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# CONCEPTUAL MODEL FOR THE INTEGRATION OF THE SUPPLY CHAIN

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**ABSTRACT**

*A customer orientation of the supply chain is need for companies that want to generate competitive advantages in the market. Customer orientation is possible when motivated by market research. The participants of a supply chain create compatible philosophies, synchronize their processes and exchange sensitive information regarding levels of inventories and demand. Likewise, when participants meet to jointly plan the creation of an offer of products and services designed to satisfy the wishes, needs and purchasing expectations of customers, the bases of a future logistic integration are established. This work proposes a conceptual model for the integration of the supply chain focused on the client. This article was generated through an exhaustive literature review and serves as a guide for the optimal integration of the members of a supply chain.*

**JEL:** O30, N7

**KEYWORDS:** Supply Chain, Logistics Integration, Strategic Alliance, Competitive Advantage

## INTRODUCTION

Strategic alliances and the buyer-seller society relationship have become more common. There is increased dialogue between business partners as management realizes the importance of sharing information and working together to jointly plan and execute strategic initiatives aimed to achieve improvements in given services. Staude (1987) wrote about the need for two types of organizational integration: interdepartmental and intradepartmental. A systemic approach requires that the objectives of the company, seen as a whole, be considered more important than the objectives of individual departments. A myopic perspective focused internally can be risky. For decades it has been recognized that satisfaction of needs and fulfillment of client demands must be the central objective of those that make up the supply chain. Many of the most progressive and successful firms emphasize the logistics service as a competitive differentiator in this area (Livingstone, 1992 y Stern, Sturdivant, & A., 1993).

Consumers have become increasingly demanding and look for more specialized services. The market environment is continuously changing to accommodate these consumer desires, and demand fluctuates each day. Therefore, the operation of logistics processes must be more efficient (Kovacs & Kot, 2016). For this reason, we consider the logistical integration of supply chain activities. These activities inlcude participating entities such as suppliers, manufacturers, transporters, stockists, customs brokers, freight forwarders, shipping companies, airlines, railways, commercial brokers and points of sales to the consumer. The goals is to create value within the market of participation.

An efficient logistics process leads to reduce costs associated with redundancy and duplication. It compresses uncertainty that arises from changes in client's orders, volatility of demand and fluctuations in

delivery time. Dramatic changes in the way of thinking and acting are required to reach optimal levels of integration. Generating support to change the logistics practices of a traditional supply chain demands substantial justification. Unfortunately, there is a lack of empirical evidence to support the link between integrated logistics processes and the creation of value in the supply chain.

Graham & Zailani (2005) argue that limited understanding about logistics has expanded to encompass all actors, from suppliers to customers, including the entire value chain system. Logistics is: "An approach of the distribution mission of a company, which integrate two or more of the functions involved in moving goods from one resource to another considering them as an interrelated system or subsystem. Which link the purposes of management planning, implementation, and control, including in this dynamic all the stakeholders: from suppliers to customers counting the entire value chain system ". Today, manufacturers and their partners in the supply chain, strive to co-create higher value for the customer and a collaboration advantage through the adoption of supply chain management (Hee-Yong Lee et al., 2016).

To better understand the efforts of manufacturers and their corresponding partners we define the Supply Chain as the chain of network of entities through which materials flow. These entities can include suppliers, operators, manufacturing sites, distribution centers, retailers, and customers. Management of the supply chain coordinates and integrates all these activities in a process without interruptions. It links all partners in the chain, including the departments within an organization and external partners. Successful logistics management integrates all these activities with synergy that works to minimize the costs of total distribution, delivery times and maintenance of the desired customer service levels (Kenderdine & Larson, 1988). Directing the supply chain towards the wishes of the client recognizes the inclusion of the client in the processes of the supply chain. The client is considered not only the final destination of a good or service but an active participant and designer in the creation of value processes within the supply chain.

## LITERATURE REVIEW

The integration of the supply chain with a focus on the customer has aroused growing interest since value is added to the market when a supply network processes are synchronized, being the good relations with suppliers and the uses of their capabilities a vital source of competitive advantage. The environmental factors of an "adjustment" relationship, of joint alignment with the association's resources, are relevant for the client's satisfaction (Srivastava, Iyer, & Rawwas, 2017). Collaboration refers to the joint and continuous resolution of problems and coordinated actions to take advantage of the available resources of the members of a chain. What members of a chain look for trough collaboration is to obtain mutual beneficial results, this involves designing well-coordinated information and materials flows to help companies to create fluid processes along the entire supply chain (A. Mackelprang, J. Robinson, E. Bernardes, 2014).

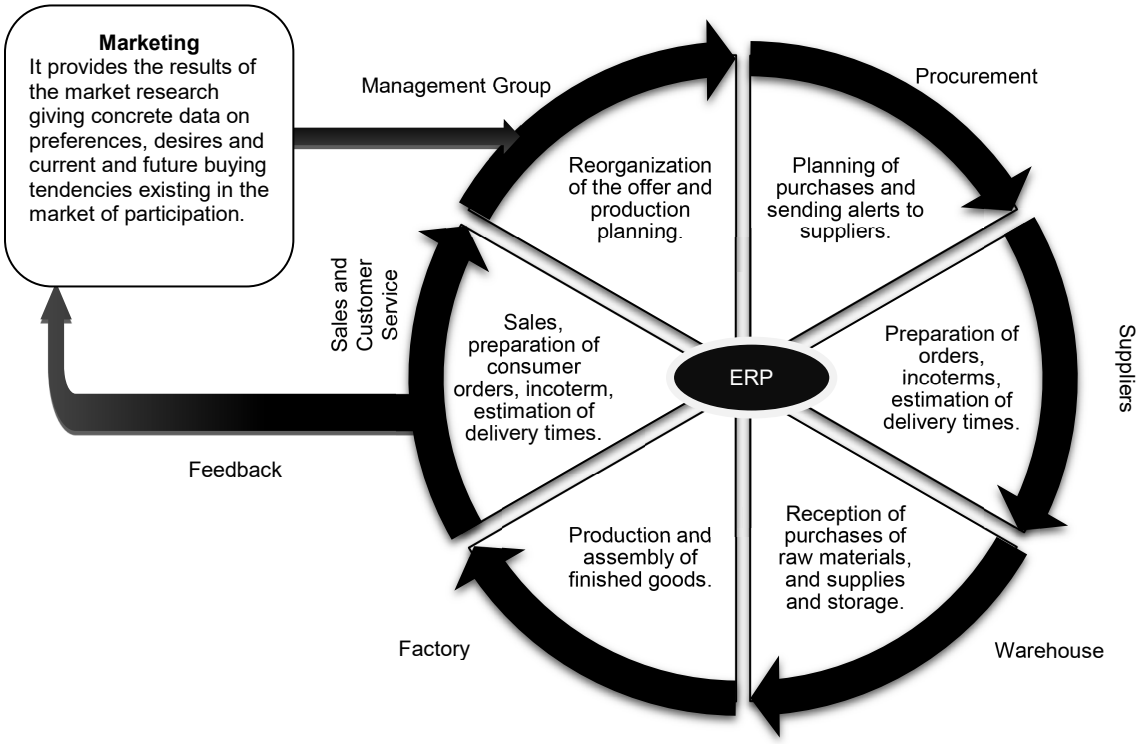
Hee-Yong Lee (2016) show that to improve the logistic performance management must be aware of the importance of collaboration practices required by integration since limited company resources can block their effective implementation. Management must strive to simultaneously implement the internal integration of suppliers and customers because none is inferior. Each member of a chain has resources and strengths with the potential to benefit the combined chain. In this manner, the weaknesses of each component are overcome. Manufacturers should retain the ability to quickly deal with a high level of dynamism of the chain if they want to integrate their logistical process into the general supply chain. External integration shows the grade to which a manufacturer develops collaborative relationships, exchanges information and jointly plans activities or processes of the supply chain with suppliers and customers (Danese et al., 2013). Internal integration refers to a comprehensive inner process, integrated planning, and control system (Stevens, 1989). Working with business partners might be helpful to cross-functional teams using the resources and capabilities of others to reduce duplicated tasks, improve product quality and jointly design products. When a company produces a new product, integration of the supplier helps reduce the time to commercialization, as well as problems of quality and cost (Quesada et al., 2008).

Customer integration occurs when companies work closely with customers and consider them a crucial part of the supply chain, where feedback on the delivered result for better customer satisfaction is vital (Graham & Zailani, 2005). The internet of things (IoT) is fast becoming the new dominant IT paradigm for companies that want to review the implementation of their operations and improve their efficiency (Witchalls & Chambers, 2013). Typical IoT technologies, among others, are identification by radiofrequency (RFID), sensors, wireless communications, cloud computing and 3D virtual reality technology (Miorandi et al., 2012). Supply chains that respond and adapt to the rapid growth of the IoT, integrating them into their business systems (ERP) will obtain more significant benefits and competitive advantages in the current business environment. Hence management needs to review and make new plans to develop and update its existing information systems and practices of their business functions, such as product design, procurement, operations, transportation, customer relations, marketing, human resources, accounting and finance (Li & Li, 2017). We focus on an integrated model where customer participation is key for the creation of products and services. Integrating information is collected into the management systems, thus enabling rapid response to the client, reducing human errors, reducing the waste of resources, allowing the generation of substantial savings and facilitating decision-making.

## MODEL PROPOSAL

The conceptual model for integration of the supply chain that we propose is presented in Figure 1. The conceptual model links activities of the functional areas of an organization. The model integrates the logistics for the materials distribution area of the leading suppliers. We include their participation in the operational and planning activities of the company that manufactures the final product and service delivered to the final consumer or client. The functional areas of a company and the logistic of materials distribution area of its suppliers communicate with each other through Enterprise Resource Planning Systems linked to the same matrix.

Figure 1: A Conceptual Model for the Integration of the Supply Chain




*This figure shows our conceptual model for integration of the supply chain where the activities of the functional areas of an organization are linked.*

Management Group

The idea here is to shape a group of companies that fit with the existing needs among themselves. The firms make available to the chain the resources and capabilities that distinguish them, with the common goal of achieving superior performance. The management group should be configured by those in charge of the areas that plan, supply, produce, store, and deliver products and raw materials as shown in Table 1. What a company looks for by creating a glider group is to facilitate the rapid reaction to changes in the market and to ensure that companies involved are ready and have the necessary flexibility to respond adequately, making decisions that could affect, in a positive manner, the chain in general.

Table 1: Conformation of the Management Group

| Manufacturer | Managing Director | Supply Manager | Production Manager | Marketing and Sales Manager |
|---|---|---|---|---|
| Supplier 1 | | Supply Manager | Production manager | Logistics manager |
| Supplier 2 | | Supply Manager | Production manager | Logistics manager |
| Supplier 3 | | Supply Manager | Production manager | Logistics manager |
| Supplier 4 | | Supply Manager | Production manager | Logistics manager |

*This table shows the construction of a management group based on the model presented here.*

Managers of the supplying companies and the factory must agree on the incoterms selections in case of imports and exports before confirming orders, to speed up the process of international distribution of materials. In the foreign trade environment, it would be difficult to carry out import and export operations without international accepted rules, which indicate the obligations and rights of the buyer and the seller. Incoterms® Rules establish clear rules for buyers and sellers, regarding delimitation of rights and responsibilities, as well as the identification of costs, documents, and tasks necessary for the delivery of goods to the agreed place, to avoid uncertainties derived from different interpretations in different countries. The 2010 Incoterms® Rules involve 11 terms, ranging from the most straightforward obligations for the exporter, such as leaving the merchandise in its factory for the buyer to pick up (term EXW), to more complicated commitments, such as delivery of the goods, by the exporter, at the buyer's door (DDP term). To better understand them, they can be grouped into two categories as shown in Table 2, (PROMEXICO, 2015).

Table 2: International Trade Terms

| | |
|---|---|
| For any mode or modes of transport. | EXW, FCA, CPT, CIP, DAT, DAP y DDP |
| For maritime and inland waterways. | FAS, FOB, CFR y CIF |

*Table 2 shows the incoterms to each transport mode: Air, road, rail, maritime, inland waterways.*

Procurement

Currently, global competition has forced organizations to seek synergies in their operations to remain profitable in global markets. One of these areas is the supply area which is responsible for contracting services and buying products effectively and efficiently (Ahmad & Adnan, 2017). Competition occurs between networks of interconnected companies, which must be integrated and aligned strategically, to generate a competitive advantage for the supply chain as a whole. To build and maintain a competitive advantage companies need to configure and manage their supply chains from a holistic perspective. The key to maximizing the supply network performance holistically and systemically, is to create an adjustment between strategic groups of supply chains with the company's competitive priorities and flexibility

requirements and linking the regional market conditions. By balancing these strategic recommendations with possible pooled effects through network sourcing strategies, companies can effectively align their supply networks and achieve superior performance for the entire system (Moraitakis, Huo, & Pfohl, 2017). Instead of trying to find alternative partners in the supply chain to reduce dependency, companies are integrating widely with partners. Companies reduce their supply risk not by finding alternatives but by strengthening their existing relationships and making them more valuable to both parties (Muhammad Usman Ahmed et al., 2017).

Suppliers

Suppliers can access confidential information of their customers, such as sales reports, to estimate demand and production, trends and customer preferences. This helps develop the ability to prepare the next lots and have them ready at the moment the buyer notifies of the purchase. With this, the supplier company tries to gain time to organize the shipments and to select sources of supply that offer the best quality of products at a lower price and to support the days of transport without being negatively affected.

Warehouse

Since storage is actively involved in the supply chain, warehouses allow us to respond quickly to better adapt the supply to customers demand. In supply chains driven by demand, this can be mainly through the storage of products, or in the classification. Both are obliged to feed, to a significant degree, the external customer's expectations. In supply chains driven by supply, warehouses are renamed stores and maintain stocks required to feed domestic activities such as production. Therefore, warehouses are an integral part of the infrastructure of the supply/demand chain (Emmett, 2005).

Information flows in warehouses and supply chains occur not only internally, but also between external suppliers, contractors, and customers. A growing number of material handling systems (MHS) and even larger system components are integrating sensors and intelligence. Objects that can be products, equipment, containers or other things (Banker, 2015). IoT provides a holistic view of the warehouse and allows operators to improve performance and efficiency by analyzing data in almost real time. Performance of the system may adapt to achieve a specific commercial objective, as well as feedback in real time. First-hand information regarding the levels of inventories and supply needs to be communicated to purchasing, the leading suppliers, and the glider group. In a connected warehouse, all devices must communicate through a common platform that contains all the information. When enough devices connect to the matrix platform, the machines, subsystems, and systems begin to communicate with each other and will try to optimize automatically saving human effort, hours of work, materials, spaces, and allowing for reduced mistakes.

Marketing

Marketing is the first echelon and the principal position that must provide detailed information on consumer purchasing behavior. Its specific duty is to provide information on current and future preferences, needs, and desires of the customers and clients. In doing so it enables the design and supply of products and services focused on customer satisfaction, with the entire supply chain concentrating on achieving the objective. To develop a logistics strategy it is necessary to obtain customer data on the importance of supplier attributes and the performance of leading suppliers in these attributes. However, most competitive strategy researchers emphasize the importance of competitive intelligence as the basis for implementing generic strategies without neglecting the importance of client evaluations. Since customer service can represent the best opportunity for a company to obtain a sustainable competitive advantage, competitive intelligence regarding logistics capabilities is of vital importance. As claimed by Mentzer et al., (1989), "Logistic performance quality is also a key marketing component that helps engender customer

satisfaction," which leads to the identification of the client with the organization when perceiving that their demands are satisfied in time, generating a stable relationship between the clients and the organization.

Market research helps make relevant and assertive decisions. The critical role of market research is to identify the target audience through the use of demographic, psychographic and needs data. Once the researcher identifies the customer's needs, ideas are generated, often by internal brainstorming, to develop basic concepts of products and services that can meet those needs. Some fundamental questions that result in new ideas are: What makes each concept work? What need does each concept have? Is it rational or emotional need? What is the point of difference of the concept concerning the competition? Also, how to combine the characteristics of the concept into a substantial benefit that meets the need? It is essential to determine the conceptual stage, regarding the positioning of the concept. This determination must occur early in the process so it affects all elements of the marketing mix. Most companies resolve the market positioning after the product or service is in the final stage and almost ready for public presentation. The delay in market positioning causes forced adjustments. This tactic defeats the purpose of positioning itself, which is like a first domino to fall, putting everything else in motion.

After generating the concepts (and their positions), research can determine which idea reveals the greatest viability with the highest purchase interest. In essence, the seller is looking for the address of the product or service. In our world of limited resources, this type of research is critical because it allows the marketer to reduce the options so that resources can be devoted exclusively to those ideas that reveal a spark of opportunity. It can also save a significant amount of R&D expenses, since many times this type of research is carried out before a prototype is produced (Del Vecchio, 1990).

Sales and Customer Service

Once an organization accepts that customers want benefits, not just products, the next step is to deliver them. There are two ways of delivering the benefits in the form of a manufactured product that is distributed in the market and offered for sale and then consumed by the customer. The second method is to deliver them directly, as a service. The value of benefits delivered, either by product or directly as a service, is determined by the adjustment. Fit or adjustment is a term used to describe the conformity of the benefits with the individual needs of the clients (Frank W. Davis Karl B. Manrodt, 1997). Lambert (1992) argues that customer service is the key for integrating marketing and logistics and that such integration is necessary to produce an attractive market offer for target customers and thus advance the company's long-term profitability goals. The most common elements of logistical-customer service reported in the literature are the following: Cycle time of the order; consistency and reliability of delivery; availability of inventory; restrictions on the size of the order; convenience of the order; selection accuracy; packing and labeling of the system; delivery times and flexibility; ability to expedite distribution or delivery; ability to replace the order or product; billing and accuracy procedures; claims procedure; condition of goods upon arrival; post-sale support for the product; product tracking; order status information (Emerson & Grimm, 1996).

The availability of products (order integrity, order accuracy, and storage levels) is usually the most critical element in the combination of customer service. For most manufacturing sectors, order cycle time ranks second in importance (order transit times, assembly and shipping time) (Coyle et al., 1992). Coyle et al. (1996) suggest that reliability is perhaps the only characteristic that clients desire in the logistical capabilities of a company. The elements of customer services for logistics have four primary dimensions: time, reliability, communications, and convenience.

## CONCLUSIONS

To be competitive in the current market it is necessary to execute actions that allow the generation of value. A proposal to accomplish this is implementation of supply chain management models that allow the

operational and administrative integration of different forces, to achieve savings and make efficient use of human capital, materials, finance, space and time resources. We propose a model where customers are considered an integral part, since the satisfaction of their purchasing expectations, wishes, and demands, are the rudder that directs decision making for the supply chain. Companies bet on the logistics integration of their respective supply chains to create value since previous studies show its potential to generate savings. This work offers clarity to companies considering the integration of their logistics activities to the supply chain which they belong and do not have the experience or knowledge. For reasons of time, previous knowledge and experience this study has not been proven in a real context. For this reason, several paths remain open for future research including, mathematical modeling, real-world implementations and performance evaluations.

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