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Customer - Supplier Relationship and Knowledge Management

A Value Creation Process in SCM

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Project Management

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Oppgavens (foreløpige) tittel The Role of Knowledge Transfer in Supply Chain Collaborating with Local Suppliers	
<p>Oppgavetekst/Problembeskrivelse</p> <p>Project organizations with international operations have developed over the years highly complex supply chains which benefit from the usage of global suppliers. Such decision is supported by incentives such as lower production costs and high reliability in the production. However, due economical (high transport costs or physical distance) or political (taxes and country regulations) reasons on the project site, the usage of local suppliers has increased.</p> <p>This study will explore the strategy behind the successful use of local suppliers maximizing its benefits like (lower costs, high responsiveness) and minimizing its disadvantages. It will also review how and what knowledge should be transferred to the local supplier in order to achieve the project goals without compromising the project delivery.</p> <p>In order to perform this study, we propose the following steps to be followed:</p> <p>1-Create an understanding of the current best practices in the usage of local suppliers in projects. Such insight will be achieved through literature review in order to assess the what, why, how, when, where and who questions.</p> <p>2-Identify challenges and room for improvement for current situation.</p> <p>3...</p>	
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Last but not least Ruben and Cuauhtémoc would like to thank their families for their unconditional support in all aspects to our personal and educational development, thanks from the heart.

***“It is a miracle that curiosity survives
formal education.”***

Albert Einstein

Preface

The authors would like to state that this work was done in the course TIØ4920 Prosjektledelse- masteroppgave as the final requirement for graduating from the MSc. Project Management from NTNU. We would like to give our deepest appreciation to the school and our teachers during these two years whom with their time and guidance made this possible.

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*"Oh coffee, you dispel the worries of the great,
you point the way to those who have wandered from
the path of knowledge. Coffee is the drink of the
friends of God, and of His servants who seek wisdom. [...]"*

Sheikh Ansari Djezeri Hanball Abd-al-Kadir , Sufi Mystic, 1587

Abstract

The emergence of global markets has opened international sourcing opportunities for firms to seek for the best customer value derived from suppliers scattered around the globe. These new opportunities raise the importance of supply chain functions in the firm; not only it provides the materials to be transformed into a final product, it additionally performs a strategic function in the firm as a continuous source of competitive advantage. Supply chain literature puts great emphasis in value creation but fails to acknowledge the role played by the network relationships under a systemic perspective. In this study we aim to analyze the vehicles for value creation within relationship and knowledge management. For this, we analyze the existing literature containing relevant strategic frameworks and external factors that, under a holistic view, affect the customer-supplier relationship behavior towards knowledge transference and, therefore, customer value creation. The study's proposals are complemented with an empirical study of the supply network relationships of four companies in the automotive industry. The results show that in order to bring value, under a knowledge-based perspective, current practices in supply chain management can be complemented by the inclusion of the social factors in the relationship management, namely trust and power. In addition, it was found that the functional areas are currently excluded in several dimensions from the supply chain management activities; this results in inefficiencies in the customer value creation.

1. Introduction

“Perplexity is the beginning of knowledge.”

Khalil Gibran

As markets for products and services become more global, international sourcing opportunities have become available to firms that after long periods of time have depended on local suppliers only. While some firms have taken an explanatory approach towards such new sourcing opportunities, others have decided to reaffirm their decision to use local suppliers and undertook strong supplier development activities in order to remain competitive. But the one thing that cannot be ignored is that the appearance of global markets drives firms towards a maximization of the resources available through their suppliers. Therefore, in order to compete in global markets, firms must lower costs, increase quality and continuously improve their value offer which consequently increases market competitiveness and benefits market participants.

In order to fully understand the impact of global markets to the firm's sourcing strategies, the importance of the supply chain function in the firm must be addressed prior to how it can be benefited or harmed by the involuntary introduction to a global marketplace. The studies of Cammish and Keough (1991, as quoted by Dubois & Pedersen, 2002, p. 35) claim that, in many cases, the spending in purchasing accounts for 50-80% of the product's total cost.

The definition of Christopher (2011, p. 3) refers to supply chain as: “the management of upstream and downstream relationships with suppliers and customers in order to deliver

superior customer value at less cost to the supply chain as a whole”. This definition holds two keywords that are especially important for this study, *relationships* and *customer value*. The first one refers to the way in which two things are connected¹; given the case, the customer and the supplier. This definition is good because it is simple enough to be easily understood by the average reader, but it is bad in the way that it limits the concept of relationship to just two things, while in a *systems thinking* approach a firm’s supply chain is interconnected with more than two elements. Thereupon, the word relationship may partially fill the needs of this study; perhaps a word like *network* could be better aligned to our thinking, but its use would require rewriting the given definition. The second relevant keyword is actually several words: superior customer value. Basically, this concept represents the perception of what a product is worth by the customer. Such worthiness is result of the usefulness of the product to the customer, or in economic terms, the measure of the benefit that the customer can gain from the product. With standardization intentions, a product’s value generally measured in units of currency.

Both, relationships and customer value are key concepts for this study because together they constitute the unifying theme of it: the creation of value through relationship management in supply chain. Such topic demands great analytical skills from the researchers, which should be able to follow the chain of evidence in complex environments populated with actors playing different roles and holding exposed or hidden intentions; a task worthy of a påskekrim² night.

Equally important is the fact that the concept of “value”, included in our unifying theme, could derive into a whole new discussion by itself. Why? Because there is no such thing as “absolute value”; rather, it is “perceived value”. Further, such perception changes depending on factors like: who is measuring the value, the information held, the context, and so on. Now, in the interest of setting limits to this work, the discussion regarding the perception of value will be left out of the scope. But the writers would like to state that such discussion arose, and it was deliberately left out in order to simplify our work.

Moreover, prior to stating the research questions for this study, it is necessary to make a second quick stop to review the connection between supply chain and a firm’s strategy. Although, such topic will be reviewed in further sections, it is necessary at this point to understand the intended reach of this study.

During the last years, the concept of supply chain management has grown and evolved in scope. From including logistics, transportation, purchasing and physical distribution, it now comprises: supply network management, demand chain management, pipeline

¹ As defined by the Cambridge Dictionary. Available in: <http://dictionary.cambridge.org/>.

² Påskekrim refers to the crime related novels and TV shows that are transmitted during Easter in Norway. Available in: <http://no.wikipedia.org/wiki/P%C3%A5skekrim>.

management and value-net integration. But most important is the realization that the strategic management of supply could produce considerable savings while contributing to the firm's competitive advantage. Thereafter, the role that supply management plays within the organization may fall three different levels: implementing competitive strategy, supporting strategy and driving strategy. These levels go from supply management as a function following the firm's strategy, to it as a driver of the strategy providing long-term competitive advantage (Cousins, 2002). Being this last one the one relevant for our study, supply management can provide a major source of competitive advantage to the firm through either a cost advantage, a value advantage, or a combination of both. While the cost advantage gives a lower cost profile, the value advantage makes the product offering an extra over the competitor's offering (Christopher, 2011). Once again, considering the reach of this study, the cost advantage will be discriminated to focus on value advantage, or, more accurately, value creation. This does not mean that a cost advantage will not be pursued, but rather than it will be handled as second priority in the firm's strategy. Ultimately, the focus on value creation was selected due the strong correlation held between value creation and innovation (Jacobides, et al., 2006; Tsai & Ghoshal, 1998); and being innovation one of major market drivers today (Satell, 2013a; Satell, 2013b; Ellwood, 2013).

As stated by Grosse (2000, in Stock, et al., 2010), the ultimate goal of supply chain management is to achieve greater profitability by adding value and creating efficiencies, thereby increasing customer satisfaction. Moreover, the basic efficiency premise of supply chain management is that value must increase faster than the costs associated with creating that value; in other words, maximum value created at a minimum cost (Lamming, 1996; Stock, et al., 2010). Modi & Mabert (2006) have confirmed the premise that operational knowledge transference initiatives, through supplier performance, lead to value creation. However the factors associated with value creation through relationship and knowledge management remain obfuscated. It is here where the study's problem lies and more important, the main catalyst for the denotation of the study's research questions.

In sum, we have now stated the unifying theme of this study, value creation through relationship management, and explained the reasoning behind this choice. Then, it is time to move forward and fit this broad topic into a scope aligned with the time and resources available to make it "feasible". This search for attainability has been consummated with the formalization of two research questions: First, how does the customer-supplier relationship affect value creation? And second, how does customer-supplier knowledge transference influence value creation in supply chain?

The two proposed research questions have evolved from the research problem initially proposed in the Masterkontrakt. The original research problem states the intention to "explore the strategy behind the successful use of local suppliers maximizing its benefits and minimizing its disadvantages." Additionally, the problem was to "review how and what

knowledge should be transferred to the local supplier in order to achieve the project goals without compromising the project delivery.” Utilizing customer value as a point of departure to measure the effectiveness of the focal firm’s efforts in supply chain management drove the apparent evolution of the research questions. Accordingly, we switched to focus from local suppliers towards “key suppliers” which hold a high value contribution for the firms’ product offering. That being said, knowledge management remains the driver of *customer value creation* (the goal stated in the original problem), but *customer-supplier relationship management* was included in the problem as it was identified as to be relevant to supply chain management.

“The devil is in the detail” is a popular saying that emphasizes the importance of the small elements hidden in the details³. We believe so. Thereafter, with the appearance of global markets, it is through careful detailing of the firm’s strategy that competitive advantages can be achieved, one detail at the time. In sum, those details can, and will make the difference against the competitors in this fierce marketplace. Subsequently, the authors of this study are convinced that value creation in supply chain can be amplified through knowledge and customer-supplier relationship management, as it will be explained.

The first question is oriented towards the exploration of the link between the customer-supplier relationship and value creation. We believe that factors like: trust, power, the strategic importance of supply chain, the degree of goal alignment, account attractiveness, the relative value of the business, the supplier’s relation to other firms and the nature of the product supplied, will affect value creation. How so? We propose that all the mentioned factors are to construct the current state of the customer-supplier relationship, and consequently, define the level of cooperation between them; in firms where supply chain holds a high strategic importance for the firm’s overall strategy, extra value can be created in the purchased products as a result of this cooperation. The first question aims to explain the different ways in which the customer-supplier relationship impacts value creation.

This last idea leads us to our second question, the one regarding the relationship between customer-supplier knowledge transference and value creation. In order to explain it, we must first fix three elements to our workbench. These elements are the ones that permit this question to exist and to maintain its relevance. The first element is the strategic importance of supply chain; it should be a part of the firm’s strategy providing competitive advantage. The second element is the existence of cooperation between the customer and supplier to develop the solutions or services that will be purchased. And the third element is the fact that innovation is a type of competitive advantage; and at the same which at the same time, innovative solutions hold customer value. Ultimately, innovation is possible because of the creation and transference of knowledge. That being said, the authors of this

³ http://en.wikipedia.org/wiki/The_Devil_is_in_the_details

paper believe that value creation is a product of the customer-supplier cooperation, but it is through knowledge transference that such creation happens. This last statement is the one opening the discussion since knowledge transference is affected by a series of factors and can take different forms. Furthermore, since knowledge is coded in the information shared between the customer and the supplier, several questions arise like: What are the different types of information and knowledge? What type of information holds value? What are the types of information shared? What types of information holds power, trust or risk? What are the risks associated with customer-supplier knowledge transference? What is quality information? Is customer-supplier knowledge transference a balanced process? What factors affect information transference? And most important, how is customer value created by customer-supplier knowledge transference? (Ajmal & Koskinen, 2008; Modi & Mabert, 2006; Choi & Krause, 2006)

In the interest of delineating this paper, the research questions will serve as guidelines to explain the impact, or the lack of it, of knowledge and relationship management in supply chain.

Equally important as the research questions, there is another relevant inquiry that needs to be assessed before moving forward to the next section. It is related to: how are the writers of this paper going to answer the research questions? To answer this, we must first define two important concepts that delineate the path to follow: the *unit of analysis* and the *perspective* to be taken. Let us first start with unit of analysis.

The delineation of a unit of analysis is in order to set the limits of our study. This decision will guide the research work by outlining the case study, which as a consequence affects the data collection strategy. In addition, the unit of analysis selected must take in account three important aspects. First, it should be defined enough to reduce environmental noise. A diffuse definition could end up including unnecessary elements in the analysis. Second,

regarding the size, it should be small enough to land inside the scope of this study and to allow us to see the “big picture”. At the same time, it should be big enough to enclose the relevant elements in the phenomena. And third, the unit of analysis must be

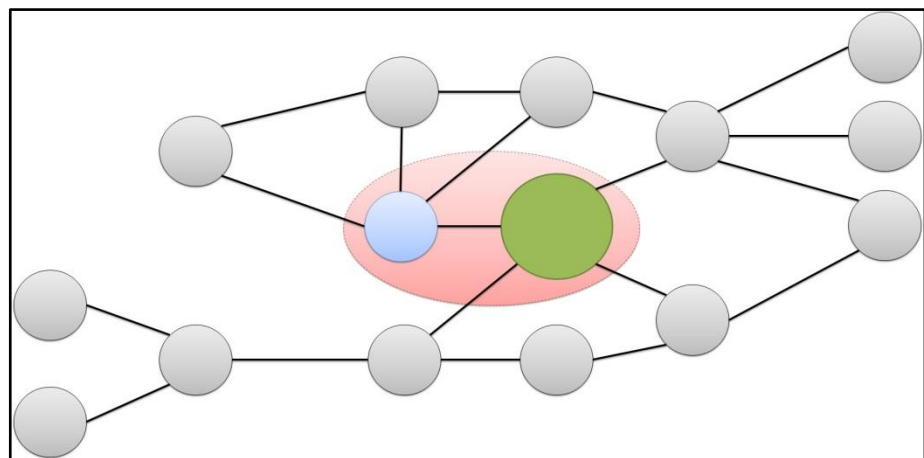


Figure 1 Unit of Analysis

handled as an open system⁴. This means that even though we are not going to focus on the surrounding environment, we should be able to perceive the effects of the environment on the system. This feature holds special importance because if the system is isolated, certain inherent characteristics of it may be lost (Oshry, 2008). Thus, given this reasons, the unit of analysis selected for this study is the customer-supplier relationship (Figure 1).

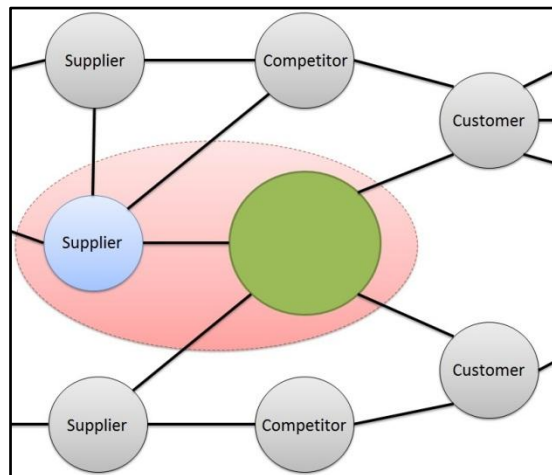


Figure 2 Unit of analysis (detail)

Figure 2 represents the entire supply network, but the elements contained within the red dotted line are the ones held within the unit of analysis. The rationale this selection is supported by the fact that the firm will focus its efforts on the management of the mentioned relationship, while being influenced by a context that contains other suppliers, competitors and customers. As a personal annotation, we believe that for this study, the unit of analysis selected is critical to attain the desired reach. In the case of multi-business unit firms, the unit of analysis is set to a single business unit due the existence of unique supply chains for every business unit.

At this point, the selection of a perspective is relatively easier than the selection of a unit of analysis. This is due the fact that being this a research study on supply chain, if we seek to apply the findings of it, we must indeed be the customer. It is worth to mention that an important factor defining the customer-supplier relationship is the level of goal alignment between them. For this specific case only, the analysis will be executed as a customer putting himself in the supplier's shoes. The reasoning behind this exercise is to explain the significance of the Strategic Goal Alignment for Relationship Management. Both of these topics will be explained on its corresponding sub-sections in the Literature Review section.

Finally, before stating our path to follow, let us make a brief summary of what's been reviewed so far. First, the rationale behind the unifying theme of this paper was explained along with the strategic importance of it. Afterwards, the study's research questions were stated followed by the definition of the unit of analysis and perspective to be taken. Now, it is time to explain how this ambitious goal will be achieved. First, an extensive literature review will be performed. Systems theory shall be used to not isolate our actors from the

⁴ In system theory, an open system is a system which continuously interacts with its environment or surroundings. The interaction can take the form of information, energy, or material transfers into or out of the system boundary, depending on the discipline which defines the concept. Available in:

[http://en.wikipedia.org/wiki/Open_system_\(systems_theory\)](http://en.wikipedia.org/wiki/Open_system_(systems_theory)).

context surrounding them. A review of economic and behavioral perspectives will settle the grounds for the make or buy decision, and to further maximize the benefits from the choice. Also, the strategic importance of supply chain management and its different level shall be assessed. Second, in order to obtain a reference point, the concept and theory behind customer value shall be presented. Third, the factors affecting the customer-supplier relationship will be assessed: the concepts of strategic goal alignment, trust and power. And fourth, knowledge, knowledge transference and its implications to customer value creation will be presented.

Further, a case study will be presented to support our propositions. It was performed in four global firms with presence in more than 50 countries and with combined revenue of more than 30 billion USD. The case study includes two rounds of interviews with positions varying from purchasing engineers, to global R&D managers, and a questionnaire in customer value.

To conclude, the data obtained with the case study will be analyzed and the findings shall be presented.

The authors of this study expect to find customer value creation opportunities hidden in the cracks of the firm's supply network management system, and especially in how information and knowledge flow across the different actors in the network.

As a personal annotation, we appreciate the fact of having you here, reading this paper. You are now holding the result of uncountable hours of studying, writing, analytical thinking, discussions and laughs. We hope you enjoy this reading just as much as we did while writing it.

2. Methodology

“If I had an hour to solve a problem I'd spend 55 minutes thinking about the problem and 5 minutes thinking about solutions.”

Albert Einstein

Writing a scientific paper is very much like building a wooden sail ship; every part must be synchronized with the rest, otherwise it will not sail. Following the same analogy, the Methodology section of this paper, just like the frame⁵ in a wooden sail ship, is what will hold the different sections together and gives direction to the ship building. It is in charge of maintaining the efforts aligned towards the overall goal of the study and it represents the study's overall strategy and intentions.

2.1 Problem Definition

As stated by Einstein almost 100 years ago, and quoted in the opening of this section, defining a problem is the beginning of resolving it. A well-defined problem may facilitate the solving just as much as an ambiguous problem may complicate it (Kothari, 2004). “The more a case study contains specific questions and propositions, the more it will stay within

⁵ In ships, frames are ribs that are bolted to the hull and run perpendicular to the keel. Available in: [http://en.wikipedia.org/wiki/Frame_\(nautical\)](http://en.wikipedia.org/wiki/Frame_(nautical))

feasible limits” (Yin, 2009, p. 29). The problem definition phase started almost 6 weeks prior to the literature search for the solution, and it overlapped 4 weeks with the first phase of the literature research which will be covered in the following section. Let us not confuse this overlap with working on an undefined problem. Because rather than defining the problem, it was an evolution and rewriting for it to fit the available resources and time frame for the study.

As mentioned in the Introduction section, the original research problem states the intention to “explore the strategy behind the successful use of local suppliers maximizing its benefits and minimizing its disadvantages.” Additionally, the problem was to “review how and what knowledge should be transferred to the local supplier in order to achieve the project goals without compromising the project delivery.” In the interest of further defining the problem, customer value was added into the problem as a means to set the field where the match should be played. Furthermore, knowledge management through customer-supplier relationship management was decided to be the weapon of choice selected for the battle. To this end, the problem evolution and definition gained strength from the analysis of the literature destined to perform as background.

Thus, the literature supporting the problem definition include: Stock, et al., 2010; Lusch, et al., 2010; Lazzarini, et al., 2008; Rock & Robles, 2012; Christopher, 2011; Cousins, et al., 2008.

It is important to mention that the purpose of this study follows the work performed for the TIØ 5230 Project Management Specialization Project. Although both papers are not topic related, in part, the specialization project inspired the problem definition as an application of knowledge management in collaboration.

Hence, the study’s problem was defined as: an exploration seeking for value creation through relationship and knowledge management in supply chain. Thereafter, the research questions were defined as: how does the customer-supplier relationship affect value creation? And how does customer-supplier knowledge transference influence value creation in supply chain?

2.2 Literature Search

The literature search for this paper lasted 12 weeks and was performed as the first step of this paper. As mentioned in the previous section, the literature search briefly overlapped with the problem definition. This was performed intentionally with two objectives in mind. First, increase the problem level definition. And second, find relevant primary literature.

The literature used is divided into 3 different categories. First, primary literature; this literature was used to elevate the problem’s definition level and to set ground for the

construction of this research. It comprises broad topics and frameworks, and it is not hard to see its commercial application. The abstraction level of the primary literature is low, which means it is practical and holds a moderate dependence to time and space. Second, secondary literature; this literature is to support its own weight and the one of the tertiary literature. It comprises more specialized topics and frameworks, and its commercial application starts to fade into more academic-related applications. The level of abstractions is moderate, which means it starts losing its practicality but it is less dependent of time and space. And third, tertiary literature; this literature comprises the details and limits of our study. Such concepts are highly specialized and are the ones with greater distance from the main topic. The level of abstraction is high, which denotes a disrelation from time and space (Wacker, 1998).

Pertaining to time, Figure 3 shows how the literature research was performed against time on its three different stages. The line marking "Literature Required" was added since the authors had to leave some literature out of the study. There are two reasons behind this decision. First, because the literature need for that particular topic was already covered. And second, because the time frame for the study limits the scope of the paper. The collection of literature slowed down as the secondary literature was reaching its completion. This is because as the authors went deeper into the unifying topic of this study the need for major pieces of literature switched into specialized literature. Note that the Figure 3 is not an exact representation of the literature research, but a mere approximation of how the process was carried out by the authors.

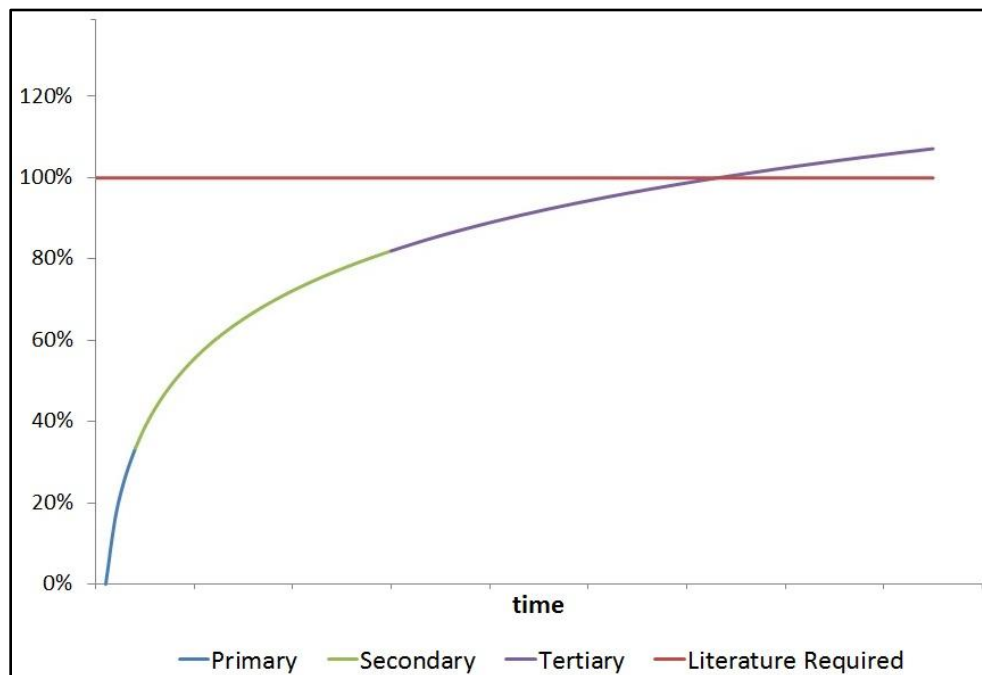


Figure 3 Data collection process

2.3 Research Design

According to Yin (2009) the research design should follow the nature of the study's research questions and should cover five main components: study's questions, propositions, unit of analysis, logic linking of the data with the propositions and the criteria for results interpretation.

The first component, the study's research questions were presented in the Introduction section, but these will be reviewed to follow Yin's research design. So, there are two main research questions:

How does the customer-supplier relationship affect value creation? And how does customer-supplier knowledge transference influence value creation in supply chain?

We expect that the answers to these questions may explain the fundamental reasons of the current state achieved in supply chain management in the automotive industry. We think that the processes supporting the automotive industry are unique and contain basic principles that may be extrapolated to applications in other industries, e.g. lean manufacturing. Which is a management philosophy derived from the Toyota Production System⁶.

In addition, since both of them are "how" questions, an *explanatory* nature is implicit in the form of the questions, which suggests the use of a case study as research method. But still, this is not enough to provide an assertive research method selection. Yin (2009) defined three conditions that assist the research method selection, these are: the type of research question posed, the extent of control an investigator has over actual behavioral events, and the degree of focus on contemporary as opposed to historical events. Figure 4 shows the relation between the mentioned conditions and the five major research methods.

So far, we have stated the condition related to the form of the research questions (explanatory), but to make a full assessment using Yin's approach the control need of behavioral events and the focus on contemporary events need to be defined. First, the need of control over behavioral events; it can be defined as a measure to isolate the phenomenon from the context. In this case, since we are trying to analyze a phenomenon with strong links to other actors in the network, and being this interrelation a defining feature, it is necessary to evaluate it on its context. Thus, the answer to the need of control over behavioral events is no. Second and last, is the focus on contemporary events; this condition is the opposite as a focus on historical events, and it just refers to the time frame where the phenomenon to be studied occurs. Then, the response to a focus on

⁶ Available in: http://en.wikipedia.org/wiki/Lean_manufacturing

contemporary events is yes. In short, three out of three conditions suggesting the use of a case study as research method were found. Consequently, a case study research method was selected.

METHOD	(1) Form of Research Question	(2) Requires Control of Behavioral Events?	(3) Focuses on Contemporary Events?
Experiment	how, why?	yes	yes
Survey	who, what, where, how many, how much?	no	yes
Archival Analysis	who, what, where, how many, how much?	no	yes/no
History	how, why?	no	no
Case Study	how, why?	no	yes

Figure 4 Relevant Situations for Different Research Methods (Yin, 2009, p. 8).

The study's propositions and unit of analysis are two essential components needed the research design; these were already given in the Introduction section, but will be recalled to clarify the path followed by the authors. The study's propositions are: the belief that factors like: trust, power, the strategic importance of supply chain, the degree of goal alignment, account attractiveness, the relative value of the business, the supplier's relation to other firms and the nature of the product supplied, will affect value creation. And that innovation is possible because of the creation and transference of knowledge. Additionally, the authors of this paper believe that value creation is a product of the customer-supplier cooperation, but it is through knowledge transference that such creation happens. The unit of analysis is the customer-supplier relationship.

The logic data linking with the propositions and the interpretation of the study findings are the final elements of Yin's approach to research design, but in order to assess these elements the nature of the data to be collected needs to be defined. The constitution of the data is aligned with study's questions that need to be answered.

Qualitative data is descriptive information about a phenomenon; quantitative data is numerical data about an event that can be ranked, organized and measured (Kothari, 2004; Yin, 2009). The explanatory nature of the study's questions creates a need for qualitative

data about the phenomenon that can assist with the breakdown and explanation building around the occurrence. That being said, qualitative data was selected as the primary target when collecting information. In addition, quantitative data will also be collected as secondary evidence for certain characteristics of the phenomenon that can be better explained numerically.

Now that it has been defined that both qualitative and quantitative data will be collected, the methods to be used to link this information to the propositions can be delineated. The selected analytic technique is explanation building. The goal here is to analyze the case study data by building an explanation about the case. It all starts with an initial theoretical statement that will be compared to the findings and revised towards an overall improvement in the statements. The repetition of this process will result in strong statements with high levels of abstraction (Wacker, 1998). Regarding the data interpretation, the quantitative will require basic statistical tools. The qualitative data will be analyzed and the empirical results will be presented.

In relation to the type of case study design, every firm included performs as a unit of analysis, but the way these are viewed in relation to the context modifies the case study design. For example, if the units of analysis are viewed as participants of the automotive industry as a whole (context), it would be analyzed as an embedded single-case design. On the other hand, if the units of analysis are viewed as participants of their own network (European and American automotive industries); two different, weakly contexts are found.

Given the fact that networks are expanding and firms benefit from the existence of global markets, an *embedded single-case study* design was selected. The rationale behind this decision follows the authors' intention to study the automotive industry, thus individual units of analysis were selected within this context. The automotive industry is considered a *representative* case of a complex supply

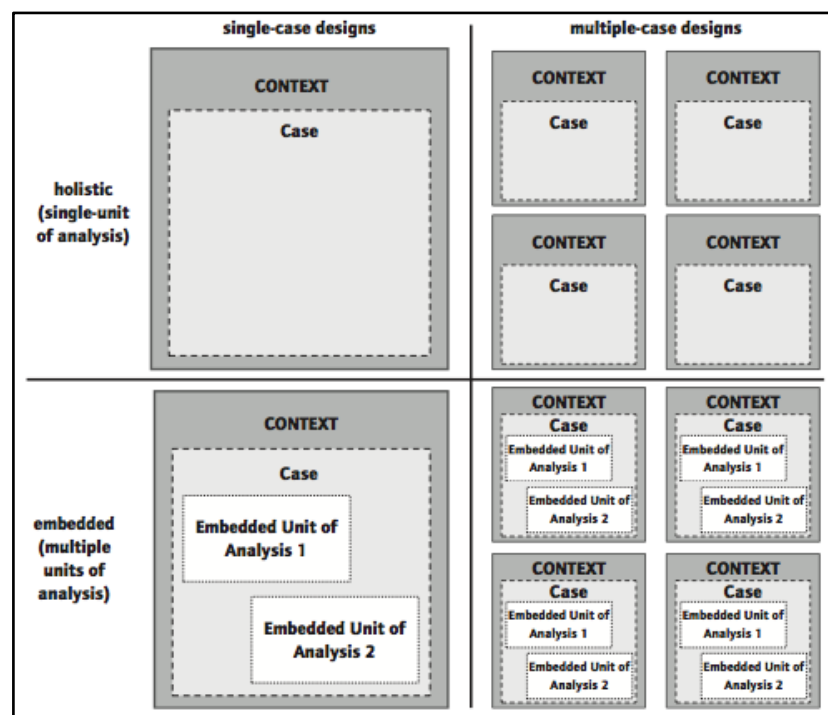


Figure 5 Basic Types of Designs for Case Studies (Yin, 2009, p. 46)

chain in a highly demanding market. Each one of the firms interviewed is seen as an independent unit of analysis embedded within a network (the automotive industry). The analytic benefits from having several case studies is known to the authors, but analytic conclusions resulting from the data analysis in the different units of analysis makes direct replication possible. Figure 5 shows Yin's basic types of designs for case studies.

2.4 Data Collection Method

Given the qualitative and quantitative nature of the data being collected, the appropriate data collection method should be selected to find relevant information and avoid any bias. Now, being this an empirical case study, the purpose is to develop insightful relationships within a selected sample. In addition, it should provide the dynamic dimension to theory to elevate the theory's abstraction level (Wacker, 1998, p. 375). Thus, the selection of a data collection method should follow the study's intentions and desired reach.

The selected methods are: web based document collection, interview and questionnaire. Each of the selected methods will be elucidated below.

2.4.1 Web Based Document Collection

Web based document collection was selected as a primary data collection method since there is relevant and easy-to-collect information available for scientific use (Yin, 2009).

There are numerous scientific, educational, consulting based and public documents available in the Internet regarding performance and operations in the automotive industry. In addition, being the firms in the sample public companies⁷, there are quarterly reports available which contained detailed information regarding the firms' operations. Furthermore, the use of previous research studies permits a better positioning in relation to what has been formerly studied in the industry. Also, the usage of research studies is not limited to automotive industry papers only, but for academic research based in different industries.

2.4.2 Telephone Interview

Telephone interviews were selected as a primary data collection method since they permit an in deep understanding of the phenomenon and are flexible enough to consent the necessity to dig deeper where needed during the execution of the interviews (Kothari, 2004; Gill, et al., 2008).

⁷ Public company refers to a limited liability company that offers its shares for sale to the general public. Public companies are required to submit reports containing a comprehensive detail of a company's performance. Available in: http://en.wikipedia.org/wiki/Public_company

In a structured interview, the interviewees are asked the same set of questions and their answers are compared to a scoring guide. This approach is used to reduce the possibility of bias and make an objective assessment of the results.

In an unstructured interview, the interviewees are asked sets of questions based on individual documents presented, e.g. a curriculum. The interview is performed without guidelines, it is casual and it seems conversation-like. This method is prone to bias, but allows a more natural perception of the interviewee.

A semi-structured interview is a blend between the structured and unstructured interview, where the interviewee is asked a common set of questions along with some case-specific questions where it is required.

For this study, a semi-structured interview was selected since it reduces the possibility of bias and it provides an objective assessment of the results; just like in structured interviews. In addition, it provides a casual nature to the interview and enough flexibility to further investigate wherever it seems appropriate to the interviewer.

Being this an embedded single case study, the unit of analysis is the firm (or a business unit of it), but the unit of data collection are individuals. Due to the positions they hold in the organization, these individuals are representatives of their departments, therefore, the questions to be used shall seek to investigate the organizational behavior embedded within the actions of individuals.

2.4.3 Questionnaire

Questionnaire was selected as a secondary data collection method since it has the capacity to reach a wide sample in a short period of time, which cannot be done by interview. It holds the disadvantage of a limited nature for data collection, but this condition is countered by using it only as a secondary data collection method (Woods, 2006).

A questionnaire was designed, as a resource, after two rounds of interviews to collect relevant data that was missing in order to complete the study. The questionnaire designed is web based and the Survey Monkey⁸ platform was used since it facilitates the handling and answer computing.

2.5 Data Collection Execution

2.5.1 First Round of Interviews

The first round of was performed in the supply chain department of the firms in the sample. It was designed as a semi-structured interview with 27 questions and an expected duration of 35 minutes which extended up to 50 minutes when executed.

⁸ <http://www.surveymonkey.com>

In order to obtain a complementary perspective about the phenomenon, the interviewees were asked at the end of the interview to direct us with one of their suppliers to interview them too. The rationale behind this is that the results may be one sided since we are asking a firm to talk about its suppliers. The selected option to counter this condition was to interview the department in charge of customer management in the supplier and corroborate the results. In addition, interviewing two participants in a value chain opens opportunities to evaluate the phenomenon from both sides. Unfortunately, no interview with the supplying firms was obtained through this method. The reason behind this may be a sense of protection by the firms to their suppliers.

In addition, one of the interviewees shut down the interview after 8 questions since he did not have clearance to share this information with us. There were attempts to complete such interview but the answer was negative.

As it will be thoroughly discussed in the Analysis section, the results from the first interview in terms of value creation were fragmented. So a second round of interviews was needed in order to find the necessary information.

2.5.2 Second Round of Interviews

A second semi-structured interview with 19 questions was designed, but this time it was directed to the functional areas working with the suppliers. The first interviewees were asked to direct us with functional departments working along with the suppliers. The topics of value creation and knowledge management were the main components of this interview as the responsibilities of the interviewees in the first round fell outside of these topics.

2.5.3 Questionnaire

Finally, a 4 questions survey was designed to cover the necessity of complementary information regarding value creation. The questionnaire contained just open questions and it was available online. It was sent to all the participants in the interviews. The results are shown in the Findings sub-section in the Analysis section.

2.6 Sample Design

Kothari (2004) defined seven steps to be followed when developing a sample design which will be individually reviewed along with its application to the case study design. Figure 6 explains these steps as defined by Kothari and their case study specific use.

The type of universe was selected due to the uniqueness in complexity held by the automotive industry e.g. Volvo has approximately 70 per cent (by value) of each car is procured from external sources, 440 major suppliers are used and 4.000 deliver other products and services (Fortgens, 2008).

	Steps	Definition	Case study specific
i	Type of universe	The set of objects to be studied. Can be finite or infinite.	The automotive industry
ii	Sampling unit	A single section to be selected.	A business unit of a firm
iii	Source list	A sampling frame from which sample is to be drawn.	12 firms
iv	Size of sample	Number of items to be selected from the universe.	From 2 - 6 units
v	Parameters of interest	Specific population parameters which are of interest.	Value chain positions, global markets participants.
vi	Budgetary constraint	Cost considerations	Firms are geographically dispersed.
vii	Sampling procedure	Technique to be used to select the items from the sample.	Non - probability sampling

Figure 6 Steps in Sample Design (Kothari, 2004)

The sampling unit selected is an individual business unit of a firm. This decision follows the firm's structure when organizing the work; this means that every business unit has a separate supply chain department.

The source list was built using all the resources available to the authors of the study, personal connections (both authors held jobs in the past in the automotive industry), company presentations at NTNU and weak ties⁹. 12 companies were invited to participate in the case study.

The desired size of the sample was between 2 and 6 units. This number was determined in accordance to the time required to perform the interviews and the data analysis. 4 units provided a positive answer.

⁹ Mark Granovetter defines "weak ties" as links that connect people who have acquaintances in common, who share membership in social networks, but aren't directly connected by the strong ties of friendship themselves. Available in: Granovetter, M., 1983. A Network Theory Revisited. Sociological Theory 1, pp. 201-233

The parameters of interest were the firm's positions in the value chain and their global participation in the automotive business, to ensure a high level of complexity in their supply chain (Choi & Krause, 2006).

The budgetary constraints for this case study are derived from the geographical distribution of the firms, which are spread in 2 continents according to the source list. Because of this condition, the interviews are to be performed as audio conferences.

Regarding sampling procedure, non-probability sampling or deliberate sampling was selected. Therefore, all of the companies included in the source list were invited since they all fulfill the parameters of interest of the sample design. The expected acceptance rate is 40%, but minimum and maximum acceptance rates are established at 16% and 50% respectively. The results regarding the sample are shown in Firm Demography sub-section in the Case Study section.

2.7 Research Design Quality

The objective of this section is to review the criteria for judging the quality of research designs and to disclose the measures taken to increase the quality of this study's research design (Yin, 2009; Kothari, 2004).

First, there is *construct validity*. It refers to the identification of correct operational measures for the concepts being studied. In other words, the degree that it confirms to predicted correlations with other theoretical propositions. For our case study, construct validity refers to the correlation degree between the study's theoretical construct and the empirical results.

Second, there is *internal validity*. It refers to the establishment of causal relationships or the ability to measure what it aims to measure; it constitutes the extent to which the systematic error¹⁰ is reduced. In our case study, it applies to the case ability of the case study design to establish a causal relation within two variables by avoiding any contextual noise in the data analysis.

Third, there is *external validity*. It alludes to the definition of the domain to which a study's can be generalized or in other words, the replication logic for this study. For this case study, external validity refers to the degree the findings can be generalized to other firms in the automotive industry.

¹⁰ Systematic error is the situation where the mean of many separate measurements differs significantly from the actual value of the measured attribute. Available in: http://en.wikipedia.org/wiki/Systematic_error

Fourth and final, there is *reliability*. It credits the demonstration that the operations of a study can be repeated with the same results.

Figure 7 contains the application of the four tests to judge the quality of research designs (Yin, 2009) to the case study design. Details about such application are given below.

TEST	Case Study Tactic Used	Phase
Construct validity	Establishment of chains of evidence. Investigator and theory triangulation. Multiple sources of evidence.	Data collection
Internal validity	Explanation building. Use of rival explanations.	Data analysis
External validity	Multiple-case study (replication logic)	Research design
Reliability	Informal case study database. Standardized data collection tools. Establishment of chains of evidence.	Data collection

Figure 7 Case study tactics used to ensure research design quality. Modified from Yin (2009).

Regarding construct validity, the research design was set to benefit itself from the establishment of chains of evidence to improve the study's construct validity. Additionally, multiple sources of evidence are to be used with the exception of *observations* given the geographic distribution of the firms in the sample (distributed in two continents with operations in 20 countries). Hence, the evidence obtained is the result from web based data collection, interviews and a questionnaire. The access to internal documentation was denied; this situation bounded the access to the firm's documentation and archival records. But, as mentioned in the Data Collection Method sub-section, being these public companies, there is public documentation available in the Internet containing information regarding the firms' operations. Thus, intra-firm data triangulation is possible, but limited. On the other hand, inter-firm data triangulation and investigator-theory triangulation will be used during the writing of this paper.

The establishment of a chain of evidence was decided in order to increase the study's construct validity and reliability. In the study, it can be found in the Findings and Empirical Conclusions sub-sections in Case Study; in addition, cross-referencing was used during the writing of this study and citations to evidentiary sources are used during the discussion to reinforce the empirical support in the argumentation. In the documentation outside the study, it can be found in the interview recordings, notes and the interview designs.

In order to increase the external validity of the study, a multiple-case study was pursued including a sample of firms that includes 1 automotive manufacturer, 2 tier-1 and 1 tier-2 suppliers. More detailed information regarding the sample of firms selected is given in the Firm Selection sub-section of the Methodology section. However, the results generalization of this case study is limited since the sample composes firms participating exclusively in the automotive industry. This industry is 100 years old and has achieved operations maturity through slow evolutionary changes. The sample selection was made in order to include different participants; still the participating firms are hardly representative for the entire automotive industry population. In short, generalization cannot be assured for the automotive industry or for other industries. On the other hand, the results obtained from this study may serve younger industries to build fulfill their own requirements by building their systems and operations over the existent knowledge and in consequence, elevate the level of their operations.

In terms of reliability, a chain of evidence was established as previously mentioned. Additionally, an informal case study database was established to hold notes, results, and the responses to the questionnaire and interviews. The nature of this database was set as informal since due the tight schedule for the creation of this study, it was not possible to develop a formal and presentable database, yet the Case Study sub-section of Analysis this information.

3. Literature Review

“We are all agreed that your theory is crazy. The question which divides us is whether it is crazy enough to have a chance of being correct. My own feeling is that it is not crazy enough.”

Niels Bohr

In this section we will quickly review first how the *systems thinking* is the correct approach to take when considering studying a complicated phenomenon like the behavior of the supply chain due to its numerous interrelated factors. Next we will discuss two different perspectives; *transaction cost theory* and *network theory* when analyzing how firms generate value, how they differ from each other, but also how the supply chain network analysis gets potentially benefited from this difference.

Next we will do a quick overview of how supply chain fits in the strategy of a firm, follow by an in-depth analysis of some of the tools that compose the purchasing strategy and the sales strategy which will become a fundamental part of our study. On the purchasing side we review Kraljic's (1983) matrix and the Cousins' et al. (2008) strategic supply wheel while on the sales side we review O'Brien's (2012) supplier preferences and the growth-share matrix (De Wit & Meyer, 2010).

For our network-all-including perspective we present some theory on trust and its effect on social structures as a complexity reducer, along with theory of power and its role as an enabler of the decision-making process. Afterwards we quickly review how those two elements can contribute to generate interdependence and what is the role they have in the new trends that try to model the supply chain network behavior. Finally we talk about knowledge theory and its potential as a value conveyor for the firms.

3.1 Setting the Ground

Systems thinking is an analysis perspective which explains that every phenomena is interconnected to other elements in the environment. Major academic efforts into this approach came after the Second World War in an effort to control and maximize outputs in the industry (Checkland, 1985).

In order to better analyze the supply chain we have decided to take a systems thinking perspective. This means that the behavior and phenomena that occur in the supply chain process is better explained by looking into all the components of the supply chain as opposed to separate the purchasing function, for example, and studying it in isolation.

Supply chain network then, represents the systemic perspective of the purchasing function of the firm, where purchasing represents only the core basic function while the strategic intentions of the firm are perceived as the main driver of its efforts. The importance vested upon the strategic alignment of the firm is due to the adoption of the network view, where firms are connected to one another through the supply chain. By adapting supply management into the firm's strategy the firm plans to improve the performance of the market channel and thus generate competitive advantages (Cousins et al., 2008).

Systems thinking principles are applicable to any systems in the real world, and sometimes they are comparable, for example: Senge's (1997) ideas the firm's behavior follow a similar path from Cousins et al. (2008) as the lowest level is represented by a highly individual firm that react to changes and look into its own organization for answers and solutions, whereas the highest level of systems thinking are composed by firms which look into their own organizational structures to determine behavior. The combination of both, the firm and the supply network, have been also considered under the systemic approach; Holmberg (2000) describes how organizations have been internally incoherent when adapting supply chain to the overall firm' strategy. This is due to the excessive use financial indicators to determine how the supply chain relation is performing, creating a narrow focus and functional orientation regarding the supply chain activities and its development in the future; financial metrics are seldom useful to make proactive decisions.

Now, in accordance to the systemic approach and considering the relationship between firms as the unit of analysis, the organizations participating in a supply chain network

would maintain the inherent characteristics of their behavior visible. At the same time, the interconnected nature of the different actors and roles would remain untouched and recognizable. On the other hand, if disembodied into smaller and more detailed units, the relations' integrative aspects would be ignored as the network as a whole loses important information when analyzed individually. Nevertheless the ability to analyze the firm in a holistic approach comes at a price: complexity. The holistic approach capacity to maintain the dependent nature of the individual parts within a system is also its biggest pitfall. In order to facilitate interpretation, we will designate each individual unit of the system as an *actor*.

Narayanan & Raghu (1993) have manifested understanding for the existent correlation between system complexity and the number of entities contained in it. As the number of actors within the system increases, the number of relationships also grows, but at a much higher rate. Figure 8 shows how by doubling the initial number of four actors in a system has an effect that increases 3.6 times more the number of relationships.

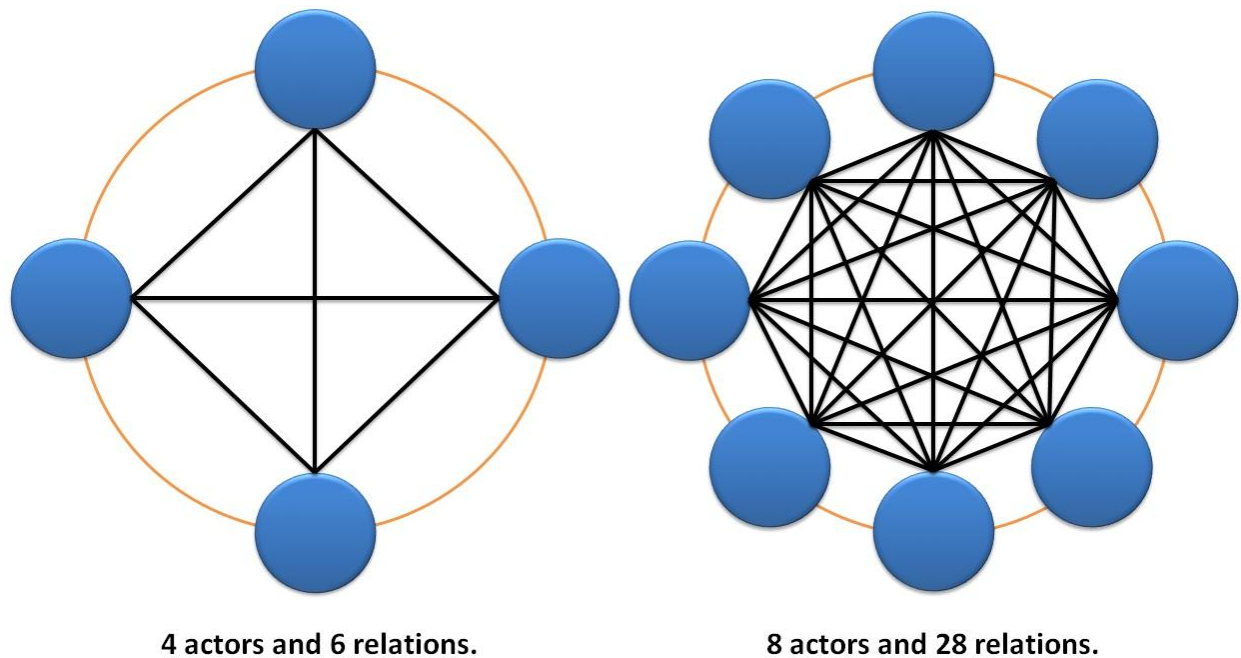


Figure 8. Actors and relations within a system.

This overall increase in relationships can be modeled using Buckminster Fuller's Synergetic Algorithm (Equation 1).

Equation 1 Buckminsters Fuller's Synergetic Algorithm.

$$R = \frac{N^2 - N}{2}$$

Where N is the number of actors in the system and R is the number of resulting relations. Figure 9 is a graphic representation of Buckminster Fuller's Synergetic Algorithm (Allen, 1996). The x and y axis correspond to the number of actors and the number of relations in the system respectively. The severe increment in complexity can be better understood as a tradeoff between using a simplistic but rather incomplete approach, or a holistic but complex approach. But, how can we make sure that the approach selected for this study is up for the task of holding the relevant actors and relations within our field of view? There is no short or easy answer for that question, but merely justified ways of trying to counter such condition.

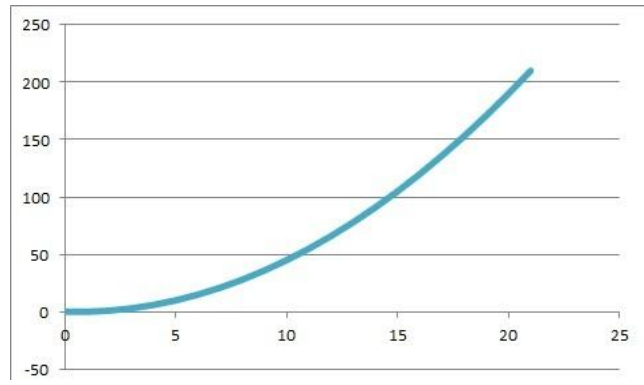


Figure 9. Buckminster Fuller's Synergetic Algorithm

The appropriate solution would be to use a model capable of managing highly interrelated systems with great numbers of actors but simplifying the complex interrelations among them. If only such model existed. Instead, strategies based on the economic perspective have been long used to minimize risks and maximize profits associated with the high numbers of interactions at the supply chain. These strategies have been little by little moved aside not to be completely replaced but to be complemented by other strategies with a systemic perspective that can explain market behaviors which have been simplified or not even recognized by the economic perspective (Dyer & Singh, 1998; Holmberg, 2000; Cousins et al., 2008; Håkansson, 2009).

3.1.1 Supply Chain Network: Transaction Costs and Network Theory

We believe that in order to make a good analysis of the supply network we have to use at least two different theories that allow us to consider different reason to the behavior of the supply chain of organizations and their effect in the supply network. Transaction cost theory for example, allows us to put ourselves in the shoes of the firm as an individual actor and explain the make-or-buy decision that seems to be standardized all over the firms nowadays. Network theory on the other hand, takes a step outside the firm and considers how the organization's benefits from other firms.

By using these two perspectives we are trying to analyze value under a systemic perspective; transaction theory for example, will allow us to see how value is represented by financial indicators, while for using network theory we expect to view other non-tangible indicators that also create value but are not considered by the economic perspective.

Prior to a deep immersion in the *Network Theory*, it is necessary to review classic economic theory to fully understand the existent dichotomy in the topic. Both, the classical and the network approach, seem to be in opposite directions from each other. Although, we think rather than being in opposite directions, both approaches are complementary to our purpose.

Håkansson (2009) compares the current business landscape with a jungle. Such metaphor is used to enhance certain characteristics of the context; especially to describe the strong rivalry among the different actors in the scene. Darwin's "survival of the fittest" phrase, in reference to the natural selection process, has become a posture widely adopted by firms that seek to achieve a stronger position in the market through power. The jungle metaphor "is used in contemporary thinking about business strategy, innovation management, marketing and purchasing to describe a business landscape dominated by fierce fighting between independent enemies" (Håkansson, et al., 2009, p. 5).

Moreover, the view of the business landscape as a jungle is not a new idea. Porter (1990) identified innovation as a source of competitive advantage in international markets and moreover, doomed the fate of any company that stops improving and innovating. His vision of the market is highly competitive and competitive advantage becomes the most suited vehicle to maintain a position in the market over the competition. Further down the same road, Porter's (2008) *Five Forces That Shape Industry Competition* model embodies a habitat characterized by strong antagonism. Such forces are defined as: Threat of new entrants, bargaining power of buyers, threat of substitute products or services, bargaining power of suppliers, and rivalry among existing competitors. Porter's vision seems heavily influenced towards holding the benefits provided by *power* in the industry and for the firm using them as a means to protect itself from other actors in the network and thus, improving its own position.

Being supply chain and knowledge management the main topic of this study, there is a certain approach that is in our interest: Transaction Cost Theory (TCT). Originally proposed by Oliver Williamson in 1981, TCT tries to explain the rationality behind sourcing activities out of the company against the option of performing such activities inside the firm's activities. In words of Williamson (1981, p. 552): "A transaction occurs when a good or service is transferred across a technologically separable interface." Such transactions are to be dimensioned in terms of uncertainty, frequency, and asset specificity. The last one being the most important dimension for describing transactions since it will enclose high fixed investments with long term orientation towards a specific transaction. It is necessary to mention that TCT separates itself from neoclassical economy by the usage of two behavioral assumptions: *bounded rationality* in human agents, and the inclination of some, not all, agents towards *opportunism*.

Although TCT is presented as a rationale to make a choice between the hierarchy (make) and market (buy) solutions, those only represent the far ends of the options available. In reality a wider range of shades are available between them e.g. joint venture, collaboration, partnering, strategic alliance, co-development or merger.

Since TCT's overall goal is to "economize" transactions and thus, maximize profits in the firm while simplifying the analysis behind the decision, it is not hard to see why TCT has been widely adopted by the industry and the academic world. In supply chain, his work has helped on simplifying the firm's internal structures in order to improve the overall operational and financial efficiency.

On a first view, it seems that TCT would have a perfect fit inside a jungle business landscape, which we think is partially right. But, we also believe that it produced several byproducts along the way, like setting the grounds for firms aligning its interests and seeking an agreement; in other words, cooperation settlements between firms.

Alternatively to this panorama, Håkansson proposes a second view for the business landscape: a rainforest. Under this conception, the actors are not perceived just as stand-alone actors in a common habitat, but as interdependent entities where the survival of the system is deeply related to the interactions among them. The focus under this representation is on the connections between the participants rather than the participants by themselves. In Håkansson words "The interdependence implies that the characteristics of the rainforest are not defined by the entities that populate it, but by the interactions between those entities." (2009, p. 6).

Håkansson's jungle and rainforest metaphor is very effective on the task of simplifying the different perspectives between neo-classical economics and business in networks economics. In a firm behavioral view, independency and rivalry are replaced by interdependency and interaction. Such statement must not be confused with the emancipation of rivalry from the context, but it is not the dominant way of relating to other actors. Firms that traditionally play a competitor role in the industry may also function as complementary, cooperative counterparts depending on the case.

There are two main aspects from the network theory that are especially relevant for this study. The first one relates to the implications of exploring the business landscape throughout the different interactions with the firms held in the *network horizon*¹¹. This perspective may unveil a series of opportunity areas available for the firm. But, on the task

¹¹ Van Liere (2007) defines a network horizon as the number of firms and their relationships that the focal firm knows to exist in an inter-firm network as a percentage of the total number of firms and relationships in the inter-firm network.

of limiting the research scope of this study, the focal point will be set towards the relationships between the different suppliers available in the context: the *supply network*.

The second meaningful aspect from network theory for this study is the perception of the business landscape as a rainforest. Such aspect goes hand in hand with the inter-firm interactions, but focuses on the main features that delineate it: relatedness, variety and motion. Next, these concepts will be reviewed and assessed on how the business landscape is shaped by them.

Variety:

The adaptations made by a firm to cope with variety are in order to either create internal efficiency or innovation in their offering. An increase in efficiency is obtained by a reduction in the variety of the solutions sourced. In contrast, an increase in a firm's offering through variety is supported by an increase in the number of adaptations

Relatedness:

The overall concept of relatedness in a network business landscape refers to the nature of the links between firms and how a stimulus will be transferred along the network as electricity flowing throughout all the conductive parts in an electric system. Such stimulus can be either positive or negative; examples for both will be briefly reviewed, but first we need to dig more into the concept of relatedness in the business landscape and for this, a couple of archetypes remarking the importance of relatedness in a firm spending shall be introduced.

"Continuity not only affects the relatedness between individual customers and suppliers. It also profoundly affects the character of the business landscape as a whole." (Håkansson, et al., 2009, p. 18). Continuity is then translated into strong long term relationships between firms and their suppliers directed towards obtaining mutual benefits. In fact, a tendency towards strengthening and developing a firm's relationships with its suppliers can be observed across industries. A convenient example is provided by Carbone (2004b) on his study over Motorola and its suppliers where the 25 top suppliers passed from providing one third to half of the total purchases in a two year period. Furthermore, following the Pareto Principle¹², a small group of suppliers should account for 80% of a firm's total purchases. This proposition is supported by Carbone (2004a) on his study over Hewlett Packard. He found that 35 suppliers account for 80-85% of its total spending on

¹² According to the Investopedia (2013), the Pareto Principle, named after economist Vilfredo Pareto, specifies an unequal relationship between inputs and outputs. The principle states that, for many phenomena, 20% of invested input is responsible for 80% of the results obtained. Put another way, 80% of consequences stem from 20% of the causes. Available in: <http://www.investopedia.com/terms/p/paretoprinciple.asp>

purchasing. Both studies combined are able to demonstrate the impact of long term relationships to the focal firm.

Such strong dependency among firms produces a structural effect in the network which then transfers stimulus from one firm towards the others. Let us take for example a specialized team in plastic injection processes which during the last two years has been working on an improvement on the production of door panels which is now complete and ready to be used for regular production purposes. Such improvement is able to reduce production costs by 7%. Top management in the firm has decided that a 3% discount will be offered to their customer in order to strengthen the relationship and eventually, increase their market share with them. The remaining 4% cost reduction will be reflected in an increased profit. The customer is impressed with the supplier's increased competitiveness that is willing to offer new businesses opportunities for them. Additionally, the supplier's own suppliers will also be benefitted by the increased sales of the new businesses.

This case reflects very well how a business landscape defined by relatedness functions. A firm's success spreads through its interactions towards the companies related to it. However, the same effect is present under a firm's failure, which will impact its suppliers and customers.

Motion:

Motion talks about the synergies generated by firms when performing their strategies, either when looking for their own goals or, specially, when working with others. In the network, all companies are interconnected so small changes done by a firm in their technological base, for example, represent new opportunities for other companies in the network that can be exploited if they have the capabilities. Because of this interdependency the industry is constantly evolving in many directions and forms with every action the firms take, creating new opportunities and changing the business landscape.

In sum these three elements; relatedness, variety, and motion shape the dynamic business landscape as no individual unit can act or operate alone. The identity of the individual companies is given by their interaction with others, as it is because of them that the individual firm takes the actions and directions that shape their strategies.

3.1.2 Supply Chain and the Firm's Strategy

Although the term "Strategy" was coined first by Athenians in regards to war affairs its essence has been carried on until modern times as firms try to make the best decisions to secure their organizational goals (Cummings, 1993).

About organizational strategy, for example, De Wit and Meyer (2010) give us a break-down of how firms look into their structures to solve problems specific to each layer. Strategy creation issues like deliberateness, evolution, responsiveness, competition, chaos, globalization, profitability, among many others, are discussed at their corresponding levels within the firm.

Although more than one single issue has repercussions at all levels in an organization some of them have special importance depending on the “zoom level” we apply when analyzing a firm. For example, when looking into the strategy of how the individual departments perform their activities one could consider that these are better given by emergence as their operating environment demands quick adaptability than by carefully describing every single aspect of their functions which would bring rigidity, likewise at the corporation level the issue of most importance is regarding managing the business units as a portfolio to give them flexibility or as a single centralized unit to promote synergy (De Wit & Meyer, 2010).

In our work the role of supply chain is seen under the business level constituted by the different functional departments of the firm as the actions of supply chain will affect the performance of each department and eventually the firm as a whole. The level of involvement of supply chain in the direction of the firm will depend on the anticipation or reaction to the needs of the other firm’s departments, by this we mean that the actions of supply chain will range between implementing strategy, supporting strategy, or driving the business strategy.

Purchasing’s activities began as a basic support for functional areas in order to procure necessary material for uninterrupted operations but as new needs besides the classics; costs, speed and quality were brought by the globalization this department had to evolve to cover these new needs, nowadays supply chain can be seen as an important part of the strategic vision of the firm bringing innovation and value as market boundaries have become blurry and complexity has raised. Cousins et al. (2008) describes the function of supply management as a function of its interrelation with the overall organizational strategy. They proposed that supply chain has several levels depending on the level of integration with the firm:

Passive: Purchasing has no strategic direction and reacts to requests from other areas. Is the most basic form and its job is basically implementing the strategy decided somewhere else in the firm. Its reach is fully contained within the firm and does not concern much with suppliers as individual agents with no influence in

Independent: There is continuous improvement of techniques and tools, along with benchmarking. This phase begins to introduce supply chain as a supporter of the firm’s strategy.

Supportive: Consistency between purchasing and departmental decision is achieved, and thus, the firm's strategic goals are supported. The understanding of new technologies and agile response to functional demands completely support the strategy of the firm.

Integrative: Long term focus and strategic planning to cope with future market changes. The final phase for supply chain is to create the competitive advantages of the firm, thereby becoming the driver of the business strategy.

These drastic changes of perspectives, from a passive (reactive) supply-fetching entity to an organization enhancer, fully integrated (active) to the firm's strategic intentions, come from the understanding that an organization-centered perspective can do only much for achieving supply performance. Instead of looking at the complexities of the firms under an individual light a more all-including perspective is necessary to grasp the potential benefits of managing a complete supply chain. The systems thinking approach allow us to do this because it is based on the *holistic* view which claims that all systems can be better understood, and therefore managed, if all the subcomponents that compose the whole are considered. The number of components, the quantity and nature of their interrelations, and their change over time all add to the complexity level of the systems (Jackson, 2003). "Strategic management is concerned with relating a firm to its environment... to be successful, firms need to gain a competitive advantage over rival organizations operating in the same business area" (De Wit & Meyer, 2010, p. 236). Organizations deal with complex internal (e.g. employees, departments) and external (e.g. suppliers, markets) dynamics. Systems thinking are the fundamental base from which the firm's strategies are created.

3.2 Customer Value

In the interest of serving as reference point to measure the firms' efforts towards supply chain management, customer value is defined by Christopher as: the division of "perception of benefits" by "total cost of ownership" (Equation 2).

Equation 2 Customer Value.

$$\text{Customer value} = \frac{\text{Perceptions of benefits}}{\text{Total cost of ownership}}$$

The representation of customer value by this equation means that there are two different ways to increase customer value: maximizing the perception of benefits or minimizing the total cost of ownership. The implications of supply chain management in customer value will be assessed in future sections of this study.

3.3 Purchasing Strategy: The Customer Perspective

In this section we will present theory on the strategic tools used to determine the actions of the focal firm towards its suppliers.

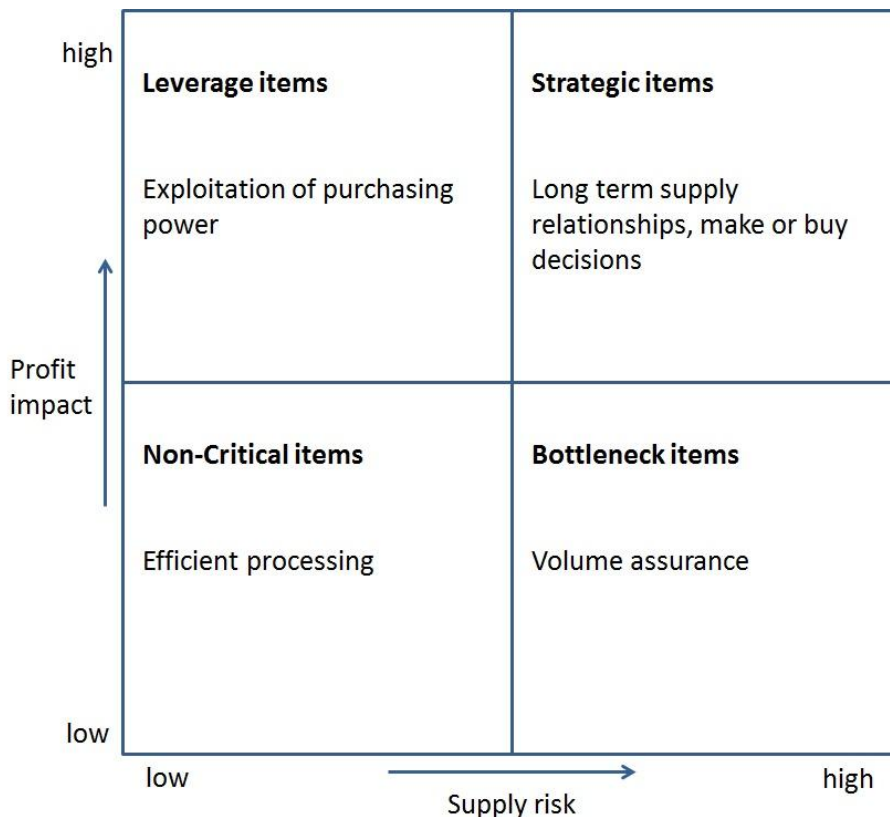
For our customer perspective we have decided to research into Kraljic's Matrix because is one of the most known tools that define the purchasing strategy of a firm. Strategic Supply wheel is also included because it provides a different perspective which contributes to the better understanding of how the customer thinks.

3.3.1 The Kraljic Matrix

Kraljic (1983) presented his approach towards purchasing as a means to manage the different supplier relations with the goal of constructing a strategy that matches the context around the different products sourced by the firm; this is what is known as: a *portfolio approach*.

His work is a call towards "a total change of perspective: from purchasing (an operating function) to supply management (a strategic one)" (Kraljic, 1983, p. 110). Additionally, his work remarks the importance of supply management as uncertainty in relations, technological developments and availability increases.

In Kraljic's (1983) vision, a firm's need for supply strategy relies upon two factors: the



strategic importance of purchasing assessed by the value added, impact on profitability, and the complexity of the supply market evaluated by supply scarcity, pace of technology, entry barriers and market conditions. An analysis based on these two variables can determine the supply strategy the firm needs to choose to maximize the benefits of its purchasing power while reducing risks. The result from this appraisal is four different stages of purchasing sophistication: supply, sourcing, materials

Figure 10 Classifying Purchasing Materials Requirements. Modified from Kraljic (1983).

and purchasing management.

Moreover, Kraljic (1983) constructs a 2 x 2 matrix as a portfolio approach in order to classify a firm's purchased items into categories based in terms of profit impact and supply risk.

Each of the product categories calls for a different attitude towards supplier management (Figure 10). *Non-critical items* are low value and ordered frequently with high transaction costs. Hence, strategy towards these products is towards product standardization, inventory optimization and optimization of the orders. *Leverage items* allow the firm to fully exploit its purchasing power. Strategies to handle these items include: vendor selection, product substitution, targeted pricing, spot purchasing and volume optimization. *Bottleneck items* are considered to hold a high supply risk, so strategies are headed for volume assurance, control of vendors, security of inventories and finding secondary supply sources. Strategic items hold high value for the firm; hence a more collaborative strategy is required between the customer and the supplier expressed by the development of long term supply relationships. Other strategies to administer these products include demand forecasting, market research, make or buy decisions, contingency planning, and logistics, inventory, and vendor control.

Kraljic's (1983) model is the first portfolio approach towards purchasing and supply management which later inspired the introduction of similar and modified models to serve different purposes (Elliott-Shircore and Steele 1985; Olsen and Ellram 1997; Lillecreutz and Ydreskog 1999; Van WHEEL 2002; Caniels and Gelderman 2004) as pointed out by Gelderman and van WHEEL (2005).

Despite the existence of other models, Kraljic's (1983) approach subsequently became the dominant approach to what the profession regards as operational professionalism Cox (1997, p. 270). The reasons behind the great acceptance of the Kraljic matrix are explained by the model's strong points which will be listed next. First, it drastically reduces complexity in purchasing by arranging products in categories that demand more or less resources according to the degree of added value to the final product. Second, it distinguishes purchasing situations and provides recommendations to handle such situations. Third, it is easy to modify in order to include firm's specific data. Fourth, since its usage has been associated with the level of purchasing sophistication, a portfolio approach can make the difference between an unfocused, ineffective purchasing organization and a focused, effective one (Hadelar and Evans 1994) as mentioned in Gelderman and van WHEEL (2005, p. 21). Consequently, "Kraljic's purchasing portfolio seems to be an effective tool for discussing, visualizing, and illustrating the possibilities of differentiated purchasing and supplier strategies" (Gelderman, van WHEEL 2002 p. 35).

However, several critiques have arisen towards Kraljic's (1983) matrix and its approach towards purchasing. Gelderman and van Weele (2005) took on the task of gathering these critiques in *Purchasing Portfolio Models: A critique and Update*. Next, some of them will be presented; in specific, the relevant ones for this study. First, on the variables selection, it is impossible to know using only this approach if the variable selection is appropriate towards the end (Nellore and Soderquist 2000). Second, the supplier side is completely disregarded from the analysis (Homburg 1995; Kamann 2000). This thought becomes one of the bases for our study propositions and will be further reviewed in the following sections. Third, the original proposition dismisses a firm's preference towards the factors being used (Olsen and Ellram 1997). Fourth, any interdependency between two or more items in the matrix may result in interest's collision (Olsen and Ellram 1997). Fifth and last, due the simplifying nature of portfolio models, all aspects considered vital in the customer-supplier relationship from a network perspective are discharged (Dubois and Pedersen 2002).

Therefore, while Kraljic's (1983) matrix is a widely spread tool for supply management that minimizes risk and maximizes the effect of buying power, it fails to assess on handling complex contextual conditions, interdependencies and other variables for the same reason that makes it strong: simplification. It is here where the need for a more complete approach capable of handling more factors arises.

3.3.2 The Strategic Supply Wheel

The *strategic supply wheel* (Figure 11) was introduced by Cousins (2002) as a framework that comprises key dimensions in supply management. The SSW is the result from extensive literature research (secondary research) supported with case study research (primary research) performed in several organizations in a wide variety of sectors. In total, 500 firms were analyzed in North America, Europe and Australia. Finally, a series of interviews was deployed in 25 firms across industrial and service sectors with the sole purpose of understanding the generation of strategic supply policies (Cousins, et al., 2008).

The main feature of the SSW is the interrelationship between each of the strategic elements of the organization; such connections represent the need of synchronization to achieve *strategic supply*¹³.

The model is concerned with finding the most "appropriate" strategy based on the key five dimensions depicted within the model. It is the balancing of all of these elements that the supply strategist must consider (Cousins, 2002, p. 77).

¹³ Strategic supply does not refer to the application of strategies to the business processes related to purchasing, but for the purchasing function to achieve a Supportive or Integrative nature. This means, for it to support the firm's competitive strategy.

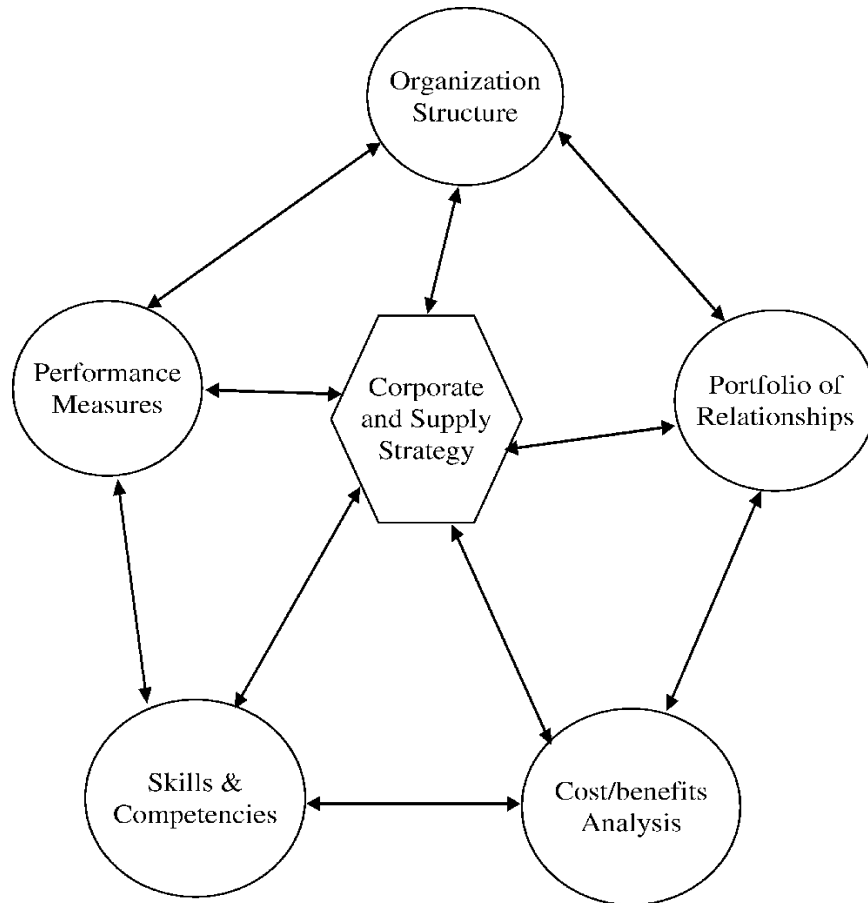


Figure 11 Strategic supply wheel (Cousins, et al., 2008).

Next, each one of the elements embodied in the SSW shall be briefly reviewed.

The element *corporate and supply strategy* can be better understood as the alignment between corporate and supply strategies or better known as strategic alignment. This concept answers the question: “does our functional level strategy support business or corporate level strategies?” (Cousins, et al., 2008, p. 103). In short, the presence of strategic alignment means that the goals of the supply function are oriented towards achieving the firm’s overall goals.

“An organization is only as good as *the skills and competences* that its personnel possess” (Cousins, et al., 2008, p. 111). In order to make strategy happen, it is necessary to have the staff with the skills necessary to carry on the strategy. This idea gains weight as the role of purchasing has evolved into a complex position undertaking a broader range of activities with higher impact.

Organizational structure refers to the way supply is put together within the firm and it delimits what strategies the firm is able to enforce. The dilemma in organizational

structure is the degree of centralization/decentralization to be adopted by the firm. A centralized organization is based upon locating all the supply functions as one entity in one site, close to the board of directors to increase control. In a centralized organization a central purchasing office specifies and buys on behalf of the firm's divisions. Some of the advantages of a centralized organization are: achieving economies of scale, standardization, financial control, policy development, auditing, and staff exchange. The disadvantages include: resentment in the local offices, missing opportunities due to slow response times and excessive overheads. A decentralized organization is based on the firm's divisions taking more control over their daily supply activities and opportunities; in other words, autonomy. Here, a central purchasing office makes policies and does corporate deals while divisions purchase on their own behalf. The advantages of a decentralized organization contain: autonomy, local satisfaction, variety/diversity, responsiveness, and cross deals among divisions. The disadvantages embody: cost anomalies, duplication of resources, lack of financial control and lack of communication between divisions resulting in divided supply volumes and hence, higher costs. However, there are infinite solutions between a fully centralized or decentralized organization; the so called *hybrid structures*. These structures are a tailored solution combining characteristics and functions from both the centralized and decentralized structures. The most common configuration in hybrid structures is for some commodities to be purchased locally and others centrally. The rationale behind this is on attaining economies of scale.

Performance measures are the key of monitoring and evaluating the efforts of the firm towards a goal. Moreover, "management can use performance measures as a means of signaling and influencing the actions of the people responsible of performing the tasks" (Cousins, et al., 2008, p. 145). The measurement system should be designed to comprise all of the levels in an organization; moving from corporate strategy down to supply strategy, goals and objectives, performance measures and finally actions. The benefits of measurement are headed to maintain purchasing focus on the goals and objectives set. Performance measures can be arranged in the following categories. Cost measures help evaluate the efficiency and effectiveness of the purchasing spend. Quality measures are assessed across three levels: manufacturer, supplier and customer related. Accordingly, production quality, defects per supplier and customer returns are the measures related to the three levels respectively. Time measures are oriented towards delivering all of the orders on time. Time measures are assessed in the following measures: on-time deliveries, customer response time and backorder/stock out. Supplier performance is a more subjective measure that includes data like degree of information sharing, number of saving initiatives, extent of assistance in the case of problems. Customer satisfaction is oriented towards the final impact of purchasing and it is measured in the firm's internal or external customers.

Cost/benefit analysis represents the firm's need to understand the costs of doing business. At first glance such idea may sound quite obvious, but it is here where maximization of the benefits while minimizing the costs can be achieved. Besides, "for a firm to follow any strategy it should make sure that it has a sound business case to support it and a clear understanding of the cost structure" (Cousins, et al., 2008, p. 97). *Total cost of ownership* is an approach that takes in account all the costs involved in the company's supply chain. It grabs a big picture perspective beyond price accounting for quality, delivery services, ordering, reception, inspection and transportation. TCO is very useful to uncover all the hidden costs implied in the selection of a supplier.

Portfolio of relationships focuses on the management of inter and intra firm relationships. Such topic is broad and can be approached from a variety of perspectives. But before going towards relationship management, the concept of relationship needs to be defined. Cousins et al. (2008) define relationships as a process (Figure 12); this means that relationships will have inputs and thus, outputs. Relationships as processes require the input of resources like people, technology, time and efforts. Besides from the relationship output, an outcome focus is also required to direct the efforts. Efficiency and effectiveness are viewed as process objectives. The perspective to be taken towards

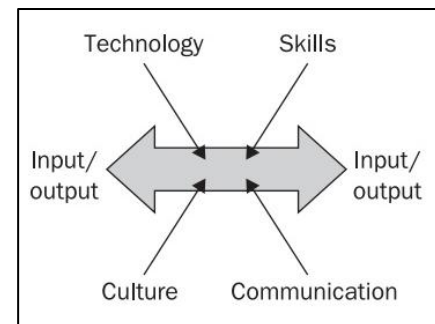


Figure 13 Relationship resources (Cousins, et al., 2008, p. 173)

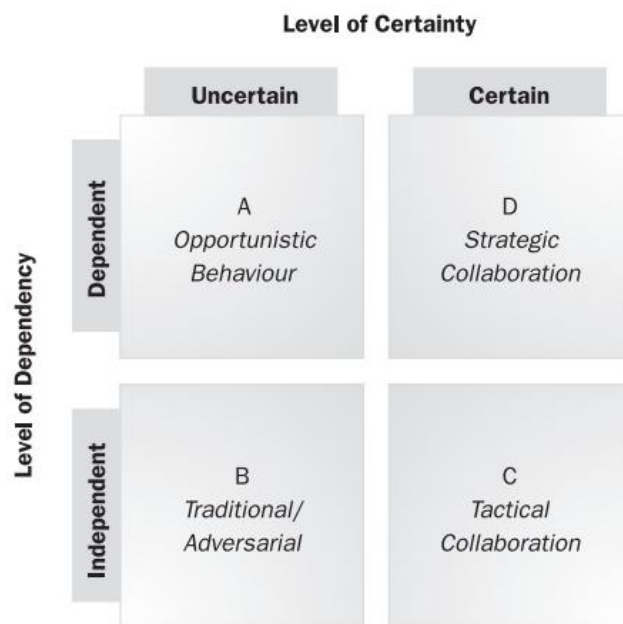


Figure 12 Strategic Relationship Positioning Model (SRPM) (Cousins, et al., 2008, p. 179).

relationships will be strictly strategic, this means that it will be oriented towards executing the firm's overall strategy. "The type of business outcome will dictate the level of relationship process or detail of course of action required to achieve it" (Cousins, et al., 2008, p. 179). Cousins et al. (2008) proposed a conceptual model for relationship management (Figure 13) which uses 2 key variables to assess on a relationship strategy. The first variable is dependency and it is defined by the mechanisms that create reliance on the buyer or supplier. There are four key dependencies: historic, economic, technological and political. The second variable is certainty. In this context, certainty is used to support the concept of

risk that is involved with the management of the interaction, for instance, the probability of success or failure of a given event. The combination between dependencies and risks result in four possible relationship management strategies: adversarial, opportunism, tactical collaboration and strategic collaboration. Cousins et al. argue that: ‘The key point to remember here is that either the buyer or the supplier should choose the most appropriate strategy for them to follow’ (2008, p. 181). Adversarial strategies refer to arm’s-length contractual relationships with high independency and low risk levels due to the existence of multiple product sources. Opportunism strategies exist when one of the parties is dependent on the other party; this condition permits for the dominant partner to take advantage of this situation. However, opportunism only takes place where the dominant partner is able to sustain this additional value over time and in short-term relations. Tactical collaboration occurs with an increased level of dependency and certainty. These relations do not represent “partnership” agreements, but they do hold significant levels of collaboration. Strategic collaboration is the final strategy available; it happens where there are high levels of inter-dependency and certainty. On this configuration both parties focus on working the relationship for mutual gain. It requires large amount of investment, with large returns for both parties.

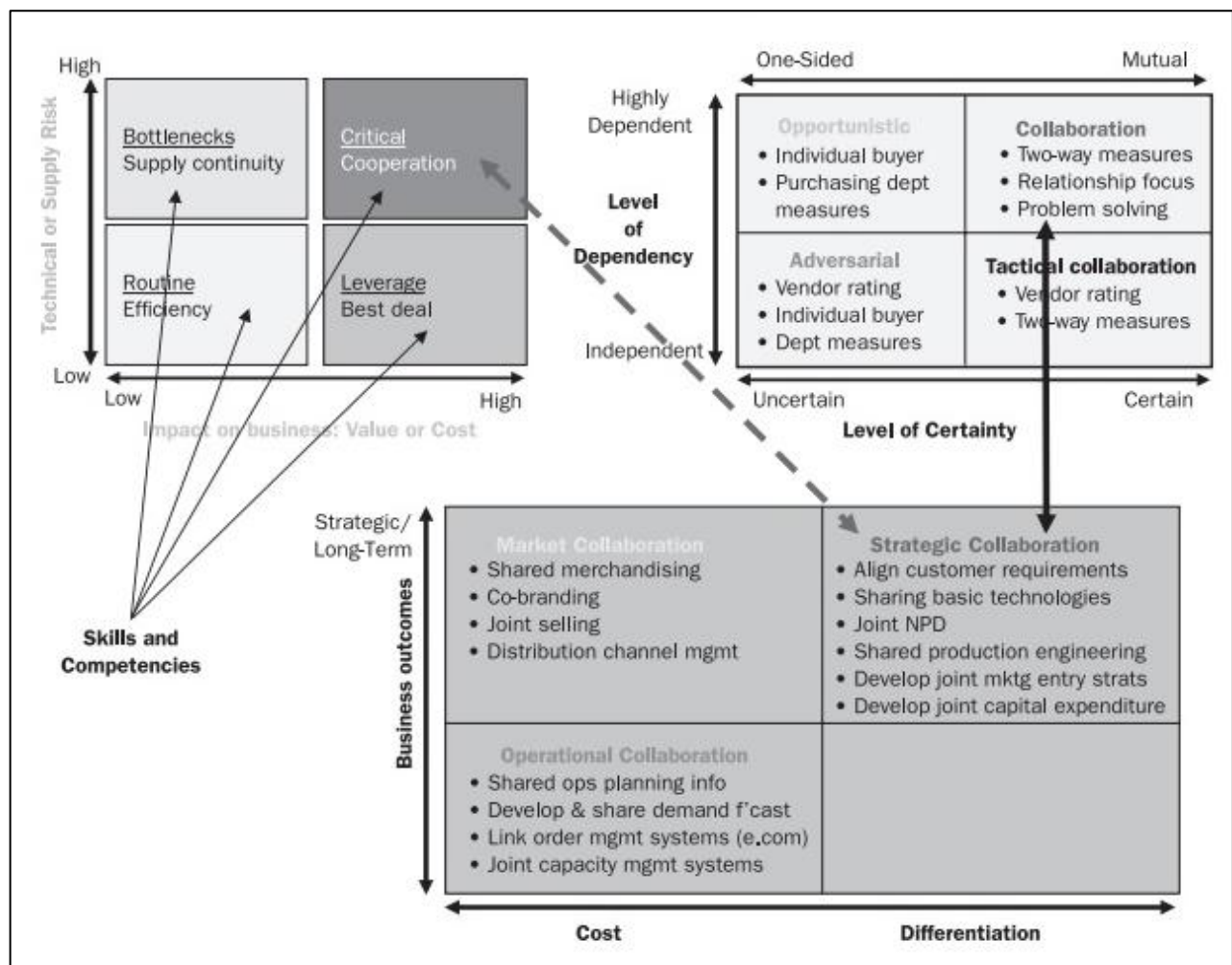


Figure 14 Alignment of strategies, relationships and skills (Cousins, et al., 2008, p. 183).

Furthermore, Cousins et al. (2008) proposes an Alignment Model inside the Inter-Firm Relationships management in the strategic supply wheel (Figure 14). This model shows the interaction between the relationship focus, the type of product purchased, and the strategic nature of the supply function. Cousins et al. argument is that firms need to align all the elements in the model if they want to maximize value from their relationships which are built from interactions at the product level. In addition, a special emphasis is set towards focusing the appropriate relationship type to the outcomes required.

3.4 Sales Strategy: The Supplier Perspective

In this section we will present theory behind the strategic tools used by the focal firm to examine the actions and intentions of its customer's accounts.

As stated in previous sections, the perspective to be taken in this study is the customer's viewpoint of the supply chain. Even though we are willing to stick to it, one of the propositions of this paper approaches the fact that firms have a tendency to look at their suppliers from their perspective only; while the maximum results are obtained by an awareness of the supplier's standpoint. That is why it is necessary for us to jump out of our customer's shoes and sit in the supplier's chain for the following section. Afterwards, we shall return to our customer desk and we will incorporate the supplier perspective to our analysis.

3.4.1 Supplier Preferences

O'Brien's (2012) supplier preferencing model is a portfolio approach holding a perfect fit with the overall intention of this study since it is meant to allow the customer get into the supplier's shoes and assess its current situation towards us, the customer.

A supplier will not show the same attention to every account in the portfolio since its resources are limited and they will try to make the best out of theirs. In fact, the supplier will set priorities within the different accounts offered and even reject accounts where they are not interested in because of low profitability, low chances of success, high resource requirement or just misalignment with their corporate strategy. As a customer, it is crucial to understand the supplier's position towards you since a perspective misalignment could end up heavily affecting the supplier/customer relationship, but this issue shall be carefully reviewed in further sections of this study.

According to O'Brien's (2012) vision, supplier's preferences can be defined by two variables. First, on the x axis, the *relative value of the account* represents how much is spent with the supplier in terms of their overall annual sales. For instance, let us say that in 2012 a firm spent \$15 million USD in raw plastic, bought from one of its popular mid-size suppliers whose annual sales for the same year were \$60 million USD. Thus, the firm's account value represents a 25% of the supplier's total business; such value would push the

supplier to the right side of the matrix. On the other hand, the same firm spend \$8 million USD in steel from one of the biggest steel suppliers in the country whose annual sales reached a couple of billion USD; this situation would push the supplier to the far left of the matrix. In this scenario, the example firm would have a strong position to negotiate and make its voice heard with the plastic supplier while being in a weak position towards the steel supplier.

Second, on the y axis, *attractiveness of account* represents, as its name says, the degree of attractiveness the account represents to the supplier. Such attractiveness is not only represented by the monetary factor, which was already included in relative value of account, but it comprises other factors like: volume of purchase, good payment terms and on time payment, profit margin, the fit between the firm's future strategy and the supplier's future strategy, a location that benefits the

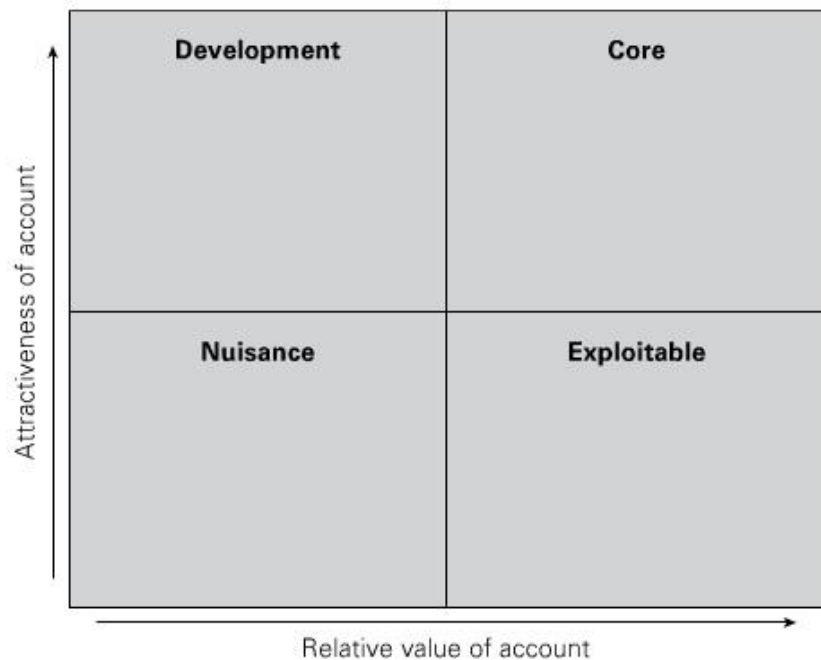


Figure 15 Supplier preferencing (O'Brien, 2012).

deliveries, the account is held by a renowned brand that the supplier will be benefitted from being associated to it, and at last but not least important, the established relationship allows the supplier facilitates working together.

The combination of these variables will result in a 2 x 2 matrix with four different views the supplier may have towards the accounts (Figure 15). Each view has different implications as follows:

Nuisance: In general terms, this is an undesirable account for the supplier. Although it is unlikely that supplier will communicate its discomfort towards the account, it will look for ways to get out of this account by taking “non-ethical” actions towards the customer shutting down the account like: aggressive pricing increases, unavailability for service requests, broken communication or general unavailability. As a customer, accounts falling in this quadrant are necessary to be identified to take actions towards a possible default by the supplier.

Exploitable: This type of account is also in the undesirable list for the supplier, but on this case, the supplier will maintain work on the account as long as there is significant money in it. This does not imply an extra effort from the supplier, but just enough to maintain the account alive. This last fact can be translated into the supplier placing this in second place against other accounts. The overall result of an account in this quadrant may be an eventual exit of the supplier, given the case no other accounts in better positions are granted.

Development: This type of account is attractive to the supplier but the account value is relatively low. This account holds high commitment since the supplier is looking to increase their overall business with the customer. On the same road, the supplier will dedicate its best resources towards this account and attention will be kept high along the life of the account.

Core: This account is the Holy Grail for the supplier; it requires high amounts of resources and commitment to maintain the relationship, but it represents an important part of the supplier's turnover, so the supplier will try at all costs to perform a successful account management.

Although the supplier preference matrix is very simple and useful tool on assessing the actual position of an account, and the supplier holding it, it does not suggest any path of action. The full appraisal of the account will depend on the firm's overall strategy.

Equally important to be mentioned is the fact that communication plays an important role in this model, especially between top management of both firms. The reason for this is that a lack of attention by the supplier may be only due to an absent account manager and not for miss positioning the account in the matrix. On this case, an open communication with the supplier may resolve all the issues.

3.4.2 The Growth-Share Matrix

The *growth-share matrix* (De Wit & Meyer, 2010) is a means for accounts with different financial characteristics to be assessed altogether. This matrix was originally created by the Boston Consulting Group during the seventies to help corporations analyze their different business lines. The blossoming of conglomerates during the sixties created a need for them to assess on the different needs of their business lines and the growth-share matrix came to save the day. After its creation, the growth-share matrix has received several modifications to fit innumerable different applications; the one we are especially interested in is the internal analysis of the different accounts in a firm.

The growth-share matrix analyzes the current position of an account based in two variables: the *relative competitive position* or *market share*, and the *business growth rate*. There are two different versions of the matrix, one where the variable in the x axis represents market share, and a second one where the same axis functions as relative

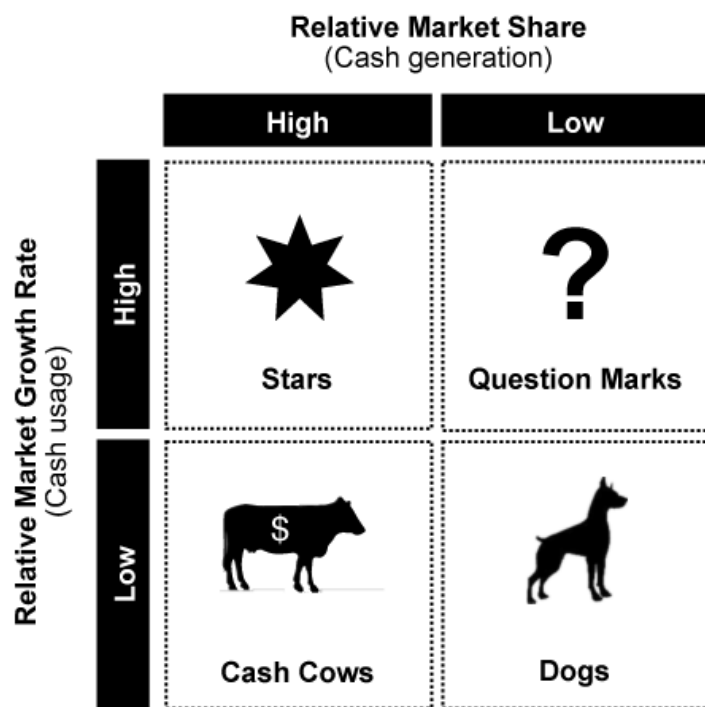


Figure 16 Growth-Share Matrix (De Wit & Meyer, 2010).

competitive position. For this study, we will focus on the growth – share matrix, which means the relative competitive position to be left aside.

Market share is an indicator of cash generation and it refers to the market share held by the firm with that specific account. The relative competitive position performs just as the market share, but it refers to the market share held by the firm when being compared to its largest competitor. So, if our firm holds a 20% market share, while the largest competitor holds 40%, the ratio would be 1:2. If we invert the roles so our firm holds 40% while the largest competitor holds 20%, the ratio would be 2:1.

The business growth rate refers to the market growth rate. A rapid growth rate market is what organizations crave. But it's not just gold and diamonds here, a business high growth rate comes with a demand of investment in the account.

The result of combining both variables is a 2 x 2 matrix. A firm's accounts can fall into four different strategic categories (Figure 16).

Stars: High growth, high share. Accounts falling in this category hold a rapid growth, but they also require large amounts of investment to maintain position. They represent the best opportunities for investment available to the firm, and strong efforts are done to consolidate the firm's competitive position. The long term strategy for these accounts is for when the growth slows, to turn them into cash cows by maintaining the market share position and lowering costs. If the market share position is lot, star accounts may become dogs, which would represent a strategic loss for the firm.

Cash cows: Low growth, high share. These accounts have a superior market position which provides high profits with low costs. These accounts pay for the major part of the firm's costs and investments in other types of accounts. Cash cows are the foundation where the firm lays.

Dogs: Low growth, low share. The poor competitive position condemns these accounts means there is little potential for gaining sufficient share to achieve a viable cost position. Cash required to maintain these accounts usually exceeds the cash generated.

Question marks: High growth, low share. These accounts require high amounts of cash to be maintained, and due the low share they hold the cash generation is also low. If nothing is done to improve the share, as the grow rate slows it can become a dog. These accounts should be carefully handled because of their excessive cash needs.

A different set of strategies are needed to manage the different accounts in the portfolio since these are so different from each other. On the cash cow accounts the focus is towards maintaining the position; this strategy will usually require reinvestments in the accounts, but it is necessary to avoid excessive investment to keep the accounts profitable. The cash generated by the cash cows will sustain the star accounts and some of the question marks. The focus on the star accounts is to turn them into cash cows while on the question marks the strategy is to finance market generation strategies to turn them into starts. Those question marks no longer funded should be divested. The dog accounts are sometimes possible to restore into cash cows, but it will require great amounts of cash and a change in the fundamental competitive position in order to perform the turnaround. The firm needs to be prepared to either turnaround or liquidate a dog account as the need arises.

Just as in the supplier preference, one of the major strengths of the growth-share matrix is that it is a portfolio approach which simplifies the analysis and leaves the way open to selecting a strategy that best fits the firm's needs. Such simplicity is also a pitfall of both approaches, since it is hard to assess on an account's situation by only using two different variables.

Furthermore, Figure 17 summarizes the models reviewed so far which are used to analyze up and down the focal firm's value chain.

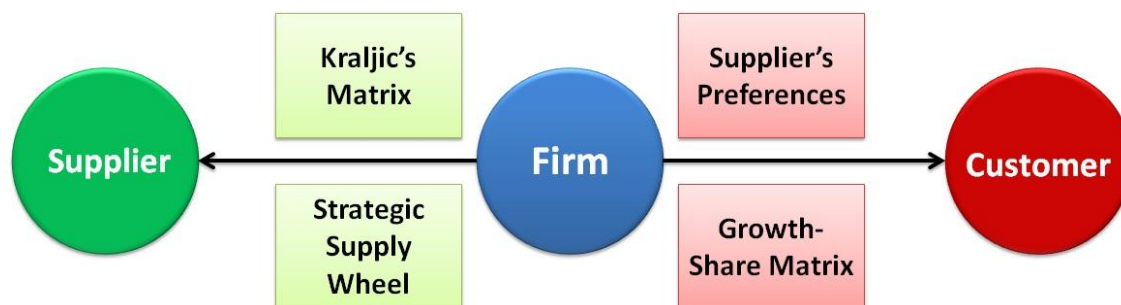


Figure 17 Models used by the focal firm to analyze up and down the value chain.

3.5 Trust

Trust is an abstract concept that is hard to define because of the sheer number of factors involved in its complexity: vulnerability (Chow, et al., 2012) cognition, emotions, behaviors (Lewis & Weigert, 1985), integrity, competence (Pinto et al., 2009), specific asset investments, behavioral uncertainty, reputation, perceived conflict (Kwon & Suh, 2004), risk, and interdependence (Rousseau, et al., 1998), have all been mentioned along with many others. The high number of possible interrelations between these factors has forced researchers to simplify and make efforts to describe trust. We can find many typologies of trust based on cognitive and emotional characteristics (McKnight & Chervany, 2001; Chow et al., 2012; Lewis & Weigert, 1985) or on the strategy and economics behind it (Dyer & Singh, 1998).

The authors of this work have decided to use the concept that Lewis and Weigert (1985) portrayed regarding trust as their view allows us to better explain the behavioral and attitudinal characteristics of the network supply chain. In their work trust is a sociological concept, a collective attribute that only exists in the presence of others.

Trust then, as a social concept, is embedded in how people interact and behave and unlike psychology theorists suggest its conceptuality is better defined when looked under the people's lens instead of characteristics of the self-mind characterized by a single person's previous experience, bounded rationality, etc. Trust is defined as a "social platform" which is composed by the mix of two main elements; the emotional and the cognitive part. The contribution level of each one and the external environment will generate behavioral trust; the actions or physical representation of trust that actually has an impact in others. Is this social platform composed of emotional, cognitive and behavioral trust from which people build intricate and complex networks that sustain modern societies (Lewis & Weigert, 1985).

Trust's effectiveness as a social glue comes from its main function; Society's structures are complex and trust is a complexity reducer. Trying to calculate all of the probabilities of decision-making based only in rational efforts would be nearly impossible as there are an infinite number of possible outcomes when it comes to relationships. Social structures in order to function properly have to rely on a predictable, consistent, behavior from its participants and trust provides this function (Lewis & Weigert, 1985; McKnight & Chervany, 2001; Pollitt, 2002).

Under profit driven organizations like businesses, trust provides the same capabilities as demonstrated by the project management literature which claims that for high complexity situations, business leaders should employ a transformational perspective (based on trust, reciprocity, charisma) instead of a transactional approach (rewards) which is better aimed for simple and repetitive tasks (Turner & Müller, 2005). Trust has been also analyzed as a

tool capable of generating rents and providing competitive advantage. Under agency theory and transaction cost theory, for example, trust brings benefits to a firm as it lowers the perception of opportunism hence lowering the costs of monitoring and enforcing relationship obligations (Pinto et al., 2009; Dyer & Singh, 1998; Malhotra and Murnighan, 2002).

Pollitt (2002) manages trust as one of the main components of the term “social capital”; an intangible asset that if used correctly facilitate transaction economics in society and business equally. Trust then, is an important concept at the network business level where firms who choose to collaborate and join efforts have to necessarily work with each other (De Wit & Meyer, 2010).

Because trust is a social phenomenon, embedded in the people’s interactions and carried on through the different social structures, it is fair to say that trust at the supply network level preserves the same effects than at other levels of organization. The mechanisms and concepts to build trust, maintain it, and exploit it are fundamentally the same between two single persons as it is between two different companies whether they are collaborating as separate entities or in a supplier-customer relationship.

The authors believe that trustworthy relationships, no matter at which level, share the similar benefits and problems but depending on external factors the perspectives of trust and its components varies. For example in their work Chow et al. (2012) focused on mechanisms that enhance cooperation in the construction industry. Their empirical data shows that *networking* and *calculativeness* -“how a trustor secures the anticipated outcome and impose negotiated rules to the trustee” (Chow et al., 2012, p. 933), are effective mechanisms that can create trust which shows that in this industry, in Hong Kong, the emotional part is more important than the cognitive part as networking, knowing people and integrating them to one’s environment, came highly rated. Pinto et al. (2009) also found that, inside this same industry, the perception of the importance of trust varies from owner to contractor; the first value more integrity and competence related trust, the latter considers only integrity as important for a satisfactory relationship.

In the end, supply chain network shares the same dynamics for trust as other forms of organizations. Trust’s components will vary depending on internal and external variables of the relationship between the actors and its behavioral output will range between total economic predictability to complete blind faith. And so, the trust-building cycle will be closed reinforcing or undermining the current trust in the relation.

3.6 Power

Power is a blurry concept for which there is no correct definition, yet its essence is well known by everyone who lives under a social system. Power can be understood as

institutionalized authority, when applied to defined statuses and formal social structures, or as an influential force, when exerted informally by personalities and roles (Bierdsted, 1950). Power then, at the social level, consists of being able to influence someone's behavior either through established norms or through informal influence. Moving to a different level of organization we can perceive that power has an important role within the company and its supply network as firms are organized structures, composed at its core by people, and considered social complex systems.

Bolman and Deal (1984) describe power within the firm under two different perspectives; Structural and Political. The structural perspective, the most accepted and used by human resource theorists, claims that power is diluted in the authority for decision-making. People in charge will make logical decisions in order to achieve a firm's purposes while at the same time trying to be congruent with the needs of organizational participants, maximizing resource utilization.

The political point of view, on the other hand, acknowledges the importance of authority but claims that there are other forms of power. The firm is represented as alliances of individuals with different objectives whose focus is on bargaining over scarce resources. Furthermore, it claims that "[...] people who rely solely in their authority often undermine their own power -they generate resistance and are outflanked by [those] who are more versatile in the exercise of multiple forms of power" (Bolman & Deal, 1984, p. 117).

Examples of other forms of power are: authority, expertise, rewards, coercive power, and charisma. In the end, authorities are limited in their decision making by the existence of the other forms of power and the politics game they represent (Bolman & Deal, 1984). For example, the manager of a factory would be focused in making proper decisions to achieve established goals, but can be limited by the coercive capacity that the worker's union is able to apply.

At the supply network level the firm is now seen as a single unit who deals with others in order to secure and place resources. At this point, the organization can either assume a discrete perspective through bargaining power and calculation, or assume the embedded perspective through trust and reciprocity (De Wit & Meyer, 2010). These strategic directions go in synchrony with French and Raven's work (1959) as they discovered that different forms of power can either impulse or hinder these strategies and claimed that a division of the sources of power is necessary in order to better comprehend the behavioral influence of power on a subject, in this case, the firm.

They first introduce a concept of generality composed by all the aspects of the person's psychological field and named it "system", after which they proceed to identify the main sources of system change produced by social influence (French & Raven, 1959). In this way we end up with a dichotomy composed by mediated power (i.e. reward, coercion, legal

legitimate) and non-mediated source of power (i.e. referral, expertise, traditional legitimate). The essence of this power division resides in perceptions and the target's behavior as a consequence of these perceptions; under mediated power the affected subject will perceive that rewards are out of its control and attribute effort's results to the external influence, while under non-mediated power results and rewards are attributable to their own actions and decision-making (Tedeschi et al., 1972).

Under this power typology several studies have been practiced in order to find deeper and interrelated behavioral effects of power between a reseller and its supplier, along with market-channel performance.

Brown et al. (1995) for example, found that the use of mediated power will create instrumental commitment; based either in economic or extrinsic motives, while at the same time will degrade the channel performance perception. On the other side, the use of non-mediated power will create normative commitment, which is based in non-economic or intrinsic conditions, and will enhance market channel performance. Benton and Maloni (2005) performed a study in the automotive industry, where big customers have significantly more power, and found that the quality of the relationship has a bigger impact in supplier satisfaction than the actual performance of the relationship. This is because suppliers "[...] believe that as long as they can maintain their relationship with the manufacturer, this performance will be created as a natural output" (2005, p. 17). According to them, this proves that power plays a significant role in the chain integration process as it can be used to promote alignment of goals between supplier-customer and consequently generating a competitive advantage through higher response times and adaptation to market fluctuations.

Power and politics then, although not readily visible, are important factors that influence on the supplier-customer relationship and their use should be carefully considered by firms when applying their strategy at the supply network level.

3.6.1 Knowledge as a source of power

Although briefly described in the past section, the main reason why power in all shapes and forms exist in the organization is to avoid or support change. Whether through extrinsic norms or intrinsic influence power helps to hold an existing structure, change it, move it towards its official goals or against them. Under the political point of view different interest groups play power games to pursue their own goals, while under the human resources perspective the organizational goals are the only truth and so, win/win solutions must be found in order for everyone to fulfill them (Bierstedt, 1950; Bolman & Deal, 1984; Pinto, 1998).

Knowledge under the strategic view becomes a fundamental concept as it has the ability to be both the *means* and the *end* regarding fulfilling organizational goals. For example,

knowledge is an agent of organizational change and can work as referent or expertise power affecting decision-making processes, or it can be an ultimate goal; a scarce resource that will provide competitive advantage and consequently leverage power in the market.

In order to understand how knowledge and power are related under a strategic perspective we need to move some steps back to the fundamentals of strategic change and assume a structural view, where managers pursue logical decision-making processes. In it we find that change toward established goals can be implemented in incrementally small steps, or in a radical way (De Wit & Meyer, 2010).

Knowledge, for example could be used to perform a slow and gradual organizational change by means of a continuous process where tacit and explicit knowledge would recombine to build upon itself (Nonaka, et al., 2001). This gradual change is embedded in the social interaction of the people composing the organization which would prove to offer less resistance as the resulting ideas would come from the same employees.

Radical and innovative change, on the other hand, is an abrupt exercise of power, with an individualistic approach, and focused on technological break-through. Strategic change, under this perspective comes as highly specialized explicit knowledge owned and controlled by few. Knowledge then is seen as a final solution instead of a tool to reach the solution, and it will be only as good as its level of competence superiority when compared to others solutions.

Power in the case of incremental change will consist on the manager being able to control the direction of the knowledge-building process; that will give him the opportunity to reach the goals with the efforts of everyone while at the same time avoiding confrontations because the change ideas were theirs in the first place. In radical change power comes from the ownership of the technological knowledge and its decision-making freedom will continue as long as it proves to be the correct and superior choice.

At the network level, the companies' strategy still preserves some of its essence. Similar to the business strategy a company can decide to work on their own strengths building knowledge on how to best reconfigure resources and activities to create innovation and how to exploit environmental characteristics to build market superiority (Porter, 2008; Starbuck, 1992). On the other end of the spectrum we have the firms that choose to cooperate with other firms and develop combined superiority by means of knowledge sharing (Rock & Robles, 2012).

The supply network strategy, on the other hand, deals less visibly with issues about direct cooperation or competition; as all companies need suppliers and customers so a relationship is given per default. The real focus is on maximizing these relationship outcomes in order to secure supplies in a strategic-competitive manner.

In order to maximize these relationships firms must be aware of the position they occupy in the value chain and the interdependence they generate with their suppliers. In their work Caniels and Gelderman (2005) analyze Kraljic's (1983) portfolio matrix under a perspective of interdependence, and claim that power and dependence are closely related; "the buyer's dependence on the supplier is a source of power for the supplier, and vice versa" (2005, p. 143). Although knowledge by itself does not generate interdependence its process and explicit results, conveyed in technological advances, do.

Knowledge sharing, for example, can be a form of passive power coercion in the automotive industry, as is very common for big customers to require the mandatory implementation of electronic data interchange (EDI) systems to its closest suppliers. These systems facilitate the interchange of complementary knowledge within areas beyond the traditional buying-selling departments and are seen as business process improvement (BPI) tools as they help fulfill operational and strategic goals. Their main goal is to provide a fast and adequate response of the network actors to the customer demands (Bhatt, 1996; Bhatt, 2001).

One might argue then, that EDI systems promote integration of customers and suppliers and consequently a balanced distribution of power in the supply network. But in her work, Webster (1995) claims that EDI systems can be used as coercive power as "corporations may share information, but use this shared information as a powerful lever with which to continue to dictate the terms on which they do business with their trading partners" (1995, p. 40). EDI systems are mainly proprietary protocol networks which create extra expense and inconvenience to suppliers. The control over trading relationships is then enhanced with the configuration of software, hardware and network, locking in suppliers as the switching costs are high after having invested in equipment and training. Through these systems control of knowledge then becomes more important than knowledge ownership and present advantages similar to vertical integration without the cost of actually acquiring the suppliers (Webster, 1995).

3.7 Interdependence/Commitment

As expressed by the variables presented, successful integration of the supply chain is a complex task that results from the combination of many factors. The strength of the bonds which conform the relationship is usually attributed to this combination of variables, as they have the potential to bring firms closer together, work despite the issues that might arise, and persevere to achieve shared benefits. This perception of necessity upon the actions of others has been referred as interdependence or commitment in the supply chain relation (Kwon & Suh, 2004; Caniels & Gelderman, 2005).

Power, for instance, has the capacity to create interdependence of one supply chain actor upon other; if the power relation is asymmetrically distributed then this will mean that one

actor is more independent of the decisions and actions of others. Caniels and Gelderman (2005) claim that interdependence (power distribution) and total interdependence (intensity of the relation) between firms vary according to the type of products been procured as they have the capacity to define purchasing strategies and so, steer the way the firm handles the relationship. Their results turn out to be surprising as the *strategic* elements from the Kraljic's matrix (1983), for which strategies are supposed to be developed under close cooperation between supply chain actors, presented an unbalanced distribution of interdependence. These findings highlight the importance of other variables in a buyer-supplier relationship as it is clear that power and dependability imbalances exist, yet partnerships endure and succeed.

In this regard we can turn to Kwon and Suh's (2004) work as they consider that trust can generate commitment in the supply relationship, which in turn helps defining successful network relations. Commitment is defined as "an exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it; that is, the committed party believes the relationship endures indefinitely" (Morgan & Hunt, 1994, as quoted in Kwon & Suh, 2004, p. 5). This commitment definition is closely related to the one of trust as the social cognitive component that allow other people to make the relationship "jump" by assuming that others will jump together (Lewis & Weigert, 1985), this is perhaps why commitment is seen as the main force determining successful relationships.

The importance of their study for us is because Kwon and Suh's (2004) did not only prove that trust has direct influence in commitment in the supply chain relation but also because trust, in their study, is composed by relation-defining factors found in the transaction cost theory and in the social exchange theory.

Finally, as mentioned in the beginning of this work, at the highest level of integration processes the firm looks into its own structures to understand behavior. This also applies to supply chain, which under a systems thinking perspective, manages relationship integration by comprehending the firm's own structures. In this regard Hult et al. (2000) provide evidence that learning organizations' processes generate and support relationship commitment in the supply chain areas. A supply chain management that applies to its processes a broader perspective outside the limits of the firm (systems orientation), which acknowledges the importance of learning (learning orientation), and which considers communication and sharing of supply chain knowledge important (memory orientation), generate relationship commitment among its suppliers (Hult et al., 2000).

3.8 The challenge of asymmetric Information

Under the economic perspective information asymmetry refers to the power imbalance created by one party holding better information than the other. As we mentioned previously, power in the organizational context is an enabler of decision-making, and if one firm has more or better information then it means it will be able to make better decision than the others. In this regard adverse selection –adverse market items go to uninformed buyers, and moral hazard –tendency to take risks to the detriment of others, are common examples of the risk of an impaired decision-making process.

Although useful to describe social market behavior (Izquierdo & Izquierdo, 2007) and value maximization in the supply chain (Corbett et al., 2005) we will focus not on the economic goals but on the main issue of the network view: the value creation through coordination issue. This means that information asymmetry for us will deal with reaching superior value through knowledge sharing the supply chain network. In order to do this a comprehension on the network behavior results useful as it will let us see how information and know-how flows from one side to another and thus, will allow us to better promote the correct knowledge flows that represent an improvement in the network. For this purpose we turn to the current theory in network modeling and their principles under which the network actors interact and behave, the aim is to find the mechanisms that seem to coordinate the effort of a network towards a common goal.

Being said that the theory points to the existence of two main components explaining the behavior of the supply chain dynamics (SCD); the production information model (PIM) and the dynamic index model (DIM). While the PIM deals with the selection of important production data that needs to be transferred to suppliers in order to deal with decisions at the strategic, tactical and operational level, the DIM deals with the information necessary to measure the performance of the supply chain and therefore, the results of these implemented strategies (Huang et al., 2003).

At first, analytical techniques were used to simulate the SCD which derived in mathematical theories and model programming, but this approach was unrealistic as it needed that private information should be shared among all chain members or at least controlled by one actor (centralized) which was difficult to realize in the real world.

A more realistic approach to the challenges of the SCD was to use simulation techniques. *Systems dynamics* became popular as they considered the supply chain as a complex dynamic system; “the debate is not about whether or not production information should be shared in the supply chain, but about how to share the right information at the right time in the right format by the right people under the right environment to maximize mutual benefits of the supply chain as a whole...” (Huang, et al., 2003, p. 1484). The dynamic system perspective tackles down the complexity of networks due to the non-linear relation

of several factors and presents the concepts of transference, feedback, and delay of information between customer-supplier's functional areas as the main issue to deal with (Huang et al., 2003).

This approach proved to be very useful as once the networks were seen under a dynamic system perspective the interaction of flows of information, orders, money, manpower, capital equipment, and material systems dynamics helped understand and solve many industry-related issues like; demand amplification (bullwhip effect), inventory swings, decentralized control, and effects of advertisements on production demands, among others. The main goal of studying information asymmetry under system dynamics then, was to learn from the possible behaviors of the agents in order to create effective policies to improve the overall performance of the supply chain (Angerhofer & Angelides, 2000).

Currently there is a more recent perspective which assumes that the industry behaves as a network composed by agents autonomous and independent. This *multi-agent system* (MAS) perspective where agents with different goals are connected in a network shares more resemblance to the behavior we find in the real world as "it becomes necessary to represent and reason about other agents in the environment" (van der Hoek & Wooldridge, 2007, p. 1).

The MAS theory models the network coordination by focusing on; how and why the agent chooses an action and how the agent uses the environment to achieve goals, and was found to be very effective in environments with a high degree of localization, distribution and discrete decisions (Huang, et al., 2003). Van der Hoek & Wooldridge (2007) give us a complete and throughout, but complicated resume, of the state of the art logic frameworks used in MAS from which we can identify the following main concepts;

- The dynamic logics: This represents the information flows dealt in the systems dynamic theory.
- The epistemic logics: Representing how what we know shapes our intentions, desires, and beliefs.
- A combination of dynamic and epistemic logics: Representing the free will and determinism that explain how one must have the abilities (internal) to exploit circumstantial opportunities (external).
- Logics of cooperative ability: Represent how the agents construct strategy with their environment in order to reach individual or group goals through concepts like power or coalitions.

The MAS perspective focuses on the modeling of cognition, learning, and power of the agents in the network and is divided in two main research areas; how to represent cognitive behavior which leads to decisions-making (internal processes of the mind), and

how to represent the strategic structures that gets to be exploited by agents (environmental). The importance of this perspective is that it considers the network behavior not only a result of agents acting upon their the knowledge they have and share of the world, which are the interrelated information flows used by the system dynamic perspective, but also upon goals, desires (the states of an ideal world), and intentions (commitment to achieve certain desires) which addresses the questions of how the agent chooses an action and why is it rational for him/her.

Also, by focusing on the environmental factor that the agents use when interacting with others in the network help us to understand how to better exploit the strategic advantages of the network structure. Some of advances in this area have focused on the logics of coalitions and the individual capacity of agents to affect variables of the supply chain which represents the use of power and cooperative behavior (van der Hoek & Woolridge, 2007).

Although the modeling techniques of networks constitutes a complete different setting of what this thesis talks about we considered that its brief inclusion is important to understand the current tendencies regarding the exchange of information and know-how that shapes the coordination issues of supply chains and at the same time we try to bring relevance to the somewhat abstract concepts of trust and power that we have presented and we consider important to explain the network behavior.

3.9 Knowledge

Knowledge is resumed by everything we know. It can be contained under tangible representations like books and technological advances, or intangible means like culture, values, know-how (Nonaka, et al., 2001). While the resource based view (RBV) recognizes knowledge as an intangible asset from which competitive advantage can be generated (De Wit & Meyer, 2010) some other proponents claim that it should be acknowledged as a strategic direction more than another tool to create profits (Starbuck, 1992; Kogut & Zander, 1992; Grant, 1996).

This perspective called Knowledge-Based View (KBV) claims that the value comes not from the tangible explicit knowledge, represented only by the firm's assets, but instead from the use and recombination processes of the intangible know-how that each employee holds. The strategic intention of the KBV resides not on how much the firm knows but in how the firm uses what it knows, and how the firm puts in place the systems and structures to better create, administrate, and use the explicit and tacit knowledge which ultimately will provide the firm unique capabilities in the market when compared to rivals.

Kogut & Zanders' (1992) work in the technology market explain that transaction cost theory, although helpful to define the boundaries of the firm and its environment, cannot explain by its own the organizational performance and growth differences. This is due to

the nature of technological advances, which in order to be exploited have to be materialized first, leaving this competitive advantage vulnerable to quick assimilation and imitation. In this sense the true purpose of the firm is to maintain and develop the correct capabilities which will allow the firm to constantly evolve further by means of sharing, creation and recombination of the knowledge contained within individuals in the organizational context.

Knowledge then, as the strategic drive of the firm represents a new and fresh perspective from the already-known aims of the reorganizational efforts, namely; shareholder value maximization and shareholder power enhancement, which are represented by the transaction cost theory and the agency theory respectively. Instead the KBV recognize that the potential superior capabilities of the firm can come from the recombination, arrangement, and administration of each employee's effort, therefore becoming more an issue of achieving organizational cooperation rather than achieving maximum value or power (Grant, 1996).

This is why organizations which consider knowledge as their primary drive invest in mechanisms that allow them to interconnect this dispersed value in order to be applied at the firm's everyday processes. Focusing on collecting, archiving and distributing explicit knowledge in forms of manuals and instructions is an outdated view of how knowledge is to be exploited in a firm; it's a difficult and inefficient process with poor results. Organizations nowadays recognize the imperfection of explicit information as all knowledge is rationally bounded by the capacity of the individual beholding the piece of information, and furthermore, acting under social prescribed rules which influence its perception of reality. Instead, knowledge-intensive firms have put especial attention to the cognitive capacity that can be harvested through the influence of the social network, namely their values and culture (Ajmal & Koskinen, 2008).

Bierly and Spender (1995) make an excellent analysis of how organizational culture can influence this cognitive capacity by changing how people think and interact giving way to important changes in the manner they make decisions and the way new knowledge is elicited. Their work is applied to high reliability organizations and go through the early efforts of the firms to centralize all decision-making, the earlier implementation of market-based mechanisms which rewarded or penalized action, to the existing current of thinking in which complexity and uncertainty can be handled by influencing perceptions and beliefs of the individuals, which in turn helps to coordinate efforts and create a congruence of goals (Bierly & Spender, 1995).

Now, in order to understand how knowledge works in the supply chain network we should first understand how knowledge behaves under social systems as both share behavior commonalities. In his work, for example, Hayek (1945) boards the individual knowledge

perspective from a social economic analysis which claims that the answer to the rational economic issue – what is the best use of the available means?, is in the “knowledge of the particular circumstances of time and place” (Hayek, 1945, p. 521), hinting at the advantages of decentralization of the decision-making process from a central, all-knowing, entity to the individuals in the right place and time.

He further exemplifies how this “circumstantial” knowledge dispersed between distant individuals in the social network works to give direction to the system as a whole. The pricing system for instance, acts as a powerful yet imperfect information provider to these individuals in order to make decisions. Price changes, for example, are generated at a certain time and place in this network but its repercussion through the system allow anyone to take a decision without the need to comprehend how, when and why the disturbance was created; “The most significant fact about this system is the economy of knowledge with which it operate, or how little the individual participants need to know in order to be able to take the right action” (Hayek, 1945, p. 527).

This is especially true in the supply chain network where companies have constant interaction, sometimes unconsciously, with other players in the network. Changes at both ends of the supply stream repercuss throughout the whole network chain; the effects of distorted offer and demand, better known as “bullwhip effect”, is one them for example (Lee, et al., 1997).

Supply chain network strategy, which ultimate goal is securing competitive advantages through strategic supply chain alignment, do so by means of establishing mechanisms to create reliable and flexible relationships with external firms who provide them goods but whom in turn might as well be dependent of other firms upstream. The great amount of actors in this network chain makes impossible for a single firm to try and control all of them, so rational efforts to strategically use the resources at hand are made by categorizing suppliers and assigning proper paths of action.

Kraljic’s matrix (1983) has been the pioneer in this regard, who’s contributions generated a wide arrange of perspectives on how best to separate the critical suppliers from the less important ones, along with possible course of actions for each category. For instance Caniels and Gelderman (2005) introduce in their work a supplier characterization based more on power and interdependence variables recognizing in this way that the supply chain network is a social construct whose actor’s interrelations provide an extra effect that must not be overlooked.

Moving ahead the sequential chain of actions and once the important suppliers have been identified the question now becomes on how to create a strong relationship that would allow securing the best resources and the correct price and time. The cooperation issue at the supply network level implies coordination of efforts between distinct firms with

different strategies, different objectives, and different perspectives of how the world functions.

A common strategy for achieving this is by implementing supplier development programs which aim to create a shared vision of what the necessities of the customer and the potential capabilities of the supplier are (Modi & Mabert, 2006). Knowledge transfer has become central in these developmental programs as it not only improves the relationship between firms but also has the capacity to generate competitive advantages. Modi and Mabert (2006) highlight the importance of operational knowledge transfer activities (OKTA) as an important tool to develop a supplier into a high performance partner, which is different from simple communication as it allows direct and constant interaction of individuals, creating over time strong and personalized links thanks to the unconscious exchange of tacit knowledge.

This intangible knowledge not only closes the gap between two different organizational cultures, effectively creating closer ties, but also allows recombining and creating new knowledge which can be exploited by both firms (Rock & Robles, 2012). It is not surprise then, that supportive top management plays an important part to achieve this integration as it “establishes three keys to supplier improvement: strategic alignment, measurement, and professionalism” (Handfield et al, 2000, p. 40). Knowledge sharing, as a “world-vision” unifier, helps with the important task of performing strategic alignment as “coordination will fail, where perceptions of mutuality for other members and commitments to the system (holism) are absent” (Simatupang et al., 2002, p. 292).

Furthermore, the theoretical knowledge of coordination framework proposed by Simatupang et al. (2002) recognize four different needs for coordination that must be confronted in order to accomplish an integrated customer-supplier relationship, these are; logistics synchronization, information sharing, incentive alignment, and collective learning. They obtain these categories by analyzing coordination needs at the operational and organizational level under two important perspectives; *Complementary interdependencies*, that achieve combined value of the core competences and *knowledge coherency* to secure alignment of goals and actions.

Although far from being the perfect solution, knowledge plays an important role in the supply chain network as it can be recombined to generate competitive advantage by means of supply flexibility or technological competence while helping to align perspectives and processes.

4. Everything is Connected

“Invisible threads are the strongest ties.”

Friedrich Nietzsche

Up to this point in the study, relevant literature oriented towards the optimization of the approaches towards supply chain and the factors affecting the customer-supplier relationship. Different models have been presented from a wide variety of authors and approaches, but no statement towards how all these tools relate to each other has been made.

This next section will serve as a hub that gathers, filters, and builds up on the unifying theme of this paper: customer value creation through relationship and knowledge management.

First, let us start with relationship management. A model (Figure 18) was built using three elements: *trust*, *power* and *strategic goal alignment*. Altogether, these variables comprise relationship management which aims to explain the current status of a given customer-supplier relationship.

The elements of trust and power were constructed using the existing literature about, but its effect on the customer-supplier relationship remains to be proved. The element strategic goal alignment was built using purchasing and sales frameworks as it will be explained in the following section.

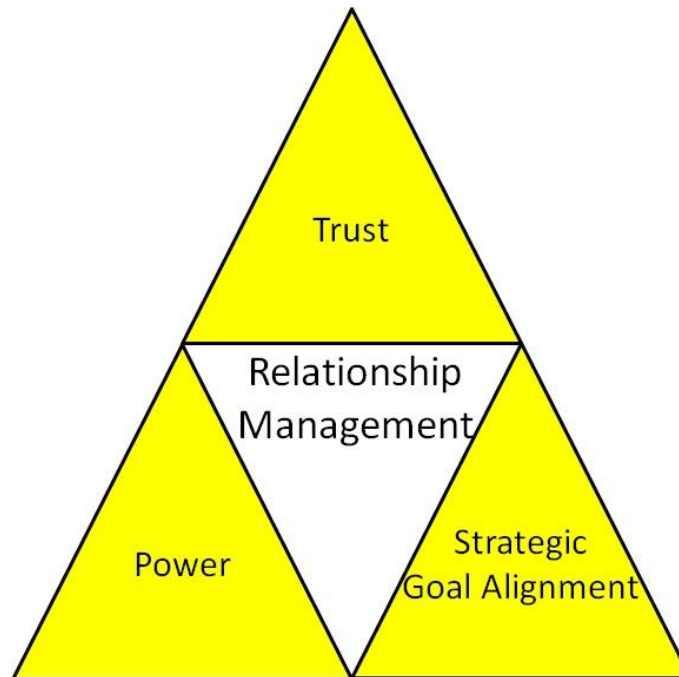


Figure 18 Relationship Management

4.1 Strategic Goal Alignment

Every firm is both a customer and a supplier. Depending on its placement in the supply network a firm will need resources from other firms and likewise, their products become inputs for others.

In the purchasing and sales' strategy section we saw that depending on the department making the transaction the framework or theories to evaluate the business change. Nevertheless we believe that a broader-systemic perspective is needed in order to understand the complex interrelations of the supply chain network.

According to van der Hoek and Woolridge (2007) the multi-agent theory is based on the notion of firms as agents rationalizing their actions based on the perceptions of the other agents' intentions in the network. From this perspective a department applying only their own specific tools, like Kraljic's matrix, would be like looking into your own firm to try to understand your supplier while ignoring the actual supplier's perspective.

In order to solve this we propose that a department should apply their own analysis tools but at the same time make an effort to comprehend the perspective that its customer or

supplier has regarding about them by applying the respective counter-techniques. This means that a firm would apply the normal Kraljic's matrix and strategic supply wheel to decide their strategy as customers, followed by the supplier's preferences and the growth-share matrix. This representation can be seen in fig. 19

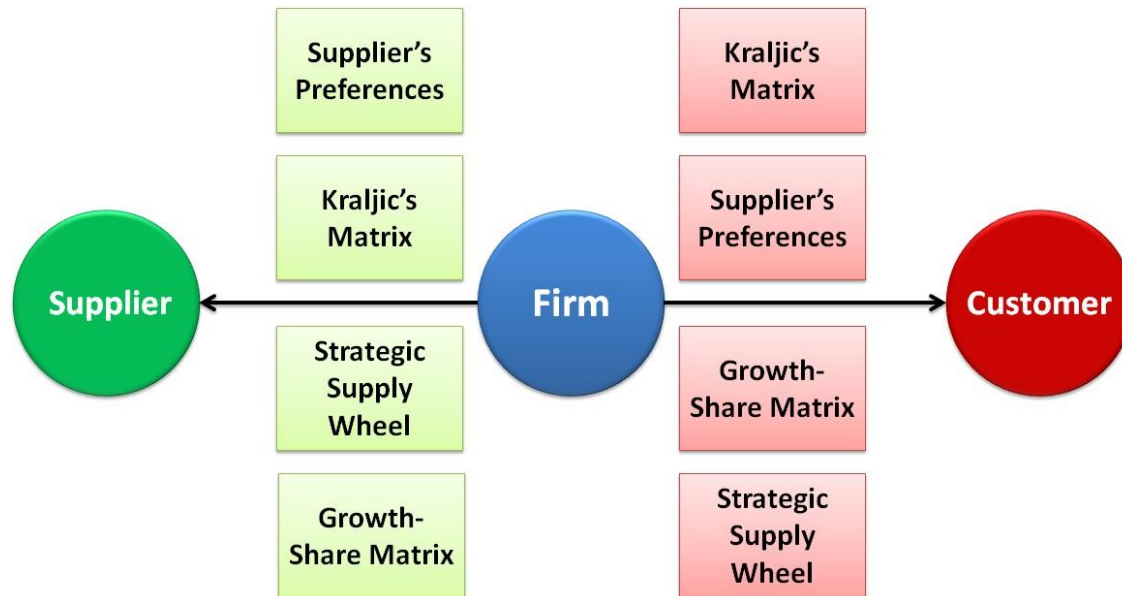


Figure 19 Firm's self-assessment in supply chain and sales departments (external perspective).

Although the growth-share matrix is destined to assist firms decide upon the strategies for their different accounts, it can be applied to assess the firm's purchasing accounts to know its position in the supplier's accounts appraisal.

This systemic approach would allow a firm to self-evaluate their image in the eyes of the other agents in the network in order to see if their own strategies are compatible and have the potential to create deeper bonds that are necessary to share knowledge and create value through their negotiations.

4.2 Cooperation and Competition

As mentioned before, supply chain can be better understood under a holistic perspective which considers as many affecting variables as possible. The tradeoff for this all-including view is a higher complexity due to the numerous interrelations between the recognizable components and, most probably, from the variables that are not readily visible but which might influence the network behavior. Being said that, and considering that we can only cognitively back-up our theories to a certain point with the limited resources given to us, the authors of this work consider that the issue of competition and cooperation in the supply chain network will be mainly influenced by the presence and dynamic between

trust, power and the goal alignment between both firms, along with the interdependence or commitment generated by them.

We recognize that these variables are abstract and ergo, difficult to grasp and control, as their meaning and impact varies from person to person, from firm to firm, and possibly from market to market. Nevertheless their universal understanding as social components makes their essence stable enough to be considered in the network theory.

And so we consider that the issue of cooperation and competition is not exclusively embedded in rivals firms and declared partners, but in all the actors in the network that with their intended or unintended actions affect others in the network.

Cooperation in the supply network level is then defined by us as the combination of the social dimensions of trust and power as well as the compatible goal alignment that would allow knowledge sharing between the interconnected actors whose actions tend toward joint strategic (organizational) and functional (process) efforts.

A firm under the cooperative perspective, for example, will tend toward relational contracts, with high participation on developmental programs that promote the human interaction, and thus, the exchange of tacit knowledge that would help to create a deeper bond, not between the firms per se, but between the individuals who compose the organization. Is this exchange of tacit knowledge especially important and defining of a “cooperative” relation because it has the capacity to create a shared vision and culture that will not only allow the participants to act efficiently as time goes by but to align strategies at the organizational level.

Competition, on the other hand, focuses on the strategic dimensions of trust, power and goal alignment. Their combination will generate, on the network participants, relationships based on calculation of benefits and predictability of risks. Strategic alignment occurs in the relation as a basic; almost situational, component which allows initial negotiations between the firms to take place and which presence erodes as external factors change the initial circumstances.

Competing firms may provide resources or buy resources from others but their perspectives are centered in their own benefits. Their relations are based on detailed contracts, great amount of resources on monitoring and enforcing are used, and information is not shared but the necessary as specified by contracts. This short-lived relations function because its risks and opportunities have been calculated and therefore have been considered as profitable.

The strategic alignment can be only situational; maybe Plastics S.A. is the only company in the Brazilian market, and thus no deep bonds are created nor is the emphatic capacity of

understanding each other necessities. Competing firms will not possess the synergy that cooperating firms have as each one will pull, as hard as possible, to their own direction.

In the real world is hard to find a firm that applies cooperation or competition completely. Small business composed by families might be able to pull cooperation off for example, but the complexity of big organizations with several thousands of employees, with many inputs and outputs demand dynamic and complex relations with their suppliers.

As the complexity of the product raises so do the organization and its interrelations with others in the supply chain network. This is why firms cannot cooperate or compete all the time with their suppliers and customers. Organizations employ analytic tools like the Kraljic's (1983) matrix or Cousin's et al. (2008) strategic supply wheel to differentiate between suppliers and implement cooperative or competing strategies. Even so this doesn't mean that the process is a mathematical formula; firms can use a combination of the dimensions of trust, power, and the different alignments of goals to develop knowledge in their supply chain strategy. For instance a powerful customer can have a heavy use of contractual arrangements, high monitoring use and low trust but with a keen interest in sharing personnel or creating joint projects for mutual development of their technical capabilities.

Synergistic partners have great flexibility to adapt to changes in the market; their understanding of each other's needs drives them to co-development as they can exploit their differences and similarities. They experiment the benefits of a steady relationship which is most likely to stand together during difficult times as their bonds are stronger. Nevertheless under the transaction cost theory too much trust, low power and high knowledge sharing create risk of opportunism and so, loosing key competitive capacities. Network theory on the other hand says that the closer the firms the more exposed they become to each other's issues. Dependability can have serious consequences when external factors suddenly enter in the picture, whether competing firms, changes in other markets, or acts of god, if strong enough, can take one company down and repercuss its entire links by consequence. This is especially true with firms closer to the customer or technological firms who deal with complex inputs and outputs specific for a certain market. Also their similar mindset and shared resources can contribute to the decay in creativity and become stank, which in highly changing markets is dangerous.

Firms that choose to compete in their network strategy pursue their own goals and thus have great flexibility to provide or buy from the best options available. Profit gains are visible and immediate, and the constant competition with others can generate important improvements in the firm's capabilities. The flexibility of buying or selling to many under short relation terms makes the competing firm less concerned with other's problems and

less exposed to market variations. Nevertheless growth is limited to a certain point, access to markets can be slow and painful, and important development opportunities are missed.

As mentioned in the beginning, firms use both strategies under different circumstances and would be hard to conceive a modern organization relying exclusively on one and survive to the competition and the market fluctuations. Both approaches are used because of they have benefits under different circumstances. These circumstances can be better understood if we look into, what we believe are the most important components of the relation. Trust, for example is helpful when complexity is high, exerting mediated power comes in handy when tasks are repetitive and simple, goal alignment helps to understand each other needs, and knowledge sharing is good when beneficial, yet hard to grasp, capabilities are perceived in the partner.

In the end we cannot stop pointing out that they are all interrelated and their combined contribution is more than the individual sum of each one.

Cooperation and competition is therefore given by the strategic alignment of the firms as well as other network aspects that help determining the intentions of other actors at the supply chain network. Their individual goals will certainly not be the same, but if a customer has an understanding of what its supplier sees as valuable and vice versa, then cooperation is the firm's behaviors and actions towards helping each other to achieve them.

4.3 Knowledge management

A final observation has to be done regarding how knowledge management relates to relationship management in supply chain.

As seen in the literature the resource-based view mainly focus in tacit knowledge, or know-how, which own nature makes it harder to transfer. Operational knowledge transfer activities (OKTA) are one of the tools to improve this tacit knowledge transfer and are mostly perceived as an essential practice of supplier development (Modi & Mabert, 2006). It is worth recalling that knowledge management is not specifically exclusive of the operational side of a firm and can be used in research and development through innovation and new products which will bring new capabilities to an organization (Dyer & Singh, 1998).

We believe that knowledge management practice in the supply network varies according to the goals the firm has regarding other network actors (strategic goal alignment), and that the correct combination of trust and power will determine the nature of the knowledge transference through the focal firm's communication channels.

For example, a harness firm realizes that its connector supplier wants to establish itself as a preferred supplier. At the same time, the focal firm is interested in achieving an agreement with its supplier due to their low cost, localization, and volume capacity. In this case the connector supplier has a great reputation in the industry for their expertise, which gives them expert power as in great degree of freedom in their actions. Concurrently, the customer provides harnesses to important auto-makers in the industry which gives them referral power, which improves their market image. Finally, both firms have made explicit their desire for a long-term relationship which aims to base their trust in something more than a simple contract. In the end, by analyzing their goals, the trust they have in the relationship, and power effects on their relationship they can see that knowledge management will be important to understand how to better facilitate this flow. The customer might need to learn about the first class operational practices of the supplier, while the supplier will need to learn about the technology and standards of the competition (other connector suppliers) and the car-manufacturer's requirements which will ultimately drive an improvement in their product offering.

5. Analysis

“Science cannot solve the ultimate mystery of nature. And that is because, in the last analysis, we ourselves are a part of the mystery that we are trying to solve.”

Max Planck

The preceding section presented the necessary literature to support the study's research questions and create the foundations for empirical investigation. As mentioned in the Methodology section, a case study was planned and executed using a sample from companies participating in the automotive industry. This section contains the results from the case study along with the interpretation of them. It is divided in two parts. First we will present the data from the case study. This first part will include demographical characteristics from the sample, relevant data from the first and second rounds of interviews, and results to key questions performed in the interviews. The second part on this section is the heart of this study, the Discussion. This part holds the argumentation of the results obtained from the case study against the theoretical propositions. Such dialogue is to maintain an orientation towards the two research questions for this paper.

5.1 Case Study

5.1.1 Firm Demographics

As previously mentioned, the case study was performed in firms participating in the automotive industry. The rationale to support this decision is based in two main reasons. First, both authors of this study have worked in the automotive industry. Such experience benefits the case study by providing access to individuals holding relevant information in firms suitable for this research. Moreover, some of the respondents are personally known to the authors; it was hoped for this condition to facilitate the way to obtain an interview, to inspire trust with the interviewees, and encourage comprehensive responses and discussions. Nevertheless, in order to avoid any bias produced from the prior condition, the interview was performed using the same procedure and the respondents were given the same information prior to the interview. Yet, the case study is far from being limited to firms and respondents previously known since only 38% of the respondents fell into this scenario. Last but not least, as a result of the author's work experience, understanding regarding the operations and challenges faced in the automotive industry is held by the authors which, as mentioned in the introduction, are part of the main drivers for the execution of this study. And second, the automotive industry's reaching maturity stage¹⁴ has made it a highly competitive business, with standardized and specific products, and high competition on price basis, where small differences in the customer value per product represent big sums when talking about production volumes. Such competitiveness has worked as a driver for the suppliers to constantly improve the product's customer value.

Thereafter, according to the sample design 12 firms were included in the sample list with 40% of expected acceptance rate, and minimum and maximum values of 16% and 50% respectively. As a result, 4 firms provided a positive answer towards participating in the case study; this equals an acceptance rate of 33% which meets the requirements.

Our ideal scenario for the case study would include several firms participating in the value chain for a given product. This approach would permit the examination of "goal alignment" as a defining factor for the customer-supplier relationship. In addition, the views towards trust, power, interdependence and knowledge transference from a customer and supplier perspective would be obtained from both parties resulting in a bilateral analysis of the relationship. To achieve this approach, at the end of each interview, the interviewee was requested to get the researchers in contact with their counterparts at the customer or supplier firms, depending on the case. Unfortunately, it wasn't possible to perform any bilateral interviews since the interviewees were reluctant with the idea of getting us in contact with their counterparts.

¹⁴ The four stages of industry life cycle. Available in:
<http://www.navhindtimes.in/business/four-stages-industry-life-cycle>

Nevertheless, the interview was designed to be performed in the supply chain department; a detail of the interview questions is included in Appendix A. By the end of the first round of interviews, it was clear that there was missing information regarding value creation, thus it was decided to perform a second round of interviews with the firms' functional areas working with the suppliers. One Global Design Manager and one Product Engineering Supervisor were interviewed. The interview for the functional areas was structured as a modification of the supply chain interview, but oriented towards the exploration of the firms' approach to value creation in the departments adding value to the purchased products. A detail of the interview questions are included in Appendix B. Finally, to fill the final gaps in the information collected, a survey was launched to collect information regarding the value creation vehicles in the firm.

The following tables contain information regarding the case study sample. Table 1 shows the different positions of the interviewees.

Table 1

Interviewee's Positions

Business Manager.	1
Supplier Quality Manager.	1
Purchaser.	2
Contract Management.	1
Global Project Purchasing Manager.	1
Global Design Manager.	1
Product Engineering Supervisor.	1

The size and location of the firms in the sample ensure the "global market participants" parameter specified in the Sample Design sub-section. The full results are shown in Table 2 and Table 3.

Table 2

Size of the Organizations (number of employees)

Less than 10.000	-
10.000 - 20.000	1
20.000 - 50.000	2
50.000 - 100.000	-
More than 100.000	1

Table 3

Worldwide locations

1 – 10 countries.	1
10 – 20 countries.	3
More than 20 countries.	-

The size of the organization works as an indicator of the complexity in the supply base. Choi and Krause (2006, p. 638) define supply base complexity as “the degree of differentiation of the focal firm’s suppliers, their overall number, and the degree to which they interrelate”. The first case study question attempts to determine the firm’s supply base complexity to later on, inspect on the methods firms use handle it. By using this definition of supply base complexity, it is complicated to make an assessment using only the data from the interviews. The main reason for this is that the firm’s supply chain structure is built in order to manage and reduce complexity in their system. This means that the firm’s overall supply base complexity has been divided and allocated in accordance to the organizational structure.

The different value chain positions of the firms in the sample are expressed in Table 4. The presence of firms in every level intended ensures the “value chain position” parameter specified in the Sample Design sub-section.

Table 4

Value chain position

Manufacturer	1
Tier-1	2
Tier-2	1

5.1.2 Findings

This section displays the results to the first, second round of interviews, and the questionnaire. The results have been organized by topic and do not reflect the way the questions were arranged during the data collection.

Supply Base

The following subdivision comprises the collected information regarding the firm’s supply base.

A categorization by *commodity* was observed in all of the firms included in the case study. At this point, no preferences are set for any supplier group. The division by commodity is in

order to separate the supplier base into comparable smaller groups that will be handled by a single individual. Table 5 shows the results regarding the firm's supplier database.

Table 5

Firm's Average number of suppliers.	1575
Firm's Average number of suppliers per commodity.	67.5

In response to the question: "What are the categories used to differentiate suppliers? What are the categories based on? What is the impact of being on one or another category?" The respondents listed the variables taken in account to classify their suppliers (Table 6) and the supplier categories (Table 7) as a result of the combination of the previously mentioned.

Table 6

Variables used to classify suppliers

Type of product.
Material.
Supplier history.
Risk.*
Location.
Technical capabilities.
Capacity.
Financial stability.
Payment terms.
Part size.
Performance.
Design responsibility ownership.
Tool status.

*Refers to risk associated with a specific supplier. It is calculated through a risk assessment using factors associated with the supplier that may overlap with other of the variables used to classify the suppliers.

Each firm has its own weighting system for each variable (not included since supplier selection is out of the scope of this study), but the result in every case is a supplier grouping system with an assigned strategy for each group. Such strategy was previously defined by the supply chain top management and it follows the main firm's strategy. 2 firms accepted the existence of a group of "key" suppliers with strategic importance to the firm. Table 7 shows the categories used by the firms to identify their suppliers:

Table 7

Supplier Categories

Technical capacities (Type of product produced).
Quality in products.
Strategy towards the supplier (Grow, Maintain, Exit & Forbidden).
Performance (A, B, C depending on self and customer evaluation)
Risk assessment

In response to the question: "What are the department's goals towards supplier management?" 1 respondent from a functional area declared not to have specific goals towards the suppliers. 2 firms stated specific goals towards growing the business of a "key" group of suppliers. Of these 2 firms, 1 of them admitted a goal heading for the reduction of the number of suppliers used.

In relation to incidence, "Savings" or reducing purchasing expenditure ended in first place with 4 mentions in 3 firms. In second place ended up "Quality" and "Improved payment terms" with 3 mentions in 2 firms. Finally, in third place ended up "Increase the use of key suppliers" with 2 mentions. The full results are transcribed in Table 8.

Table 8

Supplier management goals	Count
Savings.	4
Quality.	3
Improved payment terms.	3
Increase the use of the key suppliers.	2
Reduce number of suppliers.	1
To work only with financially stable suppliers.	1
All production space up and running.	1
Delivery performance.	1
Waste reduction.	1

In response to the question: "In relation to the total size of the business, how many suppliers hold the biggest part of the overall business? (Pareto principle)" 3 respondents provided an answer, 1 of them provided 2 different answers since he has 2 commodities in his responsibilities, and 1 of these answers refers to a corporate supplier (supplier for several business units) holding 90% of the total business. This answer was disregarded since it falls outside the unit of analysis of this study (single business units). The valid answers were used to calculate a Pareto principle for the supply base. The remaining

interviewees denied an answer since they do not hold this type of information. The results are shown in Figure 20.

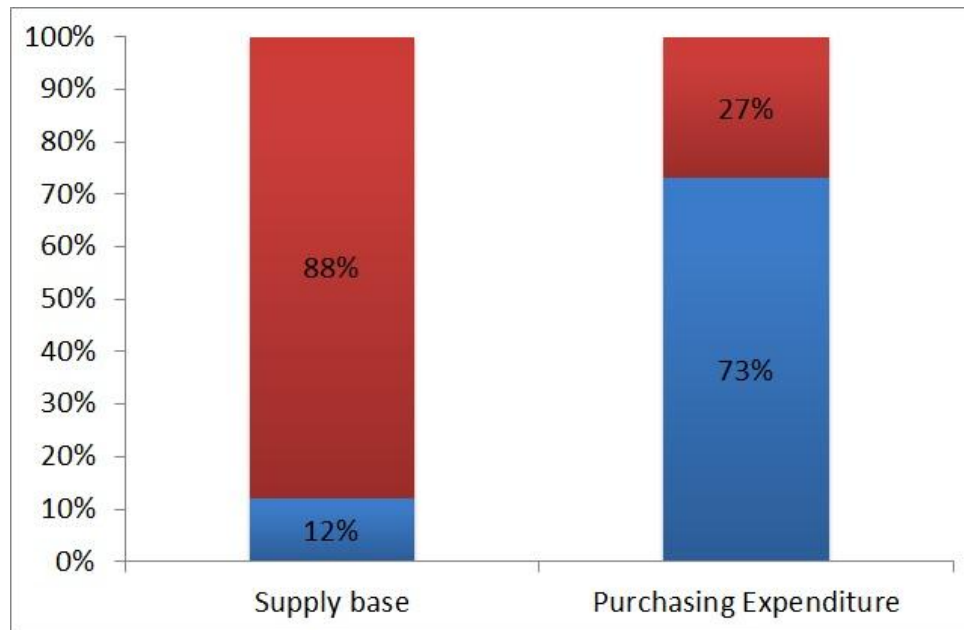


Figure 20 The Pareto principle in supply chain

The average number of suppliers quoting for a certain product was calculated with the responses of the question: “In average, how many suppliers participate in a quote for a certain product?” The results are shown in Table 9.

Table 9

	Min	Max
Suppliers participating for a single contract	2.75	4

Product

The following subdivision comprises the collected information regarding the firm’s operations.

In response to the question: “Explain the complexity sources in the products purchased?” The answer “Quality issues” was mentioned 3 times and constitutes the greatest source of complexity in supply chain management. “Miscommunication between the supplier, the functional area and the supply chain department” ended up in second place. The complete results are shown in Table 10.

Table 10

Complexity sources	Count
Quality issues.	3
Miscommunication between the supplier, the functional areas and the supply chain department.	2
High number of suppliers used.	1
Capacity issues.	1
Commercial issues of handling precious metals (copper).	1
Conflicting goals between supply chain and the functional areas.	1
High number of components purchased.	1

In response to the question: “Is there co-development in product design or production?” All respondents confirmed the presence of co-development with their suppliers (Table 11), but it was specified to be limited to the suggestion of design or process improvements to the customer’s design.

Table 11

Co-development	100%
----------------	------

In response to the question: “What are the factors affecting the supplier selection process?” The answer “Quality” was mentioned 3 times making it the most important factor for supplier selection. “Price”, “Service” and “Location” finished in second place with 2 mentions. The complete results are shown in Table 12.

Table 12

Factors affecting the supplier selection	Count
Quality.	3
Price.	2
Service.	2
Location.	2
Technical capabilities.	1
Financials (payment terms).	1
Lead time.	1
Level of investment.	1

Relationship Management

The following subdivision comprises the collected information regarding relation between the firms and their suppliers. Due the great difference between the different suppliers in the database, the interviewees were asked to respond having their average supplier in mind.

Using a 10 point scale respondents were asked to rate the importance of trust, communication and knowledge management in the customer-supplier relationship (where 10 = great importance and 0 = no importance) and to then evaluate the degree of trust, efficiency in communication and efficiency in knowledge management with their average supplier. If the respondent's evaluation answer was lower than 10, an extra question was asked regarding what is needed to do to improve that grade. From all the answers only 2 respondents graded with a 10 their current status with their suppliers; 1 of those answers was given in trust, and the second one in efficiency in knowledge management. The average results are shown in Table 13.

Table 13

	Trust	Communication	Knowledge Management
Importance	9.1	9.5	9.2
Current value	7.6	7.4	7.25

In response to the question: "How can trust be improved in your current relationship?" The respondents answered:

Table 14

Trust improvements

Intentions transparency.
 Flexibility.
 Negotiation fairness.
 Improved communication between the functional departments in both the customer and supplier.
 Email is impersonal; phone calls provide a better feeling when negotiating.
 Knowledge and understanding of supplier processes.
 Suppliers to deliver what they promised.

In response to the question: "How can communication be improved in your current relationship?" The results are shown in Table 15.

Table 15

Communication improvements

Language barriers and business perspective (perception of the big picture).
 Less bureaucracy, faster and more efficient processing.
 Follow up during the project life cycle.
 Communication with suppliers in the development phase.
 If the business is small, suppliers do not provide the necessary attention to it. The importance of the business to the supplier is low.

In response to the question: "How can knowledge management be improved in your current relationship?" The respondents answered:

Table 16

Knowledge transference improvements

Supplier's technical capabilities analysis.
 Goals misalignment between functional areas and the supply chain department.

Results regarding the knowledge management questions are limited since the interviewees from the supply chain department claimed not to be involved in knowledge management processes, so they declined to answer this set of questions.

In response to the question: "What kind impact do you perceive power has on the relation?" The respondents answered:

Table 17

Power influence

Power is not an issue. 8 out of 10 times, the final customer will get away with their demands. This is a healthy behavior. This drives continuous incremental improvement and better product offering.
 Power provides the opportunity to select the supplier with the most suitable capacities to fulfill the needs. If they don't have the capability, they can be replaced.
 Price, services and quality negotiation.
 Power has a great influence in the relation; the important issue here is what it is used for.
 In short term, it can provide good prices. In the long term, it does not work.
 Possibilities of both: positive or negative impact.
 Power comes as a result of firm size, type of product, knowledge, negotiation.
 Provide bargaining power to set a price.
 Power influences the way a firm deals with quality issues or negotiations.

Value

The following subdivision comprises the collected information regarding the value and its creation in the firm.

A questionnaire with four questions on value creation was created to complement the information obtained with the interviews. It was distributed in 4 firms and included participants from product development, project management, sales and supply chain. 3 respondents answered the questionnaire. The answers are comprised in Table 18 – Table 21:

Table 18

How does your firm measure customer value in the items produced?

Delivery. According customer needs and safety and transit inventory Quality.
Warranty due following global standard procedures.
I don't know.
Profit and loss report.

Table 19

Do you perceive suppliers add extra customer value to the items produced? How?

A very low percent of suppliers add extra customer value. How? Customizing products and services.
In the past by trade names etc. but less these days. The end customer is asking for more value for their money. In some cases could be when a certain problem can be resolved with a new material or product.
I do not perceive suppliers adding cost to product.

Table 20

Where in the value chain would you locate the best opportunities for customer value creation?

Manufacturing and logistic.
I don't know.
Close to them.

Table 21

What role do you perceive knowledge management plays in the creation of customer value?

Defining strategies to improve quality and delivery
 Creating or improving channel of communication between customers and suppliers.
 The more you know about what the customer actually needs the better, so I say it's important.
 Is a key role due to the experience one must have to understand and comply with requirements

In response to the question: "How is value created when working with the supplier?" The respondents answered:

Table 22

Customer-supplier value creation

Functional area does not chase cost reductions. Purchasing is in charge of that part.
 Customer expects the supplier to know everything about their own suppliers.
 Customer value is not held only within the product, but in the supporting systems behind it.
 The supplier adds value by an efficient transformation of raw material into a finished product.
 Functional areas of the customer create value by product design.

Knowledge Management

The following subdivision comprises the collected information regarding knowledge management in the firms.

In response to the question: "What information is shared with the supplier?" The respondents answered the following:

Table 23

Shared information	Count
Technical drawings.	2
Requirements.	1
Requirements from the final customer (depending on the case).	1
Commercial information.	1

In response to the question: “What information shares the supplier with you (the customer)?” The respondents answered the following:

Table 24

Shared information

Everything. It's the same situation with our customer; we share more with them than what they share with us.
 Product specifications
 Dimensional controls
 Tool details
 Process charts

In response to the question: “Do you perceive any improvements in the firm as a result from working with a supplier or group of suppliers?” The respondents answers are shown in Table 25.

Table 25

Improvements

Technical sharing to reduce cost or maximize the product performance.
 Product feedback from the supplier as a checkpoint.
 Supply Chain has learned about the minimal technical requirements needed to support the firm
 Technical support to service the purchased parts.

5.1.3 Empirical Summary

The use of a semi-structured interview as data collection method resulted in a conversation-like interview which, in our opinion, enhanced the feeling of confidence and openness during the interviews. This allowed us to dig deeper wherever it was necessary during the realization of the interviews. Some of that information while being relevant, it is not contained inside the interview questions; it was used as quotes in the Discussion subsection.

Regarding the supply base, the existence of a series of key suppliers which are pre-approved is proven. Moreover, some firms declared having goals oriented towards increasing the number of contracts held by the key suppliers. In addition, goals in quality, savings and payment terms are the most common among the sample. One of the interviewees declared:

“The “key suppliers” are in a grow strategy because of the service, competitive prices or are technologically superior suppliers.¹⁵”

Contradictory information was found regarding the pre-approval of suppliers performed by the purchasing department. While “technical capabilities” was mentioned as one of the supplier categories used to request a quote, and for “quality” to be ranked above “price” on both the supplier management goals and factors affecting the supplier selection, the functional areas declared for the purchasing department to pre-approve firms with competitive price, but not enough technical capabilities to perform the intended endeavor.

It was also mentioned for this issue to be absent when working with the firm’s customers since they use a technical pre-approval followed by a target price that must match the product technical requirements, and not the other way around. Or, in the words of one of the interviewees:

“I think that we need to change is that it should be the cheapest suppliers that are OK technology wise.”

More than a problem in the supplier selection, this condition leads to a misalignment between the ones doing the supplier selection (purchasing) and the ones adding additional value to the products purchased (functional areas) and in consequence, impacts the supply chain efficiency.

Further, the functional areas are impacted by the decisions made by the purchasing department and in some cases, they do not hold a goal oriented towards supplier management. On this view, the supply chain department seems to be limited to the purchasing functions while the functional areas are left out to focus on the technical issues.

Regarding relationship management, trust, communication and power ended up with importance grades above 9. Several responses regarding transparency, flexibility, fairness, the avoidance of goals misalignments and attention point out to the existence of hidden intentions and strategic goal misalignment.

In the case of power, the responses are divided within positive and negative effects of power. In our perception, firm’s try to minimize the negative effect of power during supplier selection by establishing long term relationships (key suppliers) and in relationship management, by establishing transparent relations. One of the interviewees said:

¹⁵ The quote was rewritten to avoid using the exact combination of words used by the interviewee because it holds strategic related information that is not to be disclosed.

“If we do feel that the supplier is more than willing to help find ways to deliver according to our requirements, we don’t have to put them with the back against the wall... It’s all a matter of partnership¹⁶.”

On the other hand, when questioned about the positive effects of power in the relationship, the respondents stated for it to be a healthy behavior since it drives competitiveness. As mentioned:

“Power is not an issue. 8 out of 10 times, the final customer will get away with their demands. This is perceived as a healthy behavior. This drives continuous incremental improvement and better product offering.”

This dichotomy denotes the fact that power can be applied to obtain positive or negative effects depending on the approach taken to it.

In relation to value there are two important issues. First, a lack of information regarding the concept of value exists in the different departments in the firm. Second, value creation is allocated differently in the focal firm and in the supplier. While the focal firm adds value to the product by design, the suppliers add value to the product in manufacturing. In all of the cases there is cooperation between the customer and the supplier where the customer establishes the technical requirements, while the supplier improves the design functionality and manufacturability while reducing the production cost.

Regarding knowledge management, the flow of information seems to be an unbalanced process where information grows continuously upwards the value chain (Figure 21). The focal firms declared to receive more information from their suppliers than what they send to them. At the same time, the focal firm delivers more information to their customers than what they receive from them.

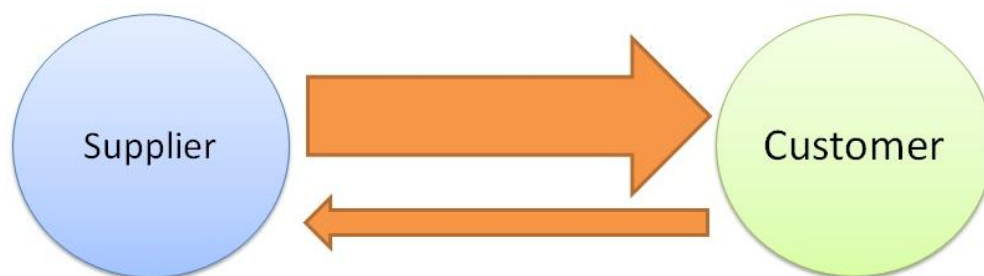


Figure 21 Customer-supplier information flow

¹⁶ It was clarified that it was not a formal partnership but an informal one. More “we are in the same boat” like.

Furthermore, the interviewees declared for the customer to expect them to be a “hub” that holds the necessary information for servicing the products supplied (Figure 22). The flow down the value chain contains technical and commercial requirements; while the flow up the value chain contains detailed information about part performance, process, quality control and product specifications.

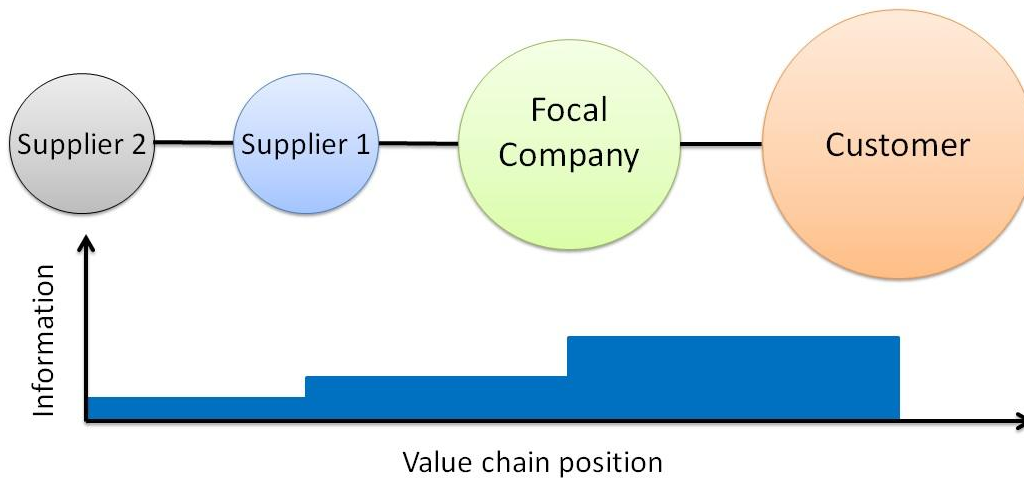


Figure 22 Information vs. value chain position

5.2 Discussion

After presenting the case study’s raw data obtained from our interviewees we proceed to compare the findings and the published theory. This will generate insights about customer value creation in the supply network and the role of knowledge in this process. The discussion will be carried out in three parts. First, the findings related to customer-supplier relationship management shall be reviewed. Second, the role of knowledge management along with the factors and actors affecting value creation in supply chain will be assessed. And third, the first two topics will be united to compose a final perspective of value creation in supply chain.

According to the strategic perspective, a firm’s supply chain functions fall within four main categories. The authors of this thesis will limit the discussion to the top two levels of supply chain; integrative and supportive, as their functions are complex enough to explain the observations from the interviewees. Compared to a passive or independent supply chain, this mentioned levels concede that relationships with suppliers are an issue that must be considered by the firm when designing and implementing their business strategy. The case companies fall inside an integrative or supportive supply chain due to their supplier base complexity and the strategic goals expected from them, under these circumstances a “relationship management” focus is more appropriate, as some suppliers play critical strategic roles for the focal firm.

For example, regarding relationship management and the strategic importance of some suppliers we observed a significant tendency towards the concentration of the focal firm's purchasing within a reduced group of suppliers. Such tendency varies depending on the size of the focal firm's supply base but it takes values that may reach up to 73% of the total spending held by 12% of the supply base; this particular group of suppliers is present in every firm included in the case study and will be referred to as "primary" suppliers of the focal firm. The relevance of the primary suppliers is supported by the great amount of business held, and most importantly, because the efforts directed to them will be magnified by this Pareto relationship and consequently impact all the different contracts assigned to them. The organizational separation by commodity in the supply chain function allows for this principle to apply for every type of product sourced. This is because the existent structure empowers the competition between the different firms supplying similar products; ergo, increasing the customer value in the product offering.

Another important point we have observed during the interviews was the realization that supply network interaction occurs mainly at two different interfaces; purchasing and the functional area¹⁷. Contact at purchasing comes to no one's surprise as this discipline has now become one of the modern pillars for sustained competitive advantage in global markets. Its practices and benefits have been tested-and-proved in practically all industries and extensive documentation exist nowadays (Christopher, 2011; Cousins, et al., 2008). This area is responsible for commercial matters and in many cases have their own strategic goals. The other main area interacting with the supply network is the functional area which uses the products being procured. Even though formal exchange is mainly channelized to the purchasing department, important interaction occurs between supplier and target area. This area defines the technical requirements from the products purchased, as they are their main users, and as stated by Dubois & Pedersen (2002), they may leave purchasing to negotiate less "important" contractual conditions for given products. This scenario creates a bifurcation of the interactions between firms and at some degree, an isolation phenomenon between the functions occurs. Although, the nature of this interaction is mostly informal as it is not as documented, nor as supported by the organization as the purchasing function, its effects are easily visualized in the product procured. Moreover, the established individual responsibilities of both areas consider the existence of these interactions but direct them to their own strategic goals.

Let say for example that, engineering is looking for a technical solution within their supply base. The metrics engineers will use are very much related to goals in their own area; how useful is this supplier for my technical need? Will it allow me to do my work faster or

¹⁷ In this study we refer to a "functional area" as an organizational unit performing activities with direct relation to the firm's core business. Such areas hold strategic importance for the overall firm's strategy.

better? How does it compare to what other companies have? Purchasing on the other hand will most likely want to run a tender with other possible suppliers, not because they distrust the engineering recommendation but because they need to make sure that certain commercial goals are met when choosing a supplier; are there more possible suppliers for the same product? Are there substitutes? Can we get the same products or similar from a “preferred” supplier? Etc.

Thereafter, the interviews provide enough information to resolve that a given purchasing event is performed by two different areas in the focal firm. Different interests and objectives are held by these departments, but there is a common goal between them: customer value creation. In the race to attain this target the supply chain department holds the purchasing commercial specifics with the goal of cost reduction, while the functional areas seek for the maximization of the benefits embedded in the purchased goods fitting the definition of value: Perception of Benefits/Total Cost of Ownership. As a consequence, we believe the relationship management will be held by both the functional area and the supply chain in order to reduce costs through deals, volumes and specifications, but the knowledge management function will be performed almost only by the functional area as they are the ones adding value to the product thus maximizing the customer’s perceptions of benefits.

5.2.1 Trust

In Cousins et al. (2008) model for the management of inter-firm relationships, uncertainty is included as one of the variables defining the relationship. In this view, risk and uncertainty, are to substitute the concept of trust as he considers that this concept applies among individuals and not collectives. To this end, the minimization of risk is pursued to avoid opportunistic behavior from the other party. Cousins’ view, rather than proposing interchangeability between the risk, certainty and trust concepts, proposes an overlap of their goals under given circumstances. This condition stands, only when referring to a partner relationship since their objectives are the same: the avoidance of opportunistic behavior. This goes in direct contrast to what (Lewis & Weigert, 1985) imply when saying that trust in the individual extrapolates to society as is the only way to manage the complexity in the social structures.

Considering the results from the case study, we can observe that most of the interviewees perceived that the role of trust is highly influential to the customer-supplier relationship (scoring 9.1 in perceived importance) yet the general feeling was that the current relationship could be improved; continuous and clear communication, increasing transparency of intentions, promoting negotiation fairness, and sharing knowledge and understanding of the other parties’ processes and operations were mentioned as the main areas where trust can have a positive effect in the customer-supplier relationship. This goes in hand with the literature that claims that information sharing is connected to the

creation trust and commitment in the relationship and “has been single out as the most important factor for successful supply chain management” (Kwon & Suh, 2004, p. 6). According to most of our interviewees then, making explicit their ideas with their counterparts and receiving feedback on them suppliers and customers reduce their uncertainty, help them make better decisions, and gain insights on how trustful a partner is. Despite these suggestions, one of the respondents mentioned that trust was not really important as the presence of contractual agreements shaped their relationship, which coincides with Cousins et al. (2008) as the risks and uncertainties are calculated and covered by binding structures.

If we focus ourselves into the specific areas interviewed we observed that, contrary to Pollitt’s (2002) claims that behavioral trust is a great enhancer of economic inter-firm relationships, the purchasing area relies heavily in economic theory in order to make the make-or-buy decision, and afterwards, in deciding who to commit resources to and implement formal development programs with. This we believe, is understandable as firms seek for competitive advantage through customer value so cost and quality come naturally as a priority when contacting possible partners or suppliers, and perhaps this could explain in part the interviewees differences in opinion regarding trust.

This behavioral trust, with a heavy rational tendency, found in the purchasing area imply that binding structures often than not substitute emotional trust in order to make sure the supplier holds the necessary capabilities to support the product or service offered. For example, in all of the firms interviewed, a categorization was used to create groups of suppliers depending of their technical capabilities, their history together, the product offering, the risk associated, and the supplier location, among others. We believe that the purchasing department special reliance in the calculative side of trust comes as a result of seeking a complexity reduction in the industry’s network. Not only did these companies had a complex supplier base, with an average of 1575 suppliers scattered throughout the globe, but they did also had an equally complex and challenging customer-base globally located and consisting of different levels of process areas. Linking every actor with emotional trust would be impossible and unproductive. Besides, the mere need of purchasing to create strategic added value, which is the basis of supply management, implies the use of tangible indicators that can be compared against other firms for benchmarking purposes. Economic indicators then, present an easy yet representative way to compare the “success” of a firm against others in the same market. This is coincident with the supply chain network perspective as its role in strategic alignment must be based in ambitious yet tangible, clear, and easy-to-understand goals (Cousins et al., 2008).

Contrary to the findings in the purchasing area we found that trust has a bigger emotional component in the process areas. Through the interviews we found that the main reason to establish regular contact with a supplier is to ensure an understanding of each other’s

necessities, followed by problem solving and keeping up-to-date with project developments. This supports Lewis & Weigert's (1985) propositions, as instead of looking for quantifiable advantages, engineers put trust on their supplier contacts as a mean to lower the complexity of their decision making. Trust in these areas helped to create a relational commitment related to a personality instead of firm's indicators; trust meant a face and a name more than a category or a rating. Nevertheless, rational trust is still present but focused on the technical capacity and less in economic transaction. This could be explained if we consider that the economic analysis was already covered by supply chain management as they are better suited at evaluating the overall impact of that business relation in the organization. This also leaves a more specialized role to the functional areas as they are the targets of the partnership's supplies and have to look upon their own functions to understand how they can be complemented by the supplier. For example, an engineering department is more interested in establishing trustworthy relations with those suppliers who seem capable in their areas and consequently better fit to help them achieve their goals. When further inquired about improving trust through communication with their external partners, the engineering department for example, was not so sure of its effectiveness as sometimes the suppliers they trust the most were the ones they didn't need to contact so often. This further supports the idea that process areas trust more, through emotional trust, the like-minded suppliers who are also able to deliver the agreed results. At the same time, those suppliers might not be considered as trusted by the purchasing area.

For example, in a given situation with a new supplier, purchasing's trust will rely on the supplier's capacity to fulfill their economic guidelines and in the same manner functional areas initially will rely on the technical indicators. Nevertheless, as the relationship goes on, the functional areas are more likely to change their initial trust based on how the supplier behaves and interact, which are indicators not so readily measurable by the technical or economical initial factors; while functional areas realize that their supplier uncooperative behavior outweighs their technical advantages, purchasing's trust continues the same as their indicators do not move or perceive other characteristics of the relation.

Now, how does this different trust perspective influence the overall objective of the supply chain management? According to the theory trust creates commitment which in turn helps to align perspectives through knowledge sharing and, ultimately, achieve competitive advantages. Based on the interviews and comments received from people in contact with the supply network we have come to realize that the conditions on which trust is generated by the purchasing area are the necessary to ensure the layout of the correct basis (as defined by the firm) to achieve the strategic goal. Nevertheless "ensure" doesn't automatically mean "secure", the role that trust plays in the other functional areas is underestimated as their connection to the business and network strategy is not readily

visible. Many engineering projects which have been considered as having the correct elements have failed because of “technical infeasibilities” attributed to a high complexity and low commitment of the functional departments. We are not suggesting that emotional trust is the universal solution for achieving supply chain objectives but its documented effects on supplier relations could help explain the differences between successful and failed strategies.

Trust then, seems to begin with its calculative component and under conditions reciprocity and communication gives way to develop into relational trust. Without tangible economical and technical benefits to establishing a long term relationship the circumstances to create a close “emotional” trust will be hardly given and thus less probable to occur.

5.2.2 Power

Regarding power we have also observed that its meaning and use change depending on the area having contact with the supply network. Power, as described in our literature review, helps us to make decision and changes with ease but also has the potential to bring undesirable effects in the relationship when abused (Bolman & Deal, 1984; Brown et al., 1995; Tedeschi, et al., 1972). Another important issue to consider in this section is that the automotive industry is well known for the power imbalances that exist between the principal car-makers and their suppliers (Webster, 1995; Benton & Maloni, 2005). This is why it came to us as no surprise to find that most suppliers found the balance tilt toward their customers.

When discussed with the buyers at different levels of the supply chain the perceived power of the supplier or customer varied accordingly to the importance of the products and services; that is, strategic products tend to give more bargaining power to the supplier than bottleneck for example. The use of other literature sourcing strategies like Porter’s (2008) five forces were not directly mentioned but inferred from their conversations as factors like size of the supplier, purchased volume, competitors, reputation on the market, and expertise level were mentioned in the interviews as influencers of the bargaining balance. We found then, that power in purchasing is very similar to trust in the sense that product categorization and market factors have a big impact on the sourcing strategies implemented by a firm, and by consequence, on the power perception of the supply chain relationships.

In this regard we found that their opinions on supply management were very close, if not entirely embedded, to the literature on the subject. We believe this is due to the widely known and standardized practices of supply management adopted and followed especially by international firms. Contrary to our findings in the buyer area, contact with sellers of supplies for the automotive industry was limited as we were only able to reach one. The conversation held clearly indicated an imbalance of power to the big customer, where

coercive behavior was common when closing supply deals which is consistent with the theory (Webster, 1995). Nevertheless due to the poor amount of contacts in this organizational area more research is needed in order to corroborate the findings.

About the consequences of using power and according to the answers from the supply chain group it was interesting to note that everyone discussed power, the ability to influence other's decisions under an economic perspective. The perceptions was that power in the purchasing-seller area helped to get better deals when negotiating terms; better payment options and cheaper costs were common "advantages" mentioned about being in the powerful end of the deal.

Nevertheless some European interviewees with top management positions made clear that they exerted an active supplier strategy since the very beginning of the process in order to work out or balance some of this power positions as it was in their best interests to establish long term relationships with all of their suppliers. Their perception was that abuse of power in their relationships would definitely provide near future gains but would also affect the relationship status bringing discontent, which in the long term would be reflected in indirect costs like logistics, trust, future deals and relationship quality.

One of the interviewees shared some examples of how the relationship was managed and how it differed from other similar companies which lead us to believe that for them creating win-win situations was more important than taking advantage of their positions. They didn't deny receiving short-terms economic benefits but mentioned that exploiting their positions, often than not, was a bad strategic decision as forced short cost gains brought competitive losses in the long term.

Based on the answers we can observe that power is not readily measured by the firms but is an everyday component of purchasing activities as its reflected on the supply strategies implemented and has an important impact on the results of the projects the suppliers participate in. Also, the approach of some firms to preemptively analyze their potential suppliers before establishing relationships with them suggest that misbalanced power is common yet it doesn't necessarily means a bad thing. These answers confirm partially what Benton and Maloni (2005) said regarding satisfaction in supply chain relationships; satisfaction in the supply relationship is more related with the quality of a given relation than the performance of the deals obtained from them.

Regarding the issue of power in functional areas we have observe that the origins and effects of power are not the same as in purchasing.

In our interviews with the engineering departments we observed that a power difference does exist and is always tilted towards the customer, but this power is limited by feasibility and contractual barriers. Regarding these limitations we have noted that contractual

barriers represent mediated power as the process activities are covered in the contract, while feasibility would be part of non-mediated power as the process areas act as experts to the customer (French & Raven, 1959). While the mediated power experimented in the functional area is just an extension of the contract already negotiated in the sales division, the non-mediated power relies exclusively in the functional area. This adds-on further to our findings that functional areas have more potential to build emotional trust as and thus; normative commitment. By acting as a referral in which the customer can deposit their necessities and see them translated to valuable solutions the functional area generates non-mediated power in the company (Brown, et al., 1995).

Regarding the observation of the abnormal power of the customer over the functional divisions, we can explain it by analyzing the origins and effects of power in these areas. When asked what could be the reason for the customer having almost always their demands satisfied, engineers answered that it was their job to “listen to these demands and apply our expertise to benefit the customer”. While in the purchasing and sales department power in the relationship is caused by factors such as size of the company, account attractiveness, expertise, etc. in the process areas the customer’s power comes from the fact that they set the perception of benefits and total cost of ownership of a product.

In other words; the customer has more power than the functional area because they basically control the definition of what is value according to Christopher’s customer value formula (Equation no 2). In this sense functional area’s target is to create a valuable product and the only way to know what is valuable is by acting on the customer’s demands. Nevertheless these valuable solutions, and therefore the power balance between seller and buyer, will be constrained in the technical capabilities of the company and reflected in the contract stipulations negotiated by the sale department and extended to the functional areas.

Let’s say for example, that a supplier is working closely with the customer in order to develop a specific technical solution. During the project work the scope will almost certainly change as new information is being received by the customer who sees desirable to include it in the project as it will add better value for their money. As long as the contract stipulations do not interfere and the technical capabilities allow it, the supplier functional areas will try to comply to these new demands as is their job to achieve customer satisfaction effectively. This has unintended consequences like improvement of the relationship, by increasing chances of generating more future business, and improved supplier’s own capabilities, as fulfilling demands generates more experience that can be applied in other cases.

It was interesting to note that EDI systems were present in all companies interviewed. This is coincident with the work of Webster (1995) which discussed the positive characteristics

of these systems in terms of response speed and adaptability to customer demands but also mentions the coercive effects embedded in the software structure. Functional areas in this regard mentioned that the systems although clearly one-side designed and sometimes incompatible between each other were favorable for their relationship and their functions and didn't perceive negative implications. We suggest that the issue about the customer holding more power, mentioned above, along with the advantages generated by this interdependent relationship contributes to this "imbalanced-but-accepted" behavior in the process areas. The effects of EDI systems in the knowledge transfer in the supply chain will be discussed in the following sections.

Now, regarding the effects this dynamic has on functional areas we found that the power that the customer exert in the relationship, although demanding on the supplier, is; "quite healthy as it is, [...] we are very frustrated sometimes that the customer decides or wants to have in a specific way but at the same time, each and every specification that we receive is tougher than the last one, and that is driving us to be a better company and making better technical solutions so often I would say it's healthy for us to have this strong customers that makes us do better products".

This brings us to the notion that the power effects in the functional area are reflected in the long term strategic benefits. By fulfilling customers' demands the functional areas increase their capabilities and make them more competitive in the market. Economic gains, although used as a baseline to start businesses, are not really a concern in the functional areas; new projects tend to bring unexpected costs for example, also the development of new capabilities by itself do not automatically equals economic gains as developing one specific technology for one doesn't necessarily means that it can be sell to other customers. This finding supports the idea that a correct joint initial strategy of sales and the functional areas is out most important to achieve strategic and economical goals.

5.2.3 Strategic Goal Alignment

The last element to be included in the customer-supplier relationship is the customer-supplier "strategic goal alignment" which represents the empathy the customer and the supplier feel for each other. Once again, as a means to limit this study, the perspective to be taken is the one of the customer seeking for affinity within the suppliers in the network.

The authors of this study propose that the customer-supplier goal alignment is defined as the compatibility level between the focal firm's strategy and a specific supplier. On this view, the strategy will translate into intentions and ultimately into actions, being the last two the ones that will be perceived and interpreted by the supplier. Another factor that shapes the relationship is trust and, according to the interviews, plays the important role of creating intention transparency and generating open dialogue to discuss each other's expectations of the relationship.

Furthermore, a consequence of defining goal alignment as a “compatibility level” between two entities composed by individuals, pose difficulties regarding its assessment and the best suitable approach to measure it, which may led us to try different ways to approximate this value. This is how the authors of this work propose a framework that includes the customer and the supplier’s perspectives; these models have different individual purposes and were adjusted to take into account how the firms perceive each other and provide, this way, an approximation of their compatibility level. The selected models to represent the customer’s perspective are: Kraljic’s Matrix (KM) and Strategic Supply Wheel (SSW). On the supplier’s perspective the proposed models are: Supplier Preferences (SP) and Growth-Share Matrix (GSM). Table 26 shows relevant information about the mentioned models.

A common characteristic of these approaches is that most models propose a strategic action plan to manage the different accounts or items while maximizing efficiency in resource usage. For example; the categorization of items in Kraljic’s matrix advises that a strategic product will demand more resources to be properly sourced since it holds a higher strategic importance. A second example would be the cash-cow and dog accounts in the growth-share matrix; a cash cow requires resources to be kept alive over a dog since its profit is higher than the cost of running it. The strategic supply wheel is the only exception since it lists the elements to be assessed while not suggesting a defined strategy. Moreover, it is this race for resource efficiency that may lead to resource wasting, supply shortages, and business losses. The proposed reason behind these scenarios is goal misalignment due reasons like: hidden intentions, hidden information and signals misreading, among others.

Therefore we suggest that the goal alignment check is to be performed on items and accounts that hold special interest and value to the focal company as they would be the most resource consuming items or services. As a first step, analyzing the customer’s perspective through the KM and the SSW will provide us the appropriate sourcing strategies to obtain the best deal out of the suppliers. In the second step, a leap must be taken from the customer to the supplier’s perspective in order to determine the compatibility level between firms. So, the focal company must perform a self-analysis using SP and GSM to determine how the suppliers perceive them, and consequently, what are the possible strategies to be implemented towards them. A third and final step would be to discuss the supplier’s expectations and determine the possible strategies to be taken. It is worth mentioning that this same procedure can be inverted and applied at the sales department in order to determine their customers’ possible perspective towards the focal firm and propose strategies.

Table 26

Perspective	Model	Author	Description	Categories	Outcome
Customer	Kraljic Matrix	Kraljic (1983)	Portfolio approach that matches the strategy importance of the goods purchased and the complexity of the supply market.	Non-Critical, Bottleneck, Leverage & Strategic.	Categories for the purchased items and a tailored strategy that matches the good's specific characteristics.
	Strategic Supply Wheel	Cousins (2002)	Framework based on research that comprises the key dimensions in supply management.	N/A.	The appropriate strategy is found by balancing and synchronizing the elements in the wheel.
Supplier	Supplier Preferences	O'Brien (2012)	Portfolio approach that matches the relative value of the account and the attractiveness of the account.	Nuisance, Exploitable, Development & Core.	Categories for the accounts based on their characteristics and action strategies towards each quadrant.
	Growth-Share Matrix	De Wit & Meyer (2010)	Portfolio approach that matches the relative competitive position or market share (depending on the version) and the business growth rate.	Cash Cows, Dogs, Stars & Question Marks.	Categories for the accounts based on their characteristics and a set of strategies to manage them.

Moreover, Cousins et al. (2008) alignment model (Figure 14 Alignment of strategies, relationships and skills) includes similar elements to the ones selected for this study's strategic goal alignment analysis. For example, the type of product purchased which is represented by the Kraljic's matrix (Figure 14, top left corner), and the strategic relationship positioning model (Figure 14, top right corner). Additionally, Cousins emphasizes the fact that the relationships are built up at the product level; this differs from our framework in two basic principles. First, we consider that goal alignment is a variable affecting the relationships, thus comprised in the customer-supplier relation. And second, the framework proposed, since it shapes the relationship, considers the different accounts (in the same commodity) held by the supplier. Ultimately, we believe that Cousins' model is incomplete since it disregards the characteristics of the account like value and attractiveness (Supplier's Preferences model), and the future possibilities for the accounts (Growth-Share matrix).

Despite the evident differences in the views around the strategic goal alignment, a shared impression was found between the authors, Cousins' model, and the interviewees regarding the importance of strategic goal alignment between firms for long term relationships. Several interviewees accepted the existence of a group of "primary suppliers" and the presence of common objectives and strategies between both parties. When questioned about their top level suppliers one of the interviewees stated:

"When classifying the suppliers we have, so we classify here a supplier with a specific strategy. One strategy is *preferred*, and if the strategy of the supplier is *preferred* that means that they will first meet the requirements that we have and that they are part of our long term plan. That is a supplier we want to award new business to and that we know we can award new business and they have the right quality level, the right contracts, and everything is in place with that supplier. [sic.]"

A second interviewee specified certain categories for their suppliers depending to the firm's strategic intentions. Such categories are: "grow, maintain, exit, or forbidden. Where the *maintain* suppliers usually move to *grow* due to their good service, competitive prices, or they are suppliers which can help us in technological developments". On this specific case it was mentioned that; "the engineering department decides upon who has the capabilities for a long term commitment with a technological development goal."

Also, one of the interviewees declared the existence of a "corporate supply chain" department that handles the relationships with a small group of key suppliers that distributes material through several business units. The goal of this group is to obtain an improved price because of a substantial increase in the volume purchased. This behavior has several implications for this study; first, returning to the power discussion, by

increasing the volume purchased the firm aims to improve their position in relation to the suppliers and consequently enhance their leverage potential. Second, it embodies the firm's intentions of making its business account more attractive to the customer, which would represent an improvement according to O'Brien's (2012) Supplier Preferences model. And third, it expresses a desire to align their strategic goals.

For example, an international car-maker wants to depend less on abroad suppliers and use more local suppliers. Because of the "newness" of those components in the local market the supplier would have to invest considerably in new machines and processes, also because of the foreign quality standards the supplier would also have to develop and add new validation tests. Aligning the intentions and goals of these two companies will be crucial in order to secure its success, the supplier for example can take initially a loser business with the promise of continuous and bigger deals in the near future if they fulfill the customer's needs; while the customer earns in savings and logistics, the supplier wins competencies and future business relations.

To conclude, it is necessary to mention that the customer-supplier strategic goal alignment holds a specific place in the relationship with extra importance since in addition to its strengthening function it performs as a *go* or *no-go* gate for the new business events between the firms. This means that even if the right amount of trust (in both dimensions), power and interdependence is held, a difference in strategic goal alignment may overcome the positive factors and prevent the business event from happening or succeeding in the long term.

5.2.4 Relationship management

Ultimately, it is through the combination of trust, power, interdependence, and goal alignment that the customer-supplier relationship is shaped.

The theory indicates that successful relationship management is a means to improve the customer-supplier partnership and maximize customer value through increased quality and product innovation, and reduced costs and risks (Cousins, et al., 2008). However, to achieve maximum results through relationship management based in our case study, we propose that the following five conditions should be considered. First, relationship management is resource demanding, so the suppliers selected to be included in the relationship management efforts should supply items or services with high customer value (e.g. the top sectors in Kraljic's matrix) to achieve resource efficiency. Second, the suppliers selected should hold strategic goal alignment with the focal firm. It is pointless to use relationship management with a supplier holding high trust, balanced power and balanced interdependence, but with different strategic plans than the focal firm. Third, a defined long term vision is needed by both firms. Fourth, if relationship management is used, benchmarking the competitor's solutions is required to maintain competitiveness with the

primary suppliers. Not performing proper benchmarking may lead to a competitiveness loss which is the whole point of doing relationship management in the first place. Fifth, due to the dynamic and complex nature of the environment; the relationship, the firm's performance, the context, and competitors need to be monitored to maintain the relationship terms up-to-date. A good strategist would also define an exit strategy to be used, just in case.

Cousins et al. (2008) defined a relationship management framework (Figure 13 Strategic Relationship Positioning Model) which is as an element of the Strategic Supply Wheel. In this model, relationships are defined as processes (Figure 12) that require an input (technology, skills, culture and communication) and will have an output which need to be defined for the relationship to be focused towards attaining the desired outputs.

We propose that the customer-supplier relationship management is affected by the different combination of trust (calculative-emotional-behavioral), power (mediated-non mediated), and directed by the strategic goal alignment (Figure 19 Firm's self-assessment in supply chain and sales departments) which will set the grounds for the collaboration between firms and determine the nature of the relationship and the strategic direction of it. However, when seeking the creation of customer value, relationship management also contributes by providing the necessary conditions for this to happen; once the strategic goals are aligned and relationship factors considered supply chain management can understand and manage the necessary elements that need to be exchanged to fulfill these expectations. This relationship exchange covers from the essential information for supplies' logistics, to more implicit knowledge like intentions and desires, and both are required to comprehend one another's goals, redefine the problems, and achieve improved solutions.

5.2.5 Knowledge Management

Relationship management thus, pave the way to create a mutual understanding or a cognitive map where the information shared will convey knowledge which then can be exploited accordingly by each party.

According to Grant (1996) knowledge transfer in the firm is a business strategy; he claims that KBV is about constantly reaching value by developing capabilities through sharing of knowledge. The network perspective uses the same principle as aligning goals require a constant exchange of information and knowledge. Asymmetric information, or the imbalance of knowledge in the supply network, is a studied and important issue which has helped to explain many harmful phenomena in the network dynamics and, by consequence, helped to correct them and improve its performance (Angerhofer & Angelides, 2000). As mentioned before, modern efforts to understand how the supply network behaves are focusing more and more on the share of knowledge and how other factors, that are not

readily visible and their interrelationships hard to understand, have an impact in this exchange of information.

(Fiala, 2005) for example, suggest that the strategic partnership can be modeled as a dynamic system and involves three coordination systems in order to accomplish cooperation in the network, these are; 1) the information, material and financial flows representing the deterministic part of supply chain, 2) an event-driven process chain to represent the logic part, and 3) a neural network to represent the stochastic learning behavior of the actors in the network. The deterministic part consist on the raw information that the supply chain's planning, logistics and business negotiation processes use as inputs to calculate clear business' financial and operational indicators. The logic part is represented by the business core structure or the value chain of a company; if we consider the deterministic part as the blood of the firm which contains the necessary "ingredients" to keep the organization alive, the logic part would represent the veins' structure which guides that information through all the important "organs" or divisions in the firm. Finally the stochastic part represents the cognitive element of the network which requires learning and sharing knowledge in order to try to predict future behavior.

Comparing this theory to our case study we have found that all companies have constant flows of different kinds of information. They also have a value chain structure, represented by software like SAP/R3, which highlight the business activities and how all departments relate to each other. Finally, all of them are composed by people who represent the stochastic agents making decisions and learning from them.

In our interviews with the supply chain areas we have found that they mainly exchange logistics information and financial data that helps them coordinate material deliveries and understand the performance of the businesses with their customers and suppliers. This constant exchange of information, sometimes in real-time fashion, cover exactly the deterministic part of the network seen in the theory because this information will let them calculate and plan their future moves regarding their supply relationship while monitoring their performance and areas of improvement.

At the functional areas we have not only found a similar flow of raw information, a characterizer of the deterministic part, but also an exchange of know-how regarding the operational processes of the firm which represents the theoretical logic part. Engineers for example, would not only solicit data regarding technical specifications as in drawings and material but also information about the processes and know-how of their suppliers as it's necessary for them to understand certain aspects of their suppliers like manufacturing and production techniques. This exchange of operational information reveals part of their businesses structures as engineers have the chance of looking into other firms' processes and capabilities. The fact that these situations did not seem to happen in the supply chain

areas as naturally as in the functional areas seems to support our theory that functional areas have more potential to share knowledge and thus, more emotional trust and potential to create customer value by product improvement.

The third network, according to the theory, corresponds to a neural system which is composed by the people on both sides of the supply network and the tools that they use to communicate and exchange knowledge between each other. In this regard both purchasing and functional areas act as the stochastic variables of the network. People from commercial areas declared that a constant communication is held with their counterparts in order to negotiate supplies, prices, deals and commercial decisions in general. They also mentioned about dedicated systems where the profile of each supplier is kept and some management activities are realized by allowing them to give and receive feedback, keep track of the deliveries, improve the ordering performance, and even raising quality alarms when necessary. People from engineering also claimed a close communication with their customers and their suppliers to ensure understanding of necessities prior new projects and give follow-up of parallel activities. In their case, the tools used were mostly EDI systems which allowed them to present project deliveries to their customers in the correct usable format, plants visits when possible, and normal telecommunication formats that ensured a more “personal” and up-close interaction.

Although many similarities are held with the theoretical model presented by Fiala (2005) we have notice that in his work the discussed negotiation happening between the people is mainly represented in the contracts by using the flows of information; price, quantity, cost, quality, and time from the deterministic part. This is not completely true in reality as we have seen from the interviews that negotiations of the purchasing area often include acquiring new suppliers, new supplies, or new capabilities for new projects which require the expert opinion of the functional area receiving the supplies. This inclusion of the functional areas, as we have discussed before, involve the sharing of the supplier’s value chain knowledge and not only flows of raw information.

For example; if a big carmaker is negotiating the inclusion of a potential tier 1 supplier it would be common for the supplier to receive a visit from a multi departmental team composed by purchasing people and, specially, engineers from the customer-to-be in order to evaluate the capabilities of the supplier. To observe the productions lines, warehouses, machines etc., would mean little to the people from the commercial areas but to the engineers it would reveal the operational and technical capabilities which means an important transference of knowledge regarding the business structure of the supplier. This does not diminish in any way the work of the commercial area but highlight the importance of the functional areas to 1) grasp the implicit knowledge represented by the business structure and 2) translate that implicit knowledge into explicit data to be used in purchasing negotiations.

We claim then, that the firms' departments having contact with the supply network constantly exchange explicit information which helps them achieve their supply chain, operational and coordination activities but also share important business related knowledge; implicit know-how regarding their value chain, which is necessary to give context to the raw information and construct a mutual base from which more value can be achieved.

Nevertheless, this important exchange of knowledge is somewhat constrained and directed by the relationship management, which is in turn given by trust, power, and alignment of goals of the interacting companies. It is important for us then, to analyze this alleged connection under the multi-agent theory (MAS) discussed in the literature, as we feel represents the trust and power effects affecting the behavior of the agents in the supply network.

As mentioned in the literature; "an agent's *beliefs* correspond to information the agent has about the world. These beliefs may be incomplete or incorrect. An agent's *desires* represent states of affairs that the agent would, in an ideal world, wish to be brought about.[...]Finally, an agent's *intentions* represent desires that it has *committed* to achieving" (van der Hoek & Wooldridge, 2007, p. 897). Once again the importance of including this network modeling perspective resides in the possibility that it give us to include trust, power and goals alignment as shapers of the notions of desires, beliefs and intentions which in turn determine the rate and impact of transference of knowledge.

We have found in the interviews that issues of communication, understanding of the partner's processes, and transparency of intentions were mentioned as trust enhancers and affect the way a buyer or an engineer behave in their relationships with their clients and customers. At some point an engineer commented that their risk of trusting someone external to the firm was partially contained by the contracts and agreements signed at the commercial area, and that the whole point of their functions is to create solutions for the customer's needs so they needed to believe that knowledge and information flows were not restricted between them and their suppliers as they can only exploit this resources when they are shared. We also found that power, for our interviewees, is given by diverse factors from which many are given by the market, and we can infer from the given negative comments in the interview that a misuse of power in the relationship creates discontent and hinders trust.

Matching these observations to the theory we observe that behavioral trust has an important influence in what other agents perceive as our intentions. Behavioral trust by definition is encased in our actions and represents an effective way of communicating what our intentions are or, according to the theory, our ideal representations of reality for which we have committed resources to achieve. If these intentions are not aligned between the

agents or coherent with others' strategies then there would be high chances of wasted resources because of many different or opposite goals. In the same manner power is connected to this behavioral trust and can be a great tool to promote changes and make decisions. Power is part of the structure of the network and the agents can use it to ease their decision-making and facilitate the transference of knowledge to their advantage.

The more trustful a relationship is, the more including the power used is, and the more aligned the goals of the agents are, the easier information and knowledge will flow between them as they will have to worry less about getting ahead of what the others plan to do to satisfy their own goals and worry more on the how to achieve their common goal. One could also argue that this situation is more like the chicken and the egg, - what comes first; knowledge-sharing or trust? To this we could go back to our thoughts about how calculative trust, represented by contracts and agreements, set the basis from where future understanding can be built as this behavior is pretty evident from the engineer comments where they would trust and share openly once the commercial areas have signed a contract and set confidentiality agreements.

Regarding power and knowledge we found that the general rule was the supplier sharing more info and know-how on their processes and the customer only sharing the necessary for the supplier to perform their functions. We must remember that power was found to be unequally distributed but it didn't necessarily represent an issue as there are other factors like the common goal of providing customer value which lessens this imbalance. Sharing knowledge and information then, is importantly related to the alignment of desires or goals to which we commit our resources to complete. Concepts like trust and power shape the network relationship by shaping our behavior and actions, and thus our intentions, in the eyes of other actors who interact with us.

Although it could sound like an endless loop where one could argue that sharing knowledge generates more trust and shapes power in the relationship or vice versa, we believe that the natural flow of the chain, and the end agent; the customer, give reasons to the network to exist and gives all the agents involved a common reason to work together and start an effort of coordination through information and knowledge.

5.2.6 Results on Customer Value Creation

The literature suggests that the knowledge-based view puts great emphasis in the firm as a product and services deliverer; working with inputs and outputs. Grant (1996) suggest that this is especially important since the firm takes these inputs and progressively transform them into valuable outputs by letting the firm's departments, and the people working in those departments, to apply their specialized knowledge and pass it along the value chain.

We have found that this a similar practice in the supply network as integrators at the lowest end of the supply stream often receive products which already contain added value

from the work of previous suppliers located upstream. Nevertheless the meaning of value to the customer is composed by perceived benefits and total cost of ownership which means that there are different ways to appreciate this customer value. Commercial areas mentioned in our interviews that some of their strategic products come from suppliers who are specialists in their industries. They look for suppliers who possess capabilities that they don't have, either because it's not in their strategy or because it's too expensive to develop, and gets reflected in the cost of their products. Engineering areas, on the other side, mentioned that when working in new projects they work really close to their suppliers to assess their capabilities and understand how their inputs can bring interesting proposals to their solutions.

What we observe from these comments is a tendency of purchasing taking advantage of the supplier's capabilities that aim for ownership cost performance. Suppliers achieve this because they either possess intrinsic knowledge that allows them to deliver inputs with less cost, better logistic, better quality, etc., or because they have extrinsic capabilities that allows them to exploit their environment. For example, copper was mentioned as a strategic product for one buyer, not because its superiority price rebates or technological advances, but because its supplier position in the network and how they are the only ones able to supply in the desired quantities.

On the other side, we observed that functional areas look for innovative and technically competitive partners for their strategic supplies because of the potential value that they can achieve when incorporating them to their own processes. While their participation certainly helps the commercial areas to obtain low costs of ownership, especially when selecting new partners, is the own input from this functional divisions the one that focus in using their own and their supplier's knowledge to give value to the customer who perceives the added benefits.

We have tried to create a strong emphasis in how these two ways to understand value differ from each other for clarity sake, but perhaps it would be wise to remark that both are interconnected and necessary for a superior market channel performance. This means that the functional area's knowledge that is bestow into their processes gets transformed into capabilities reflected in their product and services which might be appreciated as cost improvements by the customer purchasing department.

For example, imagine that a company producing copper connector terminals has a great process capability that allows them to deliver big volumes of their product with great speed. This added value by superior process knowledge in their manufacturing practices gets to be interpreted as cost reductions by the customer's purchasing area. Nevertheless the same customer's functional areas do not perceive any benefits as the costs and logistics of the terminal have no impact in their functions, moreover they might be more excited

about working with the supplier of silver terminals because this material allows them to create more powerful products.

Kogut & Zander (1992) claim that “firms are a repository of capabilities”; in their view the experience and the dynamics of the people interacting in the organization are the ones capable to provide constant value to their work which seems to explain the competitive advantages of some firms over others. Both Grant (1996) and Kogut & Zander (1992) explain that know-how, because of its nature, is hard to understand and control but agree that is important to share a same language and worldview to ensure better transmit knowledge, absorb it and exploit it.

In our case study it was interesting to note that commercial areas considered knowledge transfer as an important subject but with lot of room to improve through communication, not only with them but with the functional areas developing the projects. This concern of coordination and information feedback regarding purchasing toward their functional areas proves that supply chain is aware that the more effective the coordination and transmission of ideas between these areas, the more the economic indicators get positively affected at the end of the value chain.

In this way, commercial areas act as a kind of value “translator” by taking the competitive capabilities of their functional areas and transforming them into visible value indicators which they can exploit or negotiate with other actors in the supply network. This goes according to the theory where Dyer & Singh (1998) include knowledge-sharing routines as a means to achieve relational profits by learning from each other, encouraging transparency, and reducing opportunism. These relational characteristics get to be perceived as “important” by commercial areas because of their potential for value and also allow us to introduce a weakness of the KBV which is *motivation*.

Kogut & Zander (1992) and Dyer & Singh (1998) mention that knowledge-based view focus much on the coordination issue but fail to take into account that there might be incentives issues even if two companies have the aligned goals. Both investigations also mentioned that this problematic is partially covered by financial incentives or informal norms of reciprocity. We suggest that participation of the functional areas is crucial for achieving value, not only because they are the conveyors of the firm’s capabilities but because their participation can bring relational incentives that commercial areas cannot offer through their functions.

If we imagine a powerful customer deciding between two suppliers our obvious thoughts would be immediately to look for the better deal, but let us assume that purchasing came back with the results and both suppliers want the contract and have the same business case; same technical capabilities and offer the same economic profits. If we eliminate the corruption factor we could see that no matter how good a relationship between purchaser

and seller is, the decision could go both ways without any issue. Now, if we assume that the decision making includes the opinion of the functional area, who has worked with both of the suppliers before, we could easily realize which business relationship would most likely succeed. Based on their previous interactions a relationship measure has been established; this measure would probably not even consider economic factors but intangible things like service attention, openness, communication, etc. and so this “raw” value that has not been translated to readily visible indicators has an impact on how well two firms would work together.

Knowledge as the resource of firms for creation of value implies that the employees have to have freedom to make and take decisions, as is in them where the possibility to exploit knowledge resides. Functional areas clearly perform functions of value adding and understanding, which help their commercial areas to negotiate and become visible and quantifiable to other firms in their networks, but we claim that the active inclusion of these areas in the supply strategy would help increase trust and balance power which might help with the motivation issue of the knowledge-based view.

6. Conclusions

“The human brain is a complex organ with the wonderful power of enabling man to find reasons for continuing to believe whatever it is that he wants to believe.”

Voltaire

Finally, we have reached the final turn before the main straight that takes us to the checkered flag¹⁸ that marks the end of the race. This means that it is time to zoom out until we are able to see the whole picture, relate the work done to the original research questions and present the results for this study. The first research question for this study was defined as: how does the customer-supplier relationship affect value creation?

To answer this question, it is first necessary to redefine the supply chain functions. Christopher (2011, p. 3) defines supply chain as: “the management of upstream and downstream relationships with suppliers and customers in order to deliver superior customer value at less cost to the supply chain as a whole”. This definition is aligned with the findings of this study, since supply chain is a means to deliver superior customer value at less cost, but it is incomplete. It is right on the statement that supply chain’s goal is to maximize customer value minimizing costs. But even at the Integrative Stage (Cousins, et

¹⁸ The checkered flag is traditionally used in auto racing and it indicates that the race is officially finished.

al., 2008), it is unable to “create” customer value. Instead, it performs a strategic role supporting the customer value creation performed by the functional areas. So, the definition of supply chain is to be rewritten as: the management of upstream and downstream supply networks in order to deliver superior customer value at less cost while supporting the customer value creation in the firm’s functional areas by the management of customer-supplier relationships.

This last definition proposes that supply chain performs two different functions. The first function is: managing upstream and downstream networks in order to deliver superior customer value. And the second function is: to support the customer value creation in the firm’s functional areas by the management of customer-supplier relationships. The definition of both functions comes as a result of the empirical research performed. It was constructed by tracing the firm’s activities related to the products and services sourcing, which then switched focus into the functional areas. In this view, purchasing is not the only element in the supply chain department, but it is an element of a bigger system with open borders that holds constant communication with other areas of the firm.

Figure 23 shows the revised activities of the supply chain function. Thus, supply chain comprises the set of activities performed by the purchasing department and supported by the functional areas. The functional areas in a firm are those who work around the products or services produced, and add value to it e.g. product engineering, process engineering or quality management. So, it is them the ones understanding and holding the technical requirements of the product to be purchased, and in such a way, the only ones authorized to perform any improvements in the product or service purchased. It is here, in the understanding of how functional areas are connected to the supply network, where the biggest opportunity for an increase in customer value rests; as functional areas are the ones understanding the products they received

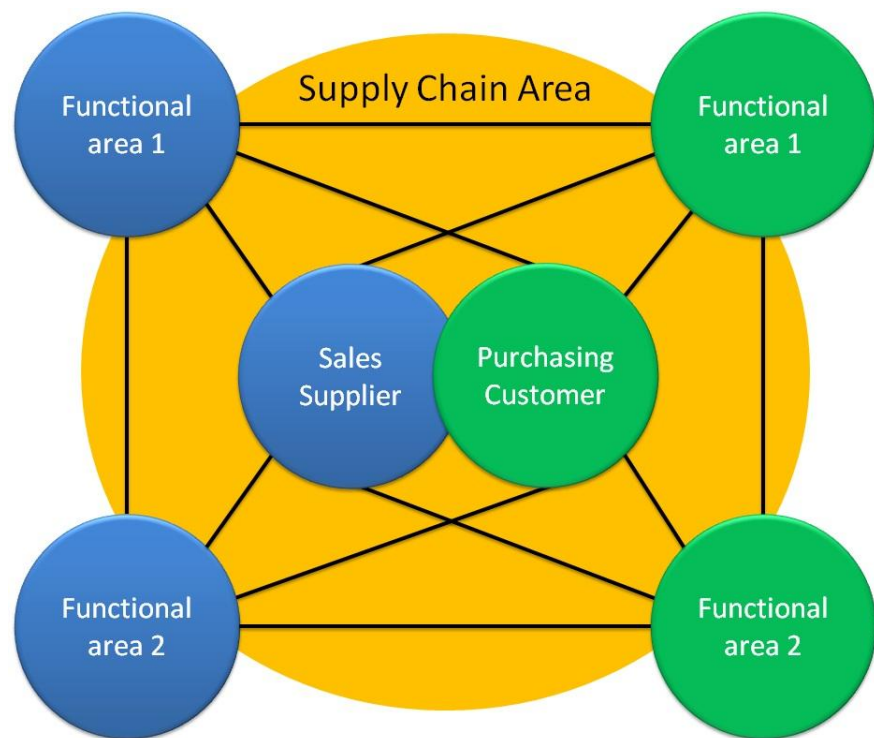


Figure 23 Supply Chain Functions Redefined

from the network, it is them who manage the knowledge encapsulated in the supplies and the ones who have the potential to add to it with their activities.

Even so, it is a common practice for the customer and supplier functional areas to have active communication channels and in most of the cases, EDI systems set to ease the information transference between them.

Nevertheless, the proposed panorama does not leave aside the importance of purchasing for the supply chain function since they command purchasing events and are the tip of the arrow of the supply chain function. The purchasing function is the one scanning the supply network, looking to grasp and maximize the sourcing opportunities existent there. Moreover, the purchasing department represents the gatekeeper and manager of the customer-supplier relationship. They are the hub set to administrate the purchasing event between the different parties in both firms.

Even though this does not answer the question regarding the connection between relationship management and customer value creation, it do brings up to the table an idea of where to search. Customer-supplier relationship management does not create customer value as itself, but facilitates the value maximization in two ways. First, it empowers the capacity of the purchasing department to grasp maximum customer value at a minimum cost. And second, it strengthens the links between functional areas in both firms and induces customer value creation through product improvements. In order to fully understand the reach of customer-supplier relationship management, it is necessary to first dissect it to analyze its individual components and review their effects. Further reassembly the relationship management concept and evaluate its generic effects.

The answer to this question will be supplied in three different steps with increasing complexity. First, the results regarding the elements characterizing the customer-supplier relationship will be presented. Each element will be presented individually along with its individual influence to the relationship. Second, these elements will be related to each other and to the relationship. And third, the relationship will be linked to customer value creation, which is the final goal of this study.

Trust, power, strategic importance of supply chain, strategic goal alignment, account attractiveness, the relative value of the business and the nature of the product supplied, are the factors proposed at the beginning of this study to be shaping the customer-supplier relationship. The links between the mentioned factors are complex and inter-related to each other which makes very hard to isolate the effect of one of them for observation purposes. Said this, it was decided that trust and power will be analyzed independently, and that account attractiveness, the relative value of the business and the nature of the product supplied are to be handled as elements in strategic goal alignment.

6.1 Trust

We have seen in the literature that trust is a social phenomenon which enables social structures to withstand intricacy and relational issues as it acts as a complexity reducer. Trust, in the social perspective, is represented by our actions and composed by emotional and rational trust, whose respective extremes would correspond to blind faith or total risk calculation. Both extremes are not plausible in the real world and so a portion of each one is needed to achieve a balanced and, more importantly, predictable expectancy of how people behave when having a relationship with others.

This trust dynamism seems to be supported in the supply network based in our case study's answers. More importantly, the answers found seem to indicate that the contribution to each "type" of trust is enhanced depending on the business' departments interacting with the supply network which are synthetized as commercial or functional areas. Our explanations for this lay in the organizational activities of these departments; while commercial areas seek maximization of value, functional areas are the ones creating the value to be maximized with sales and purchasing practices.

Moreover, we have found that emotional trust is fundamental in order to achieve customer value, as it enhances the knowledge transfer between customer and suppliers and thus, better chances of generating innovation in functional areas or cost reductions in the commercial functions. Rational trust must not be overlooked though, as the profitability intentions of the firms make risk calculation a necessary base ground from which emotional trust can be built; in other words, risk analysis and technical feasibility are a must-have in order to consider creating deeper bonds for a long-term relationship (Figure 24).

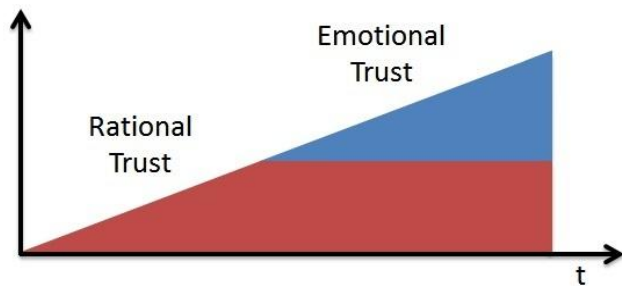


Figure 24 Trust development over time.

6.2 Power

In the case of power, literature indicates that is a concept embodying the capacity for decision-making and can be embedded in the structure of the firm (authority) or the influence of the social group using their environment (politics). The issue of power comes from the implicit relation between taking decisions and generating changes, which affect other groups' interests who can move in favor or against these decisions. This is why in this work we take a dichotomization of power based on the behavioral effect generated by its use. Mediated power, for example, has the advantage of bringing immediate change but wears-out the relation which can lower performance. Non-mediated power on the other

hand potentially generates reciprocity, thus enhancing performance, but can take some time to perceive the benefits.

As in the case of trust, power was also found to be different depending on the organizational area in contact with the network; commercial areas experimented more mediated power, while in general functional areas didn't even recognize power issues at all. The reason for this was that operational areas had a value perspective where changes are go/no-go depending on three factors; the customer as the focus, the contract's specifications, and technical capabilities. The case study also reveals that, although external factors have the potential to affect the power distribution in the supply network (politics), most of the time are the customers who hold the power to make decisions and implement changes (structure).

We propose that this tendency, where the customer has more power, occurs because of the natural orientation of the supply network structure towards creating value for the final customer. Although misbalanced, the use power seems to provide drive to the functional areas and competitive advantage to the firm overall.

6.3 Goal Alignment

We propose that goal alignment is another important influencer when handling customers and suppliers and thus we have presented two models to analyze each side of the relation. The models to be used are; Kraljic's matrix, strategic supply wheel, growth-share matrix, and the supplier preferences framework. These frameworks are grounded by variables such as market share, business grow rate, account value, account attractiveness, strategic importance, and complexity, and allow us as a participant of the supply network to 1) identify the strategies for handling our customer or supplier, and 2) identify what is the perspective that the customer or supplier has toward our business.

According to the case study, the first half of this dynamic is already a common industry standard and is used to determine paths of action, while the second part represents a self-reflection upon one's business seen from external eyes and is usually covered passively when inter-firm negotiations occur by showing intentions and giving feedback on practices. Because of the interdependence that generates the network, suppliers and customer will see that their objectives are affected by actions of others and vice versa.

The main purpose for this goal alignment practice is to understand how the strategy towards our customer or supplier compares to their possible strategy towards us, and preemptively create business policies that would allow both firms to maximize the benefits of the relationship.

6.4 Relationship Management

Relationship management in the literature is represented by Cousins' et al. strategic relationship positioning model (2008) which claims that relations between suppliers and customers are resumed by courses of action that bring business outcomes. Nevertheless, this model is unable to capture the complex and dynamic nature of relationships. First, because as a portfolio model, two strategically selected variables are not enough to determine the nature of the relationship. Second, the variable selection is representative but not helpful; this means that while it is a good model to assess the current position of a single product or service with a certain supplier, it does not assist on the task of managing the relationships nor strategic planning. Third, it only includes the perspective from the customer towards its supplier, neglecting completely the possible strategies the supplier might have regarding the customer business.

We propose that relationship management should: 1) be applied to the most complex or resource demanding products and services, 2) understand the goal alignment about the intentions toward our suppliers and the possible supplier intentions toward us as customer, 3) consider the power and trust effects that these strategic differences might have in the relationship, and 4) create comprehending business policies and adapt employee interactions to them in order to maximize the effects of the relationship.

Although the above tasks might sound only applicable for the supply chain operations, the results from the case study indicates that a further integration of functional areas into the supply network strategy is required to achieve these goals. Functional areas must develop a proper sense of their role in the supply strategy and evolve accordingly by designing supplier development programs, improving communication and generating strategic knowledge that allow the firm to obtain the maximum value from its participation in the supply network.

6.5 The role of knowledge in the supply network

Knowledge-based view as the strategic direction of a firm is covered by the literature as an issue of how the individuals holding the information (explicit) and the know-how (implicit) can cooperate together to create value. In this perspective the firm's tasks are; receive inputs, add value, and produce valuable outputs. These same concepts can be applied to the supply chain network where coordination is an important focus, though not the only one, and material move down the value-adding stream as it reaches the final customer at the end.

Theories like systems dynamics and multi-agent systems are helping us to understand how firms behave and interact in the supply network. An organization looked under systems dynamics, for example, will focus into the flows and feedback of information as a means to

coordinate efforts through the network. In this case, financial information, production indicators and even flows of raw materials throughout the value chain are studied to see how they interrelate and generate the value of a finished product, where this value is added and how it is influential in other indicators like profit or market demands, in order to control it and improve it.

Multi-agency systems treat the firm as individual agents with own beliefs, desires, and goals which helps to explain why and how organizations in the supply network take decisions. For example, an important European car-maker is planning to buy from a big company in the American automotive market but despise their reputation and the business opportunity they believe their market represent no practical advances seem to be made in the negotiation table. This behavior could be explained by different facts like the aggressive contractual approach that American companies are used to (beliefs), or maybe the European market is not even in their best interests not because it doesn't represent a technological advance but because the sales volumes are insignificant compared to their current clients and their competencies are more focus on manufacturing cheaper and faster (desires and goals).

The results of our case study prove that the flows of information and materials between supplier and customer are important for the supply network performance as these flows are always present and have an impact not only in economic performance and logistics, but also transmitting know-how of the business structure, especially at functional areas, which expose tacit capabilities of other firms. Nevertheless we have identified that other elements proper of multi-agent theory like; transparency, power, communication of intentions, commitment, etc., have an effective impact in the behavior of the actors in the network.

During our study we observed that commercial areas affect customer value by minimizing the costs of the received materials products and maximizing profits of the end products through contracts and logistics mostly which fulfills supply chain theory as:

$$Customer\ value = \frac{Perceptions\ of\ benefits}{Total\ cost\ of\ ownership}$$

On the other hand our study also indicates that the transference of know-how through the supply chain is a crucial activity to gain competitive advantage through innovation, and furthermore, that these activities come mainly from functional areas.

This makes sense when looking the firm under a value-adding perspective, as functional areas are the ones applying their knowledge to generate a valuable product which encloses the firm's capabilities which then gets to be passed along to serve as a value platform where other actors can build upon. The exchange of some of this know-how through the network is necessary in order for others to understand where their own knowledge can be

applied to make the most of the products they are working with. This exchange of knowledge, and thus a world view, helps to create an underlying understanding of the other network actors which improves further the relation by generating trusts and downgrading the negative effect of power, restarting this way the cycle by creating more knowledge and so on.

Purchasing and functional activities are inevitably interrelated regarding customer value. What sets them apart is how both use tacit or implicit knowledge and its impact in the final product. Being both areas always active in the supply chain network the underlying opportunities for exploiting others knowledge are always present. This process is not easy as it involves many factors that are, until now, not fully comprehended like power and trust but considering the relationship under a network perspective, creating an understanding of others' intentions through goals alignment, and having a long-term perspective is a good start.

6.6 Differentiation of relationship management and supplier development

The authors of this work feel that is important to give a final declaration about how the relationship management proposed here and current supplier development activities are different from each other, along with their commonalities.

Relationship management, as described in this work holds similarities with supplier development as both involves efforts of the customer to increase the capabilities and the performance of their suppliers. Nevertheless when looking more closely we found that, although supplier development can generate value, it is not its only goal. Supplier development covers a great areas of improvement which can go anywhere from simple training of supplier in quality issues, to investment in relationship's specific assets with purposes that include technical evaluation, political requirements, improved logistics etc.

Relationship management's only concern is in creation of customer value through knowledge management practices. This is achieved by considering the mutual perspectives of the firms and facilitating the necessary exchange of knowledge between the network actors.

Furthermore, although supplier development is composed by a multi-departmental group it is often, because of its different objectives, a complete different department from purchasing or functional areas as it might not involve the buyers, supplier managers, or the engineers who have continuous contact with the supplier. In this regard we do not propose the creation of a "special" department in relationship management but a maximization of the current activities that the firm already performs; we claim that relationship management is more of a perspective or an attitude under which employees with supply network interaction should have in mind in their everyday operations.

7. Limitations

The automotive business is a mature industry that has been in development for over 100 years and its strong and weak points are a result of evolutionary changes over time. This study is importantly limited in terms of generalization to other industries since the automotive industry holds a great variety of participants with parallel evolution but doing so in distinct circumstances. The firm selection (2 Scandinavian firms and 2 American firms) is aimed towards an increase in the level of external validity, but it cannot be assured even within the industry given the great differences between the approaches taken by firms towards operations. Moreover, we believe that the results of this study can be taken as guidelines showing the strong points and pitfalls of the selected topic present in the automotive industry. Further, these lessons learned can be used to avoid its appearance in younger industries still in development phases.

In pursuance of external validity, a bigger sample containing participants culturally different in accordance to Hofstede's¹⁹ cultural dimensions is needed to cement the study's applicability outside Scandinavian and American firms. The same can go for the functional departments' sample; after discovering the role importance that functional departments have in the supply network relationship we had limited time to interview more personnel in the different process areas of this industry.

In terms of construct validity, the absence of direct and participant observations, and internal documentation, rests the gathered evidence over the participants' introspection. This means that the sources of evidence are based on the interviewee's perception of its own actions, which can lead to an intention-action gap, and in consequence, to a lack of construct validity. In order to avoid this error, access to the firms' internal documentation is required along with the realization of direct and participant observations to close the intention-action gap and consolidate the construct validity test.

We also believe that the reliability of the study results could have been benefited by the inclusion of more interviews of functional employees, external to the supply chain or sales department, as their participation was not as high as from the supply chain area. This was due to the lack of time after discovering their high interaction with the supply chain network.

¹⁹ Geert Hofstede's theory of cultural dimensions describes the effects of a society's culture on the values of its members, and how these values relate to behavior, using a structure derived from factor analysis. Available in:
http://en.wikipedia.org/wiki/Hofstede's_cultural_dimensions_theory

8. Future Research

Originally, this study was intended to cover several participants sharing value chain and network. Performing it was not possible for two reasons. First, the firms in the sample denied the notion of directing us with their suppliers to include them in the case study. Second, the study's timeframe limited us pursuing this state. A great opportunity for future research lays in performing a case study in a small network to test the network effects in the different participants.

There are countless cases where a specific-industry developed solution transcends its own success and breaks out the borders of its mother industry headed for industries with similar needs e.g. lean manufacturing, total quality management or failure mode and effects analysis. An opportunity for research is allocated in the execution of a study with the same goals, but in a different industry aimed for the comparison of the industry's problems and solutions.

Also in terms of construct validity, the absence of direct and participant observations the use of direct and participant observations may unlock tacit modes of knowledge transference between the focal firm and the supplier that the interviewees are unaware of.

Regarding the relationship management framework we proposed we recommend that further studies are needed to prove that the specific selection of the four goal alignment tools is statistically significant to be included in the supply chain strategy. Likewise a future research on how other social factors influence the holistic view of the supply network is needed to further validate our results; in our study relationship concepts like commitment, interdependence, motivation and coordination were mainly explained by the combination of trust and power.

We believe that a future research is necessary to go further into one of the critics relevant for the knowledge-based view; the motivational issues. Although briefly touched here by the inclusions of social issues like power and trust, as well as interdependence and cooperation, the scope of our work was not intended to explain or solve this issue. A second study with a deep focus on what moves firms to work together in the supply network would be beneficial to cover this critic.

Ultimately, the development of a framework capable of representing the degree of strategic goal alignment between firms would be a great area of future research. Such framework would open up the possibility to measure and assess this factor as in a mathematical vector, where magnitude and direction would be the variables representing the strategic

goal alignment. Such framework would permit further development of the strategic goal alignment concept and raise its importance to the relationship.

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Appendix A

Questionnaire for Supply Chain Department

1. How many suppliers exist on your data base?
2. What are the department's goals towards supplier management?
3. How are the projects organized and classified?
4. What are the categories used to differentiate suppliers? What are the categories based on? What is the impact of being on one or another category?
5. In relation to the total size of the business, how many suppliers hold the biggest part of the overall business? (Pareto principle)
6. Explain on the long term relationships with suppliers. What products, why, timeframe, etc.
7. Explain the complexity sources in the products purchased?
8. In average, how many suppliers participate in a quote for a certain product?
9. How do you handle and compare different suppliers of the same product?
10. Is there co-development in product design or production?
11. Is there a need for coordination with another firm (or department) in order to deliver the products? Could you explain how such coordination happens?
12. To what firm are products delivered to?
13. Explain the implications of switching suppliers for a certain product.
14. In your firm, who does the supplier selection?
15. What are the factors affecting the supplier selection process?
16. Are there established systems to handle the exchange of information between the firm and the customer? Could you please describe how information flows between the customer/supplier?
17. Do you perceive any improvements in the firm as a result from working with a supplier or group of suppliers?
18. Was someone designated to handle the relationship with the supplier? Explain.
19. Do you perform supplier development activities? Explain.
20. On a scale from 1 to 10, how important would you rate trust in the customer/supplier relationship?
21. On a scale from 1 to 10, how trustful would you rate your supplier? How can this grade be improved?
22. On a scale from 1 to 10, how important would you rate the knowledge transference in the customer/supplier relationship?
23. On a scale from 1 to 10, how efficient would you rate the knowledge transference between customer/supplier? How can this grade be improved?
24. On a scale from 1 to 10, how important would you rate communication in the customer/supplier relationship?

25. On a scale from 1 to 10, how efficient would you rate communication between customer/supplier? How can this grade be improved?
26. How would you distribute power between your firm and the supplier?
27. What kind impact do you perceive power has on the relation?

Appendix B

Questionnaire for Engineering Department

1. About their relationship with the customer
 - a. Requirements
 - b. Contractual agreements
 - c. Supplier use
2. About their relationship with the suppliers.
 - a. Reasons to contact suppliers
 - b. How work is performed
3. What are the department's goals towards supplier management?
4. Explain on the relationship between the engineering department and the purchasing/supply chain department?
5. Explain on the complexity sources when working with the suppliers.
6. What information is shared with the supplier?
7. What information holds value?
8. How is supplier risk handled?
 - a. What are the challenges when sharing information with the supplier?
 - b. What is your position regarding the supplier and their other customers?
9. What information shares the supplier with you(the customer)?
10. How is value created when working with the suppliers?
 - a. Benefit increase
 - b. Price reduction
11. Are there established systems to handle the exchange of information between the firm and the customer? Could you please describe how information flows between the customer/supplier?
12. Do you perform supplier development activities? Explain.
13. On a scale from 1 to 10, how important would you rate trust in the customer/supplier relationship?
14. On a scale from 1 to 10, how trustful would you rate your supplier? How could this grade be improved?
15. On a scale from 1 to 10, how important would you rate the knowledge transference in the customer/supplier relationship?
16. On a scale from 1 to 10, how efficient would you rate the knowledge transference between customer/supplier? How could this grade be improved?
17. How would you distribute power between your firm and the supplier?
18. What kind impact do you perceive power has on the relation?
19. Benchmarking

Appendix C

Questionnaire

1. How does your firm measure customer value* in the items produced?

*Customer value is defined as: $Customer\ value = \frac{Perceptions\ of\ benefits}{Total\ cost\ of\ ownership}$

2. Do you perceive suppliers add extra customer value to the product produced?
3. Where in the value chain would you locate the best opportunities for customer value creation?
4. What role do you perceive knowledge management plays in the creation of customer value?