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LOGISTICS SYSTEMS AND SUPPLY CHAIN MANAGEMENT

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Abstract: Logistics is the planning, execution, and control of the movement / placement of goods and / or people, and the related supporting activities, all within a system designed to achieve specific objectives. "Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements."

K e y w o r d s: Logistics, supply chain management, Logistics Cycle

1 INTRODUCTION

Logistics deals with the planning and control of material flows and related information in organizations, both in the public and private sectors. Broadly speaking, its mission is to get the right materials to the right place at the right time, while optimizing a given performance measure (e.g. minimizing total operating costs) and satisfying a given set of constraints (e.g. a budget constraint). In the military context, logistics is concerned with the supply of troops with food, armaments, ammunitions and spare parts, as well as the transport of troops themselves. In civil organizations, logistics issues are encountered in firms producing and distributing physical goods. The key issue is to decide how and when raw materials, semi-finished and finished goods should be acquired, moved and stored. Logistics problems also arise in firms and public organizations producing services. This is the case of garbage collection, mail delivery, public utilities and after-sales service.

Supply chains: Asupply chain is a complex logistics system in which rawmaterials are converted into finished products and then distributed to the final users (consumers or companies). It includes suppliers, manufacturing centres, warehouses, Distribution Centers (DCs) and retail outlets. The purpose of a logistics system is simple: to obtain and move supplies and equipment in a timely fashion to the places where they are needed, at a reasonable cost. Matters are complicated by the fact that equipment and supplies usually cannot go directly from their source to the end user; they frequently must be held as inventory at one or more intermediate points along the way.

There are only four reasons for holding inventory:

1. *Transportation efficiency:* It is not reasonable to ship single bottles of pills across the ocean or to deliver maternal and child health (MCH) kits to a clinic daily; thus, shipments are made in batches of a size and frequency dictated by the transportation system.
2. *Safety stocks:* Because trucks break down and roads wash out, and because actual demand usually cannot be predicted very accurately, facilities must maintain safety stocks to ensure that they do not run out in times of high demand or late resupply.
3. *Storage capacity:* If a facility close to the end user has limited storage space, then inventory must be held at the next higher level in the system, and must be delivered more often.
4. *Anticipation:* In a program that is growing or changing, it is necessary to store inventory in anticipation of demand that does not exist yet because of the length of time between ordering supplies and receiving them.

Any system that stores inventory for reasons other than these is a candidate for streamlining. It is important to remember the overriding principle of logistics system design: the system must be simple. Its purpose is to move supplies, not to create paperwork.

2 WHAT IS LOGISTICS?

Logistics is the portion of supply chain management that encompasses distribution, transportation and inventory management. To put it in context with the simplified description given

above regarding the supply chain management functions of plan, buy, make, store, move, sell and return, logistics is the "store" and "move" functions. It is not unusual for transportation costs alone to be more than 10% of revenue. For many companies, transportation is the single largest cost element on their financial statements. Transportation costs are often double the expense of warehousing and inventory carrying costs (which means that warehousing and inventory costs can be 5% of revenue, which is no small matter). And every dollar saved in transportation costs goes straight to the bottom line. So, why don't corporations focus more attention on streamlining logistics to reduce costs?

Logistics – (business definition): Logistics is defined as a business planning framework for the management of material, service, information and capital flows. It includes the increasingly complex information, communication and control systems required in today's business environment. — (Logistix Partners Oy, Helsinki, FI, 1996).

Logistics – (military definition)*:* The science of planning and carrying out the movement and maintenance of forces…. those aspects of military operations that deal with the design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of material; movement, evacuation, and hospitalization of personnel; acquisition of construction, maintenance, operation and disposition of facilities; and acquisition of furnishing of services. — (JCS Pub 1-02 excerpt).

3 WHAT IS SUPPLY CHAIN MANAGEMENT?

Since the term "supply chain" contains the word "supply", many people naturally assume that supply chain must have something to do with suppliers (i.e. purchasing or procurement). While it is true that supply chain management does encompass the purchasing and procurement functions, supply chain management actually extends well beyond those areas. Supply chain management is the practice of manufacturing and distributing physical goods as efficiently as possible.

Supply chain management encompasses the entire process of manufacturing and distributing physical goods, from supplier's supplier to customer's customer. Business functions that are within the realm of supply chain management include: forecasting and planning, procurement and purchasing, manufacturing and assembly, warehousing and distribution, shipping and transportation, returns and refurbishment, inventory management and order management. Or, stated more simply, supply chain management includes the functions: plan, buy, make, store, move, sell and return.

A logistics system provides excellent customer service by fulfilling the six "rights": ensuring that the right goods, in the right quantities, in the right condition, are delivered to the right place, at the right time, for the right cost.

3.1 ELEMENTS OF THE SUPPLY CHAIN

A simple supply chain is made up of several elements that are linked by the movement of products along it. The supply chain starts and ends with the customer:

- ***Customer:*** The customer starts the chain of events when they decide to purchase a product that has been offered for sale by a company. The customer contacts the sales department of the company, which enters the sales order for a specific quantity to be delivered on a specific date. If the product has to be manufactured, the sales order will include a requirement that needs to be fulfilled by the production facility.
- ***Planning:*** The requirement triggered by the customer's sales order will be combined with other orders. The planning department will create a production plan to produce the products to fulfill the customer's orders. To manufacture the products the company will then have to purchase the raw materials needed.
- Purchasing: The purchasing department receives a list of raw materials and services required by the production department to complete the customer's orders. The purchasing department sends purchase orders to selected suppliers to deliver the necessary raw materials to the manufacturing site on the required date.
- ***Inventory:*** The raw materials are received from the suppliers, checked for quality and accuracy and moved into the warehouse. The supplier will then send an invoice to the company for the items they delivered. The raw materials are stored until they are required by the production department.
- ***Production:*** Based on a production plan, the raw materials are moved inventory to the production area. The finished products ordered by the customer are manufactured using the raw materials purchased from suppliers. After the items have been completed and tested, they are stored back

in the warehouse prior to delivery to the customer.

- ***Transportation:*** When the finished product arrives in the warehouse, the shipping department determines the most efficient method to ship the products so that they are delivered on or before the date specified by the customer. When the goods are received by the customer, the company will send an invoice for the delivered products.

4 LOGISTICS CYCLE

Over the years, experts have developed a *logistics cycle* that describes the activities of a logistics system. The logistics cycle comprises the following:

- The logistics management information system (LMIS), which is at the heart of the cycle;
- Quality monitoring, which is a continuing activity throughout the cycle; and
- Policies and adaptability, which constitute the logistics environment.

Each activity in the logistics cycle must contribute to excellence in customer service. Logistics management includes several activities that support the six rights. The logistics cycle emphasizes the interdependence of the various activities. For example, product selection is based on serving customers.

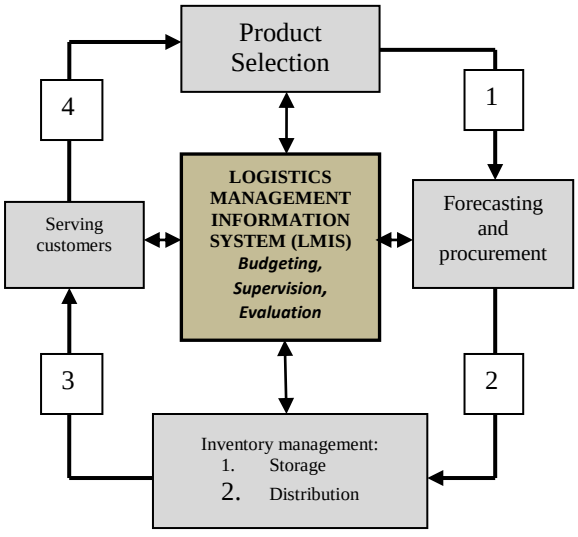

Figure 1. The Main Activities in the Logistics Cycle
1,2,3,4- Quality monitoring

Serving customers: Each person who works in logistics must remember that he or she selects, procures, stores, or distributes products to meet customer needs. For example, a storekeeper does not store drugs simply for the purpose of storing them; he or she stores and provides products for customers as needed.

Product selection: In any logistics system, product selection is crucial. In a health logistics system, product selection may be the responsibility of a national formulary and therapeutics committee, pharmaceutical board, board of physicians, or other government-appointed group.

Forecasting and procurement: After product selection, managers of the logistics cycle must determine and procure the quantity required of each product. The forecasting process focuses on estimating the quantities of the specific commodities that will be needed for a specified time period.

Inventory management (storage and distribution): After an item is procured and received, it must be stored until the customer needs it. Almost all organizations store a quantity of stock for future needs. Determining how much stock should be stored is an important decision. Resource-poor countries face a particular challenge in providing appropriate storage and ensuring limited waste and losses during storage and distribution.

Logistics management information system (LMIS): Information should drive the logistics cycle. Without information, the logistics system would not be able to run smoothly. Managers gather information about each activity in the system and analyze that information to coordinate future actions. For example, they gather information about inventory levels and consumption in order to know how much more of a product to procure.

A logistics system operates successfully only if well-trained and efficient staff members place orders, move boxes, and provide clients with goods. Health programs must be organized to provide the appropriate resources (for example, supervisory authority and technical knowledge) to ensure that all logistics activities are carried out properly. Organization and staffing are therefore important parts of the cycle.

Logistics staff must make the six rights a top priority if a logistics system is to work properly:

- *Budgeting*- affects product selection, the quantity of procured products, the amount of storage space available, and the number of staff working in logistics. Logistics activities must receive sufficient funding in the budget if the system is to operate effectively.

- *Supervision*- of the logistics system ensures that the system runs smoothly and is able to anticipate needed changes. Effective supervision helps avoid problems or resolves them quickly before they escalate into crises.
- *Evaluation*- of the logistics system can help demonstrate the impact of the system on other elements.

Quality monitoring: The logistics cycle depicted above shows that *quality monitoring* occurs between each activity of the logistics cycle. Referring not only to the quality of the product but also to the quality of the logistics cycle, quality monitoring is important for the following reasons:

- To monitor the quality of procurement decisions.
- To monitor procured products: A program's procurement request should include specifications that manufacturers are to follow. After procuring items, a logistics manager must also monitor quality before products enter the distribution system. The manufacturer often carries out quality monitoring, but the family planning program manager or pharmaceutical board may also require independent testing. Some programs also conduct quality-monitoring procedures to ensure adherence to procurement specifications. One simple quality assurance technique is to check the labeling and packaging of arriving shipments to make sure that labels and packaging match required specifications.
- To monitor quality while products are stored and distributed. Products should be in the right condition when they are made available to customers. To follow up quality monitoring even after products are distributed to customers. Feedback should be collected on how customers feel about the quality of products they receive and whether they are satisfied with the service they receive. Quality monitoring of both product and service is critical to the success of efforts to promote the use of products. The results of monitoring customer satisfaction can be used to inform decisionmakers about what products to select in the next procurement cycle.

5 CONCLUSION

Supply chain management is a major issue in many industries as firms realize the importance of creating an integrated relationship with their suppliers and customers. Managing the supply chain has become a way of improving competitiveness by reducing uncertainty and enhancing customer service. The role of planning and coordination in complex integrated systems and information technology to synchronize the supply chain is described in a framework that creates the appropriate structure and installs proper controls in the enterprise and other constituents in the chain.

In logistics management, unwise decisions create multiple issues. For example, deliveries that fail or are delayed lead to buyer dissatisfaction. Damage of goods, due to careless transportation, is another potential issue. Poor logistics planning gradually increases expenses, and issues may arise from the implementation of ineffective logistics software. Most of these problems occur due to improper decisions related to outsourcing, such as selecting the wrong vendor or carrying out delivery tasks without sufficient resources.

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