



SUPPLY CHAIN AND LOGISTICS MANAGEMENT: AN ENTERPRISE APPLICATION OVERVIEW

¹**Anuj Modgil**

Student, CMBA, Universal Business School, Mumbai, India

²**Ankit Jaiswal**

Student, CMBA, Universal Business School, Mumbai, India

³**Prerna Keshav Singh**

Student, CMBA, Universal Business School, Mumbai, India

⁴**Urvashi Baliyan**

Student, CMBA, Universal Business School, Mumbai, India

⁵**Prabhas Wajpe**

Student, CMBA, Universal Business School, Mumbai, India

⁶**Prof. Vidhya Srinivas**

Faculty & Vice President – Corporate Relations, Universal Business School, Mumbai, India

ABSTRACT

This paper covers the various factors which are considered while making logistics and supply chain management decisions. It incorporates the competitive strategy along with the supply chain strategy and creates the balance between efficiency and responsiveness so that cross functional drivers such as facilities, inventory, transportation, information, sourcing and pricing are kept in check.

KEYWORDS — *Supply Chain, Logistics, Decision Making, Enterprise, Application, Operations, Management, 3PL, ESCM, Procurement*

I. INTRODUCTION

From a logistics and supply chain point of view we are in exciting times. There are various decisions which are being made about warehousing needs of corporations, the type of storage systems which are to be used. Further the type of material handling equipment which would be used play a pivotal role in getting the strategies in place. The corporations in India used various methods to ensure all the requirements mentioned above are processed digitally in a timely manner. All this requires various key performance indicators to be assessed in order to benchmark it in with industry standards. There are various sub concepts which are involved in this this complex system. This involves outsourcing, 3PL model and E-SCM. All these aspects put together for the basis for all enterprise level decisions which are taken to meet the requirements of the supply chain industry.

II. LITERATURE REVIEW

Warehousing Decisions

The modern supply chain networks have seen all warehouses evolve into an Omnichannel warehouse. These warehouses are different from brick & mortar, online and other channels.

The reason why we are seeing this transition is because a single warehouse cannot handle all orders. Thus, via application of warehouse management technology, all orders which are coming from various channels are handled in an efficient manner. In the modern age of E-Commerce, handling of all orders via a single warehouse is impractical and can result in lost opportunities.

Due to digitalization of processes, streamlining returns is an integral part of developing an omnichannel warehouse as 30% of all purchases are returned. So, adding return capabilities to all warehouses is a mandate.

**Advantages of operating these new warehouses are**

1. Reduced delivery times
2. Better collaboration
3. Expanded options
4. More variety
5. Improved accuracy due to integration

New Storage Systems

Starting in the last 2000s we have seen a huge shift in the way storage systems operate. Now companies have started to install mobile racking systems. These systems comprise of racking superstructure, which is installed to a powered moving base, this system has been able to increase storage capacity by as much as 100%. This system replaced conventional aisles with moving aisles and this unique design combines direct access with a substantial increase in storage density.

The system provides a greater volume of storage capacity, greater product accessibility and energy conservation. In addition to cost-per pallet savings and higher revenue potential, this new system has eliminated double handling while increasing air circulation and product integrity.

The major advantages of these new systems are

1. Reduce inventory excesses
2. Improve customer service
3. Shorten delivery times
4. Enhance handling through streamlining and better timing
5. Improve inventory management and the accuracy of information through real-time monitoring
6. Facilitate product control through better monitoring and management
7. Lower overall handling costs in manufacturing, distribution and transportation

Modern MHEs

MHE stands for Material Handling Equipment. In the modern times we have various systems which are deployed to enable an efficient order to deliver cycles and help companies manage their business with buying cultures which are in a continuous state of flux. Whatever the process may be, material handling does play a crucial role in the overall success of project execution.

With respect to the Indian ecosystem, India is the only developing country which is totally self-reliant in such highly sophisticated equipment. These equipment's help to perform a variety of functions in all processes of supply chain.

In India most notably, we can see Chennai as an emerging key market for MHE with a huge number of warehouses and container freight stations coming up in and around the city. The reason behind this surge is that Chennai port is emerging as a major container handling port. This increasing the demand for forklifts, pallet trucks, stackers, order pickers and reach trucks. The major players in Indian MHE market are L&T and Godrej.

Packaging Strategies

Getting the perfect packing is the key to improve supply chain performance. It is not only associated with the box that contains the product, instead it is a coordinated system of preparing goods for a safe, efficient and a cost-effective movement through the entire supply chain network. Having the perfect packaging design maximizes the sales, profits and consumer value.

Logistics corporations improve supply chain performance by improving packaging. This is achieved by removing all unnecessary materials and steps in the shipping and packaging processes. Practices such as having too much protective material encasing the product fall under the inappropriate category. This doesn't cost more but slows down the processing and delivery time for customers.

Further proper packaging practice allows to introduce creative packaging which gives the opportunity to engage with customers. The methods which increase product safety and security while reducing materials used, focus on efficiency and resource reduction.

The factors which affect packaging design are

1. **Flow function-** It involves all features which contributes to easy handling during distribution. It includes distribution, disposal, unpacking and return logistics.
2. **Environment function-** It involves lowering the negative impact of the system on the environment and it is achieved by lowering the inputs while getting the same outputs.
3. **Market function-** It considers various aspects like layout, design and communications to add value to the brand and product.

In the modern packaging methods, the following methods can be applied to improve and optimize the network

1. **Eliminate design deficiencies-** Using of industry's best practices. This helps to enhance efficiency and reduce the cost of goods.



2. Packaging procurement- By streamlining the process and standardizing raw materials we can benefit and save cost as well.
3. Standardization of size and equipment- It can help reduce change over times and produce higher line utilization.
4. Optimized packaging- The key to optimize packaging is to reduce weight and include the package's aspect ratio to the design.
5. Identification of bottlenecks- By identification of bottlenecks we can increase overall line efficiency.
6. End of line solutions- These solutions help to increase efficiency. End to end automation can not only increase output but can also improve on the quality of end packaging.
7. Sustainable operations- Using of recyclable and energy efficient materials can help to reduce carbon footprint.
8. Better warehouse management- Some ways of better management can be reusable and standard pallets, differentiating between shortest and most efficient distance and always looking for even small packaging improvements.

Hence these practices are used by Indian logistics enterprises due to digitalization of processes.

Analysis of key performance factors in various transportation modes used in Indian logistics

There are various factors which determine the overall performance in the various transportation modes used in logistics.

Such as: -

1. **Fuel Consumption:** The type of fuel used in the transportation mode and the amount required as compared to the cost.
2. **Load Carried:** The maximum amount which can be placed on the cargo carrying medium.
3. **Weight of cargo:** The total actual weight of the cargo which is to be moved from point A to point B.
4. **Type of cargo carried and its dimensions:** Review if the cargo is odd sized or is oddly shaped.
5. **Type of route used:** Rail, road, air, water, type of highway.
6. **Type of goods transported:** Perishable or non-perishable goods.
7. **Limitation of usage:** How many times can the same solution be used. Single use vs multiple use.

There are various transport modes which are currently in place to carry or deliver freights from source to the destination. In India the various modes used are: -

Road Transportation: It is known as the oldest form of transportation to move products or goods from one place to another. This movement is normally done with trucks and trailers.

Trucks are mainly run by diesel engines. These engines allow them to carry heavy loads of freights. The trucks can have trailers specially fabricated which allows them to carry varied sizes of cargo through networks of various national and state highways. Each truck can be customized to carry special types of perishable and non-perishable goods.

The advantages of road freight are

1. It is a cost-effective method
2. It helps in to deliver freight in a quick and efficient manner
3. Roads give connectivity to even remote rural areas
4. Packing requirements are minimal in this medium
5. Real time tracking is easily possible
6. It can provide complete door to door service and is one of the commercial means of transport

Rail Transportation: It is one of the cheapest ways to transport goods from one place to another. Also, rail transportation is the oldest and ancient way of transportation. This mode, as compared to others has a very minimal chance of accidents and breakdowns.

Trains in India use two types of engines. Majority of routes have already been electrified so electric engines are run there while in other routes, diesel engines are used. Train carriages allow a very high load carrying capacity and their tonnage is normally very high. But the main constraint is freight trains must cover through long distances to reach their destinations as their routes are pre-mapped. Due to pre-mapped routes, easily perishable goods are normally not sent through trains. In trains there are three types of carriages, first is to carry liquids, second is to carry free size cargos and the third type is for shipping container movement.

Advantages of Rail transportation are

1. Cost effective solution for long distances
2. Freight can be transported in large quantities
3. Schedules are most reliable
4. Can be considered as the safest mode of transport

Air transportation: It is the fastest and quickest way of transportation. It is the most expensive mode of freight



movement as compared to other modes. The cost associated with this mode is highest, but its efficiency and time taken to transport the goods is very less.

In aircraft operations, aviation fuel is the costliest apart from aircraft maintenance. Aircrafts have a limited load carrying capacity which is derived by the aircraft size and configuration. Due to its speed, air freight can carry both perishable and non-perishable goods but the main limitation in this mode is the cost factor.

Advantages of air freight are

1. Faster delivery
2. Complete end to end security
3. Accurate time of delivery

Maritime Transportation: Due to the physical properties of water limited friction and conferring buoyancy, maritime transportation is the mode effective mode to more large quantities of freight over long distances. Indian maritime routes consist of coasts, sea, lakes, rivers and channels. Due to constraints of economic activities maritime circulation takes places on specific parts of the maritime space.

Maritime transportation is done through ships which run on gas turbines or diesel electric engines. Ships have a huge load carrying capacity as you can load containers on it for freight movement. All cargo which can fit inside a shipping container can be moved via the maritime route. All types of goods can be moved depending on the distance. The best part of maritime transportation is transport containers can be reused / reconfigured for future movements.

Advantages of maritime transportation are

1. Inventory costs
2. Involvement of heavy industries
3. Availability of ports

3PL

Third-party logistics in management of supply chain is when an organization used third party businesses to outsource elements of its warehousing, distribution and fulfilment services. Normally 3PL specializes in integrated warehouse and transport operations which can be customized and scaled as per customer requirements, market scenario and delivery service requirements of their products. A company which provides these services to the organization is known as a third-party supply chain management providers (3PSCM). 3PL companies target specific functions within the supply chain network which are transportation, provision of raw materials and warehousing.

3PL providers include courier companies, freight forwarders, etc. These companies are known to integrate and offer subcontracted logistics and transportation services.

3PL providers fall under the four categories

1. **The customer developer:** This is the provider which integrates itself with the customer and takes over the entire logistics function, these special providers have very limited customers and perform detailed and extensive tasks for them.
2. **Service developer:** This provider provides the customer with special services such as cross docking, tracking, tracing, packaging and security. A strong IT foundation helps the provider to perform these types of tasks.
3. **The customer adapter:** This type of provider takes control over entire logistics function of the company. The provider improves the overall output but does not develop a new service. Such providers have a very limited customer base.
4. **Standard Provider:** This is the most basic type and perform the basic pick and pack services. For these providers 3PL function is not their primary activity.

Outsourcing

When an organization outsources its entire supply chain management activity to an external organization (which is the outsourcing partner specializing in same). Outsourcing helps to minimize the overall cost, allows the company to focus on its core competencies, meet customer demands more effectively and avail more flexibility in operating and maintaining its entire supply chain network. When a company is outsourcing its SCM activities, organization takes care of all integration issues which they might face when an external organization manages the supply chain network (which is essentially the backbone of the organization). If the entire integration process is taken care of and 3P organization has prior experience and expertise in managing the supply chain network of other organizations, SCM outsourcing can provide a strategic advantage to an organization.

Major benefits of outsourcing SCM network are

1. More focus on strategic tasks
2. More security in supply
3. Reduced overall costs
4. Meeting of customer demands
5. Increased supply chain capabilities
6. More scalability



Electronic Supply Chains

E-Supply chain management is a regular practice in the manufacturing industry. Under E-SCM, all value-added activities are done via the internet. This ensures that the products produced meet the customer requirements and end up in a good return on investment.

E-SCM can be divided into three main activities

1. **Financial flow:** Consists of payment schedules, credit terms and title ownership arrangements.
2. **Information flow:** It involves transmitting of orders and updating status of delivery.
3. **Product flow:** It is the movement of goods from the supplier to the customer also reverse logistics i.e. customer to supplier.

Advantages of E-SCM are

1. It reduces paperwork, overheads, inventory build-up and number of hands required to deliver goods to the customer.
2. It reduces cycle time, increases revenue and improves customer service.
3. It improves order management, order fulfilment, forecasting, decision making, demand planning and distribution activities.
4. It increases the ability to implement JIT i.e. Just in time delivery which increases customer satisfaction.
5. It helps to take competitive advantage
6. It reduces inventory
7. It reduces overall cost
8. It improves efficiency

Buying and Procurement Process

Buying and procurement are two different things. Procurement involves the process of establishing payment terms, selecting vendors, selection, strategic vetting, negotiation and actual purchasing of goods. Procurement is acquiring services and goods which are vital to an organization. Broadly procurement can be considered as an umbrella term and buying comes under it.

Procurement has a fixed process which is followed

1. Requirement identification
2. Purchase request authorization
3. Procurement process
4. Supplier identification
5. Quotation inquiry / receipt
6. Price negotiation
7. Vendor selection

8. Acknowledgement of Purchase order
9. Advance shipping notice
10. Receipt of goods
11. Invoice recording
12. Matching - 3 way
13. Supplier payment

Buying as we have already discussed is a subset of procurement. It refers to buying of goods and services. Buying includes receiving and payment as well.

Main steps related to buying are

1. Acknowledgement of buying order
2. Advance shipping notice
3. Receipt of goods
4. Recording of invoice
5. 3-way match
6. Supplier payment

Hence, we can say that procurement deals with the sourcing activities, strategic selection of goods, negotiation and services which are important for the organization. Buying is the process of how goods and services are ordered. Buying can usually be described as the transactional function of procurement of services and goods.

Negotiations in Procurement

"You can motivate suppliers to offer their best price by starting the relationship as a conversation, not a competition (den Butter and Linse, 2008)."

Negotiations can be helpful while working out a deal and can be considered critical in procurement. There are various characteristics, tools and success factors which are useful for decision markers involved in the negotiation process.

Negotiation is a process of communication with the objective of reaching an agreement by means where appropriate, of compromise. An effective negotiation is the one which can achieve this goal and is able to secure the materials, supplies and services of the right quality, at the right time, in the right quantity, from the right source and at the right cost.

The main guidelines for procurement are

1. The objectives associated with procurement should always been clear. The goals set should achieve like you would do with a traditional stakeholder. Goals should be built into the pursuit plan they should be aligned with the company's and customers' values.
2. Always ask for a meeting. The early the meeting is done, more time you would get to evaluate and build a better relationship with the point of contact.



3. Material preparation should be done well in advance. All required materials such as references, insurance, background checks, business case, ROI calculation, etc all should be done before hand as it might be risky to prepare the materials when the actual time comes. Being a proactive professional is the key.
4. Install urgency i.e. the person or team taking the decision should clearly know why having a solution in place is important now than having it later. While calculating the overall cost, the cost associated with cost of waiting should also be factored in as if the solution being provided will be saving a lot of money, there is a less likely chance to delay.

Buyer / Supplier Relationship & Collaboration under framework of International regulation

Buyer / supplier relationships can be complex as each party wants to maximize its resources, time and cash investment. All these priorities can be competing among one another and they can strain the relationship.

The basis of a mutually beneficial relationship is that each party should be able to understand each other's business needs. Partners should realize that success of one partner can help in success of the other.

Knowing with whom you are conducting your business is important. For example, the US government has listed various parties with whom one cannot conduct business. It is important for the importer and exporter to take necessary steps to ensure all parties in the supply chain network are approved and are not restricted in any manner.

There are various methods applied which help to screen which parties are restricted. This becomes an important step as many businesses outsource parts of their supply chain network. US's packaging requirements, EU's reach initiative, China's RoHS initiative have gain momentum recently. Hence it becomes critical that all suppliers support these regulations.

In India buyers have a tradition of being willing to change suppliers if they are offered a better deal. This is seen as a strategic approach where supplier relationship management is initiated even before an agreement with the supplier is signed. This ensures the company has a competitive advantage in the long run. This is seen as a forward focused approach. Despite all these approached, having a long-term relationship with suppliers forms an integral part of modern supply chain strategy.

III. CONCLUSION

All the topics mentioned in this research article provide an overview of various drivers which support

numerous supply chain initiatives in the modern times. It is interesting to see how various cross functional drivers intervene to support and deliver various supply chain strategies. These drivers are not only responsible to drive the business needs but also to meet the future needs.

Understanding these drivers can help supply chain managers to effectively manage the costs and deliver projects as per the given timelines of the organization.

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