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Inter-Organizational Relationships and Supply Chain Performance: Case Study of the Subsidiary Company of a Car Parts Manufacturer

Prune Gautier *

Abstract—**This paper presents the results of a case study conducted within a company of the automotive sector. The objective was to develop solutions to improve the global performance of the company and its supply chain. The study mainly consists of a strategic diagnosis based on the thinking process of the theory of constraints. Moreover, a literature study was made so as to compare the obtained results with the ones of the supply chain management theory. The conclusions of both practical and theoretical studies reemphasize the importance of the inter-organizational relationships on the supply chain performance.**

Keywords: ***Engineering Management, Inter-organizational Relationships, Strategic Diagnoses, Supply Chain***

1 Introduction

Supply Chain Management (SCM) is the synchronization of materials, information and financial flows in order to obtain impressive gains in terms of time to market, agility and reduction of costs. In today's high competitive business environment, SCM is therefore becoming an important source of competitive edge for companies. In addition, SCM is as well the management of relationships across multiple and complex networks of companies that whilst legally independent are in reality interdependent [1]. Managing the supply chain in an efficient and performing way allows the global chain to increase its competitiveness. Nowadays, it is no longer companies but chains that compete. Effective SCM considers two kinds of organizational relationships:

- Inter-organizational relationships, that are vertical (between buyer-seller, supplier-manufacturer) or horizontal (strategic alliances and partnerships [7]),
- Intra-organizational relationships (between departments of a same company or between companies of a group/firm).

Moreover, a supply chain is defined as a system of suppliers, manufacturers, distributors, retailers and customers, so supply chain partnerships leads to a more profitable supply chain [3] . Inter-organizational relationships management is now seen as a governing element in strategy that impacts performance. It has been proven that the way relationships are managed among supply chain members can significantly enhance both efficiency and effectiveness [2] . Nevertheless, inter-organizational relationships are complex and have been studied in several approaches through different decision levels. For instance, the notion of trust is developed in disciplines of psychology, social psychology and sociology, but also marketing, management and economics [7], and there is a great difference between interpersonal trust and inter-organizational trust. This paper presents the latest results of a study performed within an industrial company. This study is part of a project which aim is to identify the main problems regarding supply chain management practices. After an initial diagnosis, the company wanted to continue the analysis in order to identify potential ways of increasing its supply chain performance. The firm concerned by the case study is a subsidiary company of a car parts manufacturer. The company employs about 100 people and produces components for air conditioning systems. The manufacturing facility consists of three production lines. It is owned by a Japanese parent company. Its customers are major actors of the automotive industry and are located all around the world in Europe, Asia, North and South America. Suppliers of the company are either companies in Europe or the parent company in Japan. The remainder of this paper is organized as follows. The next Section2 describes the context of the study and the addressed problem. In Section3, we present the applied methodology and detail its applications in Section4. Results of the case study are finally discussed in Section5.

*Manuscript received January 12, 2010. P. Gautier is with the Public Research Centre Henri Tudor, Business and Systems Analytics Unit, 66, rue de Luxembourg, BP 144, L-4002 Esch-sur-Alzette (phone: 352-42-59-91-556; fax: 352-42-59-91-555; e-mail: prune.gautier@tudor.lu)

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2 Problem Description

We started to study the different problems to which companies are confronted when building a performing supply chain in the context of a RDI project. The challenges of the project were multiple. First, the aim was to prove that supply chain approach is the most suitable one for the current economy. The second objective was to build a generic supply chain model and to develop a new logistic platform located in Luxembourg. This platform is composed by a group of services, from trainings to technical solutions for enhancing the management of supply chains. To reach these goals, case studies have been performed within companies from Luxembourg and the Great Region. The aim of the case studies was to find the main problems that affect the global performance of companies' supply chain, and then to deduct universal causes that avoid firms to build an efficient supply chain. In order to collect as many problems as possible and then to decide whether or not they are generic, we selected for case studies companies from different activity sectors (industrial, services), from different nationalities (Luxembourgish, French) and different sizes (SME, major companies). Working groups involving key management persons were formed in each company, in order to discuss the problems they were encountering inside the company as well as with other links of their supply chains. This work allowed us to collect specific problems and then, by compiling the list, to find out general causes such as the lack of trust, win-win and long-term partnerships. This paper deals with one of the companies involved in this project. The main problems highlighted by the company are represented in Figure 1 with major categories.

Problems concerning the communication and cooperation with the parent company were discussed right at the beginning of the working group. The other problems are concerning suppliers, customers and the production itself. The participants of the working group considered that the risk of stock shortage on components, the uncertainty of customer demand (i.e. the final demand comes too late for the company to readjust its production) and the reject rate that is too high for the Japanese company, are other main categories of problems, even if many of them are closely linked with the first category of problems related to the parent company. For instance, in the category of supplier problems, we can notice delay and cost problems. Most of the time, this problem occurs for components that are made by the parent company, located in Japan. The fact that the Japanese firm has to be the unique supplier for this kind of piece, and that transport from Japan is very expensive and takes a long time, causes problems concerning the supplier policy. In addition, since the Japanese group is used to take all the decisions in the head office, the projects and the customer relationships are developed in Japan. This operating mode avoid the French company acquiring knowledge on the maintenance of its own machines, which are often down, sometimes up to 10 times a day, and from anticipating the customer demand. But other problems highlighted by the working group were only due to the company itself: for example, the lack of project management. In that context, the company decided to continue the analysis for trying to find solutions to the identified problems.

3 Methodology

In order to realize this diagnosis, we decided to apply the methodology called Thinking Process [6]. It is a tool used within Theory of Constraints, a global management philosophy. It is a failsafe process that allows making a strategic diagnosis of a company. It also gives strong guidelines for the change management process. Since this approach is based on discussions and exchanges it requires a common agreement on the problem to be solved, characteristics of the solution and the ways to reach the solution. Moreover, the thinking process considers all the negative effects that may occur during the change and identifies the obstacles to a good realization; it thus facilitates the initialization and the implementation of an improvement project. The thinking process takes the form of brainstorming sessions of working groups composed by key persons of the company and requires the agreement of top management. It consist in three steps that answer three fundamental questions: what to change?, what to change to? and how to change? It ends up with the realization of a validated, complete and detailed action plan. The advantages of this methodology are numerous. It allows highlighting the problems of the company in a really realistic way, but without judging people capacities and work. It asks participants to dream about a global solution for the firm and then try to find a realistic way to reach the ideal situation. The individual notion only appears at the end of the process to avoid individualism and opportunism during the construction of the solutions and favor a global vision of the company. The three steps of the thinking process must therefore be conducted separately.

4 The thinking process progress

All three steps of the diagnosis have been achieved with the agreement of the top management. The working group was composed by the purchasing manager, the quality manager, the production manager and an employee who had been working in the company for a long time. The managers are part of the direction board and were responsible to get the director agreement. They were representing the main actors of the supply chain in the enterprise: supply - production - quality. The last participant was invited for two reasons. First, he could be the voice of the other employees as a team leader working every day with these employees. Second, as one of the

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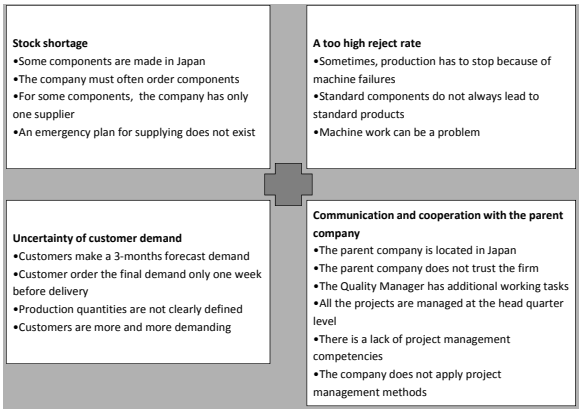

Figure 1: Main problems by the company

oldest employee in the firm, he had the historical knowledge on how the company reacts to change. Results of the first step of the thinking process, namely the identification of the core problems, led the company to continue the diagnosis.

4.1 Ideal situation

The second step of the Thinking Process consists in working on proposing what the best situation in the future could be. At this moment, nobody is allowed to think about how to realize this situation. Participants must list elements that need to be realized in order to change the undesirable current reality studied in the first step into a nice future one, even if those elements seem to be completely utopist. The aim of this work is to check that all the problems highlighted by the company are all solved by the realization of the elements listed with cause and effect relationships. Some negative effects that are the results of the change caused by the implementation of the elements can occur and the working group has to find other elements to make them disappear. The biggest difficulty during this step is to make participants understand that it is mandatory to dream, that any idea is good to be discussed and that the best one is not the most obvious one. Indeed, it is mandatory to think about optimal solutions without any idea of how they should be implemented. Participants must find final situations, without thinking of their realization. The final list of elements is written below:

- The company works on the development process of all products that will be produced in France, from the beginning of the design to the mass production.
- The company participates in the industrialization projects for Europe and really work with the parent company.
- The company does not perform control operations on every component.
- The company has an autonomous production system and work with the parent company for designing and development.
- Machines are stopped when the production does not need them.
- Customers demand is equal to customers forecast.
- A strong link exists between production and quality departments.
- The parent company understands and accepts how its subsidiary company works.
- The company has no organizational constraints from the parent company.
- The company applies project management methods.
- The company has several suppliers for components at its disposal.
- Human Resources Management is flexible (on temporary work or task attributions)
- Human Resources Management takes into account the project management way of working in the resource planning (functions and tasks linked to projects)

We can notice that the implementation of these situations has not been taken into account since the realization of these situations often requires also the implication of the parent company in addition of actions from the company itself. Nevertheless, with cause and effect relationships, the implementation of all these elements leads to a situation in which all the problems listed at the first step of the analysis new negative effects disappear.

For instance, the facts that the company works on the development process of all products that will be manufactured in France, from the beginning of the design to the

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mass production, can remove problems linked with machine maintenance and working. The subsidiary company has now all the technical data on machines since they are defined during the development process and it can also take into account during the development, the European behaviour of suppliers about utilization of quality standards, which is different in Japan and causes production problems in Europe. Indeed, the cultural background of Europe and Japan really makes a difference between Japanese and French behaviour about tolerance on pieces: French suppliers use tolerance limits contrary to Japanese suppliers who try not to use them. Moreover, this element also gives the subsidiary company information about products and gives the opportunity for the company to include in the development their customer's requirements. Cause and effect relationships linked to this element are presented in Figure 2.

There are two elements concerning the relationships with the parent company: the fact that the parent company understands and accepts how its subsidiary company works, and the fact that the company has no organizational constraints from the parent company. These elements are not only depending on the subsidiary company and thus their realization was considered as totally utopist for the actors of the working group. But the fact is that these situations must be real for the company: cause to effect relationships from these elements allows the company removing the current problems and to improve the supply chain efficiency. The last example is about the new negative effects. One element, that helps the company in improving its supply chain, is that it has several suppliers for components at its disposal. In this situation, we consider that for all the components, the company has several suppliers for the same price, transport included. But a new problem appears because controlling operations are linked with the suppliers (one quality control for each supplier for the same component). Then, the company will have to increase the controlling activities, and this situation is a new negative effect because it requires time and human resources. To suppress this negative effect, the fact that the company does not control every component has been listed as an element that will improve the supply chain efficiency. This element is not linked to an initial problem but to a new one. The cause and effect relationships related to this negative situation and the proposed solution, are represented in Figure 2.

4.2 Action plan

During the third step of the Thinking Process, the realization of elements must be taken into account and the obstacles that block the achievement of the ideal situation have to be identified. The group brainstorms upon the obstacles and objectives to achieve in order to remove the obstacles. The list of these intermediate objectives is used to construct the action plan. The action plan construction shows the dependencies of the intermediate objectives and put them into order. It gives the implementation project template. Defining resources and durations for each element of the template finally gives the action plan.

In the present diagnosis, the elements from the former step of the analysis were detailed enough and there was no need to develop more than two rounds of obstacles to realize them. But for each element, several obstacles have been discussed and analyzed. Figure 3 represents the general structure of the implementation project template.

A lot of creativeness is required to make sure that all obstacles are identified. It is very difficult to make people understand that the goal of this working session is not to make the others actors responsible for all the problems. In most of the cases, the composition of working groups provides this kind of reaction. Indeed, since all the key actors of the supply chain are involved, it is impossible to blame somebody else within the firm, but in the present case of a subsidiary company, another difficulty shows up: the criticisms towards practices of the parent company. Even if the parent company has often a responsibility, it is not the only one in most of the situation. Moreover, every problem can be approached by two ways: from the parent company point of view or from the subsidiary company point of view. Both approaches lead to very different solutions. For instance, concerning the lack of trust, we can say that the parent company does not trust its subsidiary company, but we can also consider that the French company does not deserve the trust from the parent company. In the second case, the company can find actions to improve the situation and to gain credibility. In addition, even if the obstacle concerns only the parent company, it is mandatory for the French firm to find intermediate objectives, on which it can act, i.e. actions it can do to solve the problem of the parent company. For the element "the company has to be involved in the industrialization projects in Europe", three obstacles have been found. For each of them, correcting actions were decided. The first difficulty to achieve the solution concerns the parent company. Indeed, it is not used to work in a multi-process approach. Everything is centralized at the head office: Industrialization projects, processes, products and machines development, and customer relationship management A multi-process approach in a group needs communication between the departments and between the head quarter and the subsidiary companies. The RACI Matrix (Responsible, Accountable, Consulted, Informed) is a tool that allows every employee to know the people and their job description from others processes. To achieve its goal, the subsidiary company will have to fulfill and use its own RACI Matrix, to communicate the matrix and its purpose to the parent company. To convince the parent company to change its habits, the firm will have to argue the advantages of the new approach with figures and examples. Then,

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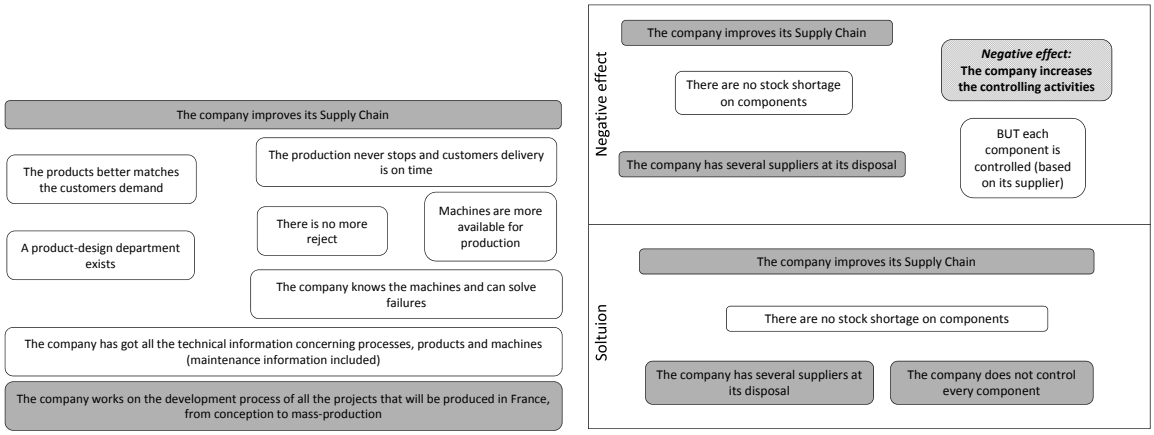

Figure 2: Example of cause and effect relationships and new negative effect

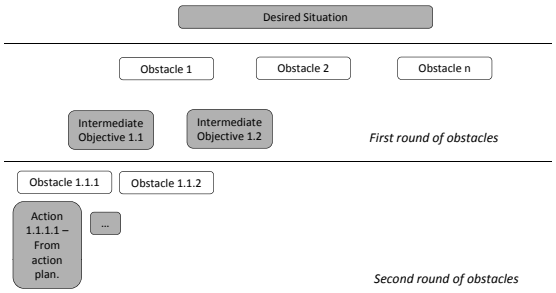

Figure 3: Structure of implementation project template

they will be able to ask the other processes to adopt this tool and the communication behaviour linked to it. The second difficulty concerns communication systems. The subsidiary company does not own the accurate communication tools to really collaborate. It must plan to buy a videoconference system for example. Adopting a project management method can solve the third obstacle. To realize this statement, the company wants to train the managers and to adopt a project-oriented organization. Then, it will be suitable to communicate the (good) results of the projects to the parent company. To conclude on this element, the intermediate objectives are:

- To communicate with the other process,
- To increase the parent company's awareness of the multi-process approach,
- To buy the needed communication tools,
- To obtain project management competences.

According to those intermediate objectives, the company planned and started to work on the following actions:

- To use and communicate the RACI Matrix,
- To argue the RACI Matrix advantages,
- To ask the parent company to use and communicate the RACI Matrix,
- To measure and argue the multi-process approach,
- To communicate the first results of this approach
- To buy new communication tools (video conference, on-line documents sharing)
- To train the managers to project management methods
- To implement project management tools
- To communicate the first results of project management

In what follows we describe other actions of the action plan that were often identified as important. To avoid controlling all components the company wants to negotiate with suppliers to obtain guarantees on components quality, it also want to adopt a supplier quality management with the agreement of the parent company. For the customer demand problems, the firm decided to work on production. The more the production is standardized,

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the easier it will be to absorb the differences between forecasts and real demand.

The company also wants to make the parent company understand that being the favorite supplier for some automotive companies has a cost, and that it is worthy in a long-term vision. Concerning internal organisation, the new functions of project manager and method engineer as well as standards for communication with the parent company will be created. The human resources will create back-up for every employee and the organisation has to be transparent to anticipate the risk of unique competencies. Many actions of the plan can also avoid the lack of credibility of the subsidiary company, which is a recurrent problem. All the propositions from the second step of the analysis have been studied and have produced intermediate objectives and actions to achieve them. At the end, the participants realized that some actions of the plan were linked to subject they would not have considered without the thinking process. For instance, negotiations with labor unions appeared to be a powerful manner to work on Human Resources and Production problems.

5 Results

The thinking process conclusions were an action plan of 61 items for 23 objectives. We can notice two main categories of objectives: the ones concerning the internal organisation and the other ones concerning relationships with the parent company. Internal objectives lead the company to be more efficient and more competitive. They concern human resources, suppliers, financial strategy and production. Achieving these objectives will allow the company to increase its performance and to reinforce its credibility towards the market and the parent company. External objectives, concerning the relationships with the parent company, re-emphasize the need for more communication and more trust between the two enterprises. The main goal of the subsidiary company is to deserve, to build, and to maintain a relationship of trust with the parent company. Many empirical and theoretical papers come to the conclusion that mutual trust is an essential factor of relationship quality and performance [7] and that trust, a complex and multidimensional concept, is necessary to increase a supply chain performance [8] and [5]. Moreover, 5 key cultural dimensions present in the management literature [4] were encountered during the analysis, even if the participants of the working group did not know them: The responsibility level (individualism/collectivism), the power distance, the uncertainty avoidance, the values (masculinity/femininity) and the short/long term vision of the company depends on culture. In this framework, Japan is considered as a collectivist, spending more time on long term goals, high in power distance, of a masculine culture and with high uncertainty avoidance. All these dimensions are considered in the action plan. For instance, the adoption of the RCAI Matrix is a collectivist tool but also shows the hierarchy. This kind of matrix will make easier the collaboration between the two cultures by integrating two key dimensions of cross-cultural management. The implementation of a communication template also shows up the need of certainty that is necessary for the Japanese company to be comfortable with. Furthermore, information sharing appears twice in the analysis. First as a desired consequence of trust [7], secondly has a manner to improve the supply chain [3]. This case study proved in practice the importance of trust in inter-organizational relationships. It also highlighted the impact of some dimensions of trust on the supply chain performance, namely: worth, reciprocity, credibility, goodwill, and communication. Finally, the study showed the importance of considering the cultural background of the actors.

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