

LOGISTICS MANAGEMENT MODEL FOR SMALL AND MEDIUM-SIZED TEXTILE ENTERPRISES

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ABSTRACT

The worldwide market opening and globalization of supply chains demand a series of structural changes where logistics plays a strategic role. Customers evaluate the quality of the product, its added value and its availability in time and form, which involves making processes more efficient. Some experts have proposed logistic management models to elevate competitiveness in the market. Some of these models are ambitious for Small and Medium-sized Enterprises (SMEs) due to their informal structure and a lack of technical knowledge. Other models make indirect reference to the internal information flows, including a whole disintegration of the system because of the interrelation among the different areas. SMEs represent 4.2% of enterprises existing in Mexico, generate 31.5% of employment and contribute to the Gross Domestic Product. It is important to reinforce their competitive position in the market. Some 85.9 percent of the textile industry in Mexico is SMEs. In this descriptive investigation, we design a logistic management model for textile SMEs.

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KEYWORDS: Logistics Management Model, SME, Textile Manufacture, Supply Chain

INTRODUCTION

A logistics management model for SMEs is different from that used by big enterprise because of the technological resources, language, structure and culture of the model operation (Velásquez, 2003). This difference is due to high levels of training and economic resources in the big enterprise. The logistics sector is important by itself, but also generates a traction effect for private sector development and growth in other economic actors in a country or region. Efficient and accessible logistics constitutes a key aspect so the enterprises in general, and specially SMEs, could successfully compete in a globalization economy.

According to the Logistic Performance Index (LPI), published by the World Bank every two years, Mexico occupies 47th place among 155 countries. According to these data, it has a global logistic performance of 3.06 (World Bank, 2012). SMEs represent 4.2% of all the enterprises existing in Mexico, which generate 31.5% of employment and contribute 37% of Gross Domestic Product. It is important to reinforce their competitive position in the market. The manufacture industry contribution to the Gross Domestic Product (GDP) was 18.1%. The textile industry is included in this percentage representing 1.2% (INEGI, 2011a) and contributing, 0.74% to the GDP in 2011 (INEGI, 2012).

A literature review allowed us to identify different integral models of logistic management to increase competitiveness in the market. Some authors proposed ambitious models for a SME since it has an informal structure and a lack of technical knowledge. Other authors and organisms have developed logistics management models focusing on the characteristics of the SMEs. However, they do not consider the internal information flows necessary for their accurate implementation. This weakens the interrelation among areas involved in the management and breaks up the system as a whole.

The first part of this investigation discusses the importance of logistics management for the competitiveness of SMEs in Mexico with specific reference to the textile industry. The literature review and the data taken from secondary sources permitted us to identify logistics management models, in a special way for SMEs. As a consequence, a logistics management model was designed to facilitate the integral management of four of the areas identified as the most important ones and the tool application that would improve the logistic performance of the supply chain. Finally, some constraints and suggestions for future investigations are discussed.

LITERATURE REVIEW

Some specialists have proposed integral models of logistics management to increase competitiveness in the market.

1. The Secretary of Economy (2011) designed a model that considers 16 capacities such as strategy and performance of the organization, customer service, process management, demand management, supply and purchase, process of customer orders, storage operation, inventory management, transportation, inverse logistics, security in goods transportation, import/export processes, financial capacities, environmental awareness, information systems and data management, organization, personnel and competences.
2. The model of operation reference of the supply chain (SCOR-model: Supply – Chain Operations Reference – model), developed in 1996 by the *Supply Chain Council of North America*, is a standard tool which analyzes and improves the supply chain performance of the organizations. The SCOR identifies five management processes: planning, supply, manufacture, distribution and/or delivery and returning goods.

The previous models are ambitious for a SME since it has an informal structure and lack of technical knowledge. Other authors have developed management models which focus on the specific characteristics of SMEs. Among these authors, we have the following:

1. Díaz *et al.*, (2008) identified three main components in the supply chain: supply, production and distribution. Although they imply the integration of all the supply chain participants, they only study those parts which are susceptible of cost, ignoring the management importance to improve the supply-chain logistic performance.
2. González *et al.* (2012) present a logistic management methodology for the Small Enterprises improvement and identify five opportunity areas, such as supply, storage, distribution, costs and customer service. This work proposes some logistic improvement tools to reduce the logistic costs in each opportunity area. What is important here is that this is not an integral model.
3. Velázquez' logistics management model (2003) identifies, in a first cycle, the production, sales and logistics; in a second cycle, it classifies the material planning, inventory management and raw material storage, purchase plan and the order collocation to the supplier; the third cycle axis is the sale plan and its execution. This investigation describes a logistics management integral model for SMEs; however, this model loses integration force when it tries to identify the indicators to be fulfilled by SMEs: it focuses on the fulfillment of those indicators but in an isolated way.
4. The Dirección General de Política de la Pequeña y Mediana Empresa de España (Instituto PYME, 2007) made a logistic management model derived from the SCOR, where it identifies the following areas: supply, production, storage, transportation and distribution and customer service. This model is designed under the SMEs' characteristics; however, the final work of this investigation is reduced to a logistics good practice guide.

In the models just described, some authors make indirect reference to the internal information flows of logistics management importance. That is why the interrelation among each area of interest is weak. It involves a whole disintegration of the system and a challenge when it is pretended to improve the SME competitiveness.

The Logistic Performance Index (LPI) indicates that Mexico is 47th among 155 countries. According to these data, it has a global logistic performance of 3.06 (World Bank, 2012). These Mexican measurements and positions reveal some improvement opportunities in the different logistics areas that will permit to increase the country's competitiveness.

Table 1: Logistic Performance of Mexico

Performance areas	Grade	Position
Customs	2.63	66
Infrastructure	3.03	47
International shipments	3.07	43
Logistics competence and quality	3.02	44
Timeliness	3.15	55

This table shows the measurement of logistic performance of Mexico, the measuring system is graded in a scale from 1 to 5, where 1 equals the lowest level (or the less efficient) and 5 corresponds to the highest one (or the most efficient). (World Bank, 2012)

Worldwide more than 90% of enterprises are micro, small and medium-sized enterprises and they represent the economic sector providing the highest number of economic units and more than 50% of employment. In Latin America, this stratus represents between 60% and 90% of all the economic units (INEGI 2011b).

In spite of the importance of SMEs in the international and national context, they are lacking with regard to some challenges. They lack a formal structure in most areas (Díaz *et al.*, 2012; Domínguez, 2010; Robles, 2003). Because of their size and lack of economic resources, it is common to find non-qualified workers making more than one activity. People managing certain activities are the same people who perform financial planning functions, production, personnel management and commercialization, among other activities. The lack of qualification leads them to develop logistics activities of a low quality due to the lack of technical knowledge and the incorrect supply chain concept application (Inter-American Development Bank, 2011). The different crises that this kind of situations produces have an influence on competitiveness (Daft; 2011; Rodríguez, 2003). Competitiveness is the capacity to attract and keep investments and talent (Executive Council of Global companies [CEEG –acronym in Spanish], 2004; Mexican Institute for the Competitiveness [IMCO], 2010), and the capacity to keep or increase the participation in the market through strategies without any profit sacrifice (Hernández, 2000)

Domínguez (2010) identifies other factors that promote the SME competitiveness. He mentions material factors (IT investment, monetary resources, infrastructure), and non-material factors (owner dynamism; management methods; human talent investment; technological, commercial and competitive security; sporadic investigation and development; administrative processes of the enterprise (Daft, 2011; Hatch, 2006), flexibility, strategic capacity, competitive advantages), among other factors. The organizational structure and processes are key factors to achieve an internal cohesion in the activities; the owners of these enterprises do not always have a clear idea about the strategic order or the appropriate information. Logistics permits to project those activities in an external scenario, visualize the activities and necessary links to commercialize the SME product and increase their competitiveness to a local or national level. The logistics activities are the core for new infrastructure investments. For this reason the integral logistics platforms are a way to link the offer and demand not only in the company context, but also in the national one (Economy Secretary, 2011).

One of the biggest SME challenges in the Mexican textile manufacture domain is the lack of formalization (Díaz *et al.*, 2012). The procedures, organized structure, programs and planning lack fall in this category. The economic performance of an enterprise is directly related to its management and efficiency. The last five decades have involve frequent crises due to a gradual transition of a standardized massive production to one oriented to fashion (Vera, 2010). The adaptation process has generated a production, an employment and sales reduction, including a frequent competitiveness loss (ITAM, 2010; Vera, 2010). In the 50's, the textile industry participation in manufacture was of 24.7%; in 1960, it was of 17.4% and in 1970, 12.5% (Vera, 2010). In 2011, this participation was of 1.2% (and 0.74% of GDP); in 2008, it employed about 661,698 people (INEGI, 2011a; INEGI, 2012).

This industry plays a very important role in the national and international context, not only because of its economic contribution and the employment it generates, but also because of the strong cultural and craft tradition of its products, the accumulated infrastructure and the consumables availability to make the most of them in the production, especially in the central region of the country. Vera (2010) affirms that since the early XXI century, the market has been configured in a new “global chain of commodities motivated by the consumer”, where certain activities will gain importance such as finished pieces of clothing importation, license of commercial name use and the assembly operation international subhiring (or shared production).

If the textile enterprises got integrated to this chain, especially SMEs, it would be susceptible of being in the market. It is important to look for the process optimization in a systemic way (Hatch, 2006), especially the logistics management in all the supply chain to make faster the information and product flows to the lowest cost and strengthen their competitiveness. There is another approach that recognizes the role that SMEs have as customers and suppliers net members related to big enterprises. This approach claims that the enterprise size is not important, since a micro, small or medium-sized enterprise could be a member of this net.

THE MODEL

This investigation is based on secondary source information which permitted us to design a model that will make easy the integral management of four of the most important areas for the textile manufacture SMEs: Inventories (1), Storage (2), Production (3) and Distribution (4), including the tools application that will improve the logistic performance of the supply chain (Figure 1).

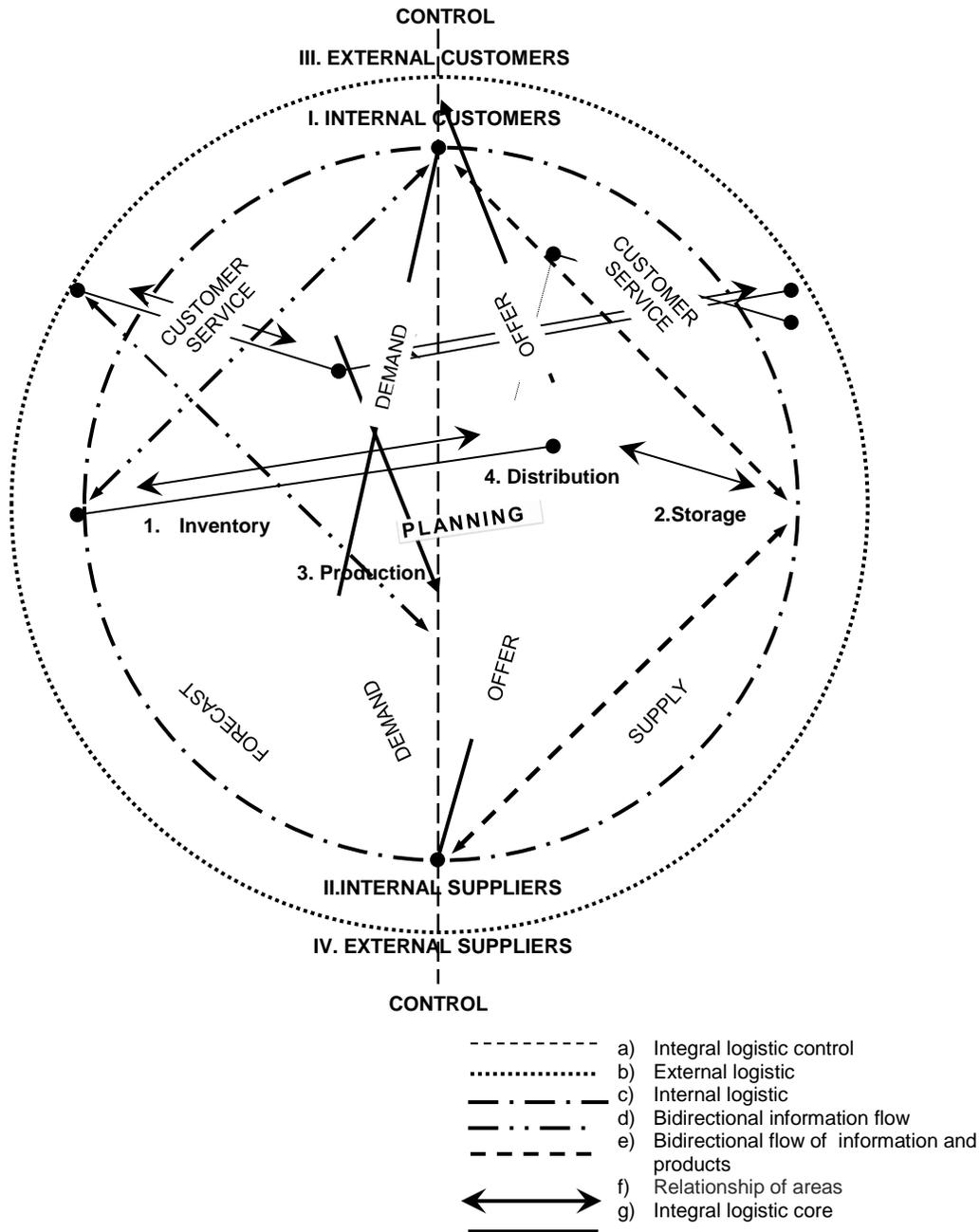
1. Inventories: The purpose of this area is to determine how much material is required and to time orders.
2. Storage is to work under operative standards in order to protect and control efficiently raw materials.
3. Production is to work under a production master program which will satisfy the customer's demands: time, quantity and quality. It is necessary to identify the necessary and feasible continuous improvement tools of application in the transformation process.
4. Distribution: the purpose of this area is to have a high capacity at the lowest cost, including to create value in the supply chain through the optimization of the level of finished product inventory, of transportation and delivery.

Internal customer (I) is a member in the same organization which receives the result of a former process, carried out inside the same organization and being, at the same time, an internal supplier (II) of the following process. It is here where the integration of the internal logistics is conceived.

External suppliers (III) are enterprises that provide consumables to the organizations. On the other hand, the external customer (IV) is a member whose only link with the enterprise is to receive its goods and who has the chance to choose the best supplier. Therefore, the company must make frequent efforts to capture a long term relationship with him and, in this way, guarantee his loyalty. But to achieve the

customer’s loyalty, it is also necessary to carry out an exhaustive evaluation and external supplier choice to guarantee quality and have as a result the external and internal customer’s satisfaction. This process gives rise to the external logistics (b). However, the internal logistics must function first in order to have an efficient external logistics.

Figure 1: Logistics Management Model for SMEs in Mexico



This figure shows a logistics management model for textile SMEs, which indicates the whole integration of a productive system through the information and internal and external product flows. Source: authors’ figure.

The core of the model is the synchronized flow of the enterprise customer information to suppliers and vice versa (g); that is to say, the demand which starts in the upper node or the octahedron (external

customers) and the supply in the lower node (internal suppliers). The information and products generate the forecasting demand through the historical sales and the necessary materials supply in the time and place indicated under a just in time approach. These flows are the support to start the four main areas planning the model (1, 2, 3 and 4), which will be related (f), will plan and control (a) as a unit, so that they could impact in the customer level through the information and product flow in the system (d and e). The main characteristic of the model is that it must be able enough to share key information among the different members of the supply chain (from internal/external suppliers to internal external customers), in order to reduce uncertainty, since decisions made in any node of the octahedron will impact others.

A hybrid system of push-pull production control, functioning in an accurate and continuous way, making a combination of advantages between both systems, can achieve a greater effectiveness. The push systems are currently defined with the demand forecasting for the material planning. On the other hand, in pull systems the order quantities are determined taking into account the real demand (Hirakawa *et al.*, 1992).

The model proposed in this investigation will work under an approach based on a hybrid push-pull system in the supply chain: the push process is carried out before the customer demand; that is to say, it is necessary to plan and control the inventory (1) and storage (2) level. The pull process in the chain is carried out as an answer to the customers demand. That is to say, the activity level in the production (3) and distribution (4) area must be planned and controlled. The pull-push system must satisfy the customer concerning the time, place, quality, quantity and service at a low cost.

CONCLUDING COMMENTS

In this investigation, a logistics management model of the supply chain is proposed for implementation in SMEs of the textile sector. As a result of the simplicity in each area, it is feasible to adopt this model as a reference to improve the logistic performance of the supply chain. It is essential to improve technical knowledge, experience, internal and external customers' information to develop, to design new textile products. SMEs belonging to the textile industry can be part of a customer and supplier net linked to big enterprises if they understand the proper operation of work through the 'consumables global chain' schema and the 'whole package' schema for some products. A Logistics Management Model, as it is proposed in this work, permits a firm to face regional and international market challenges. Although integrating the combination of resources, abilities and systems required to achieve accurate logistics is challenging, However, if it is difficult to achieve service improvement, competitors will duplicate that integral capacity.

Although the textile industry has undergone some crises, it is still possible to improve the available infrastructure, knowledge and consumables, including the great tradition and craft experience in the production of some pieces of clothing.

In future investigations, an application of the proposed model in any SME of textile manufacture from Puebla-Tlaxcala is suggested in order to evaluate the model appropriateness. Evaluating each actor and variable taking part in the internal processes (those ones concerning the enterprise culture, training, human talent, information technologies, market intelligence systems and managing information systems) increases the efficiency in the production and the consumable global chain management.

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