in Resende, Rio de Janeiro, Brazil, has implemented. As reported by Pires (1998):

> The modular consortium system implemented at the new VW truck and bus plant presents an innovative and revolutionary approach to managing production, with a radical outsourcing of some traditional automaker activities. From a general technical and managerial view of the manufacturing process, the idea of a modular consortium is simple. It consists of separating the product into sub-assemblies (modules) which are delegated to and entirely provided by a specific module supplier. The module supplier has the responsibility of assembling its module directly on the automaker's assembly line. The VW group already has some experience with a partially implemented modular concept at the Seat and Skoda subsidiaries, but the Resende plant is the first factory entirely managed by the new system.
>
> The feasibility of the modular consortium model in the automotive supply chain is limited to design, manufacturing, and assembly. It is characterised by a long-term contractual relationship between the automotive manufacturer and a small number of first-tier suppliers, which:
>
> - the suppliers assume responsibility for the final on-line modular assembly in the vehicle, the investments in the operation, and the management of the module supply chain; and
> - the automotive manufacturer provides the plant and assembly line, and assumes the responsibility for plant coordination and final testing.

The seven module suppliers have their assembly operations physically inside the VW plant – they assemble the module components into the modules and then the modules into the vehicle. Out of 1,200 employees planned to work in the site, only 200 will be actually VW workers. Although the Resende plant is already operating, it is still working with low production volumes, being still too risky to draw conclusions about the level of success of the initiative.

Although this is an innovative and promising approach it still involves only the auto assemblers and the first tier of suppliers, therefore it is limited to the management of the auto assemblers immediate supply

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network, which, as will be shown later in this paper, may not be enough to ensure the necessary competitive strength for the automotive network as a whole.

Methodology

With a view to exploring present practices in the Brazilian car industry, a field study was carried out that included three sub-assembly suppliers for vehicle assemblers, three companies among their part suppliers and four suppliers of services and raw material suppliers to those part suppliers, creating a supply sub-network, part of the overall automotive supply network with various levels represented.

Important themes mentioned in literature related to this subject were explored, such as evaluation and development of suppliers, relationships among the links of the sub-network analysed, actions taken for improvement, use of the bargaining power and practices of business negotiation. The data-collecting procedure was that of interviews. A semi-structured questionnaire was used, as well as the recording of the interview when allowed. The interviews were carried out by one of the authors with personnel from the commercial, quality, production and supply departments of the sample companies.

Propositions

We departed from some propositions which we would then try to falsify (following Magee, 1985, on Karl Popper's view of science) with the results of the field research:

P1: The Brazilian automotive industry supply network is well balanced in terms of power and responsibility shared by the so-called "partners".

P2: There is a good level of awareness of the constituents of the automotive industry network regarding the importance of a global network management.

P3: The strong links actually play an important role in terms of managing the supply network as a whole.

The companies studied

The cases of the companies described below, whose names are not mentioned for confidential reasons, were studied:

- *Company A* – brake system manufacturer for vehicles, in the market since 1945. Has approximately 2,200 employees. Its customers are the assemblers and from 1981 it has exported most of its production.
- *Company B* – carburettor manufacturer, it supplies the assemblers. The company is preparing to supply, in the future, electronic injection systems, the technological successor of the carburettor. It has approximately 1,400 employees.
- *Company C* – manufacturer of systems and components for the external and internal finishing of vehicles (instrument panels, bumpers, steering wheels, etc.), in the market since 1964. It has approximately 1,500 employees. Its customers are the assemblers.
- *Company D* – manufacturer of steel, brass and tin parts, it has 90 employees. It supplies the assembler (in a small scale), the spare parts market and the sub-assembly suppliers for the assembler (in this case, the company B).
- *Company E* – plastic part manufacturer, 60 per cent of its production is for the automotive industry (it is a sub-supplier of companies B, C and also of assemblers). The remainder of its production is supplied to other sectors, such as home appliances.
- *Company F* – precision spring manufacturer, it is a sub-supplier of companies which supply an assembler. In the market since 1986 and has 80 employees.
- *Company G* – it offers electroplating services to company D and other similar companies.
- *Company H* – it supplies steel to the car sector, totalling 40 per cent of its production (it supplies steel to company D). The remaining 60 per cent are supplied to other segments. It exports raw material.
- *Company I* – it acts in various sectors: chemical, home appliances, computing and automobile (60 per cent). It supplies companies that in turn supply sub-assemblies to the car assembler (company A), sub-suppliers of the aforesaid (company E) and the assemblers themselves. It has been in the market for 35 years. It had, when the study was done, 900 employees (75 working in the plastics department).
- *Company J* – it supplies raw material (plastics) to companies which work for the assembler (company C), to their sub-suppliers (company E) and to the assemblers themselves. Manufacturing in Brazil since 1985, it has 73 employees.

The relationship between the companies studied, as far as supply is concerned, is shown in Figure 2.

Results

The main concern of the companies studied is, generally, concentrated in the immediate network of relationships, i.e. the main concern of the companies is with their immediate suppliers and customers. Only companies

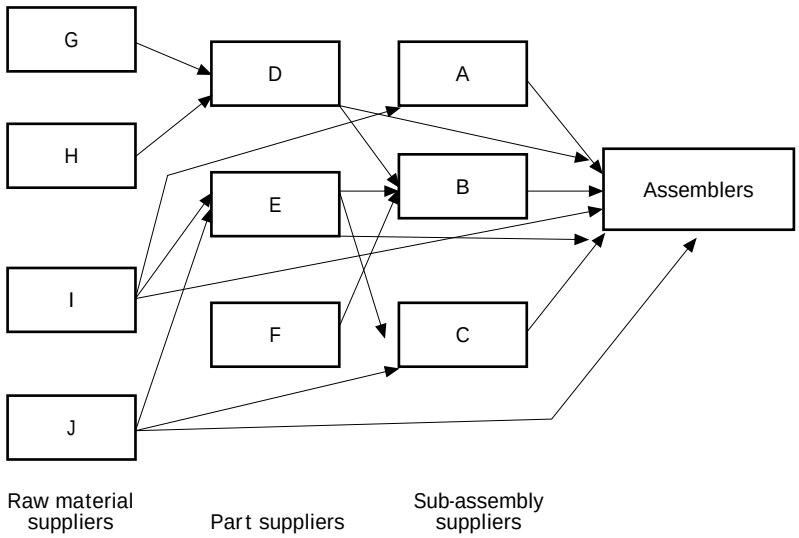
A and B, both of the car parts sector (suppliers of sub-assemblies to the car assemblers), have some degree of concern with the satisfaction of the end customer, maybe because they are penalised by the assembler if the product proves to be faulty when used.

The companies that have some relationship with exclusive suppliers[4] of raw materials stated that they feel that there is an unbalance in the negotiating power with them. However, it was found that service has improved thanks to the recent privatisation movement (steel mills, for instance, used to be state-owned in Brazil and are gradually being privatised) and because of greater competitiveness, at a worldwide level, among the large raw material suppliers (specifically in the plastics market).

None of the companies researched stated that their customers (assemblers or suppliers of sub-assemblies) specify their priorities clearly, i.e. specify which competitive criteria the supplier should emphasise. This would probably be important, since it is impossible to excel in all of them. The view of "trade-offs" in manufacturing (Hill, 1993) establishes that, at least in the short run, there could be conflicts between its competitive aspects (for example, flexibility and productivity).

The raw material suppliers researched tried to offer their customers specialised help (suggestions) as to which is the best raw material to be used. They work together in the development of products and they also make it a priority to comply with the delivery date (companies I and J).

Figure 2
The companies researched and their relationship



Some of the factors analysed in the supplier-customer relationship

Concerning the basis for selecting suppliers, it was found that:

- when possible, the practice used is to choose a supplier considering previous performance in a set of different criteria;
- the practice of evaluating the suppliers becomes more simplified (e.g. using simpler assessment questionnaires) from level to level, i.e. from the assemblers to the raw material suppliers;
- the evaluations carried out by the companies are standard, in other words, all suppliers are evaluated in the same way[5] by each customer;
- in the evaluations all the criteria are given equal weight, without specifying priorities to solve conflicts.

When the companies state the needs of their customers, they realise that there is no indication of priorities to be complied with. In other words, none of the companies said that their customer mentioned what they wanted in the first place: high performance in cost, quality, time, flexibility or other. They all wanted them all.

The opening of the Brazilian market to imports is influencing, in a general way, the setting of prices, since the assembler is quoting following international prices (the so-called target prices). Thus, the suppliers of sub-assemblies are "following right behind" (as they declared), trying to improve their internal performance and also suggesting a reasonable price to their sub-suppliers. The raw material suppliers, in their turn, are also feeling the need to offer more competitive prices, although in some cases they do not do it to a great extent because they are exclusive suppliers.

This sequence does not occur with other competitive criteria such as time, quality or flexibility.

It was learned that the various companies are trying to involve their suppliers from the beginning of the product's development process (whenever possible). The receptivity is much greater by the suppliers of sub-assemblies and their sub-suppliers of parts. The assemblers, according to those interviewed, resist and are more bureaucratic, which, in theory, makes it more difficult to obtain the benefits of complete collaboration.

In the present environment, the pressure to improve performance is high. At all levels, programmes are being developed that, in one way or another, try to introduce changes in the relationships established until now. However, the result of these efforts is being hindered by the differences in bargaining power among the

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members of the chain and because of the partial and segmented approach adopted.

The aforesaid can be seen when the case of relationships between companies B, D and H (respectively, the company which supplies the car assembler, the sub-supplier of the latter and the raw material supplier) is taken as an example.

The sub-supplier of company B recognises the need of working together and does not refuse to take part in or contribute to the programme. On the contrary, company D actually wants to establish a close relationship with Company B and other customers which supply the car assemblers.

However, company D faces a completely different situation with its suppliers. When it requests any type of collaboration from its raw material supplier, problems appear in the negotiation. This happens mainly because of its low purchasing power. According to company H (supplier of D), its attitude does not mean that it does not want to offer support to its customers, but it is hampered when it deals with its exclusive suppliers. These large suppliers sell in minimum-sized lots (many times large ones), a practice that company H passes on to its customers. According to it, there is no possibility of synchronising the production with more frequent deliveries and smaller lots, although it understands the needs of its customers. It justifies its attitude precisely because it is not able to negotiate with its suppliers.

Therefore, company D is interested in establishing a better relationship with its customer and its supplier. However, it considers that "it gets caught in the middle", so it can be considered a weak link of that part of the chain, since its negotiation and contribution powers are inferior to those of the other members.

The other car part sub-suppliers made similar statements concerning their negotiating power with the basic raw material suppliers and the assemblers or large suppliers of sub-assemblies. Sometimes the stronger bargaining power of the car assemblers or of the first tier larger sub-assembly manufacturers squeezes their suppliers' prices to the point where their margins are severely affected. One small supplier interviewed said:

"What can I do? If I do not accept the price they impose I will have to close down. If I want to see 'profit' in my bottom line, I have to stop considering equipment depreciation. Obviously I know this can be fatal in the long run, but I first need to ensure survival in the short term. And this means getting orders …"

The result of this happening repeatedly causes some of the links of the network to have their investment capacity undermined and obviously when they need to invest to expand their capacity or modernise their plants they lack capital to do so.

Revisiting the propositions

Based on evidence of the field work, the initial propositions can be revisited:

- *P1 – The Brazilian automotive industry supply network is well balanced in terms of power and responsibility shared by the so-called "partners".*

  False – It was clear from the field work that there are serious imbalances between "partners" in the Brazilian automotive industry supply network – the strong links fully exercise the power that the bargaining strength give them, frequently squeezing the margins of the weaker links in fierce price negotiations, for example. In Ramsay (1994) terms, not only have the strong links potential purchasing power but also a strong conversion capability which is the ability of organisations and their representatives in an exchange relation to convert potential into actual power – the power to produce intended changes in a supplier's product specification that both creates a closer match between that specification and the purchase specification, and incurs increased supplier costs without increasing buyer costs. This weakens even further the already weak links.
- *P2 – There is a good level of awareness of the constituents of the automotive industry network regarding the importance of a global network management.*

  False – The field work showed that none of the companies of the sample fully understand the implications of not having a global supply network management let alone the benefits which could result from having it.
- *P3 – The strong links actually play an important role in terms of managing the supply network as a whole.*

  False – Evidence from the field work suggests that there are no actions taken by the strong links in terms of managing the global supply network. Relationships are win-lose rather than win-win and the strong links are normally the ones who win. But the overall network sometimes loses.

Conclusions and recommendations

The greatest concern of the companies researched is the development of the relationship in the immediate supply network. The concern of management of the overall network, at least in this part of the chain, is not

shown in the sample researched. The difference in the purchasing power between the customer and supplier companies shows that the advantages of a relationship between equals cannot be reached (Lamming, 1993).

It is important, therefore, to strengthen those links that have difficulties. It seems possible to state that it would be the responsibility of the strong links to take the initiative of the supply network management, since the essence of this management is precisely to detect where the weaknesses in the network lie and find ways to help to diminish them. An example of this was identified in the research. One of the sub-suppliers reported that its customer (with a greater purchasing power), instead of buying the parts, began to purchase the service of processing parts, buying the raw material directly from the supplier and sending it to be processed. Generally, when a company purchases large quantities of raw material, it pays a lower unit price. The negotiation between companies of the same size happens on a more balanced basis. When the larger company cooperates with its supplier (a company with smaller bargaining power), on one hand it strengthens its network and it creates means so that it becomes more competitive and, on the other hand, it pays a lower price for its own finished part. This happens because the company that receives help avoids the costs of, for example, carrying stocks (due to the purchase of larger quantities) or the payment of a higher price (due to the request of more frequent smaller deliveries).

The statement that service has improved with privatisation or with a larger competitiveness among the large raw material suppliers indicates that the imbalance in the negotiations can be either a consequence of monopolies or of differences in size. Thus, the problem of an imbalance relationship, that shows the existence of weak links (we could even say that it is a weak tier) in the chain, can be caused by:

- difficulty of the smaller company in influencing the behaviour of the larger one, mainly because its potential purchasing power is not significant;
- subjection of the company to exclusive or monopolistic suppliers (absence of availability of the resources from other sources, increasing the supplier's purchasing power – Ramsay, 1994).

A displacement among the competitive criteria to be prioritised by purchasing people was verified according to the viewpoint of the companies belonging to different levels of a same chain of supply. This is in accordance with the view of Dimanescu *et al.* (1997): "Purchasing people think of themselves as 'strategic', but although they may create 'strategic plans', these are all too often unrelated to general company strategy or marketplace requirements". This can cause a lack of strategic direction for the chain or for the network as a whole. To remedy the situation, purchasing people performance goals must be established, taking into account the end customer and adequate means must be developed to communicate to/demand performance from the various links, allowing these efforts for improvements to reach the different levels, according to those (specific) performance criteria that are of interest. One of the ways to attain this would be a correlated (and co-ordinated) system of supplier evaluation. There must be a differentiation in the evaluations applied to the different suppliers, as it is very difficult to expect exactly the same priorities (quality, costs or any other competitive aspect) from all the suppliers. In other words, it could be important to consider the possibility that different criteria are necessary at different levels of the various suppliers.

With this in mind, the performance evaluations, instead of simply containing a list of the desired characteristics, should clearly specify which is the expected priority, i.e. instead of using the supplier's performance levels only to follow his performance (in criteria such as quality or delivery date), should make better use of its role of changing attitudes. In this way, when the supplier knows what is expected from him/her, he/she can make an effort to improve his performance, focalising and concentrating on the prioritised criteria, motivated by a desire to obtain a good evaluation and, consequently, more business.

When the case related to the companies B, D and H was analysed, the imbalance between the potential purchasing power of the companies of this part of the supply chain became clear, showing the existence of the weak link. The denomination weak link does not only mean that it is a small company, but also that the company depends on an exclusive supplier, called strong link, because its potential purchasing power is much greater in negotiations with its customers.

Thus, it seems plausible to admit that there are other small companies or companies with little negotiating power in the same situation as company D, that stated that "it was caught in the middle", it felt that its hands were tied, it had no condition to comply with the demands of its customer for just-in-time deliveries because it could not demand just-in-time deliveries from its large raw material supplier.

Consequently, this exploratory research showed the existence of a level where the

suppliers are perceptibly weaker, and is placed between the large suppliers of sub-assemblies to the assembler and the large suppliers of raw material. Therefore, a way of strengthening this weak layer must be found. This reason could well have been the responsiblity for the problems the Brazilian automotive industry faced in 1993, which was described in an earlier session of this paper. There are viable means for this, such as:

- Awareness for the need of development of specific methods by the strong links, so that they can better manage the overall supply network.
- Respect of margins when strong links deal with weaker links – one should manage supply chains for competitive advantage and not just to reduce costs (Dimanescu *et al.*, 1997).
- Use of tools which help in mapping the different levels of performance that different tiers of suppliers may be producing, such as the quality filter mapping, proposed by Jones *et al.* (1997), not necessarily focusing on quality but also on other dimensions of performance such as flexibility, dependability, delivery responsiveness, cost, among others. This way, the overall network will be more aware of the convenience of developing weak links.
- More efficient participation of the strong links in the suppliers' development, principally the weaker ones.
- Differentiation in the suppliers' evaluation system, taking into account possible differences in the contributions that different links can offer the overall network. This is in accordance with one of Hines (1994) suggestion for the adoption of what he calls network sourcing – the use of rigorous supplier grading system, increasingly giving way to supplier self-certification. The aim here is to give weak links clearer direction for improvements, avoiding that they disperse efforts and waste scarce resources.
- Clear prioritisation of the customer's needs, so that the suppliers can selectively prioritise their improvement programmes, focalising on what is most interesting for the good performance of the network.
- Evaluation system used to change behaviours and induce attitudes, in other words, to guide suppliers with less conditions to carry out strategic analyses.
- Close, long-term relations between network members involving a high level of trust, openness and profit sharing (Hines, 1994) from conflict to co-operation.
- The creation of supplier associations. A supplier association is a mutually benefiting group of a company's most important suppliers brought together on a regular basis to co-ordinate, co-operate, and share best practice (Dimanescu *et al.*, 1997). The supplier associations are very incipient in Brazil and could be a source of improvement for weaker links.

Even though the sample studied is small, results were found which show the need for companies to change their behaviour which could help to improve the existing situation in the Brazilian car industry. Part of the problem probably arose due to the comfortable position of the sector's larger companies back in the days of the protected market when the need to have a strong chain which would, for example, allow the increase of capacity to face foreign competitors, was not important. Today, with the situation of a gradual opening of the market to imports, it is necessary to keep this aspect of great priority in mind.

Some of the mechanisms and proposals mentioned in this paper can be implemented with low investments. It is simply necessary to understand the importance of network management on competitiveness in future markets, and not the management of individual companies in the chain, and try to act positively in an effort to reach a level of relationship which would enable all to make use of the advantages that come with this management. In this way, it will be possible to have a strengthened and more competitive Brazilian car industry.

This exploratory study showed clearly the need of further research, concerning the development of specific methods of analysis of the supply networks for the Brazilian car industry, if not the present networks will continue to have weak links that limit the competitive performance of the end product – the Brazilian car – in the world and local markets.

Notes

1 The links strength here refer to the balance/imbalance of bargaining power in the commercial relationships within the supply network. A strong link, for instance, when playing the buyer's role has the potential capacity to produce the intended changes in a supplier's product specification that both create a closer match between that specification and the buyer's purchase specification, and incur increased supplier costs without increasing buyer costs (Ramsay, 1994).

2 According to Ramsay (1994), the amplitude of a buyer's purchasing power may be seen to be determined by the degree of interdependence between the buyer and the supplier, and this in turn depends on the relative attractiveness and availability of the resources that the buyer and the supplier have to offer each other. The more attractive and the less available the resource (normally money on the one side and

the purchased good or service on the other side) which actor A has to offer actor B, the more purchasing power A has over B.

3 The types proposed by Lamming (1993) are: traditional model – before 1975; pressure model – from 1975 to 1982; solution model – from 1982 to 1990; partnership model – from 1990 onwards; and lean supply model – supposedly necessary for the future. They all have very different characteristics in relation to the analysed factors. For more details, refer to Lamming (1993).

4 When a traditional or exclusive, sole raw material supplier is mentioned, it is considered that it is a company that belongs to a group of few competitors that act in a certain sector of the Brazilian market. For example, company H stated that there are four companies which supply steel from which it can purchase the necessary raw material.

5 Purdy *et al.* (1994) made a study taking into account the effectiveness of the supplier evaluation process in the North American car industry. The results of this research also showed that the assembler uses the same model of evaluation for all its suppliers, without considering, for example, the size and nature of the business of the company to be evaluated. In the specific case of the present study, this practice was found in the different levels studied.

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