

From tradition to modernity: the supply chain metamorphosis

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ABSTRACT

No one can deny the fact that logistics has its origins in the military art . It has continued to develop over the centuries, ending up in the last century in companies. Much has been said on Logistics over the last century, due to the proliferation of academic research on this topic. Moreover, Marketing researchers were the first academicians to be interested in logistics, because of the close relationship between these two disciplines . The origins of Supply Chain Management go back to the 1980s. Overtime, Supply Chain Management became an independent discipline and a separate function inside companies, but its influence did not materialize until the 1990s, with the explosion of definitions, which aimed to clarify this concept, and especially to distinguish it from Logistics. There is an abundant literature on Logistics and Supply Chain Management, but confusion remains in the literature. Is Supply Chain Management the synonym of Logistics? Or are the two concepts quite different? There is a great deal of ambiguity in the literature, and few authors have succeeded in one way or another in removing the veil from these two concepts. To answer these questions, we will analyze the evolution of logistics and Supply Chain Management and, then, make relevant comparisons.

Keywords: Supply Chain Management, Logistics, Supply Chain perspectives, integration, processes.

1. Introduction

Between a predictable and structured past and a moving and turbulent present, much has been written on Logistics and Supply Chain Management, the first for centuries, and the second, very young, for the last three decades. Tracing their evolution, their meaning and distinguishing their logic is a difficult and fascinating task.

Logistics is a concept as old as mankind. Originally thought up for the military, logistics has continued to develop over the centuries, ending up in the last century in companies. Its definition was the subject of controversy among authors, drawn from multiple disciplines, which made its unification a difficult task.

More than 20,000 academic articles is the result given by the Ebscohost database when entering Supply Chain Management, which shows the importance given by researchers to this concept, which has undergone a great evolution in the last 4 decades. Many definitions have been proposed, and none of them has succeeded in gaining the consensus of researchers and practitioners.

Is Supply Chain Management the synonym of Logistics? Or are the two concepts quite different? Furthermore, there is a great deal of ambiguity in the literature, and few authors have succeeded in one way or another in removing the veil from these two concepts.

There is a huge vagueness in the literature when we talk about the two concepts Supply Chain Management and Logistics. Are they the same? Just a pun? Or are they independent? Is there a relationship between them? Searching for answers in the literature is not an easy task especially because of the scarcity of authors who have tried to remove the veil from this mystery.

2. Logistics: Background and Evolution

2.1. Military origin of Logistics

No one can deny the fact that logistics has its origins in the military art (Tudor, 2012). Having initially been seen as a support function, logistics has seen its role within the military organization broaden, to be recognized, later, as a strategic function. The evolution of military logistics can be traced back to four major historical periods: antiquity, middle age, modern times and the 20th century.

2.1.1. Antiquity

Centuries BC, the military had a great concern for maintaining an army, especially with regard to food, livestock and troops. As a result, canals were dug and water pipes were passed through the deserts to ensure supplies for the army. Moreover, herds accompanied the army, in order to provide reserves of live meat to the soldiers. In order to avoid surprises, the routes have been chosen to guarantee grazing for livestock and resting places for the legions.

The choice of the routes to be taken, the estimates of the duration of the encampments ... was highlighted by Alexander the Great (356 BC - 323 BC), who is qualified (Médan & Gratacap, 2008) the one of the first warlords to have introduced the notion of logistics planning. The latter consists on three variables; the estimation of the number of soldiers, the equipment and services that they will need and the infrastructure.

2.1.2. Middle ages

In the Byzantine Empire, local populations maintained the army, which was considered a royalty, a kind of tax. During a war, a large number of servants and slaves were transported with the army, who took care of the preparation of the tents, the fortification of the camp and the supplies. A medical troop also accompanied the legions, in order to provide medical care and assistance to the soldiers, and therefore, to guarantee their performance in the war.

Byzantium was a good example for dealing with military logistics, as it was the only place in the middle age where the principles of supply, fortification techniques, and army organization were carefully studied. As a result, the principle of supplying the country was perfectly applied (Primor & Fender, 2008), which consists in maintaining the army at the expense of the occupied country, which guarantees the supply (in most cases free). Furthermore, military logistics within the Byzantine Empire consisted of paying and arming the soldiers, choosing the routes to be taken, choosing the campsites and estimating the times that are necessary for each camp.

2.1.3. Modern age

With the considerable increase in the size of the army, which generated the increase in their supply needs, the principle of supplying on the country lost its interest, since no region, even occupied, could guarantee the enormous quantities (especially in wheat) necessary to satisfy the legions. Consequently, troops resorted to other techniques, such as the continual movement of troops; the army moves from region to region whenever food is insufficient and never comes back.

Another logistics innovation of the modern times, the organization of the food supply policy, since "food commissioners" visited the camp sites to guarantee the supply on the necessary foodstuffs during and after the camp.

Among the pillars of military logistics is transport. The latter has long been provided by civil companies through contracts. However, with the increase in the size of the army and the geographic difficulties that the new wars imposed, these companies were deemed inefficient, and, therefore, the military took the responsibility of the transport.

2.1.4. 20th century

With the technological development that military logistics experienced in the 20th century, the problem of supplying troops has been definitively resolved, since military forces can intervene thousands of kilometers from their bases without the need for local support. Indeed, supplies can be done by land or even by air, which becomes the new role of military logistics. Wars are now prepared in advance, sometimes 2 years before (Primor & Fender, 2008), thanks to the presence of highly qualified logistics managers.

2.2. Definitions of Logistics

Much has been said on Logistics over the last century, due to the proliferation of academic research on this topic. Moreover, Marketing researchers were the first academicians to be interested in logistics, because of the close relationship between these two disciplines.

Fred Clark, one of the pioneers in Marketing, dealt in his book « *Readings in Marketing* » with physical distribution, devoting an entire chapter to it. The definitions of logistics have multiplied, without being able to reach one, accepted by all researchers. In 1948, the American Marketing Association proposed a definition of Logistics: « Logistics refers to the tasks of enterprise expense determined by the material resources flow process from the producer to the consumption place or customer » (Bowersox & Closs, 1996). We can qualify this definition by reductionism since it completely excludes the "downstream" part of logistics (the supply of raw materials). However, by linking it to its context, this definition was a first step toward demystifying the concept of logistics.

In 1972, the NCPDM¹ proposed an extended definition, considering logistics as a: «Term describing the integration of two (or more) activities for the purpose of planning, implementing and controlling an efficient flow of raw materials, semi-finished and finished products, from their point of origin to the point of consumption». This definition highlights the concepts of planning and control, as essential elements of logistics. However, the concept of information flow does not appear in this definition, where only physical flows are taken into account.

In an article published in Harvard Business Review in 1977, James Heskett will considerably influence the world of logistics, by integrating the concept of customer service. His definition (Heskett, 1977, p: 2) is as follows: «Logistics, encompassing those activities that facilitate product movement and the coordination of supply and demand in accomplishing specified cost and service objectives. ». In addition to considering logistics as an element of strategy, and, therefore, the shift from designing logistics as a source of costs to logistics as value creator for the company, Heskett adds a factor largely overlooked by the other definitions: *information flows*. Indeed, it offers a dynamic analysis in terms of physical flows and information flows, where the latter make possible an efficient coordination of the former.

Academic research on logistics has been carried out under two main streams. The first, of operations research, applies mathematical models with the objective of optimizing the transport function. This trend is present in American universities. The second stream, influenced by managerial aspects, is oriented toward marketing dimension of logistics, and considers the latter as a complement to the traditional marketing-mix, which focuses on customer satisfaction and value creation. The leaders are the major American and European business schools such as Harvard business school in the United States, or HEC Paris in Europe. Referring to this second stream, we distinguish several types of logistics:

¹ National Council of Physical Distribution Management

Procurement Logistics: consists in supplying the factories with the raw materials and products necessary to the production process.

Production Logistics: it intervenes to optimize the production process by smoothly linking procurement Logistics to sales Logistics.

Sales Logistics: Strongly attached to traditional mixes, its objective is to ensure that the product arrives to the consumer at the right time and under the desired conditions.

Reverse Logistics: consists in handling the products returned by the customer, either for quality reasons or for recycling.

3. Supply Chain Management

3.1. Historical perspective

According to several authors (Lummus et al., 2001; Cooper et al., 1997), the origins of Supply Chain Management go back to the 1980s. More precisely, when the American textile industry undertook a study on the competitiveness of the sector, which concluded that the switch from the raw material stage to the final stage took 66 weeks, which was enormous, and caused colossal losses to suppliers and companies, mainly because of the Bullwip Effect (Fransoo & Wouters, 2000). Moreover, the study recommended that companies have to collaborate with members of their supply chains, and coordinate their activities; a measure likely to earn the textile sector between 24 and 30 billion USD (Håkansson & Persson, 2004; Lummus et al., 2001). However, other authors do not share this perspective (Larson et al., 2007), and consider that Supply Chain Management is older. The same authors considered that this concept followed a logical progression, through four stages:

- The first stage, Physical Distribution, integrates transportation and warehousing activities.
- The second stage, Logistics, adds sourcing, production and order management activities.
- The third stage, Integrated Supply Chain Management, places suppliers and customers in the chain.
- The fourth stage, Super Supply Chain Management, adds other functions such as Marketing, product development...

In general, the majority of authors agree that, from 1980s, Supply Chain Management became an independent discipline and a separate function inside companies, but its influence did not materialize until the 1990s, with the explosion of definitions, which aimed to clarify this concept, and especially to distinguish it from Logistics.

3.2. Toward a definition of Supply Chain Management

Citing all the definitions is an impossible task, especially in the case of Supply Chain Management. We will refer to the main authors and organizations, which may have had an influence in the development of these definitions.

In 1994, ICCE (International Center for Competitive excellence) proposed the following definition: « Supply Chain Management is the integration of business processes from end user through original suppliers that provides products, services and information that add value for customers» (Cooper et al., 1997, p: 2). The definition highlights the concept of process which means that Supply Chain Management is based on activities, where the company is seen as a set of activities that create value, both for the company and for the customer. As a result, Supply Chain Management has been influenced by Porter's value chain.

We cannot deal with definitions of Supply Chain Management without evoking that of what was called the Council of Logistics Management, before changing its name in 2005 to become the Council of Supply Chain Management Professionals (CSCMP). It considers that « Supply Chain Management encompasses 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. » (Larson et al., 2007, p: 2). The definition underlines two important issues: collaboration and integration. Moreover, Supply Chain Management (SCM) involves collaboration between all members, and therefore, the performance of each member is linked to the performance of the whole. In addition, the global aspect of SCM requires the integration of all activities within the company.

To complete this cocktail of definitions, we will discuss the perspective of Cooper et al, (1997) which, despite its simplistic nature, has succeeded in shedding light on one side of Supply Chain Management: « The integration of business processes across the Supply Chain is what we are calling Supply Chain Management» (Cooper et al., 1997. p: 2).

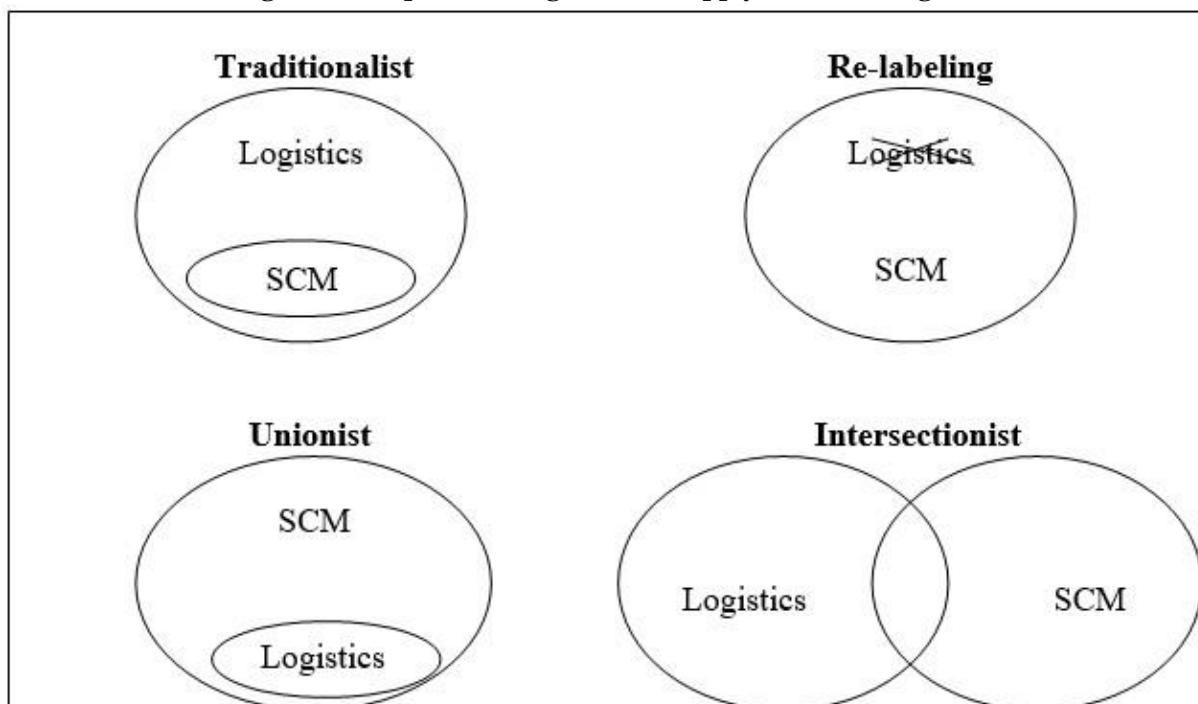
All definitions (discussed above) have emphasized the concepts of integration and process, which confirms their preponderant role in understanding the concept of Supply Chain Management.

4. Logistics vs Supply Chain Management: Theoretical perspectives

4.1. Perspectives Logistics Vs Supply Chain Management

Larson et al., (2007) presented four visions of the relationship between SCM and Logistics:

Figure 1: Perspectives Logistics Vs Supply Chain Management



Source : Larson et al., 2007.

Traditionalist

This perspective considers logistics encompasses Supply Chain Management, which means that the latter is a subset of the former. As a result, Supply Chain Management will only be one function of the Logistics department.

Re-labeling

It is a simple change of "packaging", logistics is not different from Supply Chain Management. Authors like Simchi-Levi et al., (2003) strongly support this idea, since they see no difference between the two concepts.

Unionist

This is most accepted perspective in the literature. In fact, Lambert and al., (1997) consider that Supply Chain Management goes beyond logistics, since it requires the integration of processes within the company, which logistics lacks. In the same context, Lummus et al proposed the following : «... Supply Chain Management is not just another name for logistics. It includes elements that are not typically included in the definition of logistics, such as the integration of information systems and the coordination of planning and control of activities. » (Lummus et al., 2001, p: 428).

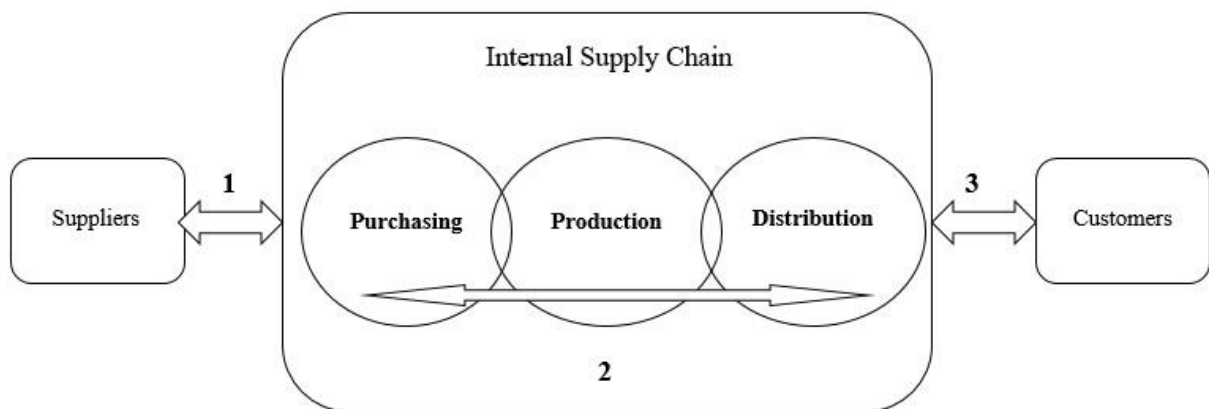
Intersectionist

Logistics and Supply Chain Management are autonomous; they are independent disciplines, but they share certain elements. Authors like Giunipero et al., (1996) support this perspective, despite its low popularity among academicians and practitioners.

Up to this point, we have understood that the majority of authors opt for the Unionist vision, but what is not yet clear is what differentiates logistics from Supply Chain Management.

Supply Chain Management can be presented in the following figure:

Figure 2: Supply Chain illustration



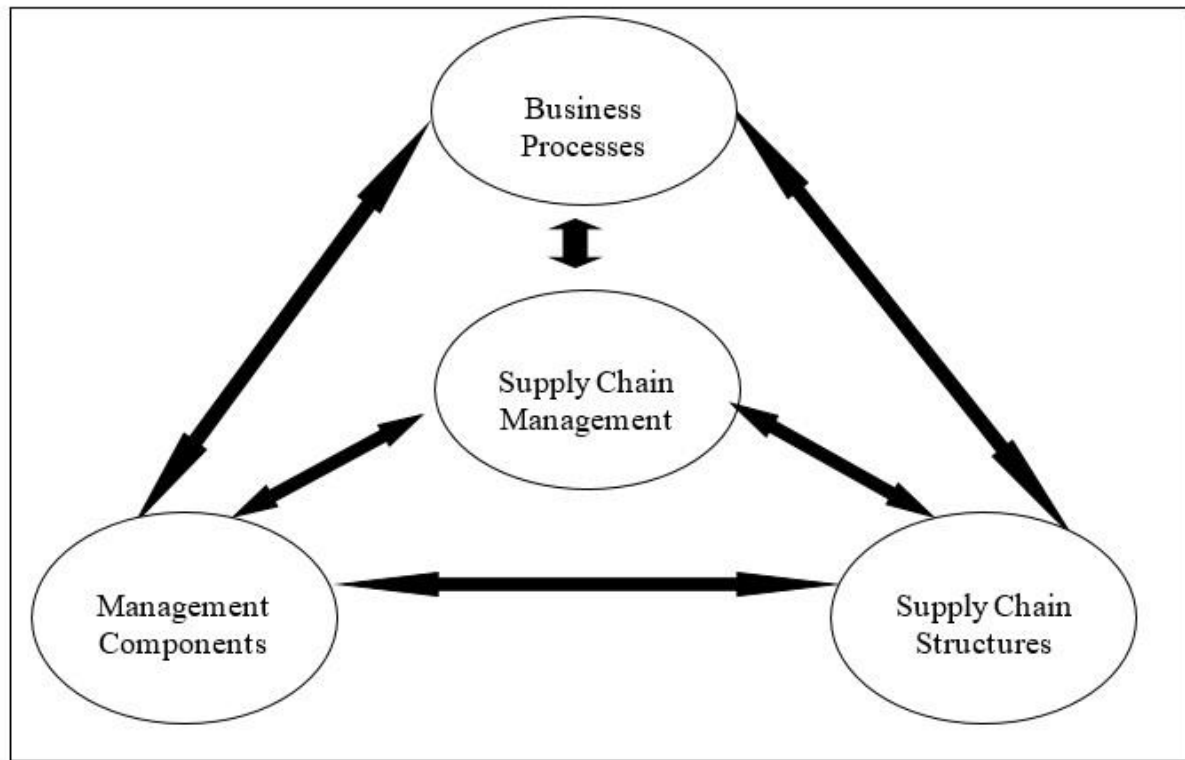
Source: Chen & Paulraj, 2004.

The particularity of Supply Chain Management is the nature of interdependence between the different members in the chain, which means that collaboration and coordination of activities are essential conditions for the performance of each member. Another key element is the alignment of the Supply Chain on the transversal division of the company, which explains the close relationship between Supply Chain and Value Chain.

4.2. Supply Chain Management framework

No researcher can deny that Cooper and al., (1997) proposed a valuable theoretical framework, which has greatly contributed to distinguish Logistics from Supply Chain Management. The following figure illustrates their model:

Figure 3: Supply Chain Management framework



Source: Cooper et al., 1997.

4.2.1. Business Processes

A process is a set of activities that create value in the form of products and services, with the aim of reaching customer satisfaction and increasing firm's performance (Médan & Gratacap, 2008).

In the literature, there is a discrepancy on the number of processes (Croxtton et al., 2001). There are those who consider that there are fourteen processes (Hewitt & Fred); The Global Supply Chain Forum distinguishes eight (Médan & Gratacap, 2008) while the International Center for Competitive excellence

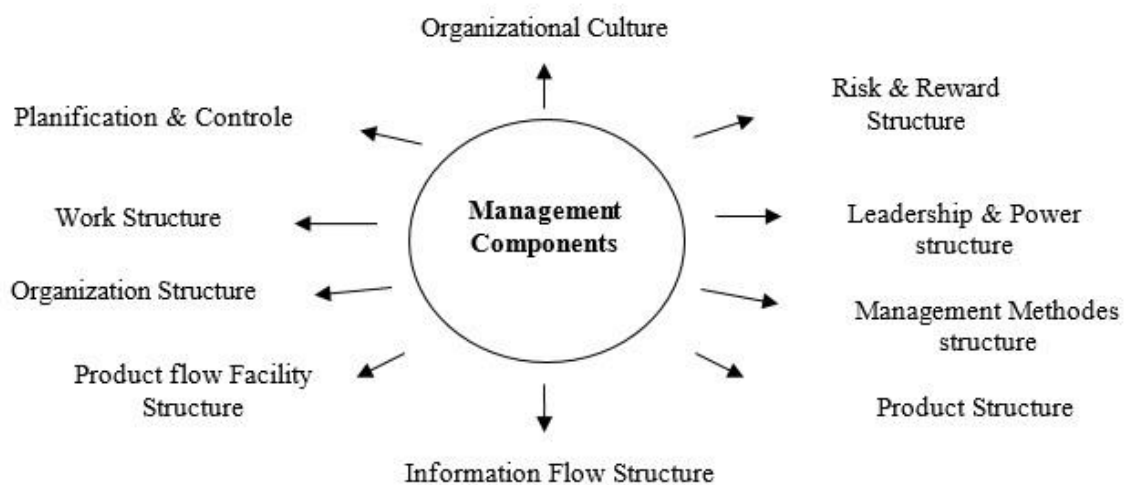
(Lamber et al., 1998) distinguishes seven. It is this perspective that we will focus on. The processes retained by this organization are as follows:

- **Customer Relationship Management (CRM):** This is the most important process, since it concerns the element that guarantees the survival of the business: the customer. This process seeks to develop programs with major customers, in order to increase their level of confidence in the company's products.
- **Customer Service Management:** This process seeks to provide the customer with information about the product, and to accompany him after purchasing the product.
- **Demand Management:** its role is demand forecasting, and effectively managing product and demand flows, which are intertwined.
- **Order Management:** the goal is to achieve fast and efficient deliveries that meet customer deadlines.
- **Workflow Management:** deals with offering a product that meets the customer's requirements.
- **Procurement:** the aim is to build strategic relationships with suppliers, in order to guarantee the supply of raw materials and components at a reasonable cost.
- **New Product Development and Marketing:** This involves integrating key customers and suppliers into product development, and into the marketing phase.

4.2.2. Management components

It refers to components by which processes are structured and managed (Cooper et al., 1997). The following figure represents the ten most common components in the literature.

Figure 4: Management components



Source: Adapted from Cooper et al., 1997.

- **Planning & Control:** They have the advantage of guiding Supply Chain members into the desired goal. Control makes it possible to measure the performance of the Supply Chain.
- **Work Structure:** This refers to how Supply Chain members carry out their tasks and activities.
- **Organizational Structure:** It refers to the design of companies in the Supply Chain.
- **Product Flow Facility Structure:** It accompanies the product from the supply phase to the distribution phase. In addition, it takes care to reduce the stocks of materials.
- **Information flow structure:** Ensures a smooth flow of information between members of the Supply Chain.
- **Product structure:** involves coordination between Supply Chain members toward the development of new products.
- **Management Methods:** They reflect the philosophy of each company of the Supply Chain and the chosen management styles.
- **Power & Leadership Structure:** In each Supply Chain, there are one or two companies that guide the chain and influence decisions. Moreover, any abuse in the use of power has a direct influence on trust and commitment, which can cause departures, and, therefore, threaten the survival of the channel.
- **Risk & benefit structure:** Sharing risks and benefits is essential for Supply Chain performance. Furthermore, any asymmetry in the sharing of risks and benefits influence negatively the degree of trust and commitment in the chain.
- **Organizational Culture:** This is the degree of sharing standards and values among members of the Supply Chain. Cultural cohesion will foster trust between members, and will push them to work towards the performance of the whole.

4.2.3. Supply Chain Management structure

Companies integrate several Supply Chains, but their degree of importance varies from chain to chain, and, therefore, their management and the devoted efforts will not be the same. This depends on the number of suppliers in the chain, their weight, the availability of raw materials and the complexity of the product. (Cooper et al., 1997). Therefore, we distinguish two types of Supply Chain. On the one hand, there are supply chains that requires forging strategic relationships between members (Stock et al., 2000). This will be materialized in sharing sales forecasts, exchanging market data, plans for the development of new products ... On the other hand, there are supply chains which will require a simple participation on both part, to the extent where the earning potential is minimal, or because members of the Supply Chain do not trust each other.

Cooper et al., (1997, p: 9) summarize in a few lines what we have just said: « Determining which parts of the Supply Chain deserve management attention depends on a number of factors, which must be weighed against firm capabilities and the importance to the firm. »

5. Conclusions

We have seen throughout this article that logistics is an old discipline, which has continued to evolve and develop throughout history; an evolution that allows it to mature and reach its independence.

From military origins, logistics took root in the business world from the 20th century onwards. Initially viewed by business leaders as a source of costs, logistics emerged from the end of World War II as a key business function.

Towards the end of 1970s, we saw the emergence of a new concept, which was confused with logistics: Supply Chain Management. In a short period of time, this concept has succeeded in establishing itself as a separate function in the company, and also as a discipline with its own theoretical framework.

We concluded that logistics is not Supply Chain Management. The latter is based on the integration of processes across the entire supply chain, and aims to build collaborative relationships with chain players, which logistics does not do. Nevertheless, these two concepts share some common elements, which corresponds to the Unionist vision, discussed in this article.

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