[*] NETWORK OPERATIONS STRATEGY: A STRATEGIC VIEW OF BUSINESS, VALUE AND SUPPLY NETWORKS

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ABSTRACT (002-0111)

The formation and the development of enterprise networks and the Supply Chain Management (SCM) studies gained relevance. In this context, the operations strategy field evolved and enclosed the broader field of supply networks, as the works of Slack & Lewis (2002) and Rudberg & Olhager (2003) demonstrate. This paper proposes to categorize and present a methodological approach, and a qualitative and exploratory research of the business, value and supply networks in the operations strategy field. The value network considers the key elements (physically or not) in a supply system that determine the received value by final customers. The business network involves the actors that play a key role in provide the conditions and requirements needed by specific consumers to make viable the business in the attended market. This set of networks intends offer to academics and practitioners a management tool, under a holistic perspective.

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1. Introduction

In the 90´s, the world competition significantly increased, putting more pressure by flexibility in production and management. That caused to change of the vertical bureaucratic structures for the horizontal company, modifying the previous paradigm, of that, the competition gave between business units. In fact, the real operational unit becomes itself the business project, enabled by a net. In this context, the operations strategy field evolved and enclosed the broader field of supply networks, as the works of Slack & Lewis (2002) and Rudberg & Olhager (2003) demonstrate. However, the importance growth to consumers for the parallel relationships in the supply chain, permitted the vision of a new perspective, the value net. That approach brought the attention for others flows in the net that are not only flows of materials and information. Of this sense, the transformations occurred in markets as the removal of commerce barriers and the implications of the participation in multiple nets has in the company performance, suggest the existence of a business network in which firms are inserted. In that context, this paper proposes to categorize and present a methodological approach, and a qualitative and exploratory research of the business, value and supply networks in the operations strategy field.

2. The Evolution of Logistic in direction to the Supply Chains

The emergence in the research about supply chains is attributed by some authors from the logistic management (Gattorna & Walters, 1996; Rudberg & Olhager, 2003). The logistic activities have been practiced for many years. However, the practioners and educators were interested primaly in the management of the physical stream of materials and in the storage of goods (Rudberg & Olhager, 2003). The logistic evolution of business can be divided in three

main phases (Masters & Pohlen, 1994 apud Rudberg & Olhager, 2003): the functional management (1960 – 1970), the internal integration (1980s), and the external integration (1990s). The external integration emerged in the end of the 80´s when the information began to be viewed as a competitive weapon. The Information Technology passed to be applied generally (Gattorna & Walters, 1996), arising the use of EDI (Electronic Date Interchange) which permitted the transference of a computer files for another through the telephone. The beginning of the EDI went reinforced after data capture by the EPOS (Electronic Point-of-Sale) went broadly adopted. The availability of data by EPOS had supplied an vital tie of information between suppliers and distributors about the movements of products (volumes, rates of flows and inventory levels). The growing application of EDI and the external integration not only had enabled to focus in the materials management and the flows of information, but had called attention for improvement opportunities that resided in consumers and suppliers. A strategic vision of Logistic, accordingly to Christopher (1992) included: “purchases, materials movement, storage and inventory management and the distribution through marketing channels”.

3. The Supply Chain

While the development of technology accelerated, became difficult for companies to maintain up to date the products and services that are offered to the market. This situation imposed that the companies concentrated in its essential competences (Prahalad & Hammel, 1990) and delegated the production to third parts no only of substantial parts of his products and services, but also the development of these parts. This situation increased the quantity and the intensity of exchanges in the interfaces between the companies: the supply chains where the companies are included became to be more complex. Some authors (Christopher, 1992; Poirier & Reiter, 1996;

Vollmann & Cordon, 1996) argue that is not sufficient improve the companies internally to improve their competitiveness. It is necessary improve the performance from its productive chain. Accordingly to Vollmann et. al. (1996), the supply chain can be viewed, as an information flow channel where are processed raw materials, transforming those in goods or services that are supplied to final consumers. The relations management between the nodes of the supply chain became to receive much more managerial attention (Corrêa, 2003). The Supply Chain Management objectives can be summarized in (Vollmann et. al., 1996; Slack et. al., 1998; Spekman et. al., 1998): maximize the synergies between all parts from the supply chain with the purpose of serve the final consumer more effectively, be reducing cost or increasing value; to manage the supply chain effectively and efficient – to take a holistic vision in the management of the entire supply chain opens many opportunities to analysis and improvements. Following will be discussed the emergence of the concept of value net, in a vision extended from the supply chain.

4. The Value Net

The competitive pressures discussed above forced the companies to adopt a perspective of their final consumers in an attempt of understand what is considerated to be the key elements in a supply system and how this determines the received value (Parolini, 1999). That raises the question of how consumers make judgments about value, of alternative products (Bowman & Ambrosini, 2000). The first researcher to exploit the task and function inside a broader satisfaction delivery process to the consumer was Porter (1985) with the concept of value chain. The value chain identifies the connections and interdependencies between (and through) suppliers, buyers, intermediate and final users. Its primary benefit is the ability of examine those

connections and identify the “value” that is created for consumers (or that can be created in the future), and how by its time creates competitive advantage for the company. The business usually refer to “consumer value” and “added value” without supply corresponding definitions or understanding, that what is value for the consumer. With the objective to analyze the value perspective in the net, becomes necessary to define exactly “value”. A better explanation about the term can be reached by the exploitation of the distinctions used by Bowman & Ambrosini (2000), between use value and exchange value. The use value refers to the specific product qualities perceived by consumers in relation for its needs. In other words, the use value is perceived by the consumer. The exchange value refers to price. It is the monetary amount acquired in a determined point in time when occurs the exchange by a good. Exchange value is carried out when the sale is made. The difference between the product evaluation by consumer, and the price payed is the “consumer excess”. Explaining this in peculiar form, the price that the consumer is prepared to pay is “the price more the consumer excess”. Sells are carried out when the consumers sees that a product confers more value to the consumer that other possible alternatives. For Parolini (1999) the consumer excess (which she calls absolute net value) drift of a combination of a number of elements, being those the following: 1) Tangible Elements - those include such elements as the intrinsic quality of the main product, your aesthetics appearance and the possibility to receive accessories or complementary products; 2) Intangible Elements - Those include elements as the presence of I sanction associated with the useof the product, the rank of security attributed to the product and themselves the product tappet the signature of a famous one designer or fashion designer; 3) Service - the offering of a service can be to only form in the which that competitive kind of system can distinguish themselves of

others; 4) Economic Elements - These include such elements has the time and modes of payment, the amplitude and duration of any guarantees, the cost of accessory products.

These elements suggests that there is value in the service provided by a supplier which increased the ability to serve his own consumers. This brings to an interesting vision about as the value delivery can be affected. Gattorna & Walters (1996) and Parolini (1999) suggests a system of "creation and delivers of value". Parolini (1999) propose a detailed definition of the systems of "creation and delivers of value": 1) are defined has a series of activities that brings value for the consumers; 2) these activities are carried out using a series of human resources, tangible and intangible; 3) they are connected to materials flows, information, financial resources and influential relationships; 4) final consumers participate in the activities of value creation; 5) is governed by the market, by a hierarchy or some intermediate forms of coordination (inter-firms network); 6) several economic actors can participate of a system of creation and delivers of value and take responsibility for one or more activities; 7) an economic actor can participate in one or more systems of creation and delivers of value.

5. Operations strategy

The desire to succeed in a market characterized by elevated competition has motivated a growing number of companies to seek strategies in a more effective and cretive way. In many companies the more important strategic decisions are taken covering the consumers and the markets in growth without any attempt to include the perspectives of operations and its abilities to suport these requeriments and generate profits. The first author that identified the absence of connection between the strategy designed by the corporation with the manufacturing function was Skinner

(1969). The operations strategy approaches the configuration of the company´s productive resources objecting agregate value for clients.

5.1. Definitions and approachs for operations strategy

The definitions for operations strategy changes according to author´s epoch and ideas regarding what constitute a operations strategy. More recently, Slack & Lewis (2002), defined the operations strategy as the total standard of decisions that mold the long term capacities of any kind of operation and their contribution for the general strategy throught the reconciliation of the market requirements with the resources of operations. There are two perspectives for the operations strategy in function of their emphasis: the first approach, that we refer as top-down, determines that the strategy should reflect the competitive position desired for the organization, while the second approach, bottom-up, foresees that some of the resources of an operation constitute a rare, valuable series of competences and are difficult to imitate and that are capable of be exploited in the market.

5.2. The content and the process of the operations strategy

Different approachs for the content and process of operations strategy has been proposed. For the content formulation of an operations strategy is necessary the studies about two essential elements. Those are: the competitive priorities and the decision areas (infra-structural and structural issues of the operation).

5.2.1. The competitive priorities and decisions areas

The competitive priorities can be understood as a set of priorities options that the operation has to compete in the market during a certain horizon of time. These competitive priorities were summarized and combined in diferent forms by diverse authors. For Slack & Lewis (2002) these priorities consist of quality, speed, dependability, flexibility and cost. Authors, as Bolwijn & Kumpe (1990), argues the existence of an other competitive priority, innovation. For this study, the competitive priorities considered are: cost, quality, speed, flexibility, innovation and reliability. Accordingly to Hill (2000), with the objective to understand the markets, the companies need to distinguish between qualifiers and order winners criterias. The qualifier criteria are those criterias that the company should reach to become eligible as a potential supplier (Hill, 2000: 37). The order winners, on the other hand, are those criteria that serve to gain the order (Hill, 2000: 37). The practical implication, is that, the performance in the qualifiers factors can be limited to the necessary level to permit the entrance in the market, while the order winner factors should be continually elevated to offer more strong competitive advantages (Silveira, 2003). As well, as the competitive priorities are part of the operations strategy content, also exist a series of decisions about the operations strategy. Usually, is separated in the operations strategy the decisions that are related to operation structure from those decisions that are related with the operation infrastructure. The first authors to formally worry about those questions inside the strategy formulation was Hayes & Wheelwright (1984), that listed eight questions needed to compose a manufacturing strategy. The questions related to the decision areas also change with different authors. Table 1 presents the perspectives in the decision areas inside a operation strategy.

Table 1- Different perspectives in decision areas inside a operations strategy (adapted from Leong et al, 1990 and Rudberg & Olhager, 2003).

Decision Areas	Hayes et al. (1984, 1988*)	Fine & Hax (1985)	Samson (1991)	Miltenburg (1995)	Skinner (1996)	Hill (2000)	Slack & Lewis (2002)
Structural decisions							
Process technology	√	√	√	√	√	√	√
Capacity	√	√	√	√	√	√	√
Facilities	√	√	√	√	√	√	√
Vertical integration	√		√	√	√	√	√
Infrastructural decisions							
Human resources	√	√	√	√	√	√	√
Organization	√		√	√		√	√
Quality	√	√	√			√	√
Production planning and control	√		√	√	√	√	√
New product development	√*	√	√				
Performance measurement systems	√*			√	√		

Subsequently, will be examined in details the components of these decision areas that has a higher impact in the physical, value and business networks project. Following, is proposed an approach for a methodological investigation of the concurrent nets under the operations strategy perspective.

6. Proposal for a methodological investigation approach

In previous sections we described, shortly, the evolution of Logistics in direction to the Supply Chain Management and Value Net concepts, as well, we did a short summary of the operations strategy concept. To realize an analysis of operations strategy under the extended prism of the physical, value and business networks, is necessary categorize each one of these simultaneous

nets. Subsequently, it should be made a description of the characteristics of the Physical, Value and Business Networks under the point of view of operations strategy decison areas. Finally, is presented a methodologic investigation approach that was applied to an exploratory and qualitative study of a net. Following, will be categorized the concurrent nets.

6.1. Characterization of the physical, value and business networks.

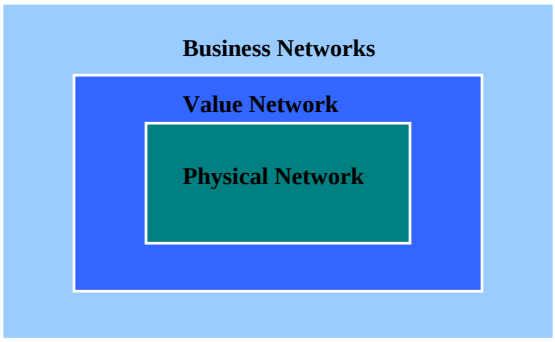
In past, the relationships between economic actors were mainly connected by downstream transmission in the supply chain of the incorporated value in goods. Analyzing also, the early development from Logistics in direction to Supply Chain is perceived that there is an emphasis in the physical flow of goods and materials. This evolution suggests the existence of a “physical network” worried about the flows of materials and products throught the net. The physical network can be viewed as an interconnection of organizations that develop and perform the activities of delivery supplies and products among firms and end-consumers. However, as we seen to, the sequential relations connected with the flows of goods throught the physical net are accompanied of others kinds of relationships and flows that this vision is not capable to identify. This leads a neecessity to treat these others flows separately. It occurs, because the activities that support the physical network has increased of importance in the consumer perspective. This increase in the parallel importance of activities in the consumer perspective suggests the existence of a Value Network. The Value Network (included the Physical Network) is constituted of organizations that perform activities of value creation to final costumers. The value network considers the key elements (physically or not) in a supply system that determine the received value by final customers. New information technologies and international removal of barriers to commerce observed in the last years improved accessibility to global markets and

facilitated the firm entrance in unexplored markets. Fast information about international business opportunities becomes-itself an upper resource, and the network based information is permitting to companies communicate about business needs and opportunities, objecting expand their markets, share resources, knowledge and experience. Given that companies are inserted in many inter-firm networks, including some that can supply access to technological and financial capital, becomes necessary to develop a more structured approach to obtain a valid description of a network, equating the dynamics nature of activities and the competitive dimensions involved. In this way, those transformations occurred in markets suggest the existence of a business network in which the firms are inserted. The business network (included the value network) involves the actors that play a key role in provide the conditions and requirements needed by specific consumers to make viable the business in the attended market. The actors inside a business network are responsible to identify business opportunities, carry out commercial negotiations and put the goods and services close to the consumers.

6.1.1. Some considerations to the physical, value and business networks:

Some considerations under the simultaneous networks are addressed. A player may be participating in more than one network being, for example, in two networks or in one. Still exists those actors that participate exclusively in one network. Another important consideration is emphasize that the business network include the value and physical networks, as well as the value network include the physical network (Figure 1).

Figure 1 – Amplitude of the value, physical and business networks.



6.2. Questions related to the Business Network Project

Following, will be discussed the decision areas related to the business network project. We will analyze in details each one of the particular visions related to the traditional questions of operations strategy regarding the physical, value and business networks, in a broader decision area called “Business Network Project”.

6.2.1. Vertical integration

The vertical integration decision area of operations strategy traditionally deals with the question of property between the different stages of the supply chain. This decision is applicable to the physical, value and business networks, since the vision be amplified to not only include stages of supply chain but any companies participants in the inter-firm environment. Second Hayes & Wheelwright (1984), the vertical strategy of integration of an organization is defined in the direction from the expansion, from the extension demanded by the process and by the balance between the stages vertically integrated. Following we will examine these questions under the perspective of the simultaneous networks.

6.2.1.1. The Expansion Direction

The direction of the expansion in the physical network traditionally is divided in upstream and downstream expansion. In the value and business networks the expansion direction cannot be utilized in those terms because exist a set of parallel activities that are not summarized as a previous or subsequent stream. An another question is that a member from the network may be participating of more than one network. Hakansson & Snehota (1995) refers to the units of the physical network as having a vertical character and that the units that affect the relation with the consumers as having a horizontal character. Then we are able to analyze the direction of the vertical integration of a physical network as being of vertical character while the value and business networks have a horizontal character.

6.2.1.1.1. Relationship with suppliers and clients

Once was taken the decision of utilize external suppliers should be determined the type of relationship that is going to be developed with these suppliers. The same kind of decision is applied for the concurrent networks. Bensoau (1999) researched a quantity of American and Japanese companies to try to understand as these companies managed its “portfolio of relationships with suppliers and clients”. To first conclusion for Bensoau (1999), is that the level of assets especificity of suppliers and customers varies, in the way that different kinds of relationships can be desirable in agreement to the specificities. He prosed five categories of relationships between market and vertical integration. For Bensoau (1999) the elevation of the transaction costs imply in the necessity of a narrower relationship.

6.2.1.2. The Extent

The decision from the extent of vertical integration range from the property of an operation to all operations along of the network. If a company owns the entire physical network, the extent question dominates the vertical integration decision area, since a company cannot integrate for-wards or back-wards, and neither can the firm balance its relations with others suppliers (Rudberg & Olhager, 2003). The extent of vertical integration can vary between the physical network companies (vertical character), but also can be considerated companies that acts in the value and business networks (horizontal character). In case of integration, a company need to consider also the horizontal and vertical character from the network of which that company does part.

6.2.1.3. The Balance

The balance in the network part that is possessed by the company is the amount of capacity of each stage in the network which is devoted to supply the next stage. Fully balanced networks has the virtue of simplicity and also permit that each stage have focus in the requirements of the next stage along the network. In the network, the challenge is to create balance between all parts throught cooperation. The connections with suppliers are also a function of its bargain power and are reflected in the suppliers/clients margins. These perceptions related to power, influence the bargain positions that actors feel that can take (Bowman & Ambrosini, 2000). The balance in the networks is related not only with cooperation, but also with the bargain positions exercised by the network actors.

6.2.2. Facilities

After decide the form of their network operations through vertical integration decisions, an organization should decide location, size and specialization/focus of each operation.

6.2.2.1. Location

The main difference between location in the traditional operations strategy and location decisions of concurrent networks is that a location of a firm is determined with a high level of control since that is the company who decides where to be located, this enables the company to “optimize” their resources regarding its competitive strategy. In case of inter-firms networks the decisions of location are much more difficult to be taken due to system composition of individual different organizations that cooperate between itself. The physical network can be changed through the choice of clients / suppliers with wich the company want to establish relationships. If this is not possible, the location has to be had as given (Rudberg & Olhager, 2003). We can presume by analogy that some factors related by Ferdows (1997) can influence the decision of location of the simultaneous networks. Ferdows (1997), suggests a possible strategic classification of roles for companies or plants located in others countries. The author consider access to low cost of production, access to abilities and knowledge and access to markets as the main reasons that decide to location of a plant.

6.2.2.2. Size

The traditional interpretation of size is difficult to be employed in the concurrent networks. Accordingly to Rudberg & Olhager (2003) the search for an optimal network size is subject to fail. When size is discussed, is more a form concerned to find a measure for size, than an optimal

size for the network. The physical network size under the point of view from the inter-firm theory is usually focused in the quantity of nodes in the network, while the value and business networks are analyzed by the number of different organizational units that are part of the network (Noteboom, 1999).

6.2.2.3. Specialization/Focus

At present are used two generic forms of focus by different authors, the product and process focus (Rudberg & Olhager, 2003). The product focus means that the plant is designed to produce a restricted series of products or only one product. The focus in process means that one or more process form the competence of the plant and that those few process can manufacture a series of products. The specialization/focus of a plant is different from that of the concurrent networks. Rudberg & Olhager (2003) argue that the network focus can be described as an continuum where the two final points are: vertically focused and horizontally focused. The nature of the physical networks combine to a vertical focus while the nature of the value and business networks tend to a horizontal focus.

The Table 2 summarizes the main operations strategy questions that were explained above and that are related to the concurrent networks.

Table 2 - Operations strategy questions that are related to the concurrent networks

Decison Areas		Types of Networks		
		Physical Network	**Value Network**	**Business Network**
Network Project	***Vertical Integration***			
	Direction	Vertical Character	Horizontal Character	Horizontal Character
	Suppliers Relationship	Market or cooperative	Market or cooperative	Market or cooperative
	Extension	Narrow Focus – activities related to physical network	Wide Focus – any activities related to the value net	Wide Focus – any activities related to the business network
	Balance	Cooperation and bargain positions	Cooperation and bargain positions	Cooperation and bargain positions
	Facilities			
	Localization	Influence or partners choice	Influence or partners choice	Influence or partners choice
	Size	Number of nodes	Number of organizations	Number of organizations
	Specialization / Focus	Vertical	Horizontal	Horizontal

6.3. A proposal of integration between the business network project and the competitive priorities

As previously discussed, the operations strategy is an attempt to reconcile the requirements of markets with the operations resources. This task is a difficult thing to obtain, due that markets move with frequency, and, beyond this, the complexity is increased when is taked the resource view of the business networks. The matrix of integration between the business network project and the competitive priorities (Table 3) propose to be a tool that links the operations strategy to the resources of the business network (that given its nature of cooperation tend to be a complex task). In the first column, from the left to the right, of Table 3 are the main questions related the decision area of "business network project" treated in details in the previous sections. In the last columns are the competitive priorities from the operations strategy. The decisions related to the resources of operations should be analyzed in terms of the effect in the competitive priorities. Of

course, some intersections will be more important than other, due to the choice by a company of the competitive priorities in which intends to compete. Slack & Lewis (2002) had proposed previously an operations strategy matrix that joint the perspectives of the market requeriments to the operations resources, however, the matrix proposed by the authors utilizes the traditional business unit perspective in operations strategy. The analysis tool serves also to gain an understanding of how the resources of operations and attended markets evolved.

Table 3 - Integration matrix between the business network project and the competitive priorities

Decision Areas		**Competitive Priorities**					
		Cost	Quality	Speed	Flexibility	Inovation	Reliability
Business Network Project	***Vertical Integration***						
	Direction						
	Suppliers Relationship						
	Extension						
	Balance						
	Facilities						
	Localization						
	Size						
	Specialization / Focus						

Following, will be applied the tool of analysis in an exploratory and qualitative research of the business network project in a net of companies of the Brazilian steel industry sector.

7. The methodological investigation approach applied to a exploratory and qualitative case study

The sizes of samples in studies of case are always, to a certain extent arbitrary, because is not intended to statistic generalization, but aims to analytic conclusions. In the case of this work, is opted, by a sample with few elements, limited by research resources restrictions. Initially, was

established the following criteria for the choice of participants companies: manufacturing companies; representative companies in the sector; companies able to influence the business network project. That work begins with the statement that the business network project reflects the competitive priorities by its time is related with the value perception for the costumers. Therefore, we will not be evaluating in this work the value perception for final costumers of the products and services, but as the business network project evolved to reflect the competitive priorities choosen by the companies in this net. The purpose of this presented study case in the subsequent topics is analyze the business network project of a business network with help from the integration matrix. Given the confidential character of the facts that will be presented, the companies will be presented with fictitious names.

7.1. Case Study

7.1.1. The steel industry and the Steel Mill Co.

Brazil is the eighth world producer of steel (in 2000, the Brazilian steel production went of 27,9 millions of tons). In 2000, Steel Mill produced around 20% of the 12,1 millions of flat tons of steels produced in Brazil. The Steel Mill was founded in the decade of 50 and in 1965 the company passed to be an integrated steel industry, with all necessary units to the production of steel, since the reduction of the raw materials (iron and coal). Other phases of expansion happened untill the company went privatized in 1993, when begun to restructure their management process. With the privatization, Steel Mill passed to be part of a large stell holding, lead by another steel-industry company. The group counts with steel distribution companies, as well as, a metallic structures manufacturer company. Steel Mill disposes in its plant of logistic

infrastructure with a maritime port and railways. Steel Mill trades the products in all of the comsumption sectors of not revested flat laminated stells. The thick steel plates from the company are utilized in diverse sectors of application, as industrial machines, pipes, wagons, boilers, reservoirs, maritime platforms, naval industry and civil construction. The plates and reels hot laminated are applied in agricultural implements, pipes, tanks, reservoirs, floors of cars, wheels, etc. The plates and reels cold laminated are destined to the automobile industries and consumer products industry - refrigerators, washing-machines, stoves.

7.1.2. The Parts Co.

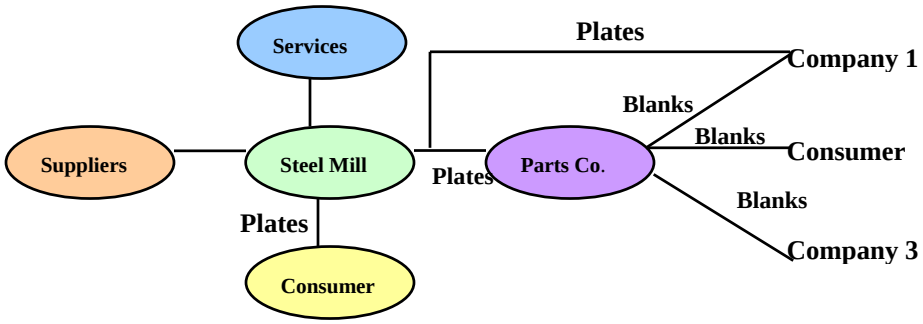
The relationship of the Steel Mill with its client Parts Co. was basically in the supply of thick stell plates. The Parts initiated its activities in the 50`s decade, providing services to farmers in the São Paulo State. In the 60´s decade, the company was transformed in mechanics/metallurgy company. With the growing competition in the 90´s decade, the company concentrated in the production of steel parts, consolidating as suppliers of multinational companies that manufacturer equipment for construction and earth moving. The main supplier of raw material from the company since the 70´s decade is Steel Mill. The relationship with Steel Mill became closer in the half of 90´s decade because the increasing quality requirements by its clients.

7.1.3. The process of business network transformation

In 1999, the United States government impose restrictive tariffs to the imports of thick plates of steel, but the blanks (parts cuted under measure) of stell thick plates were not included in the restrictive measures. With the protectionism to the thick steel plates (one important market for Steel Mill) a new business vision arose for Parts. The cutting of stell carbon thick plates is a

necessary process for the blanks production. Parts is one of the pioneering companies in the utilization of the automated cutting systems of small-scale in the country, what permitted it to do of this internal process a competence regarding the competition. This situation enabled a spin-off, or, transform this competence (part of an internal process from Parts Co.) in a new company. The situation of the relationships in the thick stell plates business network was to following (figure 2).

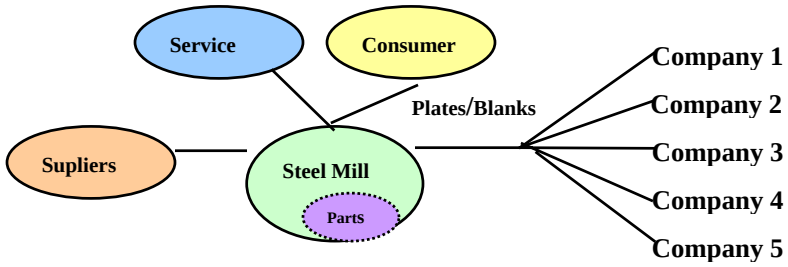
Figure 2 – The business network of the thick stell plates market (previous situation).



Parts is a much smaller company than Steel Mill, therefore did not have sufficient money for investing to purchase the supplier or build a new plant. So Parts proposed to Steel Mill cut the thick steel plates in tailored blanks (cutting parts in agreement with the drawing specifications of of clients) inside the plant of Steel Mill. Had, therefore, a strategic partnership between the companies, so that would be mounted a unit of Parts inside the Steel Mill plant. The blanks begun to be produced with the partnsehip between Steel Mill and Parts in the year of 2001. In this plant the parts are cut, and receive other operations (as welds and assembly), in agreement with the consumers specifications. The waste produced in the process is property of Steel Mill, as well as the raw material utilized (gases and thick plates) and the payment to Parts is done by the

services performed (cutting). Some clients from Parts participated actively in the project supplying equipment in the form of loan. This partnership permitted to serve specific needs of the clients, configuring a new business network project in the steel-industry sector (Figure 3).

Figure 3 – The business network project in the thick plates of steel market (present situation)



The clients from the partnership between Parts and Steel Mill are companies that utilize the parts in the production of equipment as tractors and trains, therefore, they are not the final clients. The ordering of the competitive priorities of those companies can be seen in the table as follow. The clients numbers 4 and 5 passed be part of the portfolio of both companies after the transformation occurred.

Table 4 – Competitive priorities, order-winners and qualifiers factors of Steel Mill and Parts clients.

Company	*Products*	*Competitive priorities*	*Order Winners*	*Qualifiers Factors*
1	Tractors	C, R, F, Q, S, I	C, R, F	Q, S, I
2	Tractors	C, R, F, Q, S, I	C, R, F	Q, S, I
3	Trains	C, Q, R, S, F, I	C, Q	R, S, F, I
4	Wind Mills	C, Q, R, S, F, I	C, Q	R, S, F, I
5	Parts	C, R, F, Q, S, I	C, R, F	Q, S, I

Following, will be analyzed the standard of decisions taken in this inter-firm network using the matrix of integration from the strategy of operations with the competitive priorities.

7.2. Mapping of the advantages obtained by the business network re-configuration under the point of view of the companies involved

In this section are made an analysis of the concurrent network project under the perspective of the companies involved. We are analyzing the advantages that were brought by the change in the business network project. Subsequently, we will be analyzing how these changes affected the competitive priorities of the operations strategy and reflect the competitive priorities that the clients valuated. The Table 5 demonstrate shortly which questions are related to business network project and the advantages obtained by the transformation in each one of the dimensions of concurrent networks.

Table 5 - Questions from the operations strategy that are related to the physical, value and business networks of the study case.

	Networks Typology	Physical Network	Value Network	Business Network
Network Project	***Vertical Integration***			
	Direction	"Virtual" integration back-wards, enabled inventory reduction and improved control about raw materials.	Increase in responsiveness; smaller lots and JIT delivers for clients.	Access to financing for Parts and market opportunities information for both.
	Suppliers Relationship	Parts did not have enough capital to vertically integrate Steel Mill, because this developed a strategic partnership.	Clients from Parts-Steel Mill passed to access new relationships; access to partners infrastructure.	Increase in the number of clients that were not attended previously.
	Extension	From thick plates production to cutting, a larger extension lead to increased complexity.	"Virtual" horizontal Integration by Steel Mill of a value network component (Parts).	"Virtual" horizontal integration by Steel Mill of a business network component (Parts).
	Balance	Increase of balance in terms of requirements.	Increase in balance in terms of service requirements.	Increase in balance in terms of financing and business opportunities.
	Facilities			
	Localization	Reduction of transport cost; sub-products destined to recycling; proximity to raw material; low cost labor workforce; logistic infrastructure.	Increaseof products and service mix.	Access to new business opportunities; access to tacit information.
	Size	Increase in the number of nodes	Increase in the number of organizations	Increase in the number of organizations
	Specialization / Focus	Increase in vertical focus	Increase in horizontal focus	Increase in horizontal focus

The important question is verify how these changes, in its different dimensions, affected the competitive priorities in order to reflect the requirements of consumers. As previously discussed, we will not analyze the requirements of final consumers, but the companies that are clients from the partnership between Parts and Steel Mill. In the Table 4, shown previously can be seen the more important competitive priorities for clients. It´s possible to verify in the table that the main competitive priority, in terms of order winners factors is cost followed by reliability, quality and

flexibility. As follows, in the Table 6, we will analyze in detail the performances of each one of the competitive priorities that were affected by the decisions taken by the companies involved in the business network.

Table 6 – Analysis in the matrix of integration between the business network and the competitive priorities of the decisions toked in the context of the study case.

	Decision Areas	**Competitive Priorities**					
		Cost	Quality	Speed	Flexibility	Inovation	Reliability
Business Network Project	**Vertical Integration**						
	Direction "Virtual" integration backwards decision	Customers inventory reduction; parts for a lower cost.	Higher quality specifications.	Better availability of plates improve speed.	Increase in product mix; volume flexibility.		Higher raw material control.
	Suppliers relationship Decision to form strategic partnerships	Low cost financing for Parts to invest in capacity.	Specific thick steel plates development for customers.	Logistic infrastructure availability for clients and Parts.		Steel plates production with new material combinations.	Increased the reliability capacity perception
	Extent From thick plates production to cutting	Reduction of the waste transport for recycling		Faster service for requests.			
	Balanço Decision to increase capacity balance	Increase in customers number lead to scale economies.			Permits deal with volume variations.		Higher cutting capacity installations.
	Facilities						
	Localization Decision to locate inside the Steel Mill	Low cost labor workforce; logistic infrastructure; raw materials proximity.	Obsolescense cost reduction.		A larger mix availability of steel plates specifications.	Access to tacit knowledge	
	Size Decision to increase the number of organizations involved	Production scale increase.			Improved flexibility; new service access.		Financing access; market opportunities information acess.
	Specialization/Focus Decision to increase vertical focus	Efficiency improvement.	Consumers requirements focus.				

With the Table 6, we analyze which went the more affected competitive priorities in terms of performance improvement, by the reconfiguration decision of the business network. As follow is classified in decreasing order, in terms of performance improvement, the competitive priorities: 1) *Cost* – the competitive priority more influenced in terms of performance improvement was cost. The factors related to business network reconfiguration that helped in the performance improvement are: the reduction of transport costs of the blanks in relation to plates; the use of the cutting process waste for recycling in the Steel Mill; the necessary space for the plates stocks storage in the clients was reduced; production of plates with news combinations of materials with the objective of cost reduction; the financial help from Steel Mill to Parts enables reduction of the costs with financial expenses; the necessary capital for the beginning of the activities was reduced through the loan of used machines by clients; the low cost for work in the locality and the availability of logistic infrastructure that permits the handling and transport cost reduction. 2) *Flexibility* – The flexibility went the second competitive priority most influenced by the business network reconfiguration. The performance of flexibility improved due to: increase in the mix of products and services offered; to a larger volume flexibility enabled by the joint action of the two companies; by the improvement of demand management; increase in capacity by the dispose of financing by the Steel Mill to Parts. 3) *Reliability* – A higher reliability was permitted by the following factors: control about availability of raw material; increase in the cutting capacity of cut and larger control in quality of the raw materials utilized in the cutting process. 4) *Quality* – attendance to the specifications of clients; improvements in the plates quality due to higher specifications of the plates utilized in the production. 5) *Speed* - better availability of plates permits an increase in the quickness of service. 6) *Innovation* – Production of plates with new materials combinations and access to tacit knowledge.

As we can see, the competitive priorities that had their performances improved by the reconfiguration of the business network are in decreasing order: cost, flexibility, reliability, quality, speed and innovation. The competitive priorities more important for the companies in this business network accordingly to the order winner factors in the Table 4 are: cost, reliability, flexibility and quality. The competitive priority cost is maintained in the first place in the requeriments of the companies regarding the business network project as well the requirements of the clients companies involved. In case of flexibility and reliability had an inversion, being more valued by the clients the reliability (which is in third place as priority more affected by the reconfiguration). This supposes that the companies that took the decisions of reconfiguration of that network should emphasize that priority (reliability) in future improvements. Regarding quality, that remains in fouth place in the importance for clients and in terms of performance improvement obtained by the choices made. The another priorities were fitted as qualifiers factors, therefore an improvement of performance would not signify necessarily an increase in the business. It possible to perceive that the decisions related to reconfiguration of the business project network analyzed in this article, in a wider sense, reflect the competitive priorities more valued by clients.

8. Conclusion

This work analyzed the operations strategy under the perspective of the physical, value and business networks. This approach called attention for others flows along the supply chain that are not only the flows of material and information. A good strategic model of analysis, therefore, should represent adequately all these flows and relationships. In this way, the transformations

occurred in markets as the removal of the barriers to commerce and the implications that the participation in multiple nets has in the company´s performance, suggest the existence of a business network in which the firms are inserted. It becomes necessary to develop an approach more structured to obtain a valid description of a net, equating the dynamics nature of the activities and the competitive dimensions involved. For this, each one of the networks (physical, value and business) was categorized and an analysis of the different perspectives under the operations strategy vision. Was suggested subsequently, a proposal of integration of these differents perspectives in an empirical study to analyze the reestructuring in a inter-firms network under the perspective of the value, physical and business nets. The study showed that the change in the business network project reflected, in a general sense, the main competitive priorities of clients. The suggestion of new researches pass for the impact analysis that the concurrent networks has in the performance of individual companies, by the development of strategies for concurrent networks and the perspective that these nets have about the existing theory in supply chain.

9. References

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