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Logistic management & distribution problems

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Abstract
Today's business environment has become increasingly competitive. This causes enormous pressure for many companies in many industries. In such an environment, companies need to continuously search for ways to design and manufacture new products, and distribute these products in an efficient and effective fashion. For many years, companies focused their efforts on reducing costs occurring in the manufacturing processes as well as other operations. There are an increasing number of companies looking at distribution and recognizing it as the last frontier for cost reduction. This research paper is an attempt to conceptualize the varied problem faced by logistic companies and suggest some remedial measure to encounter these problems.

Keywords: Business environment, Distribution system, Logistic management

1. Introduction

In 1991, the Council of Logistics Management, a trade organization based in the United States, defined logistics as the process of planning, implementing, and controlling the efficient, effective flow and storage of goods, services, and related information from point of origin to point of consumption for the purpose of conforming to customer requirements. This is a frequently used definition, which originated in the military. Logistics costs are a large portion of the GDP (gross domestic product) of the United States. Logistics costs constituted about 30% of the cost of the products sold in the United States.

Logistics encompasses all of the information and material flows throughout an organization. It includes everything from the movement of a product or from a service that needs to be rendered, through to the management of incoming raw materials, production, the storing of finished goods, its delivery to the customer and after-sales service (Pollitt, 1998). The scope of logistics has changed since the emergence of new technologies and strategic alliances in order to compete on flexibility and responsiveness. The growing importance of logistics arises from companies becoming globalized to gain access to new markets, realize greater production efficiencies, and tap technological competencies beyond their own geographical borders (McFarlan, 1984; Bovet, 1991; Cooper, 1993; Fawcett *et al*., 1993). A reduction in trade barriers and the emergence of advanced technologies have led to a great interest in logistics in recent years. Currently, logistics operations include purchasing, distribution and the managing.

1.1 Review of literature

Kiran Bala (2014) [5] in her research article titled Supply Chain Management: Some Issues and Challenges in International Journal of Current Engineering and Technology Vol.4, No.2 (April 2014) expressed that for effectively managing inventories requires proper process, people and technology. It means integrated management of the supply chain from the suppliers' doors right through to the customers' docks. Inventory should move, not sit in warehouses and plants. Inventory velocity is key to supply chain success, company profitability and shareholder value.

Souresh Bhattacharya (2014) [7] in his research article title logistic supply chain management in Indian industry: complexities, in challenges and way ahead in International Journal of Managing Value and Supply Chains (IJMVSC) Vol.5, No. 2, June 2014 advocates that some future trends in the auto industry have been highlighted in the paper which necessitates significant changes in supply chain practices in automotive supply chains. There is also a need for external support to the industry by way of supportive Government regulations and policies and development of infrastructure. The industry needs to focus on development of green technologies such as hybrid vehicles, low emission and fuel efficiency to meet futuristic, stringent norms, cost control throughout the automotive value chain (such as frugal engineering in the development of Tata Nano), enhance investments and efforts in R&D specially in auto component manufacturing sector and build up scale to enhance export.

S. Ramachandran (2015) [8] in his research article titled Logistics in India: Challenges and Scope in International Review of Research in Emerging Markets and the Global Economy (IRREM) An Online International Research Journal 2015 Vol: 1 Issue 2 364 advocates that the future of the Indian Logistics Industry lies ultimately in value propositions for the customer. Value solutions can be engineered only if the complex strands of supply-chain mesh together seamlessly. These solutions are expected to command a premium but also come at a cost. The cost-conscious Indian market first has to be made to appreciate the value of premium services first. This would result a reduction in cost down the line, which can only happen when most of the deficiencies mentioned above are removed. Logistics companies can leverage further economies of scale when operations are expanded. This may require industries to collaborate with logistics service providers to nurture their businesses, possibly in a way the automobile industry in India nurtured the auto-component companies. The future is bright for logistics industry in India- the expectation is that a tipping point for the industry will soon be reached which will propel it to greater heights.

Fig 1

1.2 Logistic system in India

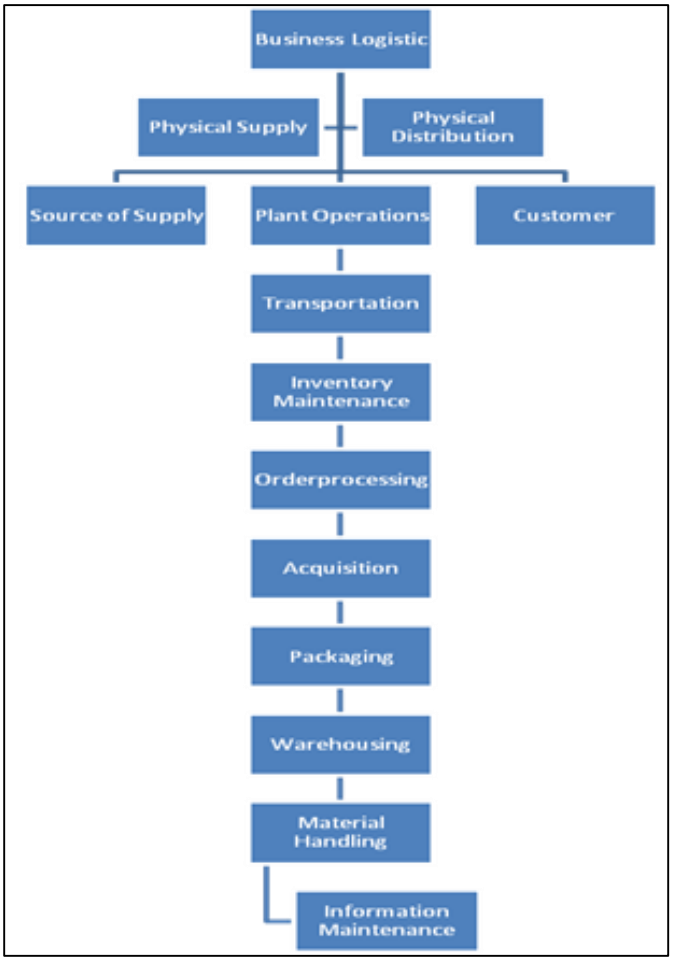

Fig 2

In a logistics system, distribution cost is typically the highest single expense, which is usually greater than warehousing cost, inventory cost and order processing cost. Distribution has captured management's attention due to rapid wage and freight rate inflation, critical swing of transportation costs and regulation, the high cost of carrying inventory, and oil market uncertainties. Procurement, manufacturing, distribution, warehousing, inventory and information systems are important logistics functions, among which, distribution is a key function in the entire logistics system and the key link between manufacturers and customers in a supply chain.

In addition, distribution is a major driver of profitability in a company, because it has a direct impact on both the logistics cost and the customer experience. Accordingly, companies have been taking a variety of approaches to reduce distribution costs in order to reach the goal of reducing overall logistics and supply chain costs.

Although product features, quality and price are important factors for customers, logistics and supply chain performance is key to a company's success. A good design of a distribution network could achieve a number of logistics and supply chain goals, ranging from low operational cost to high customer service level. In this competitive business world, the dimensions of cost, quality, efficiency and customer service level are not trade-offs for a company anymore. They have to be considered simultaneously. To achieve these objectives, optimally redesigning the entire distribution network is critical, and most of the time, necessary. Distribution is described as "the Economy's Dark Continent" and it is possibly the last frontier for cost reduction in the United States. This is even more appropriate in the current business environment, because it is becoming increasingly difficult to reduce costs of raw material and labor. Over years, logistics has developed from single-party logistics (self-managed) to 5PL (multi-party), using e-logistics networks focusing on global operations. 3PL is contractual logistics focusing on regional operations.

The main objectives behind the outsourcing of logistics services are to:

1. Reduce operating costs;
2. Meet demand fluctuations; and
3. Reduce capital investment.

The general problems that arise in corporate logistics include delayed and inaccurate information, incomplete services, slow and inefficient operations, and a high product damage rate. The possible consequences are an inability to provide inter-linked services, high operating costs, a rate of high inaccuracy, and a lack of flexibility in responding to changing demand requirements.

Aldin and Stahre (2003) presented a conceptual model for logistics supply chain management, with a special focus on 3PL. This model consists of three major components:

(1) Logistics structure;
(2) Logistics processes and related activities; and
(3) Information and reporting systems

All three components are essential for a successful 3PL operation. Logistics structure includes the participants in the logistics processes, inventory storage points, multi-echelon distribution centers and warehouses.

Logistics processes and related activities comprise order fulfillment processes, customer relationship management, and customer service, and procurement and demand management. Finally, information and reporting systems are essential for any management system, as they drive the decisions based on the data collected. These include the designing and planning of information systems, control and coordination, and cross-organizational coordination. IT such as the intranet, extranet, Internet, WWW and EDI facilitate the integration of activities in the logistics supply chain (Angeles, 2000; Calza and Passaro, 1997).

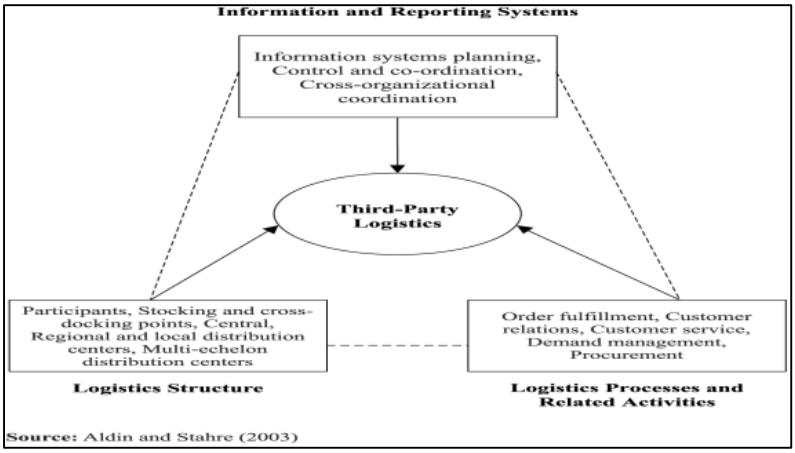

Fig 3: Third- Party Logistic

The conceptual model for 3PL:
A 3PL model with five major dimensions has been proposed. These are:
(1) Strategic planning;
(2) Inventory management;
(3) Transportation;
(4) Capacity planning; and
(5) Information technology.
This model has the objective of developing management control systems, resource management systems and integrating logistics activities. Managing a small 3PL company requires strategic planning, which involves the making of long-term decisions concerning 3PL operations. These decisions should include those on corporate strategy such as the nature of the logistics business (e.g. transportation, warehousing, etc.), the location of distribution centers, outsourcing, the size of the business, and the budget for running the logistics business. Inventory management includes planning, coordinating and controlling of materials flow along the logistics supply chain. The major decisions should involve the volume and timing of orders and deliveries, and the packing of items in batches (consolidation). There are several constraints influencing the level of stock and the speed of the material flow along the logistics supply chain. The level of stock and the speeds the material flow also depend upon the nature of the supply and demand. Transportation or shipping involves such matters as the modes of transportation, utilization of available capacity, scheduling of transportation equipment and maintenance of transportation facilities. Next comes capacity planning. The management of both long-term and short-term demand drives the level of capacity required.
For example, long-term decisions should revolve around issues such as the number of warehouses or distribution centers and their capacity; the number of transportation vehicles and the capacity of the material handling equipment, including the number of workers. These are, of course, driven by the demand for products along the logistics supply chain.
Finally, information technology or systems help to integrate the activities in all of these areas by collecting the data on the performance and utilization of resources and, based on this, making the required changes to the logistics operations. Various types of IT can be used, including intranet, Internet and extranet, together with EDI, WWW and enterprise resource planning (ERP). The use of IT also involves data mining and data warehousing.

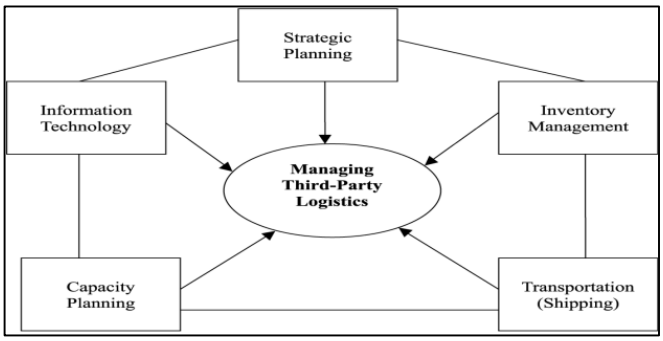

Fig 4: Managing Third – Party Logistic

1.3 Distribution problems

Definition of distribution

Distribution involves a large number of activities over a complex network. Various definitions of distribution are available in the literature. Distribution as business activities pertaining to the transportation of finished inventory and/or raw materials in a way that they arrive at the designated place, when needed and in usable condition does not explicitly consider the location of origin or destination points. Distribution as the steps taken to store and transport a product from the supplier stage to the customer stage in the supply chain. Only two stages are explicitly considered in this definition: supplier and customer. There could be more than two stages in the distribution network, such as a consolidation, break -bulk or cross-dock distribution centers (DCs).

1.4 Characteristics of distribution network

There are six categories of distribution networks:
1. Manufacturer storage with direct shipping;
2. Manufacturer storage with direct shipping and in-transit merge;
3. Distributor storage with package carrier delivery;
4. Distributor storage with last mile delivery;
5. Manufacturer/distributor storage with customer pickup; and
6. Retail storage with customer pickup.

In categories (1) and (2), the supply points are manufacturers and the demand points are customers. The only difference between these two categories is whether there is a transshipment point between the manufacturer and the customer. The supply points in categories (3) and (4) are

distributors (these could be intermediate warehouses) and there are no transshipment points. The two categories provide different delivery options respectively: carrier delivery or last mile delivery. Categories (5) and (6) are relatively unique compared to other categories, which let customers pick up their order either from a manufacturer/distributor or from a retail store. Taxonomy is as follows [8]. They categorize the distribution function as one of six types:

(1) One-to-many distribution without transshipments;
(2) Many-to-one distribution without transshipments;
(3) Many-to-many distribution without transshipments;
(4) One-to- many distributions with transshipments;
(5) Many to-many distribution with Trans shipments; and
(6) Integrated networks.

1.5 Issues and difficulties in distribution related research

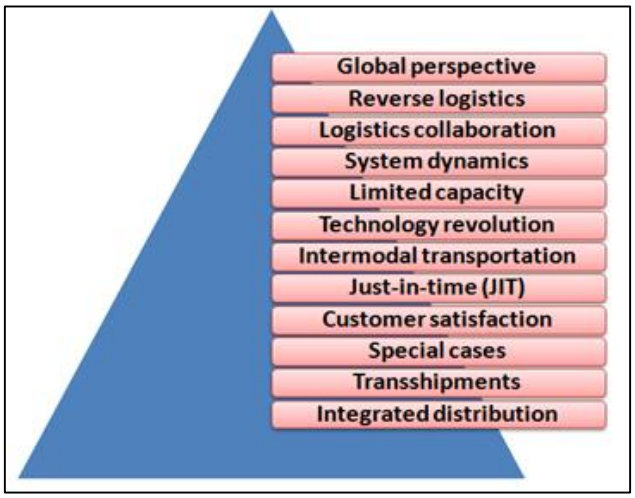

Fig 5: Problems in Logistic Management

Accurate and efficient approaches and tools are required to support and enhance the distribution planning process. There are several important factors to consider when designing a distribution network: cost, quality, delivery reliability, service level, lead time, product availability, technical ability, warranties and so on. There are also several issues and difficulties associated with research in the area of distribution.

1.6 Global perspective

Global logistics management has become a new discipline attracting the attention of many researchers. Some manufacturers in Asia offer highly efficient and less expensive production. Companies in the United States are under enormous pressure to make their operations more efficient and effective while reducing costs dramatically. Many researchers highlight the importance of coordination and cooperation among all international entities in the entire logistics system in order to improve competitiveness; otherwise, it is impossible for a single entity to achieve its overall goals.

1.7 Reverse logistics

Reverse logistics represents a way to deal with used products no longer usable or required by the users. There are four important components of reverse logistics: reduction, substitution, reuse and recycle

1.8 Logistics collaboration

Many companies prefer cooperative decision making to other operation modes. A single dominant company typically optimizes its own logistics decisions regardless of their impact on other companies in this logistics system. Often such an approach is only good for the short run; but in the long run, this approach should build strategic relationships with other companies to form a logistics alliance. To achieve this long-term, win-win relationship, the dominant company plays an important role in fostering cooperative agreements to jointly optimize the entire supply chain.

1.9 System dynamics

Dynamics within a logistics system could necessitate a change in the entire distribution network, which in turn could result in an increase in logistics costs including inventory, transportation, facilities and handling, and information changing [4]. At the operational level of distribution planning, variability is observed in scheduling services, empty vehicle distribution or reposition, crew scheduling, allocation of resources and so on.

1.10 Limited capacity

Limited capacity is a common phenomenon for many companies. Lack of sufficient production machines, warehouse space, trucks, or even drivers could have a significant effect on overall logistics performance.

1.11 Technology revolution

As the supply chain gets longer and extends beyond national boundaries, effective communication and information infrastructures to support such complex processes and systems become essential Information technology and telemetric allow mathematical models to be applied within real-time systems and process controller.

1.12 Intermodal transportation

Distribution over multiple transportation modes is an important component of transportation science and has attracted many researchers in recent years. However, due to the inherent difficulties and complexities of such problems, the study of intermodal transportation at either the regional or national level has not yet fully matured.

1.13 Just-in-time (JIT)

Since the just-in-time concept was first introduced, there have been a wide variety of studies in this area. Small and frequent shipments are required between suppliers and manufacturers in a just-in-time environment, emergency shipments may be necessary for supplying the right volume at the right time in the right place. Emergency shipments are contracted by suppliers whenever there is a sudden increase in customer demand,

1.14 Customer satisfaction

Satisfying customers' needs is becoming increasingly important because only when customers' needs are met, can the company's revenues be maximized. Managers in a company must not only consider trade-offs among facility cost, inventory cost and transportation cost, but must also focus on customer service issues also points out that there are many factors influencing customer satisfaction, e.g., response time,

product variety, product availability, customer experience, order visibility and return ability.

1.15 Special cases
Distributing special products introduces increased complexity. Apply an optimization model to determine daily production, delivery scheduling, and dispatching of natural gas.

1.6 Transshipments
There are two major functions of transshipment facilities:

a) Consolidation: - Shipments are used to combine shipments from many scattered origins into larger loads.
b) Break-bulk:- Shipments provide an opposite function to split a large load into smaller shipments.

1.7 Integrated distribution
Current industry trends show that distribution networks are selected by adopting an integrated perspective. Synchronizing the logistics processes from raw materials supply and production activities to marketing and final distribution choices is another area of research. However, most previous studies treat each component (such as purchasing, production and scheduling, inventory, warehousing, and transportation) separately, thereby ignoring many complex supply chain interactions.

2. Conclusion
Today's competitive business environment has resulted in increasing pressure for many companies in almost every industry. In such an environment, companies must fill customer orders, accurately, quickly and efficiently. At the same time, they must reduce inventory, implement reverse logistics and consider other important logistical factors. A company's supply chain constitutes several interactive processes, which are important to the integrated logistics system. In order to reduce costs for every single component of a supply chain, companies may have to redesign their supply chain network and consider every operation as part of a whole. After years of focusing on reduction in production and operation costs, companies are beginning to look into distribution activities as the last frontier for cost reduction. In this paper, we first review the definitions of distribution in the literature and then define distribution from a new perspective. We also compare various taxonomies of distribution networks. The importance of distribution and difficulties associated with the study of distribution are also discussed. We point out that there are 12 issues which should be studied in greater detail:

- global perspective
- reverse logistics
- logistics collaboration
- system dynamics
- limited capacity
- technology revolution
- intermodal transportation
- JIT
- Customer satisfaction
- special cases
- transshipments
- Integrated distribution

It is notable that distribution research has close relationship with sustainability related research. In conclusion, all of the entities and activities in the supply chain are highly interrelated to each other by means of material and information flow; as a result, synchronized consideration of production, inventory and distribution is necessary and critical in the study of a distribution problem. An integrated view of the logistics and supply chain design may lead to an improvement in service level as well as substantial savings in total costs. We believe that by focusing the study on the relationship between distribution and other functions in a logistics system, new opportunities can be identified and new results can be proposed.

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