

A Research Note on Defining the Concept of Supply Chain

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Abstract— *Defining the concept of supply chain have been the subject of several proposals. Gathering definitions so that they can be organized and analyzed seems to be an important work at this stage of research. Many perspectives have been identified, namely functional and process oriented perspective, strategic perspective, systemic perspective, structural and network oriented perspective and relational perspective. These perspectives help shaping decisions in this complex organizational configuration. They are analyzed and discussed and a definition is proposed to cope with main elements.*

Keywords— *Supply Chain, Process, Relationship, Network, Value.*

I. INTRODUCTION

To better cope with environment complexity, many companies focus their activities on their core competencies (Hamel and Prahalad, 1990; Wernerfelt, 1984), and outsource those that are less or non-value added ones. This has led to the emergence of a growing number of support companies, that has resulted in more complex flows (material, informational and financial), increasing, thus, uncertainty. This has resulted in a rise in variability demand variability, reducing, by the fact, visibility for companies Forrester (1958), but also increasing difficulty for rationalizing flows throughout the value system (Porter, 1986). To cope with such constraints, firms have embraced new organizational configurations to increase coordination and collaboration with one another. This configuration, conceptualized as ‘supply chains’, represent for Miles and Snow (2007) central organizing units in nowadays’ industries.

Supply chain configurations can be identified as hybrid governance structures, because they allow companies to be enough integrated while keeping a certain level of responsiveness. This allow them to congregate towards common interests through the development of cooperation for value creation, and to diverge on their own interests by remaining in competition for value capture.

Even if Mentzer et al. (2001) state that the definition of ‘supply chain’ seems to be more common across authors than the definition of ‘supply chain management’, we can find lots of definitions from different perspectives with give the concept different orientations. Moreover, it should be noted that in the literature and even today, several works combine ‘Supply Chain’ as an organizational configuration and ‘Supply Chain Management’ as a set of mechanisms and tools to manage this same organizational configuration. Therefore, it is necessary to define the object to be managed, then how this object will be managed. This paper proposes an analysis of the different perspectives that have attempted to define the concept of supply chain. This will allow us to have a clearer picture of the different definitions and perspectives supported in the literature.

This paper is structured around two main parts. The first part present five perspectives of conceptualization of a supply chain as an object (organization), including functional and process oriented perspective, strategic perspective, systemic perspective, structural and network oriented perspective and relational perspective. The second part tend to discuss these perspectives and propose a definition that include main features of a supply chain.

II. SUPPLY CHAIN: A CONCEPT, SEVERAL PERSPECTIVES

In this point, we will revisit the definition of SC in two main spheres, namely the academic sphere and that of professionals. This will allow us to confront these two visions in order to be able to define the concept in its common sense. The SC has been apprehended in the academic world from several perspectives. Brindley (2004) highlighted four main ones: a structural perspective, a systemic perspective, a strategic perspective and a relational perspective. However, based on an in-depth analysis of the definitions developed in the literature, we can classify them into five main perspectives, namely functional and process oriented perspective, strategic perspective, systemic perspective, structural and network oriented perspective and relational perspective (Table I.).

2.1. Functional and Process Oriented Perspective: The Supply Chain as a Set of Functions, Activities and Processes

The functional and process perspective addresses SC as a set of functions, activities and processes integrated throughout a business chain. In this regard, Ayers (2006, p. 5) presents the SC as “Product life cycle processes comprising physical, information, financial, and knowledge flows whose purpose is to satisfy end-user requirements with physical products and services from multiple, linked suppliers”. Beamon (1998, p.281) defined it as “A supply chain may be defined as an integrated process wherein a number of various business entities (i.e., suppliers, manufacturers, distributors, and retailers) work together in an effort to: (1) acquire raw materials, (2) convert these raw materials into specified final products, and (3) deliver these final products to retailers. This

chain is traditionally characterized by a forward flow of materials and a backward flow of information.”. These two definitions highlight the integrative aspect from which are organized the processes that contribute to the satisfaction of the customer.

TABLE I. Perspectives of approaching the concept of supply chain

Perspective	Analysis unit	Main authors
Functional and process oriented	Process, function et activity	Quinn (1997) Beamon (1998) Visker (2000) Zhang et al. (2003) Ayers (2006) Arshinder and Deshmukh (2008)
Strategic	Value et competitive advantage	Porter (1985) Esty and Porter (1998) Lambert and Cooper (2000) Porter (2008) Ketchen et al. (2008) Bertazzoli et al. (2011) Lee (2010)
Systemic	System: Actors and interactions	Stevens (1989) Ketchen et al. (2008) Leukel and Kirn (2008) Saikouk et al. (2012)
Structural and network oriented	Members and links	Miles and Snow (1992), Ganeshan et Harrison (1995) Swaminathan et al. (1998) Borgatti and Foster (2003) Santoso et al. (2005) Eriksson et al (2006) Sanders (2012)
Relational	Relations and behaviors	Cooper and Gardner (1993) Lambert et al. (1996) Mukhtar and Shaharoun (2002) Ketchen and Giunipero (2004)

In the same spirit, some authors define SC as a set of synergistically managed activities or functions. In this regard, Quinn (1997, p.43) states that the SC incorporates “All of those activities associated with moving goods from the raw-materials stage through to the end user. This includes sourcing and procurement, production scheduling, order processing, inventory management, transportation, warehousing, and customer service. Importantly, it also embodies the information systems so necessary to monitor all of those activities.”. Similarly, Zhang et al. (2003, p.200) describes SC as “A network of interrelated activities of procurement, production, distribution, vendition, and consumption of one or more products, conducted by coalitions of business entities who act collectively within a coalition.”.

In a functional logic, Visker (2000, p. 8) defines SC as “The supply chain is a set of functions that need to be performed coherently by a number of activities.”. Also, Monczka et al. (2010, p. 9) stipulate that the SC presents "The supply chain is a set of functions that need to be performed coherently by a number of activities." Arshinder et al. (2008, p.317) acknowledge that “Supply chains (SC) are generally

complex and are characterized by numerous activities spread over multiple functions and organizations, which pose interesting challenges for effective SC coordination. To meet these challenges, SC members must work towards a unified system and coordinate with each other.”. In sum, this perspective shows that the SC is composed of one or more integrated processes, ie a set of functions, operations and activities linked with material, information, financial and knowledge flows, which enable the acquisition, processing and delivery of products or services to the customer, ensuring their satisfaction.

2.2. The Strategic Perspective: The Supply Chain as a Value System and a Competitive Advantage

This perspective addresses SC from two main elements, namely SC as a value creation system, and SC as a competitive advantage. The value system concept comes mainly from the work of Porter (1985) who, starting from the definition of the value chain concept, which is primarily internal to the firm, defines the value system as a system that links a set of value chains of partner companies. In his words, “value system, that is, the set of value chains in an entire industry, encompassing those of tiers of suppliers, channels, and customers” (Porter, 2008, p.122). In order to go beyond its own value chain, the company must look for sources of opportunities concealed in the SC that connects it with its partners, focusing on the interdependencies existing between them, which generate synergies (Esty and Porter, 1998).

In this sense, Bertazzoli et al. (2011) point out that the value system represents the result of the sum of the value created by the company and that created by the activities of all the companies that make up the system. They add that each company has a share in the value created, which depends on the value perceived by the final customer, as well as the characteristics of the system in which the company operates, such as the level of market competitiveness, negotiation with suppliers and customers, relationships and level of integration, and policies implemented in the sector. In addition, the SC is composed of a set of strategic units that perform a set of operational or management activities, thereby creating value from processes, designed to deliver specific outputs to specific customers or markets (Lambert and Cooper, 2000).

This involves identifying opportunities that cover SC, reinventing manufacturing processes, ensuring an ecological chain that requires less capital, much lower operating costs, and providing a competitive advantage, and even developing ties with competitors to meet scale challenges (Lee, 2010). Indeed, Ketchen et al. (2008) describe SCs as key competitive “weapons” for businesses as they represent central strategic elements, rather than mere means of moving materials. They add that SCs are designed to deliver greater total value to customers in terms of speed, cost, quality and flexibility, and are tools for improving business performance. Therefore, from this point of view, SC is conceived as a value chain system, that is to say, of main activities and supports, which, by integrating from upstream to downstream of several enterprises, to satisfy the end customer and to develop a competitive advantage in an economy where it is increasingly difficult to differentiate.

2.3. *The Systemic Perspective: The Supply Chain as a Dynamic System*

The systemic perspective apprehends the SC from the elements that constitute it and the interactions that occur between them. It is mainly defined as a set of material, technological, human and organizational elements which, by interacting with each other, allow the transformation of inputs into outputs in order to satisfy the final customer (goal). In this sense, Stevens (1989) defines it as a system whose constituent parts are suppliers of materials, production facilities, distribution services and customers connected by flows of material and information. Hence, "Supply chains can be considered as dynamic and complex systems composed of autonomous firms that interact with one another contributing to fulfilling a common goal." (Saikouk et al., 2012, p.75).

In the same vein, the SC presents "a system of entities being involved in producing, transforming and/or moving a good or service from suppliers to customers." (Ketchen et al., 2008, p.235), or a system of entities involved in the production, transformation and / or movement of goods or services from suppliers to customers (Leukel and Kirn, 2008). Overall, this perspective addresses SC as a whole superior to all of the parties. It consists of production, supply, distribution, warehousing, storage, transport, information management subsystems, as well as other subsystems that enable the transformation of inputs (hardware, information, financial, knowledge) in outputs (product and service), in order to achieve the final customer satisfaction. This system has dynamics that evolves in an environment characterized by a greater or lesser uncertainty, and whose purpose is in particular to reduce the global disturbances relative to the interactions between its different members.

2.4. *Structural and Network Oriented Perspective: The Supply Chain as a Network of Actors*

The structural and network oriented perspective conceives the SC as a network, that is to say a set of enterprises represented by nodes and connected by different types of relations (links). Thus, we can emphasize the fact that the SC is structured around a set of actors connected by various types of links (Borgatti and Foster, 2003). In a network design as a homogeneous entity (Miles and Snow, 1992), the SC is orchestrated and managed by a so-called focal company, around which a constellation of suppliers and customers evolves. Indeed, Sanders (2012, p.3) defines SC as "the network of all entities involved in producing and delivering a finished product to the final customer. This includes sourcing raw materials and parts, manufacturing, producing, and assembling the products, storing goods in warehouses, order entry and tracking, distribution and delivery to the final customer.". In this line, Swaminathan et al. (1998, p. 607) define an SC as "a network of autonomous or semi-autonomous business entities collectively responsible for procurement, manufacturing, and distribution activities associated with one or more families of related products.". Also, Santoso et al. (2005, p. 96) define it as "a network of production and distribution facilities (nodes), typically involving multiple organizations, that performs the function of

transforming input resources (supplies) into finished products and services delivered to consumers."

Eriksson et al. (2006, p. 4) emphasize the main elements of network theory by defining it as "a network of production and distribution facilities (nodes), usually involving multiple organizations, the function of transforming input resources (supplies) into finished products and services offered to consumers.". Finally, Ganeshan and Harrison (1995, p.2) define it as "a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers.". They add that SCs exist in both manufacturing and service companies, and that its complexity may vary considerably from one sector to another. In the end, this perspective makes it possible to understand the structure (and not the dynamics) of the CS, that is to say the entities or members that constitute it, as well as the links that remain between them.

2.5. *The Relational Perspective: The Supply Chain as a Set of Relations*

The relational perspective defines the SC as a set of relationships between different actors. In this regard, Beamon (1998, p.292) defines it as "a set of relationships among suppliers, manufacturers, distributors and retailers that facilitates the transformation of raw materials into final products.". Mukhtar and Shaharoun (2002) insist that the analysis of SC cannot be dissociated from the characterization of the types of relationships that exist between the various actors in the chain. This definition can be supported by that of Ketchen and Giunipero, (2004, p.55), which say that "a supply chain organization is a relatively enduring inter-firm cooperative that uses resources from participants to accomplish shared and independent goals of its members."

This perspective addresses the purely relational aspect between different actors. In addition to the links characterized in the reticular perspective, as well as the interactions addressed in the systemic perspective, this perspective characterizes relations in their objective (rational) as well as social aspects, which include a subjective aspect in addition to that addressed in the other perspectives.

III. DEFINITION PROPOSITION AND DISCUSSION

After defining the SC from different academic perspectives, it would be interesting to examine the vision of professionals and consultants in order to compare it with that of the academicians and to verify that they usually speak of the same object. Moreover, we were surprised to find the first definitions from a relatively different point of view from the perspectives discussed, and which were placed relatively in a flow perspective, giving these same flows the principal role in terms of unit of analysis. In this respect, Rockford Consulting Group defines it as "the stream of processes of moving goods from the customer order through the raw materials stage, supply, production, and distribution of products to the customer. All organizations have supply chains of varying degrees, depending upon the size of the organization and the type of product manufactured. These networks obtain supplies

and components, change these materials into finished products and then distribute them to the customer.” (<http://rockfordconsulting.com/supply-chain-management.htm>). These definitions characterize the SC as a set of flows, and thus confer on it more dynamic but less stable properties. Because the notion of flow in this direction remains relatively wide and makes it difficult to identify the organization or elements that must be managed when we are in such an approach.

In addition, APICS (2010, p.148) perceives SC as "a global network used to deliver products and services from raw materials to end customers through a flow of information, physical distribution and of cash designed with engineering." For ASLOG, the term Supply Chain refers to the overall supply chain, that which goes from the supplier to the customer and where production is driven by demand. Its objective: the right product in the right place at the right time.

We define SC as an organizational configuration or a hierarchical, dynamic and sequential network of autonomous companies ranging from the primary provider to the end customer. These are linked by upstream and downstream flows (physical, information, financial and knowledge), cross-functional processes, but also relationships of various natures and levels, in order to satisfy the client and other parties better coordination and integration, but also by greater flexibility and responsiveness.

In this respect, the term "network" means that the SC is a set of autonomous entities connected by links. This network is "hierarchical", that is, the weight of companies in terms of power and value creation is not the same. It is also "dynamic", that is, its constitution and configuration changes according to its environment and capacity. In other words, companies connect or join the network, while others separate or even disappear. This network is also "sequential", that is, it is organized in a sequential logic starting with the extraction of the raw material until delivery to the final customer. It is made up of independent, not independent, companies that are free from the decision-making point of view. These are connected by upstream and downstream flows that are physical in nature (flow of materials), informational, financial and knowledge. These companies are also linked by cross-functional processes that facilitate their integration, but also by relationships that can be of various kinds (simple cooperation or advanced or conflicting collaboration) and different levels (strategic, tactical or operational). The purpose of this organizational configuration is to satisfy the customer through a balance between integration and coordination on the one hand and flexibility and responsiveness on the other.

As regards the dissociation between the notion of SC and the SCM, we have mentioned the fact that several authors do not differentiate between the two notions. This research clearly differentiates them because it is the first, that is, the SC, of an organizational form, and for the second, a mechanism of organization and management. In management sciences, this is an important nuance because it makes it possible to differentiate the organization as an entity and the organization as an action, and then to design and analyze them accordingly. To begin with the form or the organizational

configuration, we can first recall its definition, referring to the one established by Daft (2010) which defines organizations as "organizations are (1) social entities that (2) are goal-directed, (3) are designed as deliberately structured and coordinated activity systems, and (4) are linked to external environment". With respect to the SC definitions discussed in the second chapter, several units of analysis have been identified, namely process, function and activity, value and competitive advantage, actor and interaction, actor and link, relationship and behavior. These units of analysis translate and define the same entity, that is SC, from several perspectives.

IV. CONCLUSION

This paper has enabled us to bring out a definition that allows us to cover a large part of these different perspectives. Indeed, defining SC as a "hierarchical, dynamic and sequential network of autonomous enterprises ranging from the first supplier to the final customer" is the first condition of Daft (2010), that is, the entities that constitute this set. Then we added to the definition that "these entities are connected by upstream and downstream flows (physical, information, financial and knowledge), cross-functional processes, but also by relationships of various natures and levels "Thus constituting the third condition of Daft (2010) which states that these entities are conceived as deliberately structured and coordinated systems of activity.

The fact that this network is "constituted in order to satisfy the client and other stakeholders" ensures the second condition of Daft (2010), that is, the orientation towards a goal. Finally, we conclude by saying that this goal is attained "by better coordination and integration, but also by greater flexibility and reactivity", this joins both the third and the fourth condition of Daft (2010) that is to say that the network is linked to its external environment by deliberate and deliberately structured and coordinated rigidity or flexibility. Hence, the definition of SC proposed in this research attempts to bring together the perspectives highlighted by the literature in the field of SC and that which establishes the global model in the management sciences. Thus, the differentiation between the academic vision and the professional vision shows a shift in the level of abstraction that is needed in an expanding field. This allows both to introduce the concept of SC that will be the object of a language or an ontology in the field, but also to reduce the possible discrepancy between academic considerations and professional practices. This is true for the notion of SCM, which, contrary to the notion of SC, presents a much more professional than an academic anchorage in the sense that professionals are much more oriented towards defining the mechanisms by which this organizational form is managed (SC), only by its nature and conceptualization.

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