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SUPPLY CHAIN MANAGEMENT: A VIEW OF THE DISTRIBUTION CHANNEL

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Abstract

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This paper addresses the supply chain management in its practical dimension, the organization and the objectives in such a system, its mission and what the goals of the service provider segment customer service are. It also analyzes the application areas of logistics management, dealing with issues as the supply chain structure, supply and physical distribution, as well as the importance of transportations area, the services after the sale and the distribution of their products. Finally, a view of activity based costing techniques for the assessment of the supply chain management is presented.

Key words: logistics management, physical distribution, transportation

Introduction

Supply chain has become an important issue for every organization during the last decade. Individual businesses and organizations no longer compete as independent and autonomous entities, but are obliged to form supply chains, and networks of multiple businesses and complex inter-relationships, in order to assure their smooth operation and flow of inputs and outputs.

The management of multiple relationships across the supply chain is being referred to as supply chain management (SCM). SCM comes as a development of what businesses called logistics, and captures both the functions of logistics as well as the interactions in place with other functions of the firms as marketing, operations, finance etc., and businesses outside the boundaries of the firm (Ballou, 2004). Porter (1985) in his seminal work Competitive Strategy stresses the importance of Logistics and SCM as one of the core activities of a firm and as one of the main forces leading to increased profitability.

The same applies for the food industry as well. Food supply chains face an increasing demand for high quality products that result to an increase for demand of logistics service as the number of products that reaches end consumers rises continuously. Moreover, that must be accomplished by keeping the cost as low as possible or even reducing it, in order to gain competitive advantage in globalize business environment. And if that wasn't complicated enough, new issues have aroused concerning stakeholders involvement (Tsolakis et al., 2012) with issues as food safety, environmental protection, animal welfare, and sustainable logistics strategies (Seuring and Müller, 2008). Therefore the major problem and challenge that needs to be addressed in order to efficiently organize a food SCM is the complexity and cost efficiency of the logistics operations.

Despite its importance there is still great debate going on, concerning both practical application and the theoretical framework that should be used to study. This paper addresses the Supply Chain Management both in its academic and practical dimension, by surveying the objectives in such a system, its mission and what the goals of the service provider segment customer service are. It also analyzes the application areas of logistics management, the supply chain structure, supply and physical distribution, as well as the importance of transportation, the services after the sale and the distribution of their products, and the methods used to assess the efficiency of SCM.

Defining Supply Chain Management

Giving a definition for SCM has been an interesting field of academic debate as it recently emerged from Business Logistics as a field of business practice and research (Jain et al.,

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2010). In order to answer the question what is supply chain we must bare in mind who is trying to answer this question as SCM has been a melting pot of many functions and activities of a firm, namely logistics and transportation, inventory management, operations management, materials and distribution management, marketing, and recently information technology and ERP systems.

All definitions however focus on a rather generally accepted definition of supply chain. Supply Chain includes all business activities involved with the flow and transformation of goods and information of goods from raw materials to the consumer. The flow of products and information can be both from the suppliers to the consumer and the opposite, that means from the consumer to the suppliers-producers. A supply chain consists of three or more individuals or organizations that are directly involved in this flow of materials, finished goods, finances, and information.

Figure 1 depicts the configured product that finally reaches the hands of the final consumer, after having gone through various stages of processing and selling. According to Armstrong and Kotler (2009), every supply chain should be structured in such a way that aims in:

- ♦ Reaching the highest level of customer service
- ♦ Ensuring the high quality of the distributed products
- ♦ Achieving the minimum possible cost of management
- ♦ Showing flexibility and adapting in the changes that the market dictates

The control of the supply chain management of an individual firm should focus on two directions:

- the **materials supply channel** that includes all the businesses/organizations who provide materials to its processing /manufacturing plans, and
- the **products/services distribution channel** that provides the final goods to the end user/customer, in a fashion ensuring customer satisfaction through high levels of customer service.

Both channels must be controlled with scrutiny, as they constitute the immediate supply chain of an individual firm. Christopher (2005) summing up the aforementioned defined the supply chain as the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer.

Therefore, Supply Chain Management can be defined as the integration of these activities through improved and well coordinated supply chain relationships, in order to achieve a sustainable competitive advantage (Ballou, 2004). Mentzer et al (2001) investigated a number of definitions in order to define Supply Chain Management, and produced a broad and generalized definition, which is generally accepted by rele-

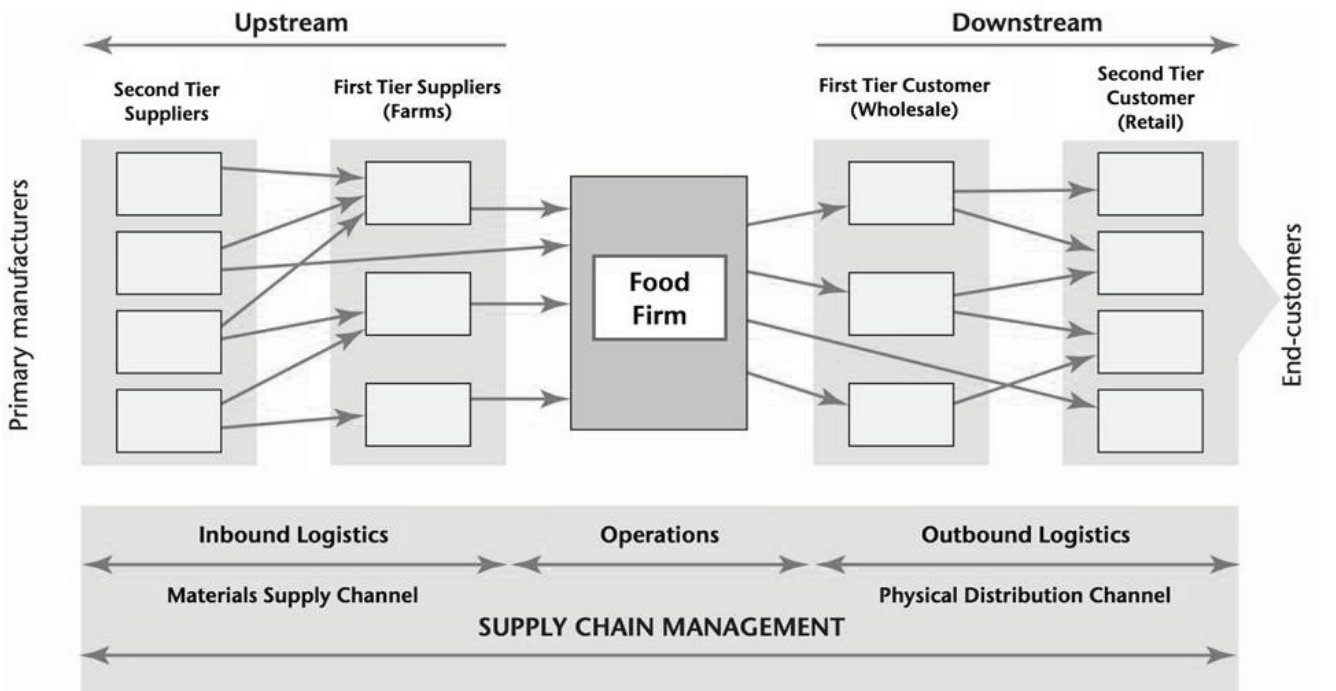

Fig. 1. Supply Chain of a Food Firm. ***Source:*** **According to Harrison and van Hoek (2008)**

vant literature (Burgess et al., 2006). According to Mentzer et al. (2001):

Supply Chain Management is defined as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.

In contrast with the neoclassical approach that focuses on the internal operations of the firm as an internalized procedure, SCM copes with the relationships that a firm is forming with other businesses and organizations, integrating them with the operations of the firm. Effective SCM is made up of a series of partnerships and, thus, SCM requires **partners to build and maintain long-term relationships.** In order to achieve this goal commitment and organizational compatibility are essential ingredients for the formation of successful long-term relationships that are the main component for the efficient implementation and governance of SCM. This is important in order to achieve coordination of activities within a supply chain.

Supply Chain Management and Logistics Activities

Activities and functions of SCM

The definitions for SCM given from literature have not helped to shed light on the discrimination between logistics and SCM activities. Ross explains that the role and activities of logistics spans from warehousing and transportation to integrating the logistics operations activities of the entire supply chain, whereas SCM merges marketing and manufacturing functions with distribution functions to provide the enterprise with new sources of competitive advantage (Ross 1998). A wider model of Supply Chain Management functions is depicted in the seminal work of Mentzer et al. (2001) where the activities of SCM are integrated not only in the firms' organization but are also inter-functionally coordinated in the whole supply chain.

In Figure 2 can be seen that logistics are just a part of activities that must be coordinated with other functions of other firms. However, we focus on logistics management as they provide with the tactical and operational issues business practitioners have to cope in everyday operations. As Ballou (2004) states: "*The boundary between the logistics and the supply chain management is fuzzy".*

Logistics activities concern both the supply and distribution channel and are interrelated with the rest activities and functions comprised by the supply chain of each firm. The logistics activities involved in SCM can be divided in key activities and support activities (Ballou, 2004). **Key Activities** are central to the operation of every firm, involve transportation, inventory management, customer service, information flows, and order management.

Support activities of the SCM include warehousing, materials handling, purchasing, packaging, cooperation with

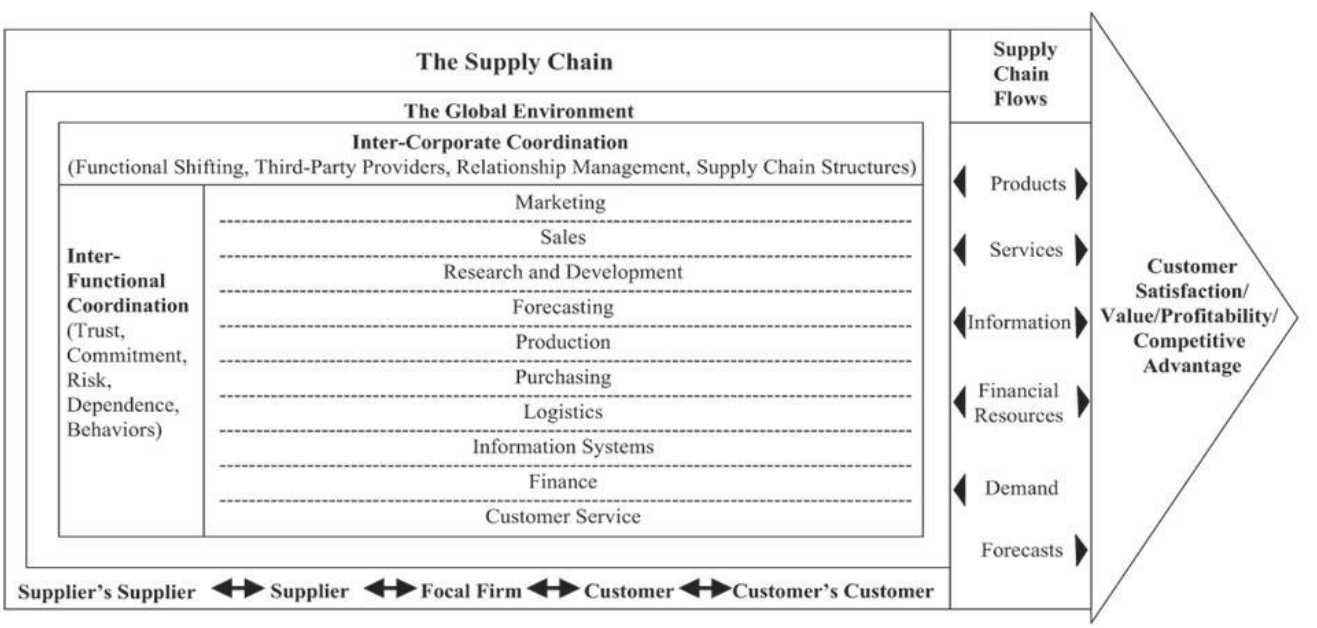

Fig. 2. A model of functions of Supply Chain Management
Source: Metzer et al. (2001)

production/operation management, and maintenance of information systems required for the smooth operation of the supply chain of the firm. Support activities are equally important and contribute to the goals and objectives set by the SCM of a firm/organization, however they may differ across organizations depending on the industry they operate, the special characteristics of the product/services and the needs of the consumers.

In the following section, we are considering some of the issues and activities concerning the selection of distribution channel and transportation issues.

Transportation

Transportation is the shifting of a load from a production site to where demand occurs (Binioris, 2008). Over the last 30 years, we have witnessed that a system of direct transportation of goods from the production site to the place of use or consumption, we gradually lean towards a system with intermediary concentration stopovers and simultaneous decentralization of the distribution of loads. The stations that nowadays, usually, take the form of commodity centers, are called hubs and the whole formation of transfer policy that they follow is called ***hub and spoke*** and mainly air-carrier and air-transport companies implement this policy.

The supply of transport services of a modern supply chain should be directed to implement the following five objectives, which are the main features and characteristics of the philosophy of logistics management (Armstrong and Kotler, 2009):

a) Quality: planning, development, implementation and choosing transport services that transfer products and materials without defects and damages.

b) Speed: the delivery and the time of handing the material or final product are sources of competitive advantage for our company. Consequently, the transportation speed assures quick introduction and smooth supply of products into new markets, stock reduction and an increase in the customer service level.

c) Reducing Cost: Transportation cost is a major component of the total cost of logistics management of an enterprise (Ballou, 2004). Consequently, the possible reduction in transport costs helps reduce total cost of operation of logistics. Consequently, the highest possible reduction of the transportation cost, contributes to the reduction of the total cost of the operation of logistics.

d) Technology access: The transport services should additionally, offer technological advantage to our company. A typical case of application of the transfer methods which create / cause a competitive advantage for our company are e-commerce activities and especially the logic of e.d.i (exchange data interactive), and finally

e) Risk management: Ensuring unhindered transportation of materials and finished products for a company, helps reducing the business risk, especially the ones associated with bad inventory management phenomena like "stock out".

The major means of transportation as identified by logistics textbooks (Ballou, 2004; Binoris, 2008) are the following:

1) Rail transportations: they have the ability to transfer large amounts of product across long distances, by keeping the cost low. Rail vehicles have the ability to carry materials, regardless of whether they are packed or unpacked or in any other form. For that very reason, rail carriers offer the appropriate facilities and the right material detection. The main competitors of rail carriers are road hauliers, who operate on specific cost and deliver at the agreed time and place unlike the rail carriers that show fluctuations in the accuracy of deliveries.

2) Road transportations: Today in Europe, they represent the most popular form of transportation. Nowadays, many variants of road transports exist and operate, and they cover any shipping need. Thus, depending on the usage, there exist tanker vehicles, freezer trucks, cars transporting materials, cars that carry packaging and transportation platforms, which are also called containers. The main advantage of road transport is both their ability to carry from door to door and the flexibility of their routes and the ability to change directions at any time. Nowadays, many variants of road transports exist and operate, and they cover any shipping need.

3) Sea carriers: they are divided in to big categories which are: a) domestic and b) overseas. The type of boat that is being used differs depending on the type of shipping load. Thus we meet: a) fuel-carrier ships (tankers), b) gas carrying ships, c) ships that carry cars, and d) boats for carrying other boats (LNG's). The low cost of transportation per nautical mile and the ability to carry large loads, are part of the main advantage of this means of transport. Instead, the long time that is required for the transfer with this means of transport, is its main disadvantage.

4) Air Carriers: in the field of air transportations, we observe the peculiarity that more passengers are transferred, than loads. The percentage of loads in transportations approaches 10%. Mainly through planes, two services are granted: a) the shipment of small parcels, usually up to 30 kilos, which are delivered and received in the place where luggage are checked, and b) air shipments of loads and especially shipments in quick package or packaged and quickly, "package express", which gain ground the recent years. The types, which are mainly transported by air transport, are: a) clothing and footwear, b) electric equipment c) typed material, d) flowers e) car parts, and g) medical-pharmaceutical material.

5) Pipelines for transport: this way of transporting liquid and gas cargo appears in our country through our own factory facilities or companies that refine and exploit the products that are in liquid form. The advantage of the conductors is the low cost and their disadvantage is their inability to change network installation.

The most decisive issue affecting the choice of the best of transportation means is the trade-off between customer service and cost. The determination of the latter is achieved through the study of typical factors of transport and charter characteristics and relies on a number of characteristics of our firm and the business environment it is operating. Those characteristics can be classified in four main categories (Binioris, 2008).

1) Local, which include: a) basic infrastructure, b) existence of trade barriers, c) taxation and legislation, d) financial services and conditions, e) communication systems, f) culture, and g) weather conditions.

2) Customer characteristics, which are: a) the desired service level, b) the limitations regarding the delivery points, c) the need for service after the sale, d) the size of orders.

3) Product features, which are: a) the ratio of volume and weight (usually special transportation: trains), and b) the weight to value (aircraft).

4) Corporate characteristics that define the enterprise which are the following: a) what is the position of the company in the industry, b) are there storage facilities or not, c) the existence or not of own means, d) financial situation, and e) an existing delivery system that our company uses.

Efficient transport systems aim in two main objectives. The first one applies on the reduction of the cost of the total cost of the transportation system, because of efficient fleet management and vehicle route planning. The second one relies on the reduction of costs associated with the maintenance of high or low levels of inventory associated with opportunity cost of invested capital in stock and relative assets, or low customer service level. That can be achieved by creating appropriate storage facilities, in intermediate nodes (so-called hubs).

Distribution Channel

Distribution is defined as the transportation of the product from the point of production or transshipment to the point or points where demand has been recorded, in order to satisfy the expectations of the production enterprise and the consumer (Binioris, 2008). The physical distribution is part of the supply chain, and its purpose is to deliver goods/services to the consumers. More specifically to the demand points of the finished product in the right place and time, in the right quantity and at the lowest possible total cost (Blanchard, 2010).

The selection of the optimal physical distribution system, takes place when the enterprise is able to answer the following questions (Binioris, 2008):

a) What is the nature of the market and the customers to which the enterprise aims at?

b) What kinds of products will be traded?

c) Do these types of products require special treatment?

d) What are the distribution objectives for company?

e) Will many material-transshipment warehouses be created and if so, to many different points?

f) What is the cost of the distribution network?

Fisher (1997) makes even clearer the most decisive factor that leads to the selection of the distribution channel and the SCM in general. It is the nature of the product and whether it is functional with predictable demand (such as food) or innovative with unpredictable demand (such as high-tech electronic devices)

The objectives, which the distribution system is put through to achieve, are the following:

1) The management of the distribution channel with the lowest possible cost through certain procedures (Ioannou, 2005): a) planning financial resources to be used within the supply chain, b) planning of the distribution networks and routes of which it is composed, c) selection of partners within the distribution channel, and d) control of the system performance.

2) Ensuring that the products being distributed are of high quality. Namely the maintenance of quality in a stable manner and the ability to respond to consumers' needs and desires.

3) Ensuring the highest level of customer service, with the aim to convert them into "loyal customers.

4) Ensuring maximum flexibility in the distribution network even in cases where problems like adverse weather conditions occur, in order to maintain the credibility of the company.

Customer Service

Customer service involves all sub-processes of the distribution, which add value to the product from the customer's perspective and reflect the speed and accuracy with which the order of a customer is delivered to him. The main objectives of customer service in terms of logistics are:

α) Maintaining and retaining satisfied customers in the direction of strengthening the occupied market share of the company.

β) Improving the distribution time in regards of the processing of the orders.

χ) Ease of placing orders.

δ) The ability to develop quality control procedures of the supplied goods, within the framework of the delivery.

ε) Rational planning and service programming.

The above objectives thoroughly describe the main elements of customer service in terms of logistics and SCM: on time delivery, order-fill rate, product condition, accurate documentation. Efficient and consistent customer service can contribute significantly in building long lasting and reliable relationships with customers through the increase of customers' loyalty. High levels of customer service can also help to the increase of demand and to retaining a competitive advantage. Notwithstanding the importance of customer service, we must bear in mind that high levels of customer service come at high levels of cost. Therefore, it is essential to know exactly which are the desirable levels of customer service of our consumers and the cost of each level.

Objectives of SCM

The objectives and goals of SCM are without doubt universally accepted across industries. Provide your customers with the right product/services, at the right time, in the right place, in a profitable way for your company. From a marketing point of view the objectives of SCM are no different as it aims in providing the appropriate quantity, quality, time and place at the lowest possible cost by utilizing all the available business resources (Armstrong and Kotler, 2009). A key objective of SCM is to lower the costs required to provide the necessary level of customer service to a specific segment

The other key objective is to improve customer service through increased stock availability and reduced order cycle time.

It is therefore obvious that despite the development of academic research and business practice on the field of SCM and logistics the main objectives and goals have remained the same. Those according to Blanchard (2010) are the following:

1) Describe in a thorough and clear fashion the supply chain of a firm and the members involved in it

2) Identify and overcome the obstacles/bottlenecks that slow down the flow of information, goods, products/services and finances across the supply chain.

3) Set up the right processes in order to get the right products/services delivered to the right place, at the right time, with the right cost.

4) Get the right people to have the above tasks accomplished.

Assessing the cost efficiency of Supply Chain Management The modern methods of cost calculation which are based on processes are increasingly being used today. The wide introduction of Information Systems and ERP has made easier to perform an exact cost analysis of firms' operations and activities.

The current conditions of business operations require more and more usage of the Activity Based Cost (ABC) methodology Traditional methods of cost determination differ from ABC because the latter:

1) Is carried out with simultaneous calculation of network efficiency ratios and is compared to their respective optimal ratios of each branch.

2) Supports decision making through interventions in the way of activity executions in the framework of budget compliance and estimation of the cost - benefit analysis.

3) Is a more rational efficiency of cost, in terms of both the products and customers is carried out, with a smaller degree of arbitrariness.

Activity Based costing is based in two principles. The first one is that A.B.C. System tries to precisely depict the activities that generate costs in the framework of implementing the distributional functions throughout the supply chain. The second principle refers to the fact that the products or the customers, namely the objects or causes of cost, create demand for activities and their implementation completes the distribution process.

Conclusions

The complexity of the modern globalized business environment has made SCM an important aspect of success for modern firms and organizations. The individual organizational characteristics of firms and organizations along with the different nature of each product/service rules out the application of universal model and strategy for SCM. Each firm must plan and organize her supply chain according to her special needs and characteristics.

Modern, global agro-food networks require multi-level supply chain management (SCM) approaches due to the increased flows of goods and information both upstream and downstream in the value chain and vice versa.

There are however some elements that are common to successful SCM for all industries. The most crucial factor for the management of supply chain is commitment at the highest corporate levels. Firms must develop their supply chain in a balanced way drawing attentions to all stages of the supply chain. The ability of forecasting future demand is equally important and helps improving the level of customer service and cutting down costs. Finally thorough cost analysis with the use of Activity Based Cost analysis and other methodologies are central to the successful operation of the firm and her competitive advantage. Investments in technology and information systems help in achieving all the aforementioned directions for planning and implementing supply chains in all industries.

The successful and efficient management of supply chain is even more important for the Food Industry. The characteristics of food products and concerns for food safety, traceability and public health makes

Research in organizing and governing agro-food supply chains and network provides a fruitful field for research for the Bulgarian and European food industry and economy.

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