



IMPORTANT ASPECTS TO THE DEVELOPMENT OF THE SUPPLY CHAIN MANAGEMENT TO PROMOTE THE INNOVATION

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ABSTRACT

The new economy, also called knowledge economy, shifts radically the basis of competition and highlights the merger of firms; the cooperation, without eliminating the role of competition; the customized and flexible production systems. It also points out the collective efficiency, which demands a new model of management of network relationships. In this context, profound changes in organizational structures are observed leading to the obsolescence of isolated companies and the emergence of networks of companies and supply chain managements. Based on this new paradigm of competitiveness, the objective of this article is to present relevant aspects of the development of supply chain managements to promote the innovation. This is an academic research, which encompasses technical and bibliographic procedures. The conquest of dynamic competitiveness depends on the growing search for optimal systems both in and out of the organizational boundary. In this context the creation of a new model of competitiveness with emphasis on the competition among supply chains highlights that organizations are part of a transitional stage which in the beginning focused on an individual efficiency and nowadays concentrates the attention on a collective efficiency. The supply chain management to promote the innovation must be focused on aspects related to technologies, to the processes involving value creation for the customer, and also on aspects related to human talent, especially in the integration of people to share the same objectives. The casting of variables that should be considered during the planning of supply chain management development to promote the innovation is: customer orientation, knowledge flow, structure, degree of relationships, and the use of information and communication technologies. It was also observed that the implementation of the concept of SCM to improve the innovation demands significant changes not only in internal procedures but also in external ones mainly due to the partnership between customers and suppliers.

KEYWORDS: Supply chain management, innovation, collective efficiency, customer orientation, knowledge flow, clockspeed, information and communication technologies.

1. INTRODUCTION

The new economy, also called knowledge economy, shifts radically the basis of competition and highlights the merger of firms; the cooperation, without eliminating the role of competition; the customized and flexible. It also points out the collective efficiency which demands a new model of management of network relationships. In this context, profound changes in organizational structures are observed leading to the obsolescence of isolated companies and the emergence of networks of companies and supply chain managements (COOPER et al., 1997; CUNHA, 2007). Increasingly, the global knowledge economy is characterised by geographically fragmented production. This creates networks of interlocking value chains where different stages of production take place in different regions, countries or even continents.

Authors such as Cooper et al. (1997), Pires and Sacomano (2010), Gurría (2013) highlight that over the last few years the supply chain management (SCM) has become a new boundary to be explored by industrial entrepreneurs in order to obtain more competitiveness.

Based on this new paradigm of competitiveness, the objective of this article is to present relevant aspects of the development for supply chain managements to promote the innovation. Therefore an exploratory research was performed. Material was taken from books, articles and thesis involving the theme. This methodology is the most adequate for the proposed objectives. This research has a theoretical nature with a qualitative approach.

This article is structured as follow: the context and the objective of the research are presented in the introduction; the second section shows some concepts of supply chain, and considerations about efficient practices of the supply chain management; the third section highlights major factors to the development of models of supply chain management. The final considerations present the discussion of the results and suggestions for further studies.

2. CONCEPTUALIZING: SUPPLY CHAIN MANAGEMENT

Nowadays, as a global context it has become common for companies to adopt a more collaborative behaviour focused on their central competencies, outsourcing the less critical processes in order to increase the company's competitiveness. As a consequence, the success

of a company will depend on how it can manage the relations along the supply chain management. Therefore, the focus on management extrapolates the barrier of each firm, demanding the management amplification to the entire network in which it is included, encompassing suppliers and the distribution channels.

Cooper et al. (1997), observe that the first initiatives in SCM date back to the seventies and were related to the integration of stockrooms/warehouses and the transportation of the goods, thus the priority was given to logistic aspects. Nowadays the focus has been given to the management of internal changes, which the company would promote with the objective of reducing costs. The practice of industrial coordination involving collective profits appeared in the eighties and was introduced by business consultants drawing the attention of the academics of the area; this interest increased in 1990.

After theoretical review it can be inferred that SCM has a lot of definitions, therefore the existence of one definite concept for the term is not possible. The definitions of SCM on Table 1 highlight the integration, coordination and network overview.

Table 1: Definitions of SCM

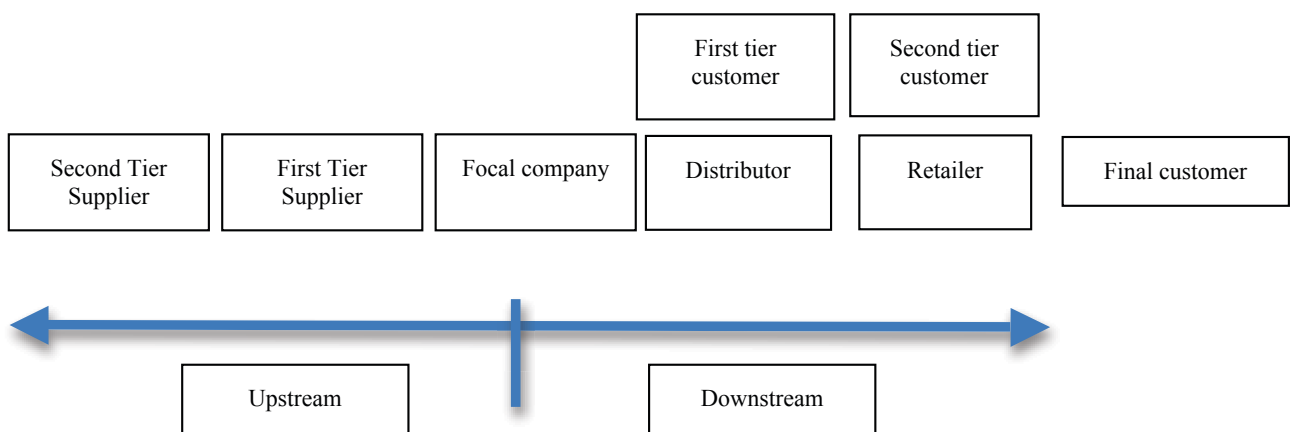
| Autor (ano) | Definitions of SCM |
|---|---|
| Council of Supply Chain Management Professionals (2010) | <p>The planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers.</p> <p>Supply Chain Management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model.</p> |
| Christopher (2009) | Involvement of a network of organizations, through entailment, the up and down of different processes and activities which leads to profits involving products and services aimed at final customers. |
| Simchi-Levi et al. (2003) | set of approaches used effectively to integrate suppliers, manufacturers, warehouses and stockrooms in a way that the goods are produced and distributed in the exact quantity, to the correct destination and within the deadline, minimizing systemic global costs and at the same time achieving a desirable quality of service. |
| Wood Jr. (2000) | methodology developed to align all the activities of production in a synchronized way to optimize its values |

| | |
|--------------|---|
| Pires (1998) | An expanded, updated and holistic view over the administration of traditional materials which encompass the management of all the productive chain in a strategic and integrated way. SCM presupposes that companies are to define their competitive and functional strategies based on the roles they have in the productive chain that they are inserted in (both as suppliers and as customers). |
|--------------|---|

All definitions in Table 1 show that supply chain management integrates supply and demand management within and across companies. According to Council of Supply Chain Management Professionals (2010), it includes all of the logistics management activities, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, finance, and information technology.

Figure 1 shows a simplified supply chain, with the upstream flux (based on suppliers) and downstream flux (leading to the final customer), the focal company is in central position. Suppliers and customers are divided into tiers or according to their business relation with the focal company. It can be observed that the focal company has a set of suppliers which directly interacts with it (symbolized by the suppliers) and another set which it has an indirect relationship (symbolized by the manufacturers and by the final customer).

Figure 1: Representation of a supply chain



Source: adapted from Pires (2004).

Due to the increase in competition and to the development of the growing volatility of markets, companies are focused on their central competencies transferring most of their productive operations to specialized service providers. The guarantee that costumers will get a high level service at a low cost, simplifying the business process and gaining more efficiency

are fundamentals of SCM, (BALLOU et al., 2000; CHRISTOPHER, 2009; SIMCHI-LEVI et al., 2003). In this sense Li et al. (2011), observe that the supply chain management is to aim at customer satisfaction, thus increasing the competency and profitability of the groups of companies in an integrated way.

Regarding the effectiveness of supply chain management Gurría (2013) alert for the importance of the development of innovative strategies that enable the integration of the logistic capacity and the productive activity of multiple companies. Cunha (2007) points out the importance of developing a good business relationship with the participants of the chain: it demands appropriate planning and distribution of responsibilities and profits. Several practices have been implemented to simplify and obtain a more efficient productive chain. Pires (2004) observes that positive results have been obtained by the fulfilment of the practices below:

- Restructuration and consolidation of the number of suppliers and customer: restructuration (generally reduction) of the number of suppliers and customer, building and strengthening the partnership with the group of companies committed in the development of a collaborative relationship presenting a synergistic result;
- Information share and infrastructure integration with customers and suppliers: the integration of systems of information/computerizing and the growing usage of systems such as EDI (Electronic Data Interchange) by suppliers, customers and logistic operators have allowed the practice, for instance, of efficient consumer response. These practices have allowed just-in-time delivery and decreased the levels of stocks. Furthermore, the usage of permanent in plant representatives together with customers has facilitated, among other things, a better balance between the necessities of these representatives and the productive capacity of the suppliers as well as more agility in the resolution of problems.
- The development of a set of products: the early supplier involvement since the initial stages of a product development has mainly provided time and cost reductions for the company.
- Logistic considerations in the phase of product development: it represents the product conception and facilitates the performance of logistics in the productive chain, generally involving the choice about an efficient logistic operator to administrate it;
- Integration of competitive strategies in the productive chain: it involves the compatibilization of the competitive strategy and of the measures of development of the company to the reality and the aims of the entire productive chain.

Pires (2004), highlights the importance of the confrontation of challenges related to the search for customer satisfaction, the integration of activities, the effective application of ICT and cost reduction. This author also points out that the distribution of responsibilities and profits is another challenge to be surpassed in the supply chain management. Due to what was exposed in this article and to the changing scenario imposed by globalization and by the knowledge of economy (Table 2), it is necessary to present a summary of what is regarded as challenges, objectives and effective practices of SCM.

Table 2: Challenges, objectives and effective practices of SCM.

| Challenges | Objectives | Efficient Practices |
|---------------|-----------------------------|---|
| Globalization | Increase in competitiveness | Creation of strategic partnerships among selected members (suppliers, distributors, customers) |
| | | Information sharing among members of the chain |
| | Customer satisfaction | Effective use of TIC |
| Innovation | Higher rentability | Collaborative behaviour in the development of innovative products and services focused on the satisfaction of the current and future necessities of the customers |
| | | Integration of competitive strategies |
| | | Planning of activities and distribution of profits from group actions |

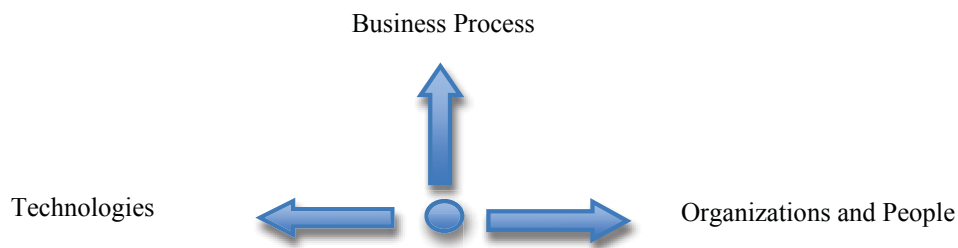
3. ORIENTATION OF THE DEVELOPMENT OF A SUPPLY CHAIN MANAGEMENT TO PROMOTE THE INNOVATION

Due to its extended and spontaneous characteristics, SCM is notably a multifunctional area still difficult to be classified. Yet we may consider its scope as having at least three support helixes: business process, technology, initiative practices and system; as well as organization and people.

According to Pires (2004) business processes represent the reason of the existence and of the finality of SCM. For this author, technology, initiative practices and systems represent the current means which make the execution of key business process feasible in SCM. Pires (2004) also observes that the third helix represents the transformations of the organizational structure and also the capacitation of the company and of its collaborators to make the managerial model of SCM able to be understood, provided and implemented.

Based on these 3 helixes Pires (2004) builds a tridimensional model, represented in figure 2, which highlights the relation they have among each other. Thus, the supply chain management to promote the innovation is to be focused on not only aspects related to technologies and to the processes involving value creation for the customer but also on aspects related to human talent, especially in the integration of people to share the same objectives.

Figure 2 - Tridimensional model of SCM



Source: adapted by Pires (2004).

These three helixes highlight the strategic and transdisciplinary character of the products in supply chain management. It also highlights the crucial character of the decisions related to: business processes, technologies, organization and people.

Authors such as Gurría (2013), Li et al. (2011), Reiner (2005) and Wood Jr. (2000), observe that in order to establish a supply chain, there must be a change in orientation in which the customer is to be focused not the product itself. Also there must be a change in the profile of the relationships established among companies (from an attitude of conflict management to attitudes such as partnership and support). Yet Christopher (2009) presents a sequence of actions which starts by the comprehension of what customers value, followed by the definition of the value proposition, the identification of market leaders, and finally the development of strategies in the supply chain. In this sense we can note the importance of knowledge flow.

In this sense, we can note the importance of knowledge flow. According to Konukcu et al. (2010), a critical issue in Construction Supply Chain Management (SCM) is the effective management of knowledge through the whole project lifecycle. This issue involves the enhancements of the flow of knowledge within and between different sectors of supply chain, as well as the accumulation, coding, and storage of knowledge in the organizations. The information shared between organizations in one SCM, varies from technical drawings

and legal contracts to purchase orders, project reports, and schedules. For Konukcu et al. (2010), the project knowledge that has to be shared within and between the organizations is interconnected and includes all the knowledge about the end product. The authors highlight that within such a complex environment, the efficient flow of project knowledge between all the sectors of construction supply chain will directly improve all the SCM efforts.

According to Barbosa and Sacomano (2001), in order to perform to an efficient implementation of SCM it is necessary to integrate the internal processes of the main company to only afterwards, expand it to other companies of the productive chain. Thus, the main company, generally involving merchandise, must be a reference to other companies of supply chain in aspects such as management of the integrated operations. Christopher (2009) points out some barriers to the implementation of supply chain management: traditional organizational structure, evaluation systems which do not measure the value addition along the chain, the excessive focus on the productivity, the misuse of ICT and insufficient technical and managerial capacity. Considering these barriers, the three strategic helix identified by Pires (2004), the effective objectives and practices presented in SCM, a reflexion is suggested about the relevant aspects which are to be considered in SCM to promote the innovation.

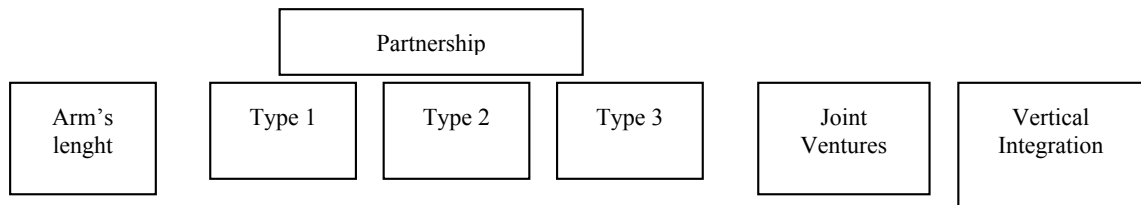
The structure of the chain is related to the roles exerted by companies or productive unities in SCM and how this work and processes are performed among companies. The structure and relationships are important dimensions to the understanding of the morphology of the supply chain and its dynamics. According to Pires and Sacomano (2010) several studies point out to the position of the companies in the structure and the way they establish relationships in the chain that affects its development.

On structural point of view, the chains can be dense or diffuse. A dense chain structure occurs when companies, from a specific chain, are attached to each other (LAZZARINI, 2008), providing a structure with several relations and major division at work.

In agreement, Lambert, Cooper and Pagh (1998) suggest the classification of the members of a supply chain management into primary level channel and support level channel. The primary level channel participants are represented by the companies which execute activities that aggregate value along SCM. Support level channel participants provide support to companies which supply resources, knowledge, etc., to the primary level channel members of SCM but they do not take direct part in the process of value aggregation.

Regarding partnership, a “strong” or “weak” partnership can be developed which means lots or little cooperation among them. Figure 3 classifies the most basic partnership as merely commercial also called arm’s length; it is ephemeral and does not require any type of additional commitment. On the other hand, joint ventures involve investments and the possessiveness of common actives. Vertical integration is an extreme case of partnership (Pires, 2004).

Figure 3 - Types of relationship



Source: adapted from Pires (2004).

Due to the collaborative nature of SCM, the selection of the correct partners is crucial. Thus the most desirable characteristics observed for partnership are companies which are not only excellent in terms of products and business service but also which financially stable and able to incorporate the culture of collaboration.

Dyer et al. (1998) following a study with supply chains in American, Korean and Japanese automobile industries, demonstrated that suppliers can be segmented into two groups: the suppliers of inputs which are necessary (the standard type) and the ones which take their place as strategic suppliers of input (generally with more aggregated value associated with the core competency of the customer). For these authors the intensity of the relational bonds may increase or decrease depending more on the strategies taken than on the objective of the transaction itself.

In the context of the knowledge of economy changes become inevitable and several times abrupt. Supply chains are not static but dynamic and stable networks. Decision such as make or buy should not be made primarily on which supply option is a little bit cheaper or a little bit faster to market. Rather, supply chain design needs to be recognized as a strategic activity that can determine the fates of companies and industries—and of profits and power. He observes that the element of the supply chain that controls the chain can shift over time (FINE, 2000).

Fine (2000) created the concept of clockspeed which means that each sector in a company evolves in a different pace. The progress will depend on the speed that changes in

their products, in their processes and in the organizational structure occur. Clockspeed is extremely important for the comprehension of the dynamics in supply chains.

When a sector is fast at the launching of new products, at the adoption of new processes of production and at new ways of organizational structures, it can be called clockspeed. Fine (2000) observed the existence of factors that propel clockspeed in a sector, citing the technological innovation and the intensity of competitiveness as the main factors involving this topic. The author states that when the structure of the industry is vertical, with internal development of products, the disintegration strengths force the company in the direction of a horizontal and modular configuration. According to Fine (2000) these strengths include: the entrance of implacable competitors; the guarantee of maintaining the company ahead of the competition; the bureaucratic and organizational rigidity established by big companies.

On the other hand, Fine (2000) remarks that the horizontal/modular structures, such as the supply chains, another set of strengths force vertical integration. According to the author, these forces include: technical advancements in a subsystem which provides market power to its owner; in a subsystem, the market power encourages the aggregation of other subsystems to increase control and add value; the market power in a subsystem stimulates the integration of engineering with other subsystems in the development of a product.

Fine (2000) also points out that supply chain managements are dynamic structures. The author cites Intel, Microsoft and IBM as examples of dynamicity and governs alternation as well as power on SCM. States that due to the clockspeed effect companies will have to evaluate the advantages of the fast technological advancement to choose the best strategy of outsourcing, analysing the risks of dependency of a key-technology provided by an external company. The author believes that the increased interest in supply chain design as a strategic precursor to supply chain management will only increase in the decade to come as industry clockspeeds continue to accelerate, and the half-lives of many capabilities in our existing supply chains need replacement and/or upgrading.

The implementation of SCM requires companies that take part in the chain to replace former systems of information, generally poorly integrated, by more extensive and integrated systems.

Pires (2004) states that along with the emergency of SCM, the growing demand for technologies of information and communication emerge in a way that: 1) in a short term,

these technologies are to be able to handle business transactions and electronic commerce along the productive chain, providing assistance to companies to align the supply and the demand of goods through the share of information; 2) in a medium term, they can help in the decision-making process providing support to an effective demand planning, the first step of production and delivery in supply chain planning; 3) in a long term they can be able to handle the execution of strategic analysis with tools which might provide the construction of real scenarios and considerations of the what-if type. To Pires (2004), nowadays there are few companies which present adequate ICT connected to the external environment in a way that they are able to obtain the necessary information that these companies indeed need.

4. CONCLUSIONS

The conquest of dynamic competitiveness depends on the growing search for optimal systems both in and out of the organizational boundary. In this context the emergence of supply chain managements provided a new form of business organization. The creation of a new model of competitiveness with emphasis on the competition among supply chains highlights that organizations are part of a transitional stage which in the beginning focused on an individual efficiency and nowadays concentrates the attention on a collective efficiency which presupposes the valorisation of the customer's need and satisfaction.

This paper highlights that there are challenges for the implementation of SCM plans but also provides reasons for the promotion of these plans. It also points out to the fact that there are not sufficient studies in the empirical and theoretical atmosphere about the development of SCM. A significant amount of these studies deepen in specific themes such as agility, lean, reliability, bullwhip effect, postponement, etc. This fact highlights the necessity of development of priorities in researches related to the construction and implementation of SCM under a new paradigm of network; comparative analyses among different chains; studies about the flux and management of knowledge in SCM; researches about the influence of the evolutionary speed in governance, structure and partnership in supply chains.

As results this paper shows that the supply chain management to promote the innovation must be focused on aspects related to technologies, to the processes involving value creation for the customer, and also on aspects related to human talent, especially in the integration of people to share the same objectives. The casting of variables that should be considered during the planning of supply chain management development to promote the

innovation are: customer orientation, knowledge flow, structure, degree of relationships, and the use of information and communication technologies.

Finally it is highlighted the importance of the development of this line of research in order to adopt a holistic overview of SCM considering the demand chain of each company as unique and the particularities originated from this network in the current context of knowledge of economy.

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