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DEPARTMENT OF ECONOMICS

SEMESTER - III

LOGISTICS

SBC: Course Material

LOGISTICS ROLE IN THE ECONOMY

The scope and influence of logistics has evolved in the late 1940s. In the 1950s, and 60s, military was the only organization which used logistics. The scope of logistics has been extended beyond the army, as it has been recognized as one of the important tools for developing competitiveness. Competitive advantage means the company has the ability to differentiate itself, in the customer's eyes, and also is operating at a lower cost and greater profit.

Logistics facilitates in getting products and services as and when they are needed and desired to the customer. It also helps in economic transactions, serving as a major enabler of growth of trade and commerce in an economy.

Logistics has come to be recognized as a distinct function with the rise of mass production systems. Production and distribution were earlier viewed as a sequential chain of extremely specialized activities. The role of logistics is to ensure availability of all the required materials before every step in this chain. Obviously inventory of raw materials, semi-finished and finished goods is a must across this chain to ensure its smooth functioning.

The concept of logistics has its base upon the systems approach. There is a single chain, with flow of materials starting from the supplier, then to the plant and finally to the end customer, and also these activities are done sequentially in order to achieve customer satisfaction at low cost. For this to be successful there has to be co-ordination in the activities of the department.

With reference to an organization, an organization gets a concrete shape due to its structure. In the earlier times, the suppliers in distribution activities were spread across the entire structure, thus resulting in an overlapping of activities and finally in unaccountable authority and responsibility. In today's process driven organization, where the focus has shifted from functions to process, logistics has become an essential part of the process.

Definitions of logistics:

The American Council of Logistics Management defines logistics as “the process of planning, implementing and controlling the efficient, cost effective flow and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consumption for the purpose of conforming to customers’ requirements”.

Philip Kotler defines logistics as “planning, implementing, and controlling the physical flows of materials and finished goods from point of origin to point of use to meet the customer’s need at a profit”.

Logistics is all pervasive. Some excellent examples of value adding logistics services are:

Dabbawalas of Mumbai: Reliable, foolproof logistics system of delivering lunch boxes to over 5,00,000 office goers every day without letting the wrong lunch box reaching the wrong office and also ensuring the boxes reach on time.

The Indian Postal Services: One of the largest logistics network in the world today, which delivers letters in the most cost effective manner across six lakh villages, one hundred and twenty cities and several thousand mofussil towns covering the length and breadth of the country within twenty-four to forty-eight hours and serving more than hundred and seventy countries with Indian source stations/ customers and/or destinations as mentioned earlier.

Objectives of logistics:

Logistics has the following objectives:

Reduction of inventory:

Inventory is one of the key factors, which can affect the profit of an enterprise to a great extent. In the traditional system, firms had to carry lot of inventory for satisfying the customer and to ensure excellent customer service. But, when funds are blocked in inventory, they cannot be used for other productive purposes. These costs will drain the enterprise’s profit. Logistics helps

in maintaining inventory at the lowest level, and thus achieving the customer goal. This is done through small, but frequent supplies.

Economy of freight:

Freight is a major source of cost in logistics. This can be reduced by following measures like selecting the proper mode of transport, consolidation of freight, route planning, long distance shipments etc.

Reliability and consistency in delivery performance:

Material required by the customer must be delivered on time, not ahead of the schedule or behind the schedule. Proper planning of the transportation modes, with availability of inventory will ensure this.

Minimum damage to products:

Sometimes products may be damaged due to improper packing, frequent handling of consignment, and other reasons. This damage adds to the logistics cost. The use of proper logistical packaging, mechanized material handling equipment, etc will reduce this damage.

Quicker and faster response:

A firm must have the capability to extend service to the customer in the shortest time frame. By utilizing the latest technologies in processing information and communication will improve the decision making, and thus enable the enterprise to be flexible enough so that the firm can fulfill customer requirements, in the shortest possible time frame.

Functions of logistics:

1.**Order Processing:** Processing the orders received from the customers is an activity, which is very important by itself and also consumes a lot of time and paperwork. It involves steps like checking the order for any deviations in the agreed or negotiated terms, price, payment and delivery terms, checking if the materials is available in stock, producing and scheduling the material for shortages, and also giving acknowledgement to the owner, by indicating any deviations.

2.Inventory Planning and management: Planning the inventory can help an organization in maintaining an optimal level of inventory which will also help in satisfying the customer. Activities like inventory forecasting, engineering the order quantity, optimization the level of service, proper deployment of inventory etc. are involved in this.

3.Warehousing: This serves as the place where the finished goods are stored before they are sold to the customers finally. This is a major cost center and improper warehouse management will create a host of problems.

4.Transportation: Helps in physical movement of the goods to the customers place. This is done through various modes like rail, road, air, sea etc.

5.Packaging: A critical element in the physical distribution of the product, which also influences the efficiency of the logistical system.

Value delivery in the supply chain

The world has become a global village where due to liberalization and globalization, business organizations are forced to supply products beyond their national boundaries. Thus in such situations, the role of logistics is to provide time and place utility of the products to customers.

Also businesses are striving to attain competitiveness. In their struggle to survive, their focus has shifted to supply chain, and to deliver value for money for their customers. Logistics plays an important role in the process of delivering value and how successful the supply chain management is greatly depends on logistics planning and support.

Nowadays, the trend is to outsource. Organizations continue to outsource their operations because it is better to outsource the functional areas to experts who can do this job at a lower cost. This is one way of adding value.

Logistics delivers value to the customer through three main phases:

a.Inbound logistics: These are the operations, which precede manufacturing. These include the movement of raw materials, and components for processing from suppliers.

b.Process logistics: These are the operations, which are directly related to processing. These include activities like storage and movement of raw materials, components within the manufacturing premises.

c.Outbound logistics: These are the operations, which follow the production process. These include activities like warehousing, transportation, and inventory management of finished goods.

Logistics Solution:

Generally, the in-house logistics departments in manufacturing organizations take care of all aspects of logistics. But this is not an area of core competency of manufacturing or trading organizations. Today, a lot of successful business corporations across the world are outsourcing logistics to the third party logistics providers, who are having the necessary infrastructure and expertise to do the job in a better manner. Complete logistics solutions to manufacturers and traders is provided by the third party logistics providers, and they help in integrating various logistics operations, thus ensuring speedy and uniform movement of materials across the supply chain.

Logistics is nowadays widely used in virtually every area. The success of a logistics service providing company depends on how they conceptualize and implement the logistics solution, and also tune to the requirements of the customer.

Future of Logistics

Nowadays corporations look only for sustainable competitive advantage, not only for growth, but also to survive. There is so much killing competition that corporations are compelled to review their business process while they deliver the products and services to customers, who are looking for more and more value for

the money that they are spending. The focus of competition has shifted from the product to the supply chain.

Today, logistics management is based on the system concept and cost approach. Transportation, warehousing, handling of material, inventory management and order processing are the major logistics activities, which impact the customer cost and operation. Integrated logistics helps in taking the cost out of the supply chain and also enhance the customer service level.

When looking at the macro level, a growth of a country's economy depends on the availability of excellent logistics infrastructure. The speed of the movement of goods depends to a great extent on the various modes of transportation like rail, road, air, and sea.

Logistics has a bright future, especially in India, but certain pressing issues like abolition of octroi levy, rationalization of customs formalities, improvement in road and rail infrastructure, creation of modern warehouse facilities etc, have to be taken care of. The geographical position of India also is well positioned to emerge as an excellent hub for a variety of products.

LOGISTICS MANAGEMENT

Logistics management plays a significant role in the success of any company's operations and has a direct impact on its bottom line. More importantly, logistics processes play a big part in customer satisfaction, which is more important than low product costs. Logistics professionals should think of themselves as a customer-facing portion of the company and strive every day to add value for their customers.

The Council of Supply Chain Management defines logistics management as:

“... 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.”

Logistics management is often confused with supply chain management. Supply

chain management has broader objectives and actually encompasses logistics management. Supply chain management (SCM) includes inter-enterprise, multi-functional processes that target everything from the supplier's inbound freight to the end consumer. Logistics management (LM) is the more practical, hands-on part of the supply chain where goods are transported into a facility, properly stored, handled and transported out. LM focuses on short-term procedures and SCM is focused on the long-term.

LOGISTICS STRATEGY

In this chapter, you will learn about the development and focal points of logistics management, difficulties companies have within these focal points and the best practices to achieve optimized logistics, which leads to superior customer service.

Making quick, informed decisions can save a company up to 40% on logistics costs, so one of the best practices in LM is to implement a fine-tuned logistics strategy. Since the supply chain is constantly changing, so are logistics processes. Developing and implementing a formal logistics strategy will add flexibility to the decision making process and increase error-response time. A deliberate strategy will let a company predict service disruptions and know how and when to respond to them to ensure service levels stay at peak performance.

How does a company implement a logistics management strategy? First, assess all logistics functions. Take a look at every part of the organization's logistics management and define how it should work and how it contributes to overall supply chain management goals. Look at each physical part of the logistics process and determine its optimum function;

Even after a strategy is applied, continue to evaluate its success and ask if there are other opportunities. The entire supply chain environment is continually evolving, so logistics roles must be flexible. To design a new strategy or analyze your existing logistics processes, ask and answer these 8 questions:

1. Do you have a way to handle expedited shipping differently than slower moving shipments? Would it be beneficial to do so?
2. Is there a plan that defines when an item should be inventoried and when an

item should be sent directly to a customer?

3. Would it be more effective to have a third party logistics (3PL) company manage some or all aspects of your logistics functions? What financial and service considerations must you take into account before making this decision?

4. Can your distribution network be improved?

5. Could a change of carrier or mode save money or improve service in outbound transportation?

6. Do you carry too much inventory? Too little?

7. What are your specific customer service goals? Is it easy item returns? Delivery speed? Safety?

8. What future business operations will affect logistics functions and are you prepared to handle them?

For every business, there are different logistics needs and different ways to evaluate operational success. A static logistics strategy will cause serious harm to customer service and the bottom line. It's detrimental to not benchmark success or direction for improvement. While the logistics environment changes frequently, and the amount of data available for analysis grows, you have to actively strategize in order to stay ahead of the fluctuations to avoid disorder. The only way to do this is to ask questions about your logistics processes, evaluate successes and inefficiencies, and alter your logistics management strategy to fit your company's changing needs.

INBOUND LOGISTICS

Inbound logistics is one of the most overlooked aspects in logistics management. On average, companies can potentially save between 20 – 58% on inbound freight spend. Most companies focus on outbound logistics as this is a low-hanging fruit. There are usually more pressing matters for a business to attend to, and many lack any control over inbound freight. However, to drive significant i.e. are distribution centers in the right locations and are there enough of them? savings and improve customer service, it is critical to gain control of inbound logistics.

FREIGHT PAID TO FREIGHT COLLECT

This is a simple change most companies can effortlessly implement. Freight Paid is a common payment method for inbound freight among shippers. Freight Paid means that the supplier pays for transportation costs. A switch to Freight Collect is advantageous; this is where the consignee pays for freight cost. It might sound counterintuitive, but it's important to keep in mind that the company who immediately pays a carrier is not necessarily the party ultimately responsible for the cost of transportation.

Switching to Freight Collect will give your company control over inbound logistics. Often, the true cost of transportation is hidden in the price of a product, between 4 and 7% of the total cost. With control over inbound freight, you know exact transportation costs and can streamline the truck's route by having it drive straight to your distribution center, not making an extra stop at the supplier's distribution center.

Freight Collect is a best practice in logistics management because this method will give you visibility into the inbound process. Visibility makes identifying inefficiencies and implementing change possible. With visibility, a company can analyze carrier performance, track overall costs, predict and avoid disruptions, and analyze vendor performance.

Then, choose the best combination to save money and time; these benefits will be seen by your customer through improved service.

VENDOR COMPLIANCE PROGRAMS

A lot of companies don't pay attention to inbound freight, and even fewer see the necessity of a vendor compliance program (VCP). These companies are missing out on potential profits, streamlined logistics functions and improved customer service, among many other benefits. A good VCP can be a competitive differentiation.

A proper VCP will define expectations and benchmarks for the vendor, have a way of tracking and reporting vendor performance, include frequent meetings to discuss any necessary changes, and ensure all consignee goals are consistently met.

3 reasons to have a vendor compliance program:

1. **Current Logistics Environment:** Logistics processes are more and more complicated every year. This means that there are more opportunities for errors than ever before, and in today's world, errors disrupt the supply chain. Every point of the logistics process is dependent on each other, and the entire logistics process is just one point of the overall supply chain. Any inefficiencies or minor slip up in inbound freight management affects the internal process, the customer, and even the end-consumer.
2. **Technology:** Technology became very important in transportation and logistics after the recession, when transportation departments downsized. Since then, the available technology has grown and improved significantly. Today's software can measure and analyze just about anything, giving you a good chance of success at any logistics venture. If you're not taking advantage of available technology to set up a controlled and monitored VCP, then you will fall behind those who do use transportation management software to their benefit.
3. **Efficiency:** Logistics management is customer-facing, and as such, its efficiency reflects the whole company. Customers are demanding more which stresses the logistics process. Maintaining high efficiency is the only way to ensure customer demands are met without significantly increased costs. Inbound freight needs to run as smoothly as possible for the best customer experience.

As you can see, a proper VCP is necessary to have competitive logistics management processes. To ensure a VCP is successful, work with the vendor at every step.

Rather than fighting over requirements, or simply charging a vendor for bad service, collaborate to solve problems and improve service. Today, programs take a strategic approach, focusing on flow and efficiency, using advanced cloud-based software to predict compliance issues before they occur.

Simply put, don't just tell a supplier when they do something wrong, establish a mutually beneficial relationship; help them achieve success and reward them for being reliable.

Reliability is invaluable in this volatile industry and economy. When a VCP is successful, and two companies have a great working relationship, companies will see reduced inventory and safety stock, improved warehouse operating costs,

overall reduced inbound costs (with value-added), and enhanced customer service. Fully investing in a VCP may be taxing at first, but, when successful, it is worth the effort.

REVERSE LOGISTICS

A well-planned, customized reverse logistics strategy will reduce storage and distribution costs, improve brand reputation, create more sustainable business practices, and satisfy customer demands.

Reverse logistics is a type of inbound freight that most companies are losing money on. It's seen as an expensive, complex challenge and many companies avoid managing it.

It requires an efficient, sustainable approach to resolve each individual item-level issue. It also requires full support from senior management, which is rarely provided. However, reverse logistics is vital to the customer experience and it is important that it's managed properly.

A good reverse logistics program generates maximum value from each item returned. Returns impact the bottom line.

An average retailer's reverse logistics costs for consumer goods are equal to 8.1% of total sales. In some industries, such as book publishing, catalog retailing and greeting cards, over 20% of all products sold are eventually returned to the vendor.

Quality and distance traveled determine the backward path of the product and its final form and destination. The longer a product stays in the system, the less valuable it becomes. And, of course, already damaged goods and packages will get worse being transported again. A time-sensitive category of products, like those with technology components, lose market value with each passing week. It's best practice to minimize the time items spend within the system to ensure maximum reclaimed value.

Reverse logistics is important for customer service. 69% of customers think of great customer service as quick resolution of problems. For example, consumers who order clothes online typically order several different sizes and colors of the same item. Then, they'll send back the products that don't fit or aren't the right color. If this process is difficult, they won't order from you again. Good reverse

logistics practices, and by extension customer service, include a return shipping label and easy packaging for returns. This encourages future purchases.

Not to mention, reverse logistics can reduce environmental waste (and improve your company's waste costs). More and more customers appreciate companies who take social and environmental responsibilities seriously, so implementing green practices can further improve the customer's experience.

TRANSPORTATION MANAGEMENT SYSTEMS (TMS)

TMS technology is absolutely necessary for any logistics operation. This software will measure and report detailed shipping records for inbound and outbound freight, monitor vendor and carrier performance, optimize routing and mode choice, and most importantly, help give you end-to-end visibility of freight movement. Not to mention, a TMS can reduce overall transportation costs by 30%. If implemented and used properly, a TMS is invaluable to your logistics objectives.

USE THE RIGHT TMS FOR YOUR NEEDS

When purchasing a TMS, or evaluating the success of your current system, the first thing to consider is what your specific needs are. Consider how it will be used, what benefits it should provide and how well it will grow with the company.

There are many options to choose from, and choosing the wrong TMS software will lead to unnecessary costs and limited value gained from the data-generating system.

To get full value from a TMS system, there are 6 must-have features:

1. **Carrier Contract Management:** Dealing with multiple carrier relationships at once, all with different contracts, is challenging. A TMS will alert you when a contract is up, display total shipping costs, help establish pricing, and track terms and agreements in real-time. You will always be sure you and your carriers are following the terms of your contract, as well as any special location-based regulations.
2. **Parcel Shipping Support:** In recent years, demand forecasting has become more and more accurate. This triggered lower inventories, with many businesses using a

‘Just in Time’ approach where items are received only as needed. In general, there is demand for smaller, more frequent shipments. In turn, this has caused a universal need for parcel shipping.

3. **Item Visibility:** Due to rising customer demands and the need for efficient logistics operations, shipment visibility is mandatory, even down to the item level. This is very important, as 67% of companies implement a TMS to improve customer service in the first place. A TMS provides frequent notifications, expectation alerts and some form of integration with carrier software. By tracking your items while they’re in transit, you’ll reduce cycle times, gain more control over logistics costs, and improve the customer experience.
4. **Business Intelligence:** A TMS will track and analyze shipping trends. This helps you find the best lanes, vendors, carriers and modes. You will be able to develop performance metrics and key performance indicators (KPIs). The TMS analyses will help prevent future supply chain disruptions, reduce transportation costs and shorten delivery times. Again, significantly boosting customer service.
5. **Back Office Duties:** A TMS with fully integrated accounting saves time doing paperwork, cuts administrative costs, improves cash flow and fills out the Bill of Lading (BOL) correctly every time. You’ll spend more time assuring customer satisfaction and gain time to focus on your core business operations.
6. **Scalability:** Not all versions of TMS are scalable. If your company plans to expand at any point in the future, you need to get scalable software. That way you won’t have to purchase, implement and learn how to operate a new one in the future. A highly scalable TMS will grow with your business and increase the likelihood of success when dealing with highly complex routing solutions.

Since every TMS is different, it is important to assess the particular needs of your company and the capabilities of the technology. Do you focus on inbound freight? Outbound freight? Shipment-tracking? Or do you want one that’s all inclusive? Selecting a TMS is a critical point in a logistics operation and a best practice that will provide continued benefits.

RISK VS. REWARD: PROPER IMPLEMENTATION IS KEY

Implementing a TMS is difficult. These systems are expensive, complicated and can be discarded or misused very easily. To get the software's full value, it must be implemented properly. This is risky, but necessary, and the results are numerous.

You can't just buy an expensive TMS and expect to start seeing results right away. It takes serious work to implement a TMS. You need full company support, and sometimes even a significant culture change within the organization to start effectively using the software.

Many companies fail at implementation for one reason or another. However, there are some areas that can easily produce a return on investment (ROI) when your TMS is still gathering data and employees are still learning how to use it. Here are three things you will use your TMS for to start seeing savings right away.

- ✓ Increase Usage of Preferred Carriers
- ✓ Lower Cost Mode Selections
- ✓ Better Routing

These areas are where most TMS programs excel, and historically, they are the safest target areas during implementation. This is because they are the easiest cost-saving methods to achieve with a TMS, even when it is brand new. An initial focus on these areas can help assure implementation is successful.

Implementation can be a risky period. Implement a TMS with the features most relevant to your business needs, do the necessary work up front during implementation and value to logistics management.

VISIBILITY INTO LOGISTICS PROCESSES

Visibility into logistics functions is hands-down the most important benefit of a TMS. Visibility allows organizations to identify opportunities and challenges, so they can adapt their logistics management and make better decisions. If you didn't know what was wrong with your process, how would you change it? Organizations need to have visibility into their existing processes before they can develop a comprehensive transportation and logistics strategy. Having visibility is the basis of optimization. It's what allows you to plan, monitor and implement any and all changes within your

logistics operations.

The benefits from gaining end-to-end visibility into logistics functions are plentiful. Below is a list of just a few of them:

- ✓ Find less expensive transportation modes
- ✓ Reduce unexpected shipping charges
- ✓ Avoid logistics disruptions
- ✓ Reduce safety stock
- ✓ Optimize inventory levels
- ✓ Improve cash flow
- ✓ Enhance customer service
- ✓ Quicker, more accurate reporting
- ✓ Easy regulatory compliance
- ✓ Correct BOL every time
- ✓ Negotiate better contracts
- ✓ Analytics on business partner performance
- ✓ Smaller transportation department

Better understanding of the cost to serve customers setup, and you should have no problem seeing ROI and added.

OUTBOUND LOGISTICS

Outbound logistics is an easy target for cost savings and improved speed of delivery. All companies have some sort of optimization process for outbound freight management. Although logistics management is complicated, the idea of outbound logistics is fairly simple: store as little product as possible and move it as quickly and accurately as possible while maintaining safety. Despite its simplicity, there are some common pain points.

LEAN LOGISTICS

As mentioned, companies want to hold as little inventory as possible. For the most part, the longer an item stays in transit or in storage, the more value is lost. Using

data gained from a TMS is the only way to start implementing lean logistics practices.

In order to have small amounts of inventory on hand, you need very accurate demand forecasts. This is where all the information you collect from a TMS comes in handy. By tracking yearly cycles of shipment quantities, number of returned products and other statistics, you'll get an idea of future demand. The more information you collect, the more accurate the demand forecasts will be. These predictions are what allow you to receive shipments just in time and have just enough products on hand to meet demand. In this way, reducing safety stock and overall inventory levels saves money without harming customer service.

In order to apply lean logistics, you need to be efficient with inventory management. When inventory spends little time in the warehouse, and there's almost none to spare, it must be quickly transported where it needs to be, when it needs to be there. Combining the TMS with a good Warehouse Management System (WMS) will give you a central database of incoming and outgoing shipments, and full visibility into materials handling and inventory management.

Over 50% of those who adopt lean logistics practices report immediate improvement, and it's easy to see why. With this level of information, you'll know exactly where all items are, where they need to be, how many employees are needed, where they're needed, when and where shipments are coming in, and when and where shipments are leaving. This is invaluable information and will improve warehouse handling processes and customer service, all while reducing costs.

LAST MILE LOGISTICS

Last mile logistics is where a company actually makes contact with a customer. Many shipments are stalled in last mile logistics because of its complexity. Most companies don't worry about the shorter routes of the trip and only focus on long routes, which are easier to manage than the final leg of the trip.

Last mile logistics accounts for 28% of a company's transportation costs. It's a difficult process to handle and most companies do a poor job managing it. Here are the best practices of successful companies leveraging last mile logistics management:

Have a Plan in Place:

Create a customer-focused plan. Satisfying the customer is the number one goal in last mile logistics, but every customer has different expectations for the incoming

shipment. Businesses can only receive shipments at certain times and at specific locations; some businesses may prefer to have consistent deliveries at the same time; some customers need an exact delivery time so they're not stuck waiting for a package.

This last mile logistics plan should take into consideration the constraints and obstacles in the delivery process.

For example, will weather disrupt transportation during certain times of the year? Is the destination difficult to get to on time? Will the trip be subject to unexpected delays? The answers to these questions need to be taken into account so you will be ready for any interruption and deliver on the customer's anticipated date and time.

Track, Analyze and Act on Information:

Technology should support your individual last mile logistics needs. With TMS technology, you can collect and analyze historic performance to find better solutions. You can find the best possible combinations of carriers, modes, routes, drivers and freight that best suit the company. In this way, you will improve operational performance and customer service.

Track the progress of a truck while it is in transit, not just for data but to ensure the delivery is on time. Maneuvering a 28-foot trailer on residential streets can be more difficult than it seems on paper. A driver may have questions about the freight and problems could occur. It is always best to have quick, accurate assistance for a vehicle in transit.

Once you have historical data and are able to assist freight in progress, you can begin measuring client performance. You can see if they consistently miss their delivery time, aren't there to sign for their package or if there are delays at the dock. This information can be very valuable, as most customers don't realize their own inefficiencies are a major source of delays in delivery.

Work with clients to improve performance on both ends.

Get Help from a 3PL:

- ✓ Most 3PLs have their own proprietary TMS with detailed reporting capabilities. This ensures constant tracking of a delivery's progress, provides accurate tracking of customer and carrier performance, and help with any possible

problem is only a phone-call away. A 3PL can also contact a customer if the delivery will be late, explain why, and give an updated, approximate time of delivery in order to improve customer service.

- ✓ Most importantly, a 3PL can work with a carrier who has had poor past performance. 3PLs have intimate industry knowledge and, depending on the 3PL, offer carrier- coaching for almost any safety or performance problems. The point of this is to allow you to secure more reliable capacity in the future, because the availability of trucks is dwindling and you don't want your customer service to falter because of capacity issues.
- ✓ Last mile logistics is difficult to navigate. Whether you outsource this to a 3PL or try to tough it out yourself, you will need a plan, the right technology, useful data and a customer-centric mindset.

CUSTOMER SERVICE AND THE 3PL

Everything in logistics management is done in the name of customer service. It's a fast moving world with high demands and you need to keep up and provide respectable service or fall behind the competition. Approximately 70% of consumers are willing spend more money for good customer service, so it may be the most important part of your business. Providing superior customer service can be a difficult task. You'll need to add value to logistics processes, develop beneficial collaborations, and strive to offer service not just to customers, but your customer's customers.

ADDING VALUE VS. CUTTING COSTS

It is predicted that by 2020, customer experience will be more important than price, product or brand choice as a differentiator in purchasing decisions. The customer experience is top-of-mind; 80% of companies plan to increase customer service spending in 2015. There's a good reason for this, as customers have access to more product options and shopping choices than ever before. This makes competition between businesses more intense, and those who provide the customer with the best experience will have the upper hand.

A business will assure a profitable future by creating rapport with customers. A recent survey shows that 62% of B2B customers, and 42% of B2C customers make future purchases with a company after they have a good buying experience. On the

other hand, 66% of B2B customers, and 52% of B2C customers, stopped buying from a company after just one bad experience. 95% of people share their bad customer service experiences on social media, adding even more importance to the level of service you provide to your customers. In addition to that, 39% of customers stay away from a company for at least two years after a bad experience. ‘Lesson: a bad customer experience turns customers away and they tell their network about it, leading to lost sales and poor brand reputation.

What to do with all of this information? Add value to your logistics processes instead of simply just cutting costs. The idea that cutting costs is more important than adding value is no longer a sustainable business practice. Cutting costs often leads to poor performance. The way to add value is to get serious about implementing logistics management best practices and create a company-wide mindset of providing superior service.

One of the easiest ways to add value to business operations is to partner with a 3PL. 3PLs gain end-to-end visibility of a shipper’s performance through the analysis of historical data and detailed reports. They are able to identify inefficiencies and improve functions throughout logistics operations that result in a more streamlined and efficient transportation process.

More data means more metrics are available to recognize techniques to meet and exceed customer expectations.

The ultimate goal of logistics is to satisfy the customer by selecting the best transportation options. Shippers gain numerous benefits from 3PLs who are able to generate and analyze big data to find opportunities that drive success and improve the customer experience.

CUSTOMER-DRIVEN COLLABORATION

Simply enlisting the help of a 3PL and its technology isn’t enough. The term ‘Cradle to Grave’ management is an accurate description of how you should view collaboration. A 3PL should integrate with every part of your business from start to finish to ensure all processes are optimized for the best results possible.

Most shippers don’t want to fully integrate with a 3PL provider. However, those who take a strategic approach to collaboration and outsourcing, as opposed to viewing it as simply a cost reduction, see improved customer service and form more effective

procedures. Working closely with a 3PL allows the logistics provider to see challenges and opportunities from every possible angle.

What type of things do you need to share with a 3PL in this ‘Cradle to Grave’ model of collaboration? Everything in the logistics process and absolutely anything that could affect logistics functions. For example, let your 3PL know when you will begin offering new services, launch a new product or open a new distribution center. The 3PL will ensure transportation during the implementation or launch is successful, doesn’t strain logistics processes and continues to provide value to the customer.

SERVING YOUR CUSTOMER’S CUSTOMER

This is where logistics management begins to merge with supply chain management. As you’ve seen, everyone has customer service on their mind since it’s the most important factor in the shipper-consumer relationship. If you can provide value to your customer (quick, accurate delivery and low costs) they can pass that value on to their customer.

In a B2B setting, your customer wants value because their customer wants value. This is why it’s important to provide good customer service. The entire supply chain is connected. One company’s logistics processes affect the whole inter-enterprise chain of exchanging goods. That’s why mistakes are so costly; they affect everyone, especially the end consumer.

A 3PL is a great resource to help provide value to your customer’s customer. 3PLs have in depth industry knowledge and technology capable of seeing inefficiencies in the supply chain. This makes logistics providers good at preventing disruptions before they occur or quickly fixing them when they do happen. 3PLs have the transportation experience to work with carriers and other shippers in the supply chain to find solutions to challenges and avoid problems in the future.

How do you know when you’re providing good service? There are four signs that your logistics processes are passing value on to your customer:

1. **Organizational Flexibility:** You have the ability to quickly and accurately respond to changes in the market driven by customer demands. You can also develop new logistics processes and services that are required to meet and exceed these new customer demands.

2. **Cycle Times:** The time it takes you to fill customer orders and related activities is as fast as possible without sacrificing quality. This includes inbound, outbound and reverse logistics management.
3. **Key Performance Indicators (KPIs):** Your KPIs are developed from past TMS data. They are relevant, timely and accurate forms of measurement for shipping performance and customer satisfaction.
4. **Brand Presence:** You have an established position in the market. You are known as a good service provider by your customers and the market as a whole.

Customer service is majorly influenced by transportation and logistics management. If you're not providing enough value to your customer so that they can pass it on to their customer, you aren't doing a good enough job. A 3PL will help you get on track.

Finding the best logistics management practices will help you gain a competitive advantage through better customer experiences. After all, the end goal is to provide as much value to the customer as possible while creating optimized business operations. A brand's success hinges upon successful logistics operations.

Freight movement has a noteworthy impact on the bottom line. Optimize your transportation management processes to realize where you can improve business operations.

Partner with a 3PL to ensure continuous optimization of logistics management and maximum value is provided to your customers.

INTEGRATED LOGISTICS

Logistics links an enterprise with its customers and suppliers. Information flows through the enterprise from and to customers in the form of sales activity, forecasts and orders. Such information is refined into specific manufacturing and purchasing plans. A value-added flow of inventory is initiated as products and materials are procured. This ultimately results in transfer of ownership of finished products to customers.

Supply chain integration focuses on defining key linkages across functional

areas both within and among companies partnering along a supply chain. Integrated logistics is a process-oriented integrated approach to procure, produce, and deliver products and services to customers.

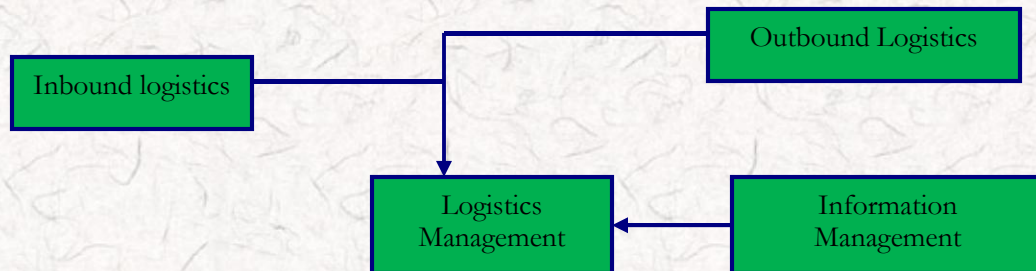


fig 1: Logistics Management

The following are the imperatives for successful integrated logistics:

- **New Culture:** Enabling employees to adapt to the new operating realities in cross-supply chain collaboration are a key component of integrated logistics. Core capability teams, which consist of professionals, must be focused on key integrated logistics activities, which synchronize activities across the entire supply chain. Senior executives entrusted with the task of integration and synchronization has to articulate the strategy for a new cross supply chain culture, which will be shared by all partners.
- **Agreements on cost-sharing and revenue-sharing:** Building a benefit structure balancing rewards with each partner's understanding of their contribution is important for maintaining close partnering relationships. A generally agreed upon framework for equitable revenue and cost sharing amongst all participants is necessary. Analyzing the supply chain economics examines the role and costs of each of the different participants of the supply chain. Detailed practices and performance metrics will help in understanding the participant's competitive advantage.
- **Establish Transparency:** Establishing of an integrated logistics system is challenged by participants' unwillingness to forgo any degree of control,

which is a symptom of lack of trust. This lack of trust will hinder acceptance of integrated logistics while lack of standard communication and business processes will hinder implementation.

Need for Integration

A significant feature of a responsive organization is the priority the organization attaches for integration. Not only integration within the organization but also integration upstream with suppliers and downstream with distributors and customers is important. There is also a lot of emphasis on linking organizations through information. Information systems nowadays drive companies to reconsider their relationships with customers and suppliers. Process integration is achieved through logistics integration, which means both upstream and downstream integration. The objective in an extended enterprise is creation of an 'end-to-end' process so that innovative products are created and delivered at higher levels of quality and in lesser time frame to markets. This is achieved through the following means:

Rationalization of supply base: Companies try to rationalize their supply base by reducing the number of suppliers. In fact, companies are looking at these suppliers to provide systems rather than components. Companies are basically trying to rationalize their supply base. For example: the automotive sector is trying to integrate tier 1, tier 2 and tier 3 suppliers.

Centralized inventory: The extended enterprise not only includes upstream suppliers but also the downstream flow of finished products through dealer networks. Traditionally, when dealers did not have the product demanded by customers, they used to swap this with another dealer who had that product variety in stock. Today, enterprises have centralized inventory and also take responsibility for its management. The dealers have only demonstration models; they have on-line access of the enterprise supply system and can give the customer an immediate confirmation about the availability of the product of their choice and when it can be delivered. For those products not available from stock, dealers enter order directly into the production schedule and the product required

is made to order.

Integrated Information Systems: The benefits of a fully transparent information system are being considered with the use of Electronic Data Interchange (EDI) together with the growing acceptance of 'just-in-time' philosophy. Suppliers can now manage the flow of materials into the plant on the basis of advance notification of a company's production schedule. With integrated information systems, there are no manual orders, invoices or delivery notes. A single source of information provides the basis for a timely physical response, which automatically triggers payment to the supplier.

Supplier Development Programmes: Supplier development has replaced the traditional purchasing function. A cross functional team of specialists work closely with suppliers and seek improvements in supplier processes as well as in the interfaces with the enterprise's processes.

Supplier involvement: Innovations in industries are supplier originated. By bringing suppliers closer to the process of new development, it has been found that innovation can be embodied in new products continually and simpler cost effective designs can be created.

Activity Centers in integrated logistics

Refers to the activities that make up business logistics. These are studied in the following two categories:

Key Activity centers: These are the activities forming the core of logistics function and also take place in every logistics channel. These are as follows:

Customer Service Standards: The customer has become more and more demanding in overall performance terms. The manufacturer needs to create a competitive advantage on the basis of customer-service. Co-operating with marketing to determine customer needs and wants determine the customer response to service and set customer levels.

Transportation: This is one of the most expensive activity centers in logistics. It is concerned with movement of raw materials to the plant and semi-finished goods or finished goods to the market. Any problems in the transportation service can result in the company holding inventory for more days than planned for. An efficient transportation planning and management is a pre-requisite function of logistics.

Inventory Management: The operational aspects of logistical management are concerned with movement and storage of materials and finished goods. Logistics operations start with the initial shipment of material from a supplier and finalized when a manufactured or processed product is delivered to a final customer. As material gains value at every step of its conversion into finished inventory, work-in-progress inventory needs to be moved to support final assembly for supporting manufacturing. A meaningful value-addition is done only when the final ownership is transferred to customers wherever specified. For better understanding of the inventory it is divided into the following three areas:

➤ Physical Distribution: Concerns with movement of a finished product to customers. Here, customer is the final destination of a marketing channel. Availability of a product is a key part in the marketing efforts of every participant. A major part of the overall marketing effort will be lost unless a proper assortment of products is delivered efficiently wherever needed. Time and space of the customer service becomes an integral part of marketing through the process of physical distribution. The common feature of all physical distribution systems is that they link manufacturers, wholesalers, and retailers into marketing channels that provide product availability as a key aspect of the overall marketing process.

➤ Manufacturing Support: This area focuses on managing work-in-progress inventory as it flows between various stages of manufacturing. The overall concern of manufacturing support is the method by which production occurs. Manufacturing support is different when compared to physical distribution. Physical distribution attempts servicing the desires of customers and thus needs to accommodate uncertainty of consumer and industrial demand. Manufacturing support involves movement requirements under the control of the

manufacturing organization.

➤ **Procurement**: This area focuses on with purchasing and arranging the inbound movement of materials, parts or finished goods from suppliers to assembly plants or retail stores. It involves availability of the desired material wherever needed.

All the above three areas of inventory flow in logistics overlap in a typical enterprise. Looking at each as an integral part of the overall value-adding process gives an opportunity for capitalizing on the unique attributes of everything while facilitating the overall process. A major concern area for integrated logistics is co-ordination of overall value added movement. All these three areas combine to provide an integrated management of materials, work-in-progress and finished products moving between various locations.

Information Flow and Order Processing: Completing activities of the order cycle are very important in customer service. A lot of management attention is being given to activities involved in processing orders. An effective order processing system should have an effective order status reporting system also.

Support Activity Centers: These are the activity centers necessary for achieving synergy in key activity centers. This category includes:

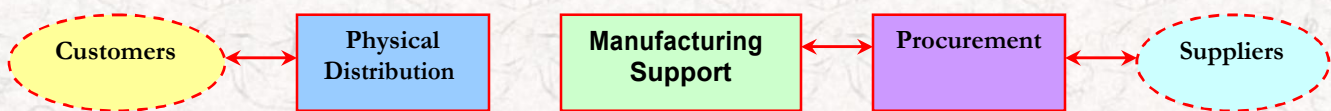
Warehousing: Storing goods that are waiting for sale. This function is necessary as there is rarely a match between production and consumption. Organizations choose between warehouses and distribution centers. Distribution centers are larger, automated warehouses designed to receive goods from various plants and suppliers.

Material Handling: Efficient material handling methods in warehouses can improve customer satisfaction by decreasing the damage in handling, maintaining the quality of storage, facilitating order processing and moving the right goods at the right time to make them available to the right customers. Costs are also reduced through proper material handling techniques.

Information: Information collection, storage and handling are necessary for achieving higher customer service. Information enables reducing the gap between actual and benchmark and also assists in strategy formulation – a key activity in logistics.

Packaging: Packaging protects the goods and acts as a source of information for customers. It is also used as a marketing tool to attract customers. The concept of packaging has paved way to ‘Unitization’, where various package are handled together as one unit. Example: Palletization.

Fig 2: Logistics Integration (Source: Bowersox & Closs, 2004)



BARRIERS TO INTERNAL INTEGRATION

Implementing internal logistics integration is not possible in a vacuum. There are certain barriers to integration, which are as follows:

Organization Structure: The traditional organization structure prevents implementation of any cross-functional process being implemented. Traditional structure is to divide authority and responsibility according to functional work. Organizations are generally concerned with achievement of functional excellence and this structure can hinder success of the goal of integration – which is co-operation among functional areas. Also, managers are usually rewarded for achieving functional excellence. Successful integration of logistics process requires managers to look beyond their organizational structure and facilitate cross- functional co-ordination. This may not be possible by creating a new organization structure. Thus, regardless of whether organizational structure is realigned or not, organizations dealing with cross-functional matters are required for successful integration of processes.

Ownership of Inventory: Inventory can facilitate a specific function to

achieve its mission. A traditional approach to ownership of inventory is to maintain adequate supply for gaining ease against demand and operational uncertainty. Availability of inventory also results in economy of scale. While such practices create benefits, they also have a related cost. The critical issue is cost-benefit relationship.

Measurement systems: Traditional measurement systems make cross-functional co-ordination difficult. A new scorecard needs to be developed for facilitating integration of logistics functions. The measurement system must facilitate logistics managers to view their specific functions as part of a process and not just stand-alone activities.

Transfer of knowledge: Ability to share experience is an additional barrier. Failure to transfer information or knowledge tends to nurture functional orientation by development of specialized employees. Many firms also fail to develop procedures and systems to transfer cross-functional knowledge. When work is done in a series of processes and involves many employees, transfer of this type of knowledge and experience is difficult.

Information Technology: IT acts as a key resource to achieve integration. IT applications need to be designed along organizational lines. Databases are mostly limited to specific functions are not easily accessed on a cross-functional basis. Data warehouses have emerged due to the need to share information. Schemes to transfer information are required to be developed as existing applications can serve as a barrier to process integration as critical data cannot be shared readily.

Hierarchy of logistics integration:

➤ Competencies: For long-term survival, a wide variety of competencies are required. A firm will excel in a few of these, which are referred to as core competencies.

➤ Performance Cycle: A structure integrating all aspects of logistical

operations linking procurement, manufacturing, support and physical distribution.

- Function: These are traditional areas of logistics specialization, which are essential for operational excellence. They need to be viewed as integral parts of the overall logistical competency and not as unique areas of performance.
- Sub functions: Specific jobs within functions, which need to be performed within functions for satisfying logistical requirements.

Complete Systems Perspective for Logistics

This concept is a cost-service integration, backed by an integrated logistics network, which is aimed at minimizing the total cost of distribution at a given level of customer service. The main components are as follows:

Perspective of total cost: The cost of logistics includes various logistics activities such as cost of planning and managing range of logistics activities such as transportation, finished goods distribution, receipt, inspection and storage of goods etc. All functions necessary for converting inventories and satisfying customers have a cost. An individual cost control perspective should be avoided and the overall cost of all logistics elements need to be considered simultaneously. This is referred to as tackling the cost of logistics as a whole, while trying to tackle the primary function of logistics system i.e. to perform the function assigned to the system in a most cost effective manner. In fact, the total cost perspective is an important component of logistics.

System Perspective: This concept is an extension of the logistics concept and is a key for managing logistics function. This total system perspective of logistics is time consuming but results in reduction of inefficient logistics systems as a whole. The total system of logistics also has a number of sub-systems such as transportation, warehousing, inventory management etc. A number of techniques and objectives that are stated beforehand have been designed so that each of these activities is conducted in an optimal manner. A proper balance between these activity centers is necessary to reduce the total cost of logistics.

Trade-offs: This refers to the evaluation of the cost of each system component with the objective of determining a combination of components providing a minimum total cost for a specified level of customer service. Trade-off takes place when management incurs cost in a particular activity center as part of the strategy to achieve benefits from another activity center.

Intra – activity trade-off occurs when trade-offs occur within an individual activity of the logistics system. An example can be a decision to use one’s own transportation instead of a public transportation.

Inter-activity trade-off occurs between various activities of logistics system. Management prepares itself to bear the increased cost of one activity center so as to get the profits from another. For example, using airfreight can increase transportation cost but would result in a reduced inventory and warehousing cost.

Inter-functional trade-off occurs between the logistics system and other functional areas of the firm. A trade-off is made between various functions. For example, the packaging structure for a company was changed from conventional vacuum packs to a different shape to suit the structure of the product.

Inter-organizational trade-off is a category between manufacturer and other organizations involved in creating utilities for the manufacturer. The manufacturer has to be concerned with the members of the distribution channel and should try maintaining relations with these members.

Managing the supply chain as a network

The firm is at the center of an inter-dependant network that competes as an integrated supply chain against the other supply chains. Managing such a competitive structure requires various skills and priorities. A focus on the network management as well as upon internal processes is necessary to achieve market leadership. The following are the most significant issues in such an environment:

□ Collective development of strategy: In the traditional view, members of a supply chain never considered themselves as part of a marketing network and so never shared their strategic thinking with each other. A higher level of joint strategy development is required for network competition to be truly effective. Network members must collectively agree to strategic goals for the network and the means of attaining them.

□ Open communication: The advent of information technology is making the exchange of information between supply chain partners very easy and this has been one of the most powerful drivers of change in the marketing networks.

□ Benefits for partners: There is a growing realization between network partners for co- operation that usually leads to improved performance. Another issue is how the results of that improved performance can be shared amongst the various players. All partners must benefit and be better off due to co-operation.

A key to logistics integration is the transparent flow of information from one end of the chain to the other. Supply chain partners are able to respond more rapidly to known demand with lesser inventory and hence lower cost by sharing information. A responsive supply chain is highly integrated. They integrate internally across functions and externally integrate with suppliers and downstream customers. A lot of companies are attempting to become more agile and responsive due to an encroached functional structure. They have a fragmented approach to the marketplace and thus manage functions rather than processes. It is also difficult for firms like these to reflect external integration when they lack internal integration. Companies that have got over this are now looking to design close linkages with their supply chain partners.

LOGISTICS STRATEGY

In the modern day dynamic business environment, competitive pressures and customer demands force a large number of firms in shifting their priorities towards understanding the logistics supply chain process for delivering superior value to customer. In order to achieve this objective, the historic role of

warehousing, transportation, storage, and handling have started with a more comprehensive role, which pervades the entire supply chain.

Logistics strategy facilitates gaining a competitive edge to support emerging technologies. As a service function logistics involves the four basic features:

- **Reliability:** Influences the degree of trust, which a supplier can have, in a company's capability for honoring commitments. The supplier has to be perceived as reliable and for this the supplier needs to exhibit certain service characteristics. A high degree of reliability in terms of inventory and material delivery is expected from the supplier end. Thus a key objective of the logistical system needs to be reliability in meeting the needs of the customer, according to the resource planning.

- **Responsiveness:** The speed with which customer demands are being responded. Responsiveness is expected at all levels of the supply chain. Response to pre-sales enquiry by using latest available information and communication technologies is an important strategy. Supplying material as per customer needs, and frequent deliveries in fewer lot sizes are important. Deliveries can also be made at the various assembly centers, which are in proximity to the markets. A firm will gain a winning edge in competitive markets through a responsive strategy.

- **Relationship:** Firms spend huge amounts in Customer Relationship Management (CRM) related activities for development of long term relationships to retain customers, and also reduce the element of risk in demand management. Partnering with the right supplier and considering the supplier operations, as an extension of its own operations will enhance the efficiency and effectiveness of the supply chain.

- **Rationalization:** This refers to reducing the supplier base and partnering with select suppliers. The supplier's facility is treated as an extension of the buyer's facility and there is sharing of information, experience and resources for mutual advantage.

Requirements for an effective Logistics Strategy

Characteristics of an effective logistics strategic planning and project management are as follows:

Dedicated planning resources and programs: Unless proper resources are set aside for long term planning, it will not be carried out to the level of necessity to assess ways of changing economic, technological, competitive, demographic and regulatory environments affecting long-range requirement of logistics. A dedicated logistics planning team needs to be organized. The logistics planning team should include analytical and operational backgrounds that are required to resolve complex issues.

Formal Logistics Planning Methodology: Logistics is filled with interdependent activities, which impact other areas of the organization. Planning activity goes through three important phases such as investigation, vision and implementation. In the investigation phase, a logistics audit is conducted and the company's current performance and practices are compared with world-class practices. The vision phase involves application of world-class practices to the current environment. In the implementation phase, detailed project plans for completing the recommended initiatives are developed and monitored.

Strategic Logistics Planning

Business firms have been forced to reengineer or redefine their business process so that efficiency and effectiveness can be brought into the operations. The main reason for this has been the increasing globalization of business activities, intense competition, and uncertain markets. Different firms have different process of strategy formulation and implementation. The process of strategic logistics planning has the following steps:

- Analyzing the external and internal environment, which will help to determine the resource requirements, limitations and any other factors.
- The environmental analysis identifies the company's strengths, weaknesses,

opportunities and threats in customer service.

- SWOT enables in formulating the appropriate resources and the logistics mix or resources required for achievement of organizational goals.

- A structural design is needed to implement the strategy. The primary concern here is the strategic planning of warehouses; transportation and information flow in the entire supply chain. A proper interface between channel structure of the firm and its logistical network can be done with the help of a structural design. The efficiency of the functional elements in the movement of information and inventory across the supply chain will influence the success of the strategy implementation.

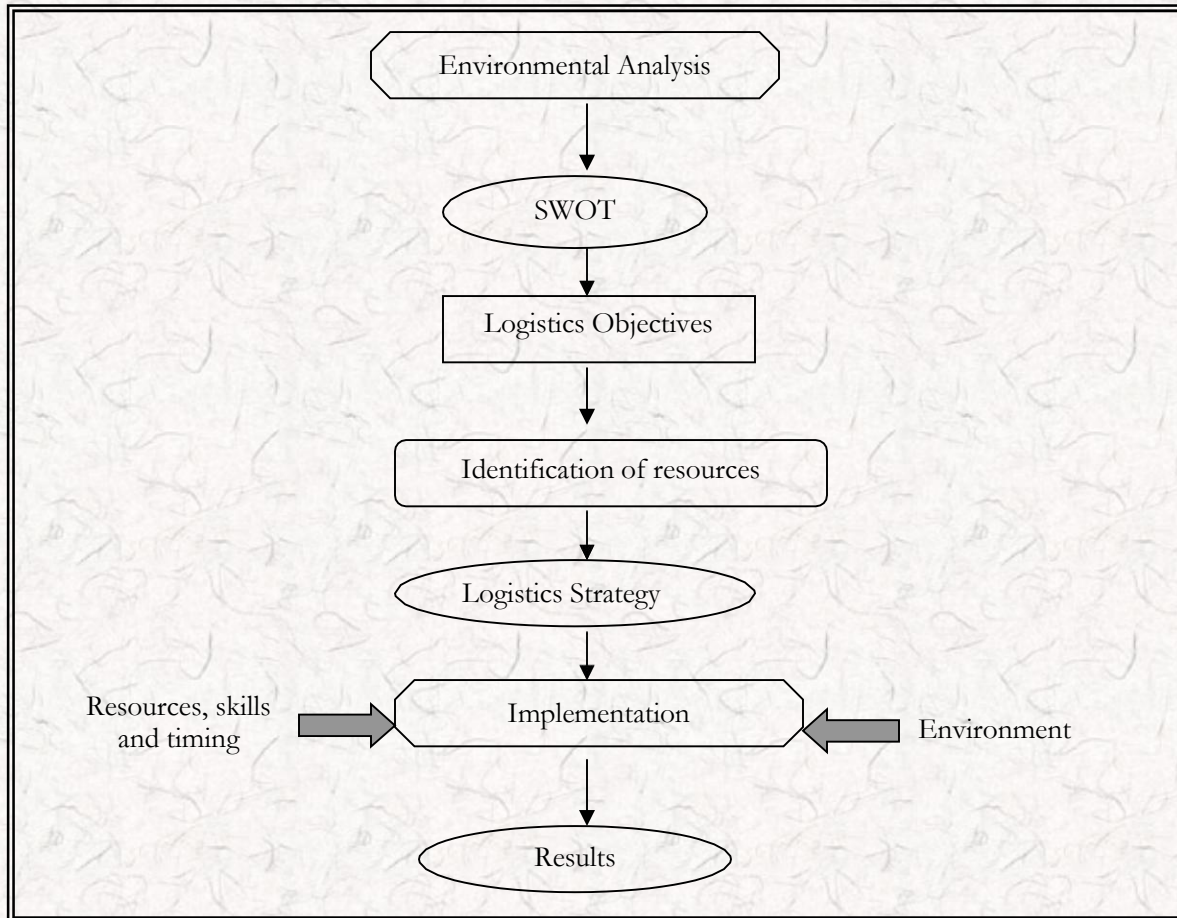
- Selection of transportation route, mode and carrier operator is a key aspect for offering and maintaining a reliable and consistent service level.

- The role of material procurement and management also cannot be ignored.

- Implementing the strategy is absolutely important and its success depends on efficiency of the human resources, equipment and the interfaces involved. A major task at the level of operation are order registration, processing, picking, replenishment and dispatching.

Thus, the process of strategic logistics planning will improve the overall responsiveness of the organization.

Fig 3: Strategic Logistics Planning (Source: Sople, 2004)



Components of Information Decisions in Supply Chain Strategy:

- **Push Versus Pull:** While designing the pieces of supply chain, it is necessary to determine whether these are part of the push or pull phase in the supply chain. Push systems require an elaborate Master Production Schedule (MPS) and Master Requirements Planning (MRP). The Master Production Schedule rolls the Material Requirements Planning (MRP) system. In contrast, for pull systems, information is required on actual demand for quick transmission throughout the entire chain so that the real demand is reflected.
- **Competitive Strategy:** This defines the customer needs to be satisfied through its products and services. A firm's competitive strategy depends upon the

customer requirements. It targets the customer segments with a main objective of providing products and services to cater to the customer needs.

- **Product Development Strategy:** Mentions clearly the portfolio of new products, which needs to be developed by a company giving an indication whether efforts towards these are done internally or externally.

- **Marketing and Sales Strategy:** Specifically mentions about market segmentation and details relating to positioning, pricing and promotion of the product.

- **Supply Chain Strategy:** A wide term, which includes supplier, operations and logistics strategy. Includes decisions relating to inventory, transportation, operating facilities and information flows. The strategy specifies the activities of supply chain such as operations, distribution and service.

- **Other Strategies:** A company also devises additional strategies for finance, accounting information technology and human resources.

Logistics Strategies

Formulating a logistics strategy can be viewed from the following three angles:

- Customer demands satisfied through strategy implementation
- Targeting customers
- Resources required for implementing strategies

Formulating a strategy is not an isolated process. Logistics strategy needs to have congruence with the overall goal and strategy of the business. A synergy with the other domains of the organization is necessary. An example of this can be the Management Information Systems of an organization encompassing all the functional areas of business. The MIS, being an information sharing system across the supply chain has considerable synergy with logistics operation.. Considering the importance of formulating a logistics strategy, the following are the possible approaches:

The following competitive and generic strategies could be pursued for logistics operations:

1. Cost Leadership: Achieving cost leadership is facilitated by logistics cost reduction to a major extent. This can be achieved by many ways. Examples of achieving logistics cost reduction are:

- Reducing transaction costs through IT support
- Warehouse operations based on scale economics
- JIT, cross docking and postponement, which results in reduction of inventory and related costs.
- Reduced vendor base and co-partnerships with suppliers.

2. Differentiation: This strategy focuses on offering superior service. Examples of offering logistics services for differentiation:

- On time and consistent delivery
- Logistics solutions to suit individual requirements
- Tracking consignments

3. Collaboration: A strategy where the customer works in collaboration with the suppliers. An example here is Vendor Managed Inventory (VMI). In VMI, customer places no orders but instead shares information with the vendor. This information relates to actual usage or sales of their product, their current on hand inventory and details of additional marketing activity. On the basis of this information, the supplier takes responsibility for replenishment of the customer inventory.

4. Diversification: Firms having a lot of operations adopt this strategy. The basic objective here is the lower cost and better control over operations thus providing superior customer service.

5. Outsourcing: Outsourcing services to logistics service providers having expertise in this area in order to bring efficiency and effectiveness into the logistics operations. An example in outsourcing is Customs Clearance service providers. As a majority of exporters and importers do not have a proper expertise

in this area of logistics operations, many logistics service providers offer customs clearance services to their clients. This can reduce the overall transaction cost.

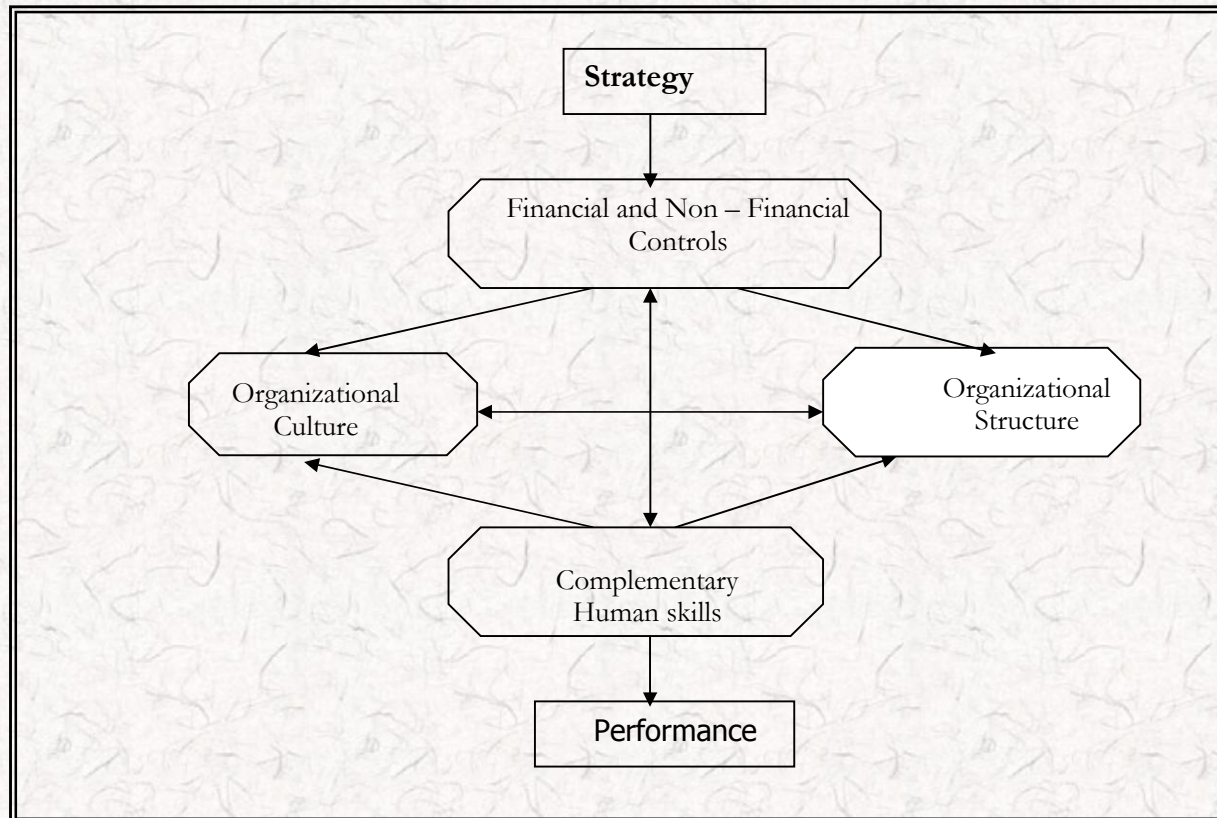
Implementation of Strategy

Implementation of the strategy is an important activity after the formulation. The firm needs to evolve a proper framework to successfully implement its logistics strategy. Important aspects for implementation of strategy are:

- Financial dimensions of control such as net income return on equity, net profits etc
- Non-financial parameters of control such as quality of service, customer satisfaction, delivery time etc
- The organizational culture and employee motivational programmes initiated by the company facilitate behavioral controls for employees.
- The structure of the organization is of importance. Organizational structure with a wide span of control give higher motivation to employees to perform well and strategy implementation can be done successfully in such organizations.
- Skills of the implementers of the strategy are also an important consideration.

The successful implementation of logistics strategy depends to a great extent on the information shared with internal and external customers and also logistics partners. Transparency at both the buyer and seller's end helps to build an element of trust, thus adding value to the customer delivery chain, which makes the task of implementation simpler.

Fig 4: Framework for strategy implementation (Source: Sople, 2004)



Strategic Issues that confront today's business organization

With today's business scenario becoming more complex these have an impact on logistics. The following strategic issues confront the area of logistics today:

- **Expansion of customer service:** Today's customers are more demanding, not only in terms of quality but also from service point of view. There is a need for differentiation with more and more markets becoming 'commodity' markets. The creation of differential advantage is through adding value, especially through customer service. Achieving competitive advantage through customer service is from a carefully planned strategy for service, and

developing appropriate delivery systems and commitment from people throughout the organization. Achieving service excellence can be only through a closely integrated logistics strategy.

- **Time Compression:** Time is a critical issue in management. Shorter product life cycles enable customers to accept substitute products, which are available just in time. In the case of introducing new products, management implications result from the reduction in the time 'windows' for making profits. Amidst all the concern for creating and managing innovation, there is an issue, which is perhaps given the necessary attention only now. This issue is the problem of extended logistics lead times. Lead-time is the time taken to convert order into cash. An important function of logistics is the provision of availability. The integration of marketing and manufacturing planning is necessary to achieve the availability requirement. More problems are created by limited co-ordination of supply decisions with the dynamic requirements of the market and the limited visibility in purchasing and manufacturing related to final demand. A radically different approach to manage lead-time is required to overcome these problems and establish long-term competitive advantage by ensuring timely response to changing demand.

- **Globalization of the industry:** The increasing trend towards globalization is proving a challenge for logistics management. Global companies seek to achieve competitive advantage by identifying world markets for its products and then developing manufacturing and logistics strategy to support its marketing strategy.

- **Organizational integration:** The classical business organization is based upon strict functional divisions and hierarchies. Achieving a closely integrated, customer-focused materials flow while encroached management with its priorities guards traditional territorial boundaries. Today's organizations follow a systems approach where functions are components of the system, which requires an overall guidance to fit together.

Strategic Fit

This means that there is a common goal between the competitive as well as

supply chain strategies. Aims at achieving a consistency between the customer priorities satisfied by the competitive strategy and the supply chain capabilities satisfied by the supply chain strategy. Three basic steps in achieving the strategic fit:

1. Identifying the uncertainties of the customer and supply chain: To have an understanding about the customer, the company must first understand the needs of the customer segment. For example a customer who visits a store nearby may be doing so for convenience and not for the low cost. Similarly, a customer may visit another store irrespective of its location for its low cost.

Various attributes on the basis of which customer demand varies across segments are as follows:

- Product quantity required in each lot
- Tolerable limit of response time
- Price of the product
- Required service level
- Desired level of innovation

Demand and Implied Uncertainty: Demand uncertainty reflects the uncertain customer demand for products implied demand uncertainty is related to the portion of demand, which the supply chain is required to handle. This is in contrast to the demand uncertainty, which reflects uncertain demand for a product.

2. Understanding the Supply Chain: After understanding the company uncertainty, the firm needs to meet the demand in the uncertain environment in the best possible way. A trade off between responsiveness and efficiency is of significance here. A responsive supply chain has an ability to provide the following such as responding to a voluminous demand; meeting high service levels, handling variety and innovative products. But responsiveness can be achieved only with a cost. An efficient supply chain operates by making and delivering a product to the customer at a lower cost.

3. Achieving Strategic Fit: The performance of the supply chain needs to be consistent with the targeted needs of the customer and uncertainty in the supply chain. A firm needs to consider all the functional strategies within the supply chain to achieve a complete strategic fit. A supply chain, which is highly responsive, needs to devote all its functional strategies towards service levels while an efficient supply chain needs to focus its functional strategies towards cost.

Other Issues Affecting Strategic Fit:

Multiple products and customer segments: A majority of the companies manufacture and sell multiple products to multiple customer segments, each one of these with different characteristics. Each of these products and segments has an implied demand uncertainty of their own. While creating a supply chain strategy for each of these, the company needs to balance efficiency and responsiveness provided the portfolio of products, customer segments and sources of supply are known.

Product Life Cycle: When products pass through the product life cycle, there is a change in the characteristics of demand and the needs of the customer segments being catered to. Towards the beginning of the cycle, demand of the product is absolutely uncertain and there is unpredictable supply. Availability of product is a crucial factor in capturing the market, cost being a secondary factor. High implied uncertainty makes responsiveness a key feature of the supply chain.

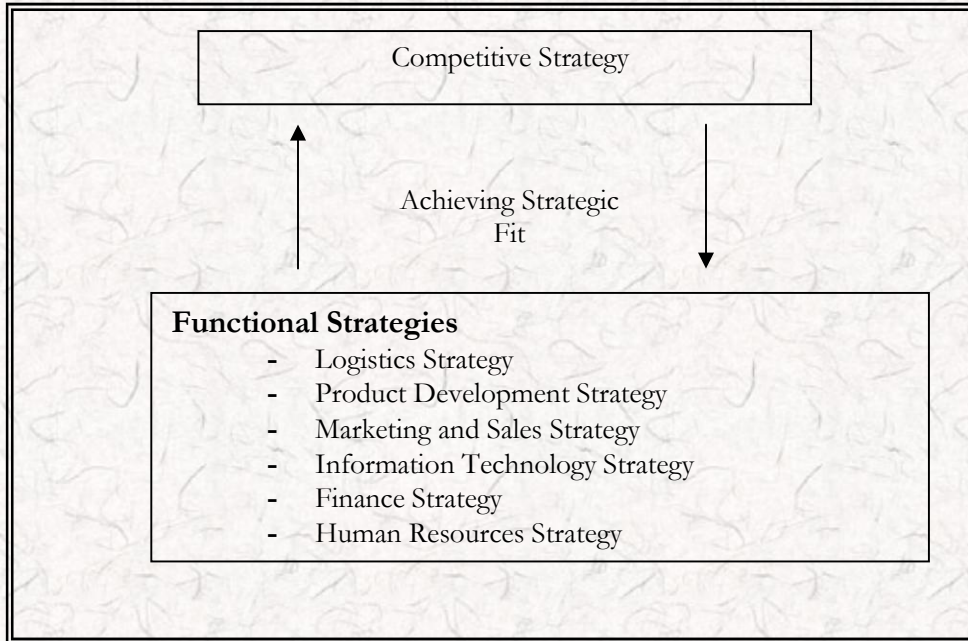
At the later stage of the life cycle, demand becomes more certain and supply is predictable to a certain extent. Increase in competition lowers the margin. The supply chain becomes efficient from responsiveness. Thus the supply chain strategy must keep changing over the product life cycle as demand and supply characteristics change.

Competitive Changes over Time

Finally, changes in competitor behavior are a point of consideration. Competitors can influence the competitive strategy. With more product variety,

supply chain have been forced to develop an ability to supply high variety. With a change in the competitive landscape, firms are forced to alter the competitive strategy. A strategic fit needs to be maintained with a change in the supply chain strategy.

Fig 5: Achieving Fit between Competitive and Functional Strategies



Organizations formulate strategies responding to environmental pressure. Logistics is an important element in these strategies. The apparent trends today are from a logistics strategy approach to a strategic logistics approach. Logistics is being used as a tool to again sustainable strategic advantage more than a tool for developing competitiveness. The success of the strategy depends to a great extent on the framework, where key variables are control tools like organizational culture and structure, and human skills involved in the process.

Today, managers are encouraged to look beyond the traditional view and seek out to develop logistics strategies for exploiting a lot of potential to improve productivity and efficiency to deliver advances in customer service. A large amount of capacity utilization, reduction of inventory and improvements of service through tighter co-operation with suppliers is required.

LOGISTICS AND CUSTOMER SERVICE

Customers are the focus of any activity. The primary reason behind this being that ultimately every product, service or idea finally needs to cater to the customer's requirements.

According to Lalonde Bernard J, "Customer service as a complex of activities involving all areas of the business which combine to deliver and invoice the companies product in a fashion that is perceived as satisfactory by the customer and which advances the companies objective". Customer service, as a concept has many aspects to it. Logistics management has a major role in enhancing the customer satisfaction and also retention and thus creating a lifetime customer value.

In other words, customer service as a combination of activities enables a business firm to add more value to the buyer. It is a key element of the product or service, which is offered to the customer. With good customer service, the existing customers are satisfied and this attracts new customers through word-of-mouth communication. Customer Service is not just a function or an activity. It is a philosophy, and attitude. With so much importance given to customer service, companies are trying to increase the level of customer service and scale up to the expectations of the customer. Unless the products are in the hands of the customer at the time and place of requirement, products do not have any value attached to them. To attain a commendable service level, the firm has to plan a closely integrated logistics strategy.

In today's market, customers are so much demanding, not only in the quality aspect but also with regard to the service aspect. Customers form a few perceptions in relation to the various aspects of customer service like reliability, competency, responsiveness, trustworthiness etc. With the help of these cues, customers evaluate the firm's services and conclude whether they are satisfied or not. Physical distribution plays a major role in delivering customer service.

As there is an increase in the competition, and there is advancement in technology, companies today are faced with the mounting pressure to develop

even more innovative strategies for customer service.

Two key factors that have contributed maximum for the growing importance of customer service as a competitive weapon are the continuous development of customer expectations and the gradual shift of customers from branded products to local unbranded products. A very good example would be the personal computer market, where the buyer finds it difficult to make a difference between a branded version and an unbranded one. The rapidity of technological change and a decreased product life cycle has further developed the importance of customer service.

ELEMENTS OF CUSTOMER SERVICE

Order Delivery Cycle Time:

The general tendency for a manufacturer to look into is the physical delivery of the product when the orders are not delivered on time. So, when orders are not delivered on time and customer complaints are received, the manufacturer looks into the physical delivery of the product to the customer and tries to solve this problem by bringing the product closer to the client. Thus, there is a tremendous increase in the stock-holding points for the manufacturer. When the manufacturer examines this closely, he will realize that physical delivery is not the most time consuming element of the order-delivery cycle time, but there are a host of other activities like transmission of the order, processing the order, etc which also affect the delivery. In fact an activity like the order processing itself consists of a series of activities like the registering the order in supplier's system, allocation of material from work – in – progress, warehousing and distribution centers, packing the materials, dispatch of material etc.

Reliability of inventory:

When a specific item is out of stock, which is interpreted as a loss of sale and if these stocks out conditions take place frequently, these will influence the customer service levels. And would further lead to a loss of credibility for the company.

Consistency and frequency in delivery:

The firm must ensure the maintenance of a same or similar delivery period over a period of time to deliver material to the customer. This means the firm must have the ability to co- ordinate the various logistics arms, and also the efficiency and effectiveness of the entire chain.

Also, the frequency of delivery is an important part of the customer service. Usually, a customer does not prefer to stock huge quantities of particular items, and would prefer smaller quantities in smaller lots. Eventually there is an increase in the transportation cost, but the inventory cost reduces and there is a net effect in the entire supply chain. When there are multiple orders from small clients, there is congestion in the logistics pipeline, and thus this reduces the ability of the company to serve its larger clients more efficiently. Also the logistics costs for small orders are more than the large orders and also they would swallow up the profit on the large orders. To avoid such hassles, and to avoid additional costs, the frequency of delivery and minimum orders are being used as limitations imposed on suppliers as an effort to reduce normal tendency of most clients.

Other factors

Apart from the regular factors there are also others like the transmission of order collection, frequency of visit of salesman to customers, invoicing and collection systems, communications level between customers and suppliers which can be of more importance to certain organizations.

Phases in Customer Service:

a) **Pre transaction phase:** In this phase, the service level and other related activities are defined on a policy level in both qualitative and quantitative measures. It is the creation of a service platform to serve the customer, so as to build up credibility in the market and create a good image amongst the existing and prospective customers. In other words, this refers to those elements, which determine the capability of service before they are provided.

Pre – transaction elements are usually relate to corporate policies or programs, written statements of service policy, adequacy of organizational structure and system flexibility.

The following are the important elements of the pre-transaction phase:

- **Customer Service Policy Statement:** This gives the service standards for the company. For example, company X, a leading automobile spare part manufacturing company, makes a policy commitment to deliver the spare parts to its customers within 48 hours of placement of the order.

- **Accessibility:** This refers to the ease with which customers can contact the firm.

- **Building the organization:** In order to implement the policy derivatives on customer service, the firm must formalize the reporting structure, delegate authority and also allocate responsibility. Also, a proper reward system will motivate employees who are involved in customer service to interface efficiently with the customer.

- **Structuring the service:** The expectations of customers, the industry standards, and the standard of service the firm would like to maintain influence the basic structure of any service. For sustaining the competitive advantage, innovation in service is very much necessary. Innovation adds to the value of the offerings made to customers. Another key aspect to service structure is the delivery. Two important aspects of delivery are place and time.

- **Educating the customer:** This is important because this can reduce the customer complaints on deliveries of products, their operations and maintenance etc., Usually customers are educated through manuals training, seminars workshops etc.

- **System design and flexibility:** While designing the system, care should be taken that all the possible queries, which the customers can ask, must be answered. The system may be manual or fully automatic, similar to e-commerce. Also the adaptability of the service delivery systems to meet a particular customer need is essential.

b) **Transaction phase:** During this phase, the customer service is

associated with the routine tasks, which have to be performed in the logistics supply chain. Those variables directly involved in performance of the logistics functions, for example, availability of product, order cycle time, reliability of delivery etc. The following are the various service elements associated with this phase:

- **Reliability of order fulfillment:** This is a key factor. There needs to be reliability in fulfilling the order within the agreed time frame and also with respect to the quantity and quality of the material ordered.
- **Order convenience:** The ease with which customer can place an order. There are various barriers to this like the paper work required by the supplier, compliance to various procedures, complex payment terms, poor communication network at suppliers end etc.
- **Order postponement:** Sometimes, the customer may postpone an entire order or some parts of it. This means customer has to reschedule his requirements. In some other case, due to availability of a certain product category in the future, the seller can allow the buyer to place the order immediately and he would ship the product when it is available on future dates.
- **Consistency of delivery:** Delivery consistency of repeat orders is important.
- **Product substitute:** There may be some situations in which the product ordered couldn't be shipped due to certain manufacturing or quality problems. In such cases, the seller can offer a substitute product and honor his commitment.

c)**Post transaction phase:** This is a phase where customer satisfaction and building up of a long-term relationship with the customer are involved. It involves commitment of resources to offer the desired level of service. These measure the customer satisfaction on the basis of the expected results. Generally supportive of the product in use, for example: warranty of products, parts and repair service, procedures for complaints of customer and replacements of products. The following:

- **Information of order status:** In B2B transactions and e-commerce, the customer after payment of part value (sometimes full value) of the product as an advance, requests feed back on the status of the shipment on a continuous basis.

- **Customer complaints, claims, and returns:** The seller's responsibility will not be over once the product is dispatched to client. Sometimes, the products damaged during transit, or the product may not be according to the functional requirements of the customer. For this, there must be a policy for product return and this is usually done through reverse logistics system.
- **Product installation, commissioning and technical snags:** This is part of the after sales service, as complex products may sometimes develop technical snags during the warranty period. The after sales department takes care of all these issues.
- **Customer awareness and training:** A key aspect of service element in this phase. For technically complex products, it is necessary for the seller to train or educate the user regarding its operation.

Customer Retention – An Extension of customer service:

It is the totality of the 'offer', which delivers value to the customer. An illustration to highlight this can be a comparison between a product in the warehouse and a product in the hands of the customer. The value addition here is the fact that the product is in the hands of the customer.

According to the 80/20 Pareto (The Italian economist, Pareto) rule, 80 per cent of a company's profits come from 20 per cent of the customers. A further dimension to this would be to say that 80 per cent of the total costs to service would be generated from 20 per cent of the customers.

Thus identification of the real profitability of customers and then develop strategies to develop services that will improve the profitability of all customers is essential.

While 'getting and retaining customers' is the main focus of marketing, in practical terms, organizations put in more effort in getting the customers rather than retaining them. Organizations have to make a conscious effort in understanding how many of the customers they had a year or six months ago are still with them as customers. The retained customers can be more profitable than

the new customers in the cost perspective. Also the word-of-mouth communication happens through existing customers.

The principle of 'Relationship Marketing' is rapidly gaining popularity. A high level of customer satisfaction must be created so that they don't consider any alternative suppliers or offers.

There need to be certain pre-determined standards for controlling the service performance. There are various standards available like order cycle time, order-size constraints, technical support, order convenience, frequency of delivery, claims procedure etc.

The basic purpose of providing services is to deliver value to the customer for the money he is spending for the product. Customer service means all customers must be treated equally and also to extend service to build a fundamental business relationship. Also, a step ahead of offering basic services is to offer zero defect services. Repetitive operations have to be performed without errors by using automated systems.

Another possibility is to provide value added service, which are basically unique and add efficiency and effectiveness to the basic service capabilities of the firm. These value added services have evolved due to forced innovation due to differentiated offering, for growing and surviving in competitive markets.

PROCUREMENT AND OUTSOURCING

Procurement is usually done in order to meet the needs of the manufacturing function or other internal functions for which buying is made. It enables access to external markets, supplier development and relationship management and also relationship to other functions.

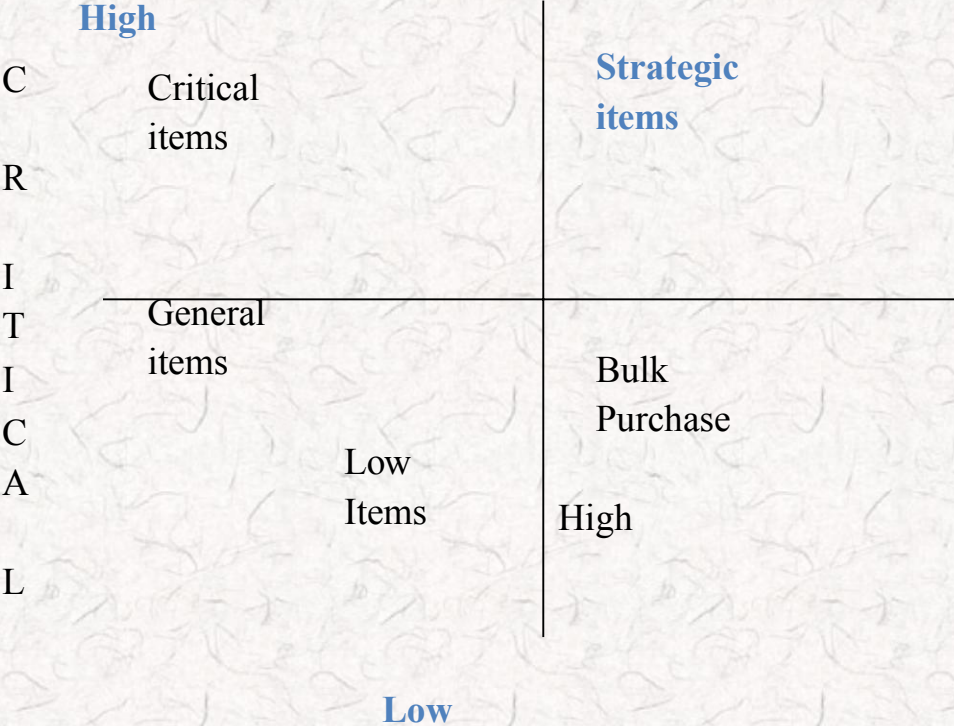
It is the buyers and suppliers who are usually engaged in procurement transactions, which usually begins with the buyer receiving and paying for the order. When designing the procurement process, it is important to consider goods that the process will be used to purchase. The two main categories of purchased

goods are direct material and indirect materials. Direct materials are components like used to make finished goods. Indirect materials are goods used to support the operations of a firm. Indirect materials are components used to make finished goods. Indirect materials are goods used to support the operations of a firm. All procurement processes within a company relate to the purchase of direct and indirect materials.

The procurement process for direct materials should focus on improving coordination and visibility with the supplier. The procurement process for indirect materials should focus on decreasing the transaction cost for each order. The procurement process in both cases should consolidate orders to take advantage of economies of scale and quantity discounts.

In addition to the categorization of materials into direct and indirect, all products purchased may also be categorized on basis of value/cost and how critical they are:

Product Categorization by Value and Criticality



Making or Sourcing Decisions:

1. **Use multifunctional teams:** The strategy, which is developed, must be in collaboration with the various functions like engineering, purchase, manufacturing, engineering etc which will help in identifying the correct drivers in the total cost.

2. **Ensure that there is appropriate co-ordination across regions and business units:** Ensuring that there is enough co-ordination across all the regions and business units, which will allow a firm to maximize economies of scale.

3. **Evaluating the total cost of ownership:** Price reduction need not be the sole objective of an effective sourcing strategy. Total cost of ownership is also influenced by other factors, which have to be identified and used for selecting suppliers. By focusing on the total cost of ownership, also allows a buyer to identify opportunities for having a better collaboration in terms of design, planning, and fulfillment.

4. **Building long-term relationships with key suppliers:** Basically, when buyer and supplier work together, more opportunities for saving will be generated than the two parties working independently. A long-term relationship will encourage the supplier to expand greater effort on the issues that are key from the point of view of the buyer.

Logistics Outsourcing

Today, business organizations across the world are struggling for competitiveness, not only for growth but also for survival alone. The factors responsible for this are liberalized economies of the countries across the world. Moreover, the customers have become more demanding and look for value added services from prospective suppliers, as he wants value for the money he is spending. In such a situation, business organizations across the world have started reviewing their business processes and have realized that cost cutting and differentiation in value delivery are solutions to the current problem

Outsourcing is the transfer of a function previously performed in-house to an outside provider.

Outsourced providers are often referred to as contractors or "third parties." When "outsourced" work is contracted out, the outsourcing business or agency still provides oversight.

Once it is decided to outsource, identifying a short list of partners can be a daunting task. Though many options exist it is essential to sort them. The following can facilitate in sorting them:

1. Identify areas of opportunity:

Gaining the ability to enter new markets without building a costly distribution infrastructure is one great reason to outsource. Establishing a team to look at current and future requirements of a business, and assess the ability to meet those needs. This team should consist of key members of the logistics organization and such other areas as marketing and customer service. These other departments can provide insight into growth projections and shortcomings in existing processes.

2. Assessing the Strengths and Weaknesses

Having an understanding in what the company is good at and not--will enable to find an appropriate partner. Potential partners also have distinct strengths and weaknesses. For example, some logistics partners are better at warehousing than transportation. Others may be great at managing the import process but less skilled in such functional areas as order management.

3. Decide what to outsource

Once a team has identified partnering opportunities, it needs to be determined which functions to cede to the partner. Such functions as warehousing and transportation affect how customers view a company's ability to execute. The success of an outsourcing project

depends, in part, on the company's comfort level with the partner's ability to execute on the company's behalf.

4. Identify a Short List of Providers

Several strategies can help in selecting the right partner. Creating and distributing a request for information that asks potential partners about their capabilities can be done. A list of providers who have experience in the industry can be developed. This process will reduce the number of potential partners quickly. The network infrastructure of the remaining companies also needs to be examined. It may also be helpful to initiate a logistics network optimization effort to identify optimal locations for distribution. The company's geographic needs may require a nationwide network or be more focused on specific regions. Comparing requirements with the capabilities of potential providers and assessing their technological capabilities is essential.

5. Consider the Human Element

Successful outsourcing projects have one element in common: nurturing relationships between key people on both sides. Ensuring not only a fit between corporate cultures but also chemistry between individuals. This is especially important during implementation and ongoing operations.

Outsourcing – A value proposition

Logistics service providers help the business corporation in achieving two goals, i.e., reducing operating cost and increasing revenue. As the service provider organizes the required logistics assets, the investment in owning the logistic assets on the part of the customer is reduced, this in turn allows the firm to invest in more productive activities and get more returns on the remaining assets, enhancing the return on stockholders' investment. Alliances with service providers will free the company's manpower for more productive work, concentrate on their area of core competence, and increase the company's returns. The firm gains in knowledge because of exposure

and acquaintance with the best available practices and technologies used by the service providers. These value propositions justify logistics outsourcing.

Benefits of Logistics Outsourcing:

In logistics, considerable quantities of materials are required to be transported and stored at various locations. Raw materials and components are to be moved over long distances from vendor supply points to production centers. These materials have to be stored for some time as raw materials and later as finished goods. Finished goods need to be transported to the point of consumption. With so much to be done, the critical reasons why companies outsource logistics activities are:

- a. Better focus on core competencies
- b. Cost saving resulting from better management of supply chain
- c. Cross pollination of better available practices
- d. Wider and better geographical coverage by access to specialist world class capabilities
- e. Improved re-engineering benefits
- f. Lesser internal resources

Critical Issues in Logistics Outsourcing:

The following are a few major issues that need to be addressed and examined before deciding on a 3 PL or 4 PL partner:

• **Switching Cost:** By outsourcing logistics services, there is a re-organization of the existing assets of the company. It includes activities like:

- a) Managing the existing assets, by the service provider
- b) Deploying the existing assets on lease to the service provider
- c) Divesting of the existing assets and also switching over fully to the usage of a logistics infrastructure provided by the service provider

• **Degree of control:** The firm, which is outsourcing must be particular about the degree of control over the service provider's

activities, so that they get the service desired by the end user. Having a direct control over the activities of the employees of the service provider is not possible, but service provider should ensure that the information is available on time in order to monitor the activities.

- **Human and electronic interface:** A proper interface between employees of two organizations is important to resolve the issues, which are raised out of misunderstanding or miscommunication. The job of co-coordinators of both organizations is important to formulate the policies and guidelines for a smooth operation of the outsourcing firm and also the service provider.

- **Tuning logistics services to the needs of channel partners:** For an efficient channel management, logistics is a key enabler. Actually, channel and logistics management have to go hand in hand for an efficient as well as effective physical distribution system. The major areas of interface between channel and logistics management is defining the logistics standards as required by the channel members, designing the logistics programmes by standards, implementing the programmes, and also monitoring the programmes.

- **Degree of outsourcing:** The various business organizations resort to logistics outsourcing depends on the following factors like existing logistics infrastructure of the company, company's product portfolio, management t policy for third party involvement.

Logistics service providers basically help the organization achieve two major goals: reducing the operating cost and also increases the revenue. When the service provider organizes the required logistics assets, the customer's investment in owning the logistics assets is reduced and thus the firm can invest in more productive activities and also get more returns on the remaining assets. There is a knowledge gaining activity on the firm's part because of the exposure and acquaintance with the best available practices and techniques utilized by the service providers.

MATERIALS MANAGEMENT

Materials Management is the process of management which co-ordinates, supervises and executes the tasks associated with the flow of

materials to, through, and out of an organization in an integrated fashion. There is maximum utilization, conservation, elimination of wastes, and thus avoidance of unnecessary delays.

Objectives of materials management

- Economical procurement of materials
- Issuance and timely distribution
- Store accounting
- Record keeping
- Stores control
- Looking at new supply sources
- Development of vendors
- Value engineering
- Coordinating smooth flow of materials

Materials Planning

This is a scientific technique of determining in advance, the requirements of raw materials, ancillary parts and components, spares, etc. given by the production programme. The overall management planning and control system is a broad perspective within which material planning functions, and materials budgeting are an exercise translated in money terms for its effective functioning, control as well as execution.

The actual planning starts with the information gathered from the annual sales forecasts, production and general business forecast. Forecasts provide the means for satisfying locational needs, and the general business forecasts provide the means to estimate in advance the trends in prices, wages and costs of other services. While breaking down broad forecasts into specific plans, the next step is to make the price and supply available to confirm to the specific plan. The materials consumption estimation is broken down into specific periods. The quantities are checked against the inventory control procedure, by taking into account the safety stock and lead-time requirements.

Purchasing

Refers to the exchange of goods or services for cash. In other words,

it provides the right materials, at the right price, of right quality and quantity at the right time and, from a right source.

Objectives of purchasing:

- ❖ To maintain a continuous supply of materials to support production as well as the schedule
- ❖ Avoidance of duplication of purchases, wastes, obsolescence and delays
- ❖ Adopting proper standards of quality on the basis of suitability
- ❖ Procurement of materials at the lowest possible cost, at the same time ensuring that it is consistent with quality and service requirements
- ❖ Maintenance of the company's competitive position in the market

The purchasing department has the following functions:

- Selection of suppliers
- Analyzing bids
- Price negotiations
- Issuing purchase orders
- Follow – up actions
- Cost – analysis and study of market conditions
- Maintenance of price catalogues, information library, etc.

Inventory Management and Control Systems

Inventory refers to the stock of materials of any kind stored for future use, mainly in the production process. Inventory is critical to supply chain management because it directly impacts both cost and service. These are the prime ingredients for any logistical system. They also have an influence over the other activity centres of logistics such as customer service, transportation, warehousing, order processing and material handling. At least a certain amount of inventory is inevitably required somewhere in the chain to provide adequate service to the end customer, as demand is mostly uncertain and it takes time to produce and transport product.

It is necessary to have an optimum minimum of inventories, where the inventories are minimum and the chances of stock out also

minimum. A Company achieves this through inventory management.

Inventory has various functions like striking a balance between demand and supply; minimize costs at acceptable inventory levels, providing the desired customer levels, availing quantity discounts etc.

Inventory control is a scientific method of storekeeping and considerably brings down the acquisition and retention costs of materials. It is concerned with maintaining the optimum level of stock and also recording its movement. The need for inventory control arises due to many factors such as increase in the manufacturing units, growing complexity of the modern industry, higher idle time cost of machine and men and a higher degree of stress on liquidity.

There are several inventory control mechanisms such as ABC, VED, SAP, and FSN analysis.

The various inventory models are Economic Order Quantity (EOQ), Materials Requirement Planning, Just – In – Time, and Distribution Requirement Planning.

Stores Management and Operation

The three main storage systems on a broad view are receipts, physical upkeep and maintenance system. The system must be flexible enough to change with the change in the environment as well as production demands.

The key activities of stores are as follows:

- ❖ Receipt of materials, checking the quantity, co – ordination for inspection and the preparing the goods receipt note
- ❖ Accepting the checked materials, preparing rejection notes and thus completion of formalities for payment of bills
- ❖ Taking stock of the accepted materials and storing them in their respective locations
- ❖ Preparing issue vouchers, making actual issues for disposals and accounting for the same
- ❖ Ensuring proper sharing of information with the purchase

departments through regular reports

- ❖ Ensuring the storage place is clean to facilitate handling, movements and observing all safety and security measures.

Having a key role to play in the success of warehousing operations, the storage system should be designed in such a way that it accommodates the inflow of inputs of materials and bought out components from the outside sources, in – process inventories and the outflow of finished goods to the ultimate customers. The design, size and location of a storehouse must be an important part of the management strategy.

Three basic ways of storage are as follows:

- **Fixed Location:** Stock can be found easily without any complex system of recording, but there is a considerable wastage of space.
- **Random Location:** Space is better utilized, but there is a need to keep good and elaborate records for the location of materials.
- **Zoned Location:** Goods of a particular group are stored together in a given area.

Warehousing

An element of strategic importance in the logistics system. A proper decision making regarding warehouse is necessary to ensure effectiveness of marketing. The warehouse acts as an important link in the supply chain of a manufacturing company. It serves as the interface area for production, market, customers and suppliers. Functionality of warehousing covers operations like holding, consolidating break bulk, cross docking, postponement, mixing, packaging, and information handling. Public, private and contract storage are the different types of warehousing operations.

While making the warehouse selection, factors like nature of the product, access, availability, infrastructure, market, regulations and local factors influence.

Warehouse network planning is a complex activity, and whose

decision upon the number is dependent on a number of factors such as product characteristics, objectives of logistics, and availability of resource. Performance parameter ratios such as stock turnover, cost to sales, occupancy rate etc enable in successful management of a warehouse.

Material Handling and Storage Systems

Every operation in materials management involves the raising, lowering or moving an item, which is termed as materials handling. The management of materials handling activities brings about a host of specialty disciplines and responsibilities like mechanical, electrical, hydraulic means and electronic devices.

Basic Principles of Material Handling

- **Best handling is least handling:** As handling does not add any value to the product, it is advisable to keep the handling cost minimum
- **Use of standardized equipment:** The material handling equipment must be chosen in such a manner as to afford flexibility and also be capable of performing multiple standardized operations.
- **Minimum use of specialized equipment's:** Though it is desirable to have specialized equipment, the cost of acquisition, cost of operation, maintenance, repair etc needs to be taken into consideration
- **Payload:** The selection of equipment needs to be made after careful consideration of the cost of moving. The economics can be measured by studying the cost of operation involved in handling in each move.
- **Standardized methods:** When the methods of picking, carrying and settling down are fixed, the wastage in time, labour and equipment will be eliminated.
- **Capacity of equipment:** The capacity needs to be examined carefully, as any over loading causes undue wear, and also results in excessive maintenance.
- **Loading and unloading:** A major portion of Material handling activity is in the loading and unloading and thus this function needs a lot of attention.

Types of material handling equipment's

Pallets: Specially designed platform, which is built to dimension to suit forklift operations. These are designed out of hardwoods, though in some cases, steel pallets may also be used. The supplies are loaded onto the pallets, transported and stored in warehouses.

Forklift trucks: Move loads of master carton horizontally and vertically. The master cartons are stacked upon the pallet, which forms a platform. There are many types of forklift trucks, which are available for handling a variety of products. Though these trucks can be used to load and unload other vehicles too apart from transporting material, they are not economical for long distance horizontal movement due to the high ratio of labour per unit of transfer.

Cranes: These are power – driven, self – propelled units fitted with a boom mounted on a mobile chassis.

Conveyors: These enable straightforward transportation as rehandling before each and every activity is eliminated. Nowadays these are loaded and unloaded automatically. The cost increases with the distance to be traveled and thus it makes them more attractive for high –volume throughputs overshooting the distances.

Elevators: Contains an endless chain or a belt which runs over two – terminal pulleys or sprocket – wheels fixed at different levels on a vertical plane.

Tractors: Used as a substitute for forklift trucks, which are uneconomical for long distance movements.

Towlines: Consist of either in – floor or overhead – mounted drag devices and are used in combination with four – wheel trailers on a continuous power basis.

Carousels: Operates on a different concept than other equipments.

The desired item to the order selector is delivered by using a number of bins mounted on an oval track. The logic behind carousel systems is to reduce walking length/paths and time.

Containerization

Unifies a number of shipments, which then move as individual units. Used to handle bulk commodities as well as merchandise. Benefits include door-to-door shipment, reduced freight costs, higher labour productivity, lesser documentation, reduced warehousing costs, environmental control and better utilization of capital equipment.

Roll On/Roll Off Ferries (RORO)

A lorry is loaded at the manufacturer's workstation driven on to a ship and then driven off at the end of the voyage directly to the consignee, using the ship as the moving bridge.

LASH (Lighters Aboard a Ship)

LASH barges are loaded at Inland River and shallow ports. Then, the barges are towed to ocean port's fleeting areas to meet the LASH mother vessel. On arrival, the mother vessel's crane lifts LASH barges onto the ships. The same crane lifts outbound barges, which are placed in the water, and then towed, to their final destination. LASH cargo does not require transshipment, as the movement from origin to destination with a single bill of lading.

Material Storage Systems

The storage system in a warehouse has a key role to play in the total cost and the efficiency of warehouse operations. The manner in which inventories are handled rather than how they are stored is very important. An efficient usage of material handling equipment is possible if the storage system allows easy access and retrieval of inventory. Selecting a storage system for a specific application depends upon the following factors:

- **Nature of the product:** Products, which have a higher risk of contamination, will have to be isolated from other product groups. For example hazardous chemicals can cause damage to other products.

- **Configuration:** While uniform products may be stored in stacks or in an enclosure, products, which are in odd shapes and sizes, need more space.

- **Perishability:** Perishable products are stacked in such a manner that consignments, which come in first, are distributed first.

- **Product variety:** When a variety of products are stored together, there needs to be segregation for easy identification for storage and retrieval.

Transportation

With the environment becoming very competitive over the past 10 to 15 years, speed has become an unmistakable competitive advantage for firms. Transportation helps an organization to achieve this advantage by ensuring that the right product reaches the right place and at the right time. Achieving this competitive advantage require effective functioning of transportation activities.

There are various modes or transport like road, rail, air, pipeline etc, the transit time being an important consideration. After the mode has been chosen, the logistics manager can choose the type of transport mode, i.e., whether to opt for common carriers, contract carriers, exempt carriers, private carriers or freight forwarders. Transportation management not only deals with settling an efficient transportation activity center but also continuous evaluation and management activity of the transport department.

Most of the businesses arise out of the idea, which is much, more fundamental than mere profit making. The ultimate product or service is of great importance. Materials Management involves much more than cost – reducing techniques and includes cost control, cost reduction, work simplification and value analysis.

The professional materials manager needs to judge the right procedures, tools and techniques before approaching the job. Control of materials function is a primary task. In future, the materials managers have to be well equipped to face the challenge the modern days have posed to them.

TRANSPORTATION

Transportation is basically the movement from one location to another as it makes its way from the beginning of a supply chain to the customer's hands. Transportation not only ensures movement of people but also goods from one place to another thus assisting the economy in the growth of trade and commerce. Being one of the most visible elements in the logistics operations, this function has gained a lot of importance and interest from the logistics perspective.

Transportation plays an important role in each and every supply chain because products are usually not produced and consumed in the same location. The third P in the marketing mix, 'Place' is of importance here. In fact, transportation costs occupy a significant part of the total costs in most supply chains.

With the growth in industry and commerce, transportation facilitates in achieving the social and economic objectives. As times are changing and according to the requirements, the mode of transportation is changing to keep pace with the growth of science and technology across the globe. The degree of sophistication of the various transportation equipment in use varies according to the level of economic condition and growth of any particular region / country. As the economy has transformed from subsistence agriculture to commercial agriculture, and also with the spurt of manufacturing activities, the scope of development of transportation modes has widened. In the olden days, the various modes of transportation like human beings, camels, horses, donkeys, carts and ships were being used. Today, these have paved way to newer modes of transportation to suit the needs of the modern world. In spite of the emergence of sophisticated modes of transportation, older modes continue to serve the society, but in a smaller way.

Transport, being the main component of logistics, plays an important part in all management decisions within the organization, from strategic decisions to everyday operations. Day to day management decisions also relies on transport, as "Just in Time" methods for both production and distribution have become the standard. With the growth

in e-commerce, resulting in more and more home delivery of products, transportation costs have become very significant in retailing. Especially for products sold online, transportation cost is a larger fraction of the total delivery cost.

The appropriate use of transportation is the key to any supply chain's success. For eg: Wal-Mart uses a responsive transportation system to lower overall costs. Wal-Mart uses the technique of aggregation for products leaving for different retail stores on trucks leaving to a supplier. At distribution centers (DCs), Wal-Mart uses cross – docking, where product is exchanged between trucks such that each truck going to a retail store has products from different suppliers.

Basically, transportation serves two main purpose:

➤ **Product movement:** The primary function of transportation is the forward and backward movement of the product in the value chain. It is necessary that product be moved only when they are necessary and there is an enhancement in the product value. This is because transportation utilizes the financial resources for expenditure like driver's labor, operation cost of the vehicle, and other administrative expenditure. The environmental resources are utilized both directly and indirectly. An example of direct usage can be the fuel and oil costs and an indirect usage can be the environmental expense caused by air, noise pollution in the environment.

➤ **Product Storage:** Temporary storage for in – transit goods is expensive. But in circumstances where the warehouse space is limited, utilizing the transportation vehicles may be a better option. One option is where the product is loaded on the vehicle and then it takes a round about or indirect route to its destination. The vehicle can be used as a temporary storage option where the origin or destination warehouse has limited storage capacity. Another option is to take a diversion. This is done when there is an alteration in the shipment destination while the delivery is in transit. While, telephone was used for diversion strategies originally, today satellite communication handles this task efficiently.

A transportation strategy to be successful, should recognize the following:

- **Customer requirements.** The supply chain involves continuous and efficient movement of product from vendor to manufacturer to customer. Thus the transportation program must reflect and meet the customer's needs. The vital aspects are time and service.

- **Timely movement of shipments.** Customers demand their shipments be delivered as they require - on the date needed, by the carrier preferred, both shipped complete and delivered complete and in good order. A transportation program, which can do this, can provide customer satisfaction and give a competitive edge.

- **Mode selection.** Selecting the mode of transport is an important consideration. The transit time has to be considered while doing so.

- **Carrier relationships.** Volume catches the attention of the carrier or forwarder. The carrier attention with volume creates a competitive interest in a business. Another side to this attention is that the business cannot be divided among many carriers. The chief reason being that responsive transportation can create a competitive advantage and this can be done only with a focused relationship with a carrier.

- **Measuring/benchmarking.** There is a necessity to know about the performance of the strategy as well as the carriers. Measuring and benchmarking can be of assistance to this. Measuring means comparing performance versus standards. Benchmarking means learning what other companies do--the best practices. Benchmark needs to be done with a company in the same industry.

- **Flexibility.** As change is happening everywhere, the strategy has to be ready to change. There is a constant change in the customers, products, business, suppliers and the overall corporate emphasis, which can dramatically change the company's strategy. It is important to recognize that change will occur. Just as times are changing, the strategies will also keep changing. A company must adapt itself to such an environment.

Participants in the Transportation Decisions:

Primarily there are five key parties in transportation decisions. Each of these parties has a role in the transportation environment.

Shipper: The party, which requires the movement of the product between the two points in the chain. The shipper's objective is to fulfill the customer order with responsiveness but at the minimum cost.

Consignee: The destination party or receiver. The consignee also has the similar objective of receiving the goods at a lowest cost and with maximum responsiveness.

Carrier: The party, which moves or transports the product with an objective of maximizing the revenue at the least cost. Carriers have a tendency charge a higher rate and reduce their costs by trying to consolidate various individual loads into economical loads and thus would seek flexibility in pick up and delivery with the client. This motive is in conflict with the manufacturer's objective of reducing total transportation costs.

Government: The Government has a high interest level in the transactions because a stable and efficient transportation environment is necessary to sustain economic growth. To facilitate this, carriers must offer competitive services while operating profitably.

Public: The ultimate determinant of transportation by desiring goods at reasonable prices. Their concerns are related with the accessibility, expenditure, effectiveness as well as the safety and environmental standards.

Factors affecting carrier decisions:

- **Vehicle related cost:** Cost incurred by the carrier for purchase or lease of the vehicle to transport goods

- **Fixed operating cost:** Costs which can be associated with the airport, terminals and labour which are incurred whether vehicles are in operation or not.

- **Quantity – related costs:** Usually variable in nature except in circumstances where labour for loading and unloading is fixed.
- **Trip – related cost:** Includes the price of labour and fuel incurred for each trip independent of the quantity transported.
- **Overhead cost:** Any cost incurred for planning, scheduling a transportation network as well as the information technology costs incurred.
- **Factors affecting shippers decision:**
 - **Transportation Cost:** Total amount paid to various carriers for transporting products to customers.
 - **Inventory Cost:** Cost of holding inventory incurred by the shipper's supply chain network.
 - **Facility cost:** Cost of various facilities in the shipper's supply chain network.
 - **Processing cost:** Cost of loading / unloading orders and the other processing costs associated with transportation.
 - **Service level cost:** Cost of not being able to meet delivery commitments. This cost to be considered in strategic, planning and operational decisions.

Modes of transportation

- **Air**

This is the least hazardous in nature when compared to all other modes of transport. Air transport is expensive, and is very suitable for products having high value or extreme perishability. The prohibitive aspect of this mode is its high cost. From the operator's point of view, though the fixed cost is low compared to other modes like rail, water and pipeline, variable costs are very high as a result of fuel, maintenance, and the labour for crew.

Though the cargo handled by air is growing at a fast pace, it is still not important when compared to the cargo handled by other modes of transportation. Air, by whatever type of airline, is generally considered a premium means of transportation. The best justification for the high cost can be an emergency situation, which necessitates the service of air transport. Technological developments like new cargo-handling equipment at air terminals and the use of larger containers have been beneficial.

- **Sea / Water**

The oldest mode of transportation. Water transport, due to its nature, is limited to certain areas. It is the slowest modes of all the modes and a lot of delays also occur at ports and terminals. Water transport is generally suited for carrying very large loads at low cost. Usually the shipping fleet across the globe comprises of tankers, dry bulk carriers, container ships and special vessels. Some of the problems encountered with this mode are rough weather characterized by storms, ice, high waves etc in – transit. Also there is a disadvantage of a limited range of operation and speed.

- **Railways**

Generally capable of transporting large quantities of freight over long distances very economically. These are the principal carriers of men and material, and play a major role in the country's trade and commerce activities. It is the main source of supply of essential commodities, which are transported across the length and breadth of the country. Road traffic is relieved to a certain extent and also air pollution caused by trucks can be eliminated. The railways also charge competitive freight rates.

- **Roadways**

Most popular mode of transport. With the manifold growth in industrial and agricultural activities, this mode has achieved a lot of importance. The various advantages of this mode are flexibility, faster turnaround, lesser risk of delays or strikes, door-to-door service, reach to remote places and through movement from consignor to consignee.

- **Pipeline**

In India, pipelines are used for oil transportation by all public and private sector petroleum refineries. They are also utilized for transporting manufacturing chemicals, dry bulk materials like cement and flour by hydraulic suspension, and also sewage and water within cities and municipalities. This mode is unique in comparison with the other modes in the sense that they operate throughout the day, with limited time for changeover and maintenance. The basic advantage here is that they reduce the operational costs, though the initial investment is high. Also these are eco-friendly. The disadvantage of this being its lack of flexibility where only limited commodities in the form of gas, liquid or slurry can be transported.

Transport Economics: The factors which influence transport economics:

1. **Distance:** This is a major influence on the cost as it is a direct contributor to variable costs like labour, fuel, and maintenance. The tapering principle, where the cost curve increases at a decreasing rate as a result of the distance function is relevant here.

2. **Volume:** It is viable to consolidate smaller loads into larger loads to take advantage of the economies of scale.

3. **Density:** The product density or weight is discussed here, where the product density can be increased within a truckload for better capacity utilization.

4. **Stowability:** This refers to the product dimensions and how they affect the vehicle space utilization. It is easier to stow standard shaped items than odd – shaped items, which occupy more space.

5. **Handling:** While loading or unloading trucks, railcars, or ships, there is a necessity for special handling equipments like trolleys, forklift trucks, conveyors etc to load or unload trucks, railcars or ships.

6. **Liability:** These are product characteristics, which basically affect the risk of damage and the resulting incidence of claims.

7. **Market Factors:** Factors like lane volume and balance. A transportation lane refers to the movements between the points of origin and destination. When a vehicle is sent from the point of origin, it may return empty-handed or may bring back load. Due to the imbalances in demand in both the manufacturing and consumption locations, a balanced (volume is equal in both directions) move is nearly impossible.

It is the responsibility of the logistics managers to understand the influence these factors have on the transportation cost and minimize such expense.

Documents in Transport Decision Making:

➤ **Bill of Lading:** A computerized, basic document, which is, utilized in purchasing transport services. This serves as a receipt of the commodities and quantities shipped. It also serves as the basis for damage claims in case of loss, damage, delay etc. The terms and conditions of the carrier liability and gives in documentation form the responsibility for all possible causes of loss or damages.

➤ **Freight Bill:** This is how the carrier charges for the transportation services he performs. The information contained in the bill of lading is utilized for preparation of this.

➤ **Shipping Manifest:** This document is used when multiple shipments are placed on a single vehicle. The document provides a comprehensive list, which informs the entire load content, making it unnecessary to view individual bills of lading as all details relating to the stops, bills of lading, weight, case count etc for each shipment are listed in this manifest.

Transportation Management

Factors like globalization and technological improvements in the past years have changed the logistician's view of transportation. The logistics manager is expected to be more pro- active in identifying the desirable combination of carrier services and also the suitable pricing structures in order to meet the objectives of the firm. Transportation, when managed independently of other value added logistics operations often represents the weaker elements. Transportation decisions, which are made in co-operation with, related functions remove this weakness.

The two main fundamental principles in transportation management and operations are **economy of scale** and **economy of distance**. Economy of scale means the transportation cost per unit of weight decreases with an increase in the size of shipment. Economy of distance implies that there is a decrease in the transportation cost per unit with an increase in the distance. These principles are essential while evaluating alternative transportation strategies or operating practices.

Thus transportation management is an important activity for the organization which involves the following process:

a) **Analysis and Understanding of environment:** There is a necessity to understand the transport environment, to make sound transport decisions. The environment consists of the five parties – shipper, consignee, carrier, government and public.

b) **Clarity in objectives:** The order of preference in

performance of transportation functions has to be decided. The manufacturer must determine his objectives at a level at which service can be performed and the levels at which customers expect, the amount of trade

– offs that can be expected. Such setting of objectives can enable the company to choose an efficient mode of transport.

c) **Selecting mode of transportation:** A choice between single mode and intermodal transport has to be made to achieve objectives efficiently.

d) **In source or outsource:** After selecting the mode, the company must decide whether to in source the activity or outsource to third parties. According to the mode selected, the company must perform the functions.

e) **Evaluation and Control:** The efficiency of the transport system can be ascertained by measuring the customer satisfaction.

Modern transportation has undergone a sea – change with a change in the point of view of an operational function to a strategic one. In the new era, transportation requires a constant search for methods to ensure that the customers order will arrive at their doorstep when required, in the right quantities and in undamaged condition. Additionally, transportation has to continually improve its flexibility and ability to respond to the market place, at a short notice, while providing better avenues for communication and also cost reduction. This makes transportation a continuous perennial activity rather than a one – time exercise.

WAREHOUSING AND DISTRIBUTION

Warehousing is a support function for logistics and plays an important role in attaining the overall objectives of an organization's supply chain system. Warehouse is a place where inventory is stored. It is basically an area of interface for production, market, customers as well as suppliers. The performance of warehouse is often judged by its productivity and its cost performance.

In today's highly interconnected and interdependent supply chain networks, successful warehouse management involves a thorough

understanding of how the basic warehouse management functions impact the supply chain. The warehouse, being a critical link in the supply chain, serves as the source of order status information for the customers, provides inventory visibility for the supply chain partners and for the enterprise as a whole.

While focusing on warehouse objectives of improving profit through reducing cost and enhancing customer service level, the following have to be taken into consideration:

- Utilizing the storage space to the maximum
- Higher productivity of labour
- Reduced material handling
- Reduced order filling time
- Maximum utilization of assets
- Reduced operating cost

Functions within the warehouse:

➤ **Receiving:** Collection of activities involved in proper receipt of all materials coming into the warehouse, providing the assurance that the quantity as well as quality is as per ordered, and distributing the materials to storage or to the other organizational functions which require them.

➤ **Pre packing:** This is done in the case when products are received in bulk from a supplier and repacked into single consignments. The entire merchandise, which is received, may be processed at once, or a portion may be held in bulk for processing later.

➤ **Storage:** Putting away the inventory received to complement order picking. It can be explained as the physical holding of merchandise while it awaits demand. Method of storage depends on the size and the quantity of the items in inventory and the handling characteristics of the product or its container.

➤ **Order picking:** Physical selection of the products from their locations after receiving the customer orders. In other words, process by

which items are removed from storage in order to cater to a specific demand. A document named Pick List containing details like sales order number, shipment details, item details, quantity etc facilitates order picking.

➤ **Packaging and / or pricing:** This is basically optional which may be done after the picking process.

➤ **Sortation and / or accumulation:** When a warehouse stores multiple products, this activity is done.

➤ **Packing and shipping:** Performance of tasks related to dispatching an order. This includes the following tasks like checking whether order is complete or not, packing material in an appropriate shipping container, preparation of shipping documents, including packing list, address label, and the bill of lading, weighing the shipments to determine shipping charges, accumulate orders by outbound carrier, loading trucks etc.

➤ **Traffic management:** Choosing the best mode of transportation for inflow and outflow.

Benefits of warehousing:

🏗️ **Economic:** Refers to the overall reduction in the logistical costs by utilizing one of more benefits. The major benefits are as follows:

a) Consolidation: Material from a number of manufacturing plants destined to a particular customer on a single shipment are consolidated and received by the consolidating warehouse which results in reduced transportation cost. The advantage is that it combines the flow of logistics from several small shipments to a specific market area. Several firms may also join together and use this consolidation service, which will benefit each shipper individually.

b) Bulk Breaking: Various combined customer orders are received from a manufacturer and shipped to individual customers. A

break bulk warehouse sorts or splits individual orders and delivers them locally.

c) Cross Docking: This facility is similar to bulk breaking but involves multiple manufacturers.

Truckloads of products arrive from multiple manufacturers, which are sorted customer wise. Then they are loaded into the truck destined for the appropriate customers. This system is widely used by retailers.

d) Postponement: A warehouse with facilities for light manufacturing activities like packaging and labeling can enable postponement of final production until the exact demand is known. The benefit here is a reduced level of risk and lower inventory as the final labeling and processing activity is done only on knowledge of the actual demand and thus the basic product is used for a variety of labeling and packing configuration.

e) Stock Piling: Stocks piled in the warehouse act as buffer inventory which help to tide over situations of material constraints and customer demands.

Service:

Service benefits may not reduce costs and the justification for a warehouse based on service is an increase in the market share, revenue and thus an increase in margin. The benefits are as follows:

a) Spot Stocking: A selected amount of a firm's product line is placed in a warehouse to fulfill customer orders during a key period of maximum seasonal sales. Features include a narrow product assortment and stocks placed in many small warehouses catering to specific markets over a limited time horizon.

b) Assortment: Various product combinations are stocked in an assortment warehouse in anticipation of customer orders. This is similar to spot stocking except that this has a broader product line, is limited to a few strategic locations and functions throughout the year.

c) Mixing: Similar to the bulk breaking process with an

exception that various different manufacturer shipments are involved. Truckloads of products are shipped from manufacturing plants to warehouses and upon arrival at mixing warehouses these are unloaded and the desired combination of specific product for a particular customer or market is selected. Inventory is sorted to suit specific customer requirements.

d) Support in production: Production support warehouses provide a constant supply of components and materials for assembly units. Such a warehouse supports production by supplying components or sub – assemblies in a regular and timely manner.

Warehousing Alternatives:

The various warehouse strategies are as follows

1. Private warehouse:

Refers to having the entire facility under the financial and administrative control of the firm,

i.e. the firm owns the product and also operates the warehouse.

The actual facility can be either owned or can be taken on lease, for a short period. The major benefits of this warehouse are

- **Control**: The enterprise has complete decision-making authority over all activities in the facility thus enabling integration of warehousing operations with other internal processes of the firm.
- **Flexibility**: Operation policies and procedures can be formulated and altered to suit individual needs.
- **Cost**: The basic objective of this warehouse is not profit – making, thus the cost aspects are less compared to public warehouses.
- **Marketing**: An intangible benefit is a marketing advantage over other firms due to the firm’s name attached with the warehouse thus enhancing customer perception.

2. Public Warehouse:

These are similar to private carriers in transportation service. Services are provided to others by firms that have warehousing space,

storage facility, and material handling equipment for their own use and are used a lot in logistical systems. These are designed to handle the most general packaged products or commodities, which would not require specialized storage or handling arrangement. The products usually stored are food grains, paper rolls, bulk material (cement, fertilizers), furniture, chemicals etc.

A major advantage of a public warehouse is that they provide financial flexibility and economies of scale. More operating and management expertise is provided, as warehousing is the core business for such firms. Variable costs are lower compared to private facilities. With more customers and higher volumes, the fixed costs are spread over resulting in economies of scale. Public warehouses are of great use to firms, which are newly formed, and have the desire of expanding their distribution network and thus needn't invest in developing a private warehouse. They can alternatively hire a space in a public warehouse or channel their funds into other activities, which generate more revenue. This would improve their performance and thus increase the return on investment. Location flexibility is also available through public warehouses. Firms can also close storage facilities in one market and open at other places without any financial losses.

3. Contract Warehouse:

Combine features of both public and private warehouses. The risk is shared and there is a long – term relationship that will result in lower costs. Benefits include economies of scale, flexibility, information, and equipment sharing among clients.

Other types of warehouse

- **General Merchandise warehouses:** Deal in all commodities except specialized or commodity items. These can either be public or private.
- **Refrigerated/Cold Storage warehouses:** Used for storing perishable items, which are kept at low temperatures to preserve quality. These are expensive and a variation of this type of warehouse is known as the controlled temperature warehouse, which is lesser expensive and is used for storing fruits, milk etc.
- **Bonded warehouses:** A special type of warehouse whereby distributors can produce, transfer and store products without paying

excise taxes and duties on them. The government licenses these to various parties.

- **In – bond warehouses:** Bring in imported merchandise, store as well as display the merchandise in shops, which sell for export or sell merchandise, which is directly exported.
- **Special commodity warehouses:** These are specialized and handle a specific or a bulk commodity.
- **Combination warehouses:** Warehouses, which combine all the above facilities.

Nature of warehousing costs:

The warehousing costs can be either

- a) Fixed costs: Incurred irrespective of how much or how little throughput is experienced.
- b) Variable costs: Vary with the throughput.

Warehousing costs are associated with the following:

Association	Costs
Land	Rent
Building	Rent & Rates
Storage and material handling equipment	Maintenance
Labour	Pickers, Packers
Supervision	Warehouse Management
Services	Electricity, Telephone

Decisions in planning the warehouse:

Warehouse Site Selection:

Cost and service are the key considerations here. The other supplementary factors are:

1. **Nature of product:** This influences the number and location of warehouses. For perishable commodities, proximity to the consumption centers is essential. It is preferable to have limited number of warehouses, which have delivery limitation in terms of distances and

geographical reach.

2.Infrastructure: The efficiency of the warehouse operations improves with the availability of suitable infrastructure like roads, utilities (water, electricity, communication etc) and labour, the unavailability of which will increase the transportation cost. For example, for cold storage, availability of electricity is a major influencing factor.

3.Access: Again, when there the warehouse is located at a place where there is little accessibility, the transportation costs will escalate.

4.Availability: The availability of warehouse space is an issue, especially in the metros. In the case of non – availability, alternative location at the outskirts will be the alternative, but which will increase the transportation costs.

5.Market: To offer better service to customers, warehouses need to locate in proximity to consumption centers so that frequent deliveries by customers in small quantities can be organized at a limited time.

6.Regulations and local taxes: Government regulations guide the site selection for certain hazardous chemicals, explosives etc. In such cases, there are limited options for site selection. Also the regional sales tax and octroi charges influence the site selection. With a lack of uniformity in the sales tax structure across the States, warehouses will be planned to make maximum utilization of this.

7.Product – Mix Consideration:

The product mix is directly related to the design and operation of a warehouse. Considerations such as product sales, demand, weight, bulk, packaging etc needs to be made.

Future Expansion:

Some consideration about the estimated requirements for future operations in case of expansion must be made. A five – to – ten-year

expansion plan must be considered while establishing the warehouse facilities so that normal operations are not disturbed during expansion.

Selecting the material handling system:

As movement is the primary function within a warehouse, it is necessary to select the appropriate material handling system.

Warehouse layout:

The warehouse layout needs to fit specific needs. Considerations to be made while planning the layout and operation are:

- Deciding on the receiving and shipping locations
- Identify minimum paths for movement of equipment and people, for speedy storage and retrieval
- Classifying items as slow, medium and fast and then allocating separate area for these
- Placing the material handling systems at their assigned location

Determination of warehouse space and design:

a) A sales forecast or total tonnage expected is used to estimate the final size of the warehouse required. A number of techniques like linear programming, simulation etc are used to determine warehouse size.

b) Warehouse designing is a specialty planning activity usually done by an architect. Specifications like size of warehouse, lay – out, path of material – handling equipment, are required. The warehouse must be designed for maximum utilization of available space and material handling equipments.

Factors to be considered while initiating warehouse operations:

- While stocking the warehouse, a complete list of inventory needs to be obtained. Quantities of individual stock keeping units to be determined while planning the warehouse.
- Hiring and training of personnel is an important issue. There

must be clarity about the role played by personnel hired for specific requirements and each group of employees needs to be given special training.

- The management must ensure that work procedures are developed and also understood by personnel.

- Protection against theft of merchandise must be ensured. Adequate security measures to be undertaken by allowing only authorized personnel to enter the premises, where computerized inventory control and processing systems are of use.

- Product deterioration arises from careless storage and non – compatibility among products stored in the same facility. Careless handling by warehouse employees is a mater of concern.

- When firms handle a large number of products it is economical to utilize computers for billing and inventory control. The computer inventory needs to be compared with the physical stock

- Accident prevention is an important consideration.

Warehouse Management Systems

This is a software solution to control movement and storage of materials within a warehouse, transportation management, order management, and a complete accounting system. The following activities are managed through a WMS:

- 1.**Inbound:** Functions like addition of a new purchase order, palletisation, receipt of goods, putting away received goods etc

- 2.**Inventory Management:** Transferring inventory, holding and adjusting inventory, awareness of inventory balances etc

- 3.**Outbound:** Tasks such as creating an order of shipment, shipping multiple orders, allocation of orders, shipping order status etc

Warehouse being the interface area for production, market, customers and suppliers performs a number of functions in the supply chain. In many logistical system designs, the role of warehouse is viewed as a switching facility when contrasted to a storage facility. While the role of a traditional warehouse was to maintain a supply of goods to protect any uncertainty, the contemporary warehousing offers

a host of much other value – added services. Effective warehousing has become the order of the day.

PACKAGING AND MATERIALS HANDLING

Packaging is a marketing tool related to the performance of marketing function. The basic objective behind packaging is to prevent damage to the product during storage, transportation and handling, when it is in movement for distribution in the market. It forms an important cost element of goods and represents 5 – 30 per cent of the value of goods, depending on the type of product. It has a significant impact on the cost and productivity of the logistical system. The main cost elements are the purchase of packaging materials, introducing automated or manual packing operations, and further the need for disposal of material. A systems approach is necessary to manage packaging. Any central planning logic, which is designed to control total distribution costs, must keep in mind the costs related to packaging.

There are two main types of packaging: Consumer and logistical/industrial packaging

- **Consumer packaging**

This packaging is done with a marketing emphasis. The packaging design focuses on aspects like customer convenience, market appeal, shelf utilization, product protection etc. The proper package design should have its base on a complete assessment of the logistical packaging requirements, which requires a complete evaluation of how all the components in the logistical system influence packaging.

- **Industrial packaging**

The concept of containerization or unitization where the individual products are grouped into carton, bags, bins, or barrels for handling efficiency. The master cartons are grouped into larger units for handling,

the combination that is referred to as containerization or unitization. Logistical packaging is designed to meet the distribution objectives.

Determining the degree of protection required to cope with anticipated physical and element environments is an important issue in package designing.

Functions of packaging:

- **Damage Protection**

The master carton protects products from damage while movement and storage, in addition to being a restraint to pilferage. The cost of protection increases according to the degree of value and fragility of the product. The vulnerability of damage is related to the environment in which it is stored and transported. The physical environment relates to the logistical system. When the firm has more control over its physical environment, lesser the packing precautions are required. An example can be the utilization of privately owned transportation, which will move the product in a controlled environment. But if common carriers are used for transportations, more precaution needs to be exercised as the product may be transported in a variety of vehicles and there is lesser control. Certain situations in which the product will cause in – transit damage to the product are vibration, compression, puncture and impact. Securing the package with a tight strap or to load the carrier in a right pattern can reduce this.

The outside elements also influence the packaging. There are certain factors like temperature, humidity etc which are beyond the control of logistical management. It has to be determined in advance how the contents of the packing will react to each of these factors and design the packing accordingly.

- **Utility/Convenience**

This refers to how packaging can affect the logistical productivity and efficiency. When products are packed in certain configurations and order quantities, it increases the logistical output. Packaging thus

provides convenience of handling and storing. Also the concept of unitization is very significant here. Unitization refers to the process of grouping the master cartons physically into one restrained load for easier material handling and transportation.

- **Communication**

Packaging plays a significant role by assisting all channel members to identify the contents of the package. An attractive surface decoration can serve as a display item. Information such as the manufacturer's name, quantity, code number etc is mentioned on the package. The labels must be visible from reasonable distances. Handling and damage instructions are provided on the package. Especially for hazardous products such as chemicals such instructions can be of great assistance. Tracking is one more feature of logistical packaging. The consignment moves along multiple storage locations, transportation systems at various points with other consignments. For a well – controlled material handling system to track the product as it is received, sorted or shipped, packaging identifiable through a bar code is essential.

Packaging Cost:

The packaging cost depends upon factors like nature of product, physical dimensions, value, regulations etc. Delivery of the product at minimum overall packaging cost is essential. These are the costs included in packaging.

➤ **Unit Package Cost:** Basic material or container price. This will depend upon factors like volume, freight charges, and methods of over packing and development costs. An increase in the volume attracts lesser price.

➤ **Operation Cost:** The packaging equipment must have the strength and ability to withstand the stress of high speed filling equipment, in order to make the production process cost effective and efficient.

➤ **Warehousing:** The packed product is shipped to the user's warehouse for storage before shipment. Shape of the package and strength of the package are the factors of key importance here.

➤ **Distribution:** Moving the product from the user's warehouse involve several forms of transport. The costs of these are referred to as transport costs, which are governed either by the weight of the finished pack or the volume. They may also depend upon the shipping distance and value of the item being handled.

Types of packaging material

❖ **Shrink – Wrapping:** Form of packing where a pre - stretched plastic sheet or bag is placed over platform and master cartons. Heating locks the cartons. Advantages of this packaging are adaptability to various shipment sizes, low cost, and the ease of identifying contents and damage. A major disadvantage is disposal of waste material.

❖ **Stretch – Wrapping:** The unit load is wrapped with a tightly drawn external plastic material. Then it is rotated on a turntable to place the stack under tension. Platform is wrapped directly into the unit load.

❖ **Aluminium:** The main area of usage is foil. These are used as a replacement for beverage cans, stackability being the main advantage. Metal tubes and moulded trays are the other two forms. While metal tubes are used in pharmaceuticals, crafts, and cosmetics, moulded trays are used in the food industry.

❖ **High – Density Plastic Boxes:** Containers with lids similar to those purchased for home storage applications. These are rigid and sturdy, thus ensuring high protection.

❖ **Plastic Strapping:** A load is unitized so that many smaller containers can be handled as a single larger container. The strapping, which is usually about one to one and a half inch wide, is bound tightly around the containers.

❖ **Plastic Foam Dunnage:** Used to pack irregular shaped products into standard shaped boxes. These are light and do not increase the transportation cost and also provide substantial protection. A major issue here is the environmental problems related to disposal.

❖ **Film – Based Packaging:** This utilizes flexible materials instead of rigid packaging like corrugated fibreboard boxes. Corrugated fibreboard cases represent an important part of the paper and board industry, in terms of both tonnage and value. Corrugated fibreboards are commonly used for television, washing machines, refrigerators, cigarettes, personal care products, etc among a host of other products. The advantages here include automatic operation, reduced labour costs of manually boxing products.

❖ **Blanket – Wrapping:** A traditional form of packing, which is generally used in household packing. This packing is most suitable for irregular shaped products like chairs, tables and other furniture. Generally household goods carriers use these services.

❖ **Returnable Containers:** These are mostly re – usable packages like steel or plastic and sometimes corrugated fibreboard boxes. These are used by automobile manufacturers to pack inter - plant shipment of body parts.

❖ **Intermediate Bulk Containers:** Used for granular and liquid product shipment quantities smaller than tank cars but larger than bags or drums. Resin pallets, food ingredients, and adhesives are packed in these containers.

❖ **Plastic Pallets:** The rapid growth in the utilization of plastic in packaging is noticeable. These are lightweight and recyclable.

❖ **Pallet Pools:** Third – party supplies maintain and lease high – quality pallets all through the country. Palletization has contributed immensely to logistical productivity. Advantages include reduced damage, lesser costs of disposal, and improved use of pallet resources. The disadvantage is the costly investment in pallets.

❖ **Refrigerated Pallets:** A self – contained refrigerated shipping unit, which can be placed inside a regular dry van as a Less Than Truck Load shipment. This integrates the demands of environment and unitization.

Unitization

Products are grouped together in cartons, bags and barrels for handling efficiency. The containers used to group individual products are called master cartons. When the master cartons are grouped together, it is called unitization. The concept of Unitization has its base upon the theory that all shippers must pack their cargo in such a manner that it is moved and handled entirely by mechanical equipment, like lifts and cranes, all through the distribution network. It enables faster loading and unloading by transportation equipment, results in more efficient distribution center operations and also a reduced level of pilferage.

According to the unit load concept:

- Small, heavy and expensive items are enclosed in containers with double or triple wall to avoid pilferage and damage.
- The boxes or containers are secured to pallets with shrink-wrap or steel strapping.
- Large items can be directly secured to pallets, with assurance that they are completely protected from damage.

Palletisation for Unitization

Pallets enable unifying dry cargo loads. Basically, it is a flat tray upon which a lot of articles can be placed, and can be handled as one article. For securing the articles to the pallets, metal strapping, plastic films or more elaborate forms of devices are used.

Benefits of palletisation include reduction in time required to load or unload the products from the vehicle, and better utilization of warehouse space. Other benefits include assembly of individual packages according to a single customer order, easy handling of pallets for road as well as rail vehicles, and reduction in the rate of damage in

transit, and reduced delivery time.

A drawback can be the lack of uniformity in pallets.

Containerization:

Container refers to physical equipment, which is used for unifying a number of shipments, which then move as individual units. These are used to handle bulk commodities as well as merchandise and are especially adaptable for inter-modal transport.

Benefits of containerization

- Reduced door to door shipment
- Reduced freight costs
- Reduced damage and pilferage, thus eliminating intermediate handling of packages
- Higher productivity of labour
- Lesser documentation
- Reduced warehousing and inventory costs
- Better utilization of capital equipment through uniformity of cargo
- Environmental control

Drawbacks of containerization

- All cargo need not necessarily suite containerization
- Heavy capital investment in equipment required
- Difficult to thrust liability as there are several carriers and also no intermediate inspection
- Proper equipment to handle containers may not be available
- System not comfortable with air freight

Movement of containers:

While moving the container, the consignor is faced with several choices such as the follows:

- **By Road:** This is done by using equipments like direct lifting cranes, forklift trucks, portal frames and other self-loading devices.

- **By Rail:** For long distances, road may prove uneconomic and thus the rail transport can be used to transfer containers.
- **By port terminals:** The container finally arrives at the port to be shipped whether road or rail transport is used to transfer containers.
- **By ships:** To secure benefits of rapid loading and unloading and thus to ensure efficient utilization of space, containers are built or customized. Wide hatches give complete access to holds in these ships.

Designing a Package:

Designing the package involves the following steps:

- **Briefing the designer:** The person who is designing the package needs to understand what is in the mind of the manufacturer. A complete marketing analysis may be given to the designer or some specific objectives may be given. The designer needs to list his views about the problem.
- **Gathering information about the package:** Meeting the people involved in the production process, various channel members like sales personnel, dealers etc. has to be done. Facts about the packaging materials need to be gathered.
- **Writing the Design Platform:** The designer gives a report giving details of what he has understood and what must be done to achieve the objectives he has laid down. The product and packaging engineers need to work together.
- **Creative Phase:** Here, the creative people are involved. They are given a precise definition of the problem and a set of objectives to work upon. They are required to find visual solutions to the problems stated within the boundaries outlined in the platform of design.
- **Consulting Suppliers:** Then, the appropriate suppliers of materials need to be called in. The ideas are synchronized with reality.

The ideas need to be practical and also cost effective.

- **Initial Presentation:** The ideas are presented at a first visual presentation meeting. The client actually sees the work being done. The designs should be judged in relation to the design platform.
- **Modification:** Modifications, if any which need to be done after the first presentation, must be made.
- **Design Testing:** To test package, a number of tests have been developed, a few of which have been listed below:
 - **Image tests:** Use the qualitative and quantitative research to assess consumer attitudes, preferences and message communicated.
 - **Usage tests:** Examine the functional related attitudes towards packaging and usually involve in - placement tests.
 - **Visibility tests:** Are designed to evaluate legibility of pack graphics, relative impact of different pack elements, and the relative impact of different designs they include the use of
 - **Brainwave analysis:** Used for both advertising and package designing. Method is based on “Alpha” and “Beta” brainwaves.
 - **Final Design Phase:** A final meeting with client is held to finalize the design. In this stage the various aspects of packaging like labels, contents, colour schemes, artwork on label etc need to be finalized.
 - **Production Design:** The complete designs are presented to the clients for approval. The design is approved and also set as per the initial discussions concerning the marketing strategy. Any variance needs to be resolved by consulting the experts in the respective fields.
 - **Finishing the Job:** The finalized artwork is turned over to the suppliers for producing the packs.

Factors effecting choice of packaging materials

- ❖ Characteristics of Materials to be Packaged
- ❖ Destination
- ❖ Kind of Transportation
- ❖ Handling, stowability and storage considerations
- ❖ Conditions of usage and distribution
- ❖ Cost
- ❖ Availability of the type of package and choice of substitutes

Packaging has a key impact on the cost and productivity of the logistical system. A central planning logic designed to control the total distribution costs must incorporate all the relevant costs and trade – offs, also those related to packaging. The cost of every logistical activity is affected by packaging. Inventory control is dependant on the accuracy of the manual or automatic identification systems that are keyed by product packaging. The order selection speed, accuracy, and efficiency are affected by the identification of product, configuration and ease of handling. The capability of unitization and techniques influence the handling cost. Package size and density influences the transportation and storage costs too. From the customer perspective, factors like quality control during distribution, providing consumer education, compliance with environmental regulations explain the importance of packaging. Given the complexity in the global supply chain and the costs of locating new facilities, the concept of packaging postponement to achieve strategic flexibility is gaining importance. With so much influence of packaging in every logistical activity, an integrated logistics approach towards packaging operations can yield substantial savings.

Third Party Logistics

Logistics involves getting the right goods to right place at the right time at the right cost in the right condition. To survive in today's highly competitive markets, companies are focusing on their core competencies to adopt outsourcing as a strategic solution to improve quality of service and also reduce cost of key and non-core activities.

An accepted trend today is to form a collaborative relationship with logistics service providers on the basis of the backbone of information technology, for integrating knowledge based supply chain.

Business organizations across the world are struggling for competitiveness for both growth and survival. Customers are demanding more and more value-added services from prospective suppliers for the amount spent. Business organizations have started reviewing business processes and realized that cost cutting and differentiating in value delivery systems is essential. Focusing on core business areas can be done through outsourcing non-core operations to experts in the field.

Logistics operations are an area of specialized function and a majority of marketing and manufacturing organizations do not have the requisite expertise in housed. Thus, there is a requirement for outsourcing operations to experts in the field. It has become an accepted practice to use strategic partnerships that are known as ‘third party service providers’ in integrated logistics.

Most companies consider using the services of a 3PL in their supply chain operations when they realize that it is essential in providing efficient and effective competitive customer service which requires huge investment and is difficult to develop on their own.

Outsourcing has the following advantages:

1. Focus on core competencies
 - Management is freed from repetitive/mundane tasks, reduces investment and generates cash.
 - Organization can concentrate on core competencies.

2. Organizations can adopt “best-in –class” practices.
 - Vendors have considerable strength and focus on outsourced processes. To remain competitive, they are continuously looking to improvise their services and adopt best practices to make them more efficient.

➤ This helps organizations achieve faster, efficient, effective and more economical business process.

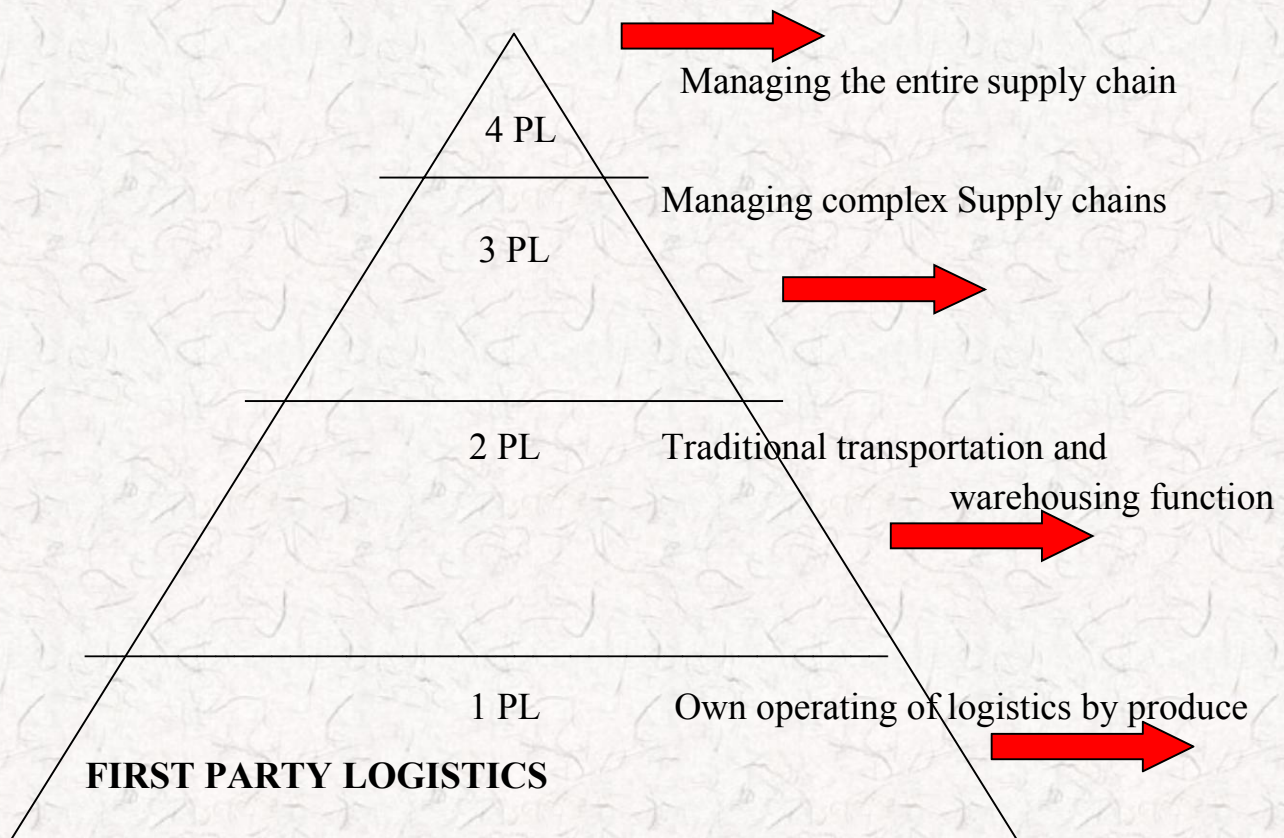
3. Organizations become more competitive

- Can respond more effectively to changing demands.
- Allows companies to gain more scalability.
- Outsourced activities allow companies to have greater leverage in responding to changes and to gain market access, expand.

4. Reduced cost and advanced technologies

- Vendors often implement latest technologies to make their processes and services. Companies can take advantage of these technologies, which they might not be always able to do if they were conducting activity in-house.
- Vendor's economies of scale helps drive down overall cost in the system, thus enabling companies to realize more productivity and efficiency.

Fig 6: Difference between various logistics service providers



First Party Logistics are companies, which do their own logistics

activities.

SECOND PARTY LOGISTICS

Second party logistics people provide their own assets such as truck owners, warehouse operators etc.

THIRD PARTY LOGISTICS

Third party Logistics Provider (3PL) performs logistics services on behalf of another company. 3PLs provide the management skills along with the physical assets, labor, and systems technology to provide professional logistics services, relieving companies of the responsibility of performing these services themselves. 3PL's typically can provide transportation, warehousing, pool distribution, management consulting, logistics optimization, freight forwarding, transportation management, rate negotiations, cost evaluations, and contract management services.

3PL is the function by which the owner of goods outsource various elements of the supply chain to one 3PL company that can perform the management function of the clients inbound freight, customs, warehousing, order fulfillment, distribution, and outbound freight to the clients customers. 3PL is a service provider who gives service for one or more portfolios of services in stand alone or integrated manner with own or leased or contracted assets or services.

A 3PL can also be described as a contract logistics service provider who manage inventory/material flow between companies and encompasses all processes and activities such as transportation, warehousing, documentation.

Common 3 PL functions are as follows:

1. Transportation Management
 - 3PLs fleet (or alliance partners) offer optimized network to serve their customers.
 - 3PLs plan load management, routing, equipment and driver management by Shipment Management System (SMS).
 - SMS can be effectively integrated with Warehouse Management Software (WMS), to provide integrated logistics solutions

concepts such as multi-stop workload or less than truckload which are often used to serve customers better.

➤ Multi-vendor consolidation reduces overall costs. Full truckload economies can be used to combine freight from different vendor to common destinations.

2. Warehouse management

➤ 3PLs run and manage warehouses using Warehouse Management Systems, radio frequency scanning, and bar code labeling

➤ 3PLs manage and track the movement of goods from initial receipt to outbound shipment. Real time, periodic and accurate information can be provided to manage inventory and demand better.

➤ Additional services such as advanced shipment notifications can be generated to inform the retail partners in the supply chain.

3. Packaging

➤ 3PLs often have ability to do final product packaging in their warehouse, thus eliminating the need to ship product to off site packaging companies. This in turn means reduced product handling, reduced cycle time and reduced costs.

➤ 3PLs can offer variety of packaging services like custom pallets, display shippers, inserts and coupons, labeling and printing, repackaging / conversion and also wrapping and bundling.

Advantages to companies by using 3PL services: -

- Focus on core competencies: Outsourcing enables companies to focus on the core businesses and strengths. The companies limited resources can be saved and the company can remain focused on what it can do best.

- Lower Investment: Organizations can outsource and save a large amount required for building logistics assets, networks and facilities such as warehouses. As an alternative for these investments, the companies can outsource these requirements by outsourcing and investing in their core processes.

- Enhanced technological capabilities and flexibility: Utilization of technological capabilities has enhanced the efficiency of logistics

operations. But, it may not be feasible always for companies to invest in newer systems or upgrade their existing systems. However, deploying third party logistics providers can insure against such technological changes. 3 PL often invest in such technologies for providing competitive services.

- Best practices: Outsourcing logistics to third party logistics enables companies to implement best practices and also allows organizations to achieve best performance.

Essential characteristics of a 3 PL.

- Solutions Orientation
- Logistics Know-how
- IT Capability
- Management and organizational Skill
- Innovativeness
- Independent and best of breed approach

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