Bernburg
Dessau
Köthen

Hochschule Anhalt
Anhalt University of Applied Sciences

Department of Economics

Master Dissertation

In Partial Fulfillment
Of the Requirements for the Degree of

Master of Business Administration (MBA)

How logistics is playing a significant role in shaping up an e-commerce business

Submitted By: Saha, Sumit
Enrolment No.: 4061886
Date of Birth: 06.06.1990

and

Submitted By: Pal, Sukanya
Enrolment No.: 4061875
Date of Birth: 22.02.1991

Degree Course: International Trade (MTR)

1st Supervisor: Prof. Dr. Frank Himpel
2nd Supervisor: Fei He

Submission Date: 22.08.2017 Bernburg, Germany

Abstract

How logistics is playing a significant role in shaping up an e-commerce business.

By the work of this master thesis we aim to provide how the logistics and E-Commerce industry are closely related to each other and the distinct types of support the e-commerce industry gets from the logistics industry to flourish its business. Building on the existing base of the supply chain network modern e-commerce companies have been able to take it one step forward. There have been significant improvements in the field of warehousing, inventory management, packaging, last-mile delivery which is making the industry outshine the brick and mortar retail stores. The growth of the e-commerce industry phenomenal and is expected to touch 4,058 billion US dollars by the year 2020. The advent of several types of logistics services such as the 3PL and the 4PL method have ensured that the E-commerce companies support their core business and outsource these activities to the experts. The support of cross border logistics has shored up the business conducted all over the globe. An example of an E-commerce company from Berlin has been added to showcase the logistics system they undertook during their initial journey and subsequently modified the process to benefit their vendors and customers. Logistical services such as on demand warehousing, tagging of products in warehouses via aerial vehicles, cost reduction packaging alternatives and delivery of products via drones and droids have truly helped the industry flourish.

Contents

List of figures

List of tables

1. Introduction:

The meteoric rise of the internet in the last couple of decades has created a whole new business segment called the Electronic Commerce also popularly known as E-Commerce. Young entrepreneurs are willing to sell their ideas and creativity to a generation who spend a bulk of their time browsing the internet. This has not only benefitted the young and tech savvy generations but only also people who wish to avoid the queue and do not like venturing out for every purchase. E-commerce companies sells everything, from clothing, jewellery, groceries and even provide SaaS – Software as a Service. The process is simple, if you need something simply log in to your computer, search for the product and order it.

So, while a lot is talked about the platform and the services an E-Commerce company has to offer people fail to realize the backbone of the business model- Logistics. Thousands of deliveries need to be made across the world every day for a single company. For this both the E-commerce company and the logistics company need to be prepared to handle this traffic. According to Teece 1986 "In almost all cases, the successful commercialization of an innovation requires that the know-how in question be utilized in conjunction with other capabilities or assets […] certain complementary capabilities or assets will be needed for successful commercialization." [1] This is extremely true for E-commerce companies where the logistics of a company can make or break the profitability. The reliability on logistics is so high now that consumers purchase items that is to be delivered the same day. If any of the support system fails and the delivery does not take place in that day then the consumers may suffer losses in some instance.

This Master Thesis will talk about the dependence on the logistics industry in the E-commerce business. The topic would cover, whether companies like to have their own supply chain systems or prefer to outsource it and whether the traditional supply chain system is still valid for today's fast-moving industry. It will also provide an insight as to how

[1] Teece, David J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. University of California. 15 (6), pp 285-305

logistical support can increase the profitability and competitiveness in a firm.

1.1Theoretical background

The popularity of E-Commerce dates back to early 90's when the internet was starting to get popular with the masses in North America. Initially the service was popular between business houses but with the spread of personal computers the end consumers took active interest in this type of trade. Now we have classified it into three distinct types: Business to Business (B2B), Business to Consumers (B2C) and Consumer to Consumer (C2C). The most popular being B2C model.

The evolution of the modern logistics system is an actually a process improvement from the earlier years. During the 1970's there were warehouses who kept the stock on behalf of the manufacturers or it was the manufacturers themselves and supplied it to the stores selling the products. This was a simple chain and involved goods mainly in the domestic sector. During the next decade, bigger retail chains started to get immensely popular and hence there was some larger storage units where goods from many different suppliers could be accumulated and distributed to the smaller retailers from there. During 1990's as the transactions among global business houses was rising and international deliveries were beginning to get popular, the goods started to be sent import and distribution centres who in turn delivered it to the shops selling the goods to the final customers. And finally, with the advent of the new millennium and the soaring popularity of the E-commerce business the concept of E-fulfilment centres arrived. It is an all in one process where receiving of the goods from the seller, inventory storage, order processing, shipping and returns processing would be carried out if need be. The E-fulfilment centre may be operated by the E-commerce companies or there may be a third-party company who helps the smaller and newer companies to scale up their logistics and brings in to the concept of economies of scale.

A small pictorial is provided for the process mentioned above.

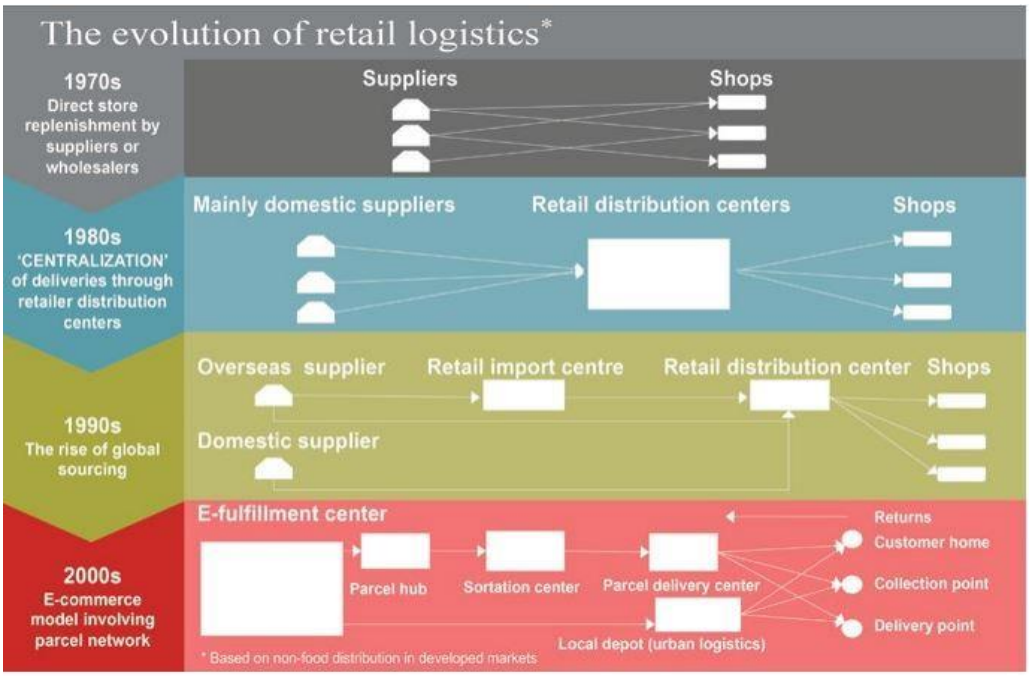


Figure 1: The Evolution of retail logistics [2]

1.2 Problem Statement

Since the E-commerce business relies largely on the logistics capability it is gaining much more importance when it has to scale up its business. Since there are various types of logistics model to choose from, the E-commerce companies need to have an understanding of the cost benefit of each of the model. If an enterprise company has enough resources and does not want to involve others it can start the logistics process themselves and for companies who are not so well to do financially or someone who has just opened up its business they can choose to outsource their logistics process. But it needs to be seen once outsourced, whether the process works to their favour as paying huge money for logistics model like the 4PL and not having enough orders to compensate for the technical know-how received will have a detrimental effect on the company financially. It is also to be seen whether the process of delivery to the customer called the last mile is beneficial to both parties. With this Master Thesis, we will also see where all the technological advancements

[2] 2013, E-commerce boom triggers transformation in retail logistics: Driving a global wave of demand for new logistics facilities, Jones Lang LaSalle, p9

are used currently and what the future of logistics would be like. The next challenge is how the logistics work when there are various countries involved in the process. We would consider what are the rules and regulations of cross border trading for e commerce companies and what formalities they should adhere to while shipping products overseas. Lastly the process of reverse logistics is an area of concern for both consumers and companies alike and we would look into the detailed mechanism of reverse logistics and how it influences the e-commerce environment.

2. The Supply Chain Management Concept

2.1 Definition

Supply chain management is nothing but taking into account all the logistical elements. It is a single unit which considers all the processes such as procurement, manufacturing and distribution. It also includes suppliers and end users in the process. The supply chain management helps in establishing a stable relationship in transfer of the processes both within and in between different companies. It helps decision makers with the right approach to reduce inventory and costs rather than only emphasizing in the day to day logistics operation of the company. One of the most important use of supply chain is the need to reduce inventory. Traditionally, companies like to keep stocks of their inventory. So, during a manufacturing process the company takes the required stock out and again refills it. This creates an abundance of inventory at every stage of manufacturing which ends up costing the company hugely. Supply chain management focuses to reduce these inventory piles and supply the required products directly at the point where it is needed. Its goal is to use inventory as the last option in case there is a disruption in the supply chain process. Supply chain management is also about using technology to forecasting demand in the whole product manufacturing process rather than looking at every individual stage of production. Other factors that impact the supply chain management includes managing customer relationship and supplier relationship, demand management, product development and

returns management. [3]

There are many supply chain management frameworks but the two most popular methods are SCOR (Supply-Chain Operations Reference) and GSCF (Global Supply Chain Forum) models. These two processes are widely followed as they are easier to implement and evaluate.

SCOR - Supply-Chain Operations Reference was developed by a non-profit based organization called Supply-Chain Council (SCC) in 1996. At the time of its founding it had four different business processes, plan, source, make and deliver. However, in 2001 another process called return was added to it. Each process can be defined as:

Plan- This step includes managing the demand and supply side planning. This also helps in determining the rules by which inefficiencies in the supply chain can be removed. Processes included in the plan are transportation, stock management and regulatory issues.

Source- This step requires to check the activities in relation to the procurement and other acquisition related process. It takes care of the supplier end of the network like agreements and supplier performance, how to release payments and when to receive and transfer products.

Make- It is the process involved in activities which help to turn the products to completion and ready to use. This step is involved from the production of the product to the packaging to the release into the market. It sometimes also contains further activity like maintaining databases and managing receivables.

Deliver- This is towards the final end of the process where finished product is due to be delivered to the recipient. This step involves the order management, how to transport and deliver the products which comes under transportation and delivery management.

Return- This process is when a product is returned for several reasons like packaging or

[3] Rushton, A. Croucher, P. and Bakep, P. (2011). The Handbook Of Logistics And Distribution Management. Kogan Page Limited. Pp- 27-28

defect product. Due to the return of product numerous factors like return inventory, reverse logistics and proper regulations need to be in place. [4]

An illustration of the above process is given below:

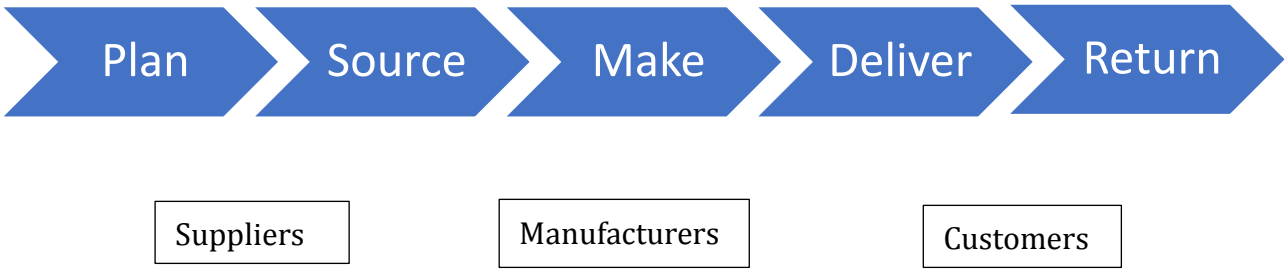


Figure 2: SCOR Model Diagram (Illustration at own construction)

GSCF – Global Supply Chain Forum is a process of integration by which all the most important business processes are covered. It covers processes from the final beneficiaries to the original suppliers which adds value to the entire chain. The GSCF is implemented through the supply chain network structure, supply chain business processes and other management components. The below mentioned processes are included in the GSCF:

Customer Relationship Management- This process provides as to how the relationship with the customer is nurtured and how it can be continuously improved. Presence of teams that help to create and tailor products according to the wishes of the customer is needed.

Customer Service Management- This is a window for the customer to have a continuous flow of information exchange. The customer can provide all necessary inputs for process improvements and grievances if any. This is the contact point for servicing the customer with respect to any product.

Demand Management- This process is a platform for estimating the demand that the products of the company have so that it can be brought in line with the supply chain capabilities. This

[4] Hudson, S. (2004), The SCOR Model For Supply Chain Strategic Decisions. [online] NC State University. Available at: https://scm.ncsu.edu/scm-articles/article/the-scor-model-for-supply-chain-strategic-decisions [Last accessed on 15th May 2017 12:11 pm]

helps to provide a stable supply chain if there is a spurt in demand all of a sudden.

Order Fulfilment- This is the entire chain of the firm receiving an order from the customer to customizing the product in response to the request, designing the necessary frameworks and delivering all while keeping the costs at the minimal level.

Manufacturing Flow Management- This is a process by which all necessary and designated steps are taken to receive, enforce and maintain the flexibility of the products in the supply chain system.

Supplier Relationship Management- Similar to the customer relationship management, this provides a process to set up a structure as to how relationships with the important suppliers can be maintained at a supreme level. The teams provide individualistic agreements to key suppliers.

Product Development and Commercialization- This process includes to develop and bring new products and variants into the market in consultation with the customers and the suppliers. This also helps the company understand the on-going trends and diversify the business.

Returns Management- This includes all processes related to the return of a product. It takes into reverse logistics which is a key indicator in the E-commerce business. The process also includes as to how the returns can be minimized as this ends up the company a lot of money.[5]

[5] Lambert, D. Garcia-Dastugue, S. and Croxton, K. (2005). An Evaluation of Process-oriented Supply Chain Management Frameworks, [online] Vol 26(1), pp 27-30. Available at: http://onlinelibrary.wiley.com/doi/10.1002/j.2158-1592.2005.tb00193.x/full [Last accessed on 15th May. 2017, 02:34 pm]

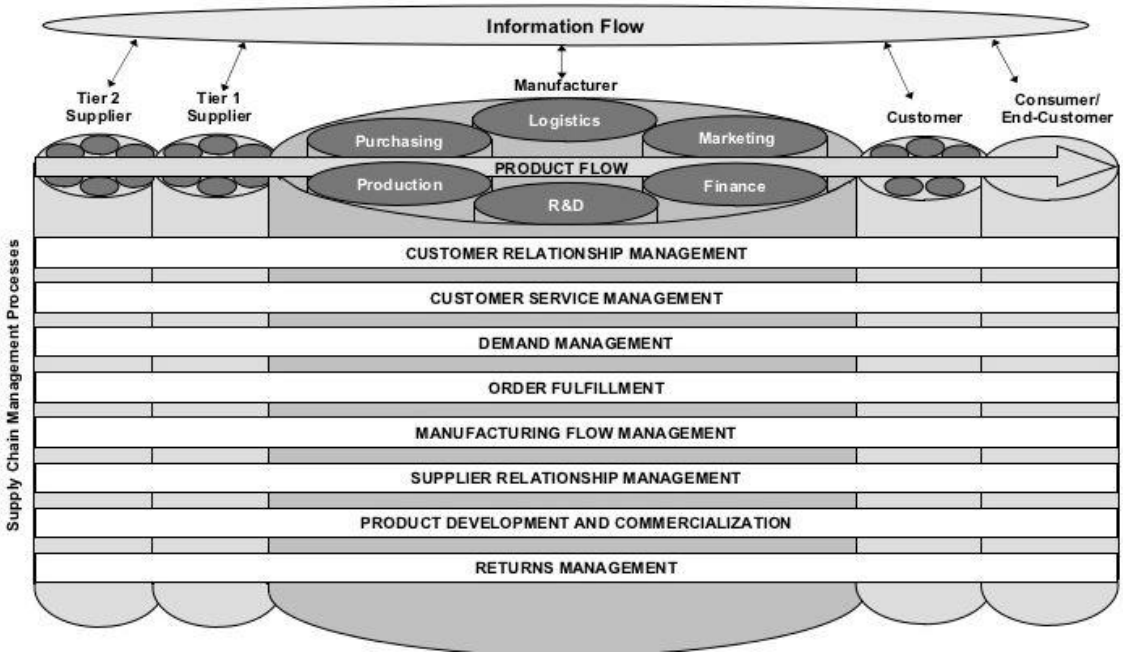


Figure 3: Global Supply Chain Forum Supply Chain Management Framework [6]

2.2. Logistics and Information Technology

The use of Information Technology is a need and necessity in today's every business environment. And it becomes all the more important when it is needed for the basic jobs of the company; like production of the goods and delivery to the customer is involved. It is needed to effectively control the ever-increasing complexity of the supply chain system. Information technology helps to plan, execute and co-ordinate activities in the supply chain while dealing with people from its own organization and also the customers. When the margins of the business are tight, it is the use of IT that effectively increases its efficiency. According to a study conducted by Forrester Research on the manufacturers of the United States, it was concluded that IT had helped them provide flexibility in the supply chain, reduced the overall cycle time, improve the efficiency and concluding business with the

[6] Douglas M. Lambert, Martha C. Cooper, Janus D. Pagh, (1998). Supply Chain Management: Implementation Issues and Research Opportunities, *The International Journal of Logistics Management*, 9 (2), pp. 2

customers with a time bound manner. [7]

Information and communication technology can be used to increase the communication with the customers or partners as it can shorten the channels and reduce the number of persons involved. This in turn helps to reduce costs and the transit of information is faster. As controlling the flow of information is difficult most of the times it can be best optimized by adopting the LIS or the Logistics Information System. This can be defined as "the interactive structure composed of people, teams, methods and controls which together, give the information management needs to form a basis for decision making on planning, implementation and control". [8]

This is especially helpful as it can transfer all the data generated into concrete information to help in further processes.

Application of Information Technology in SCM:

Information technology can be used in various ways in the Supply chain management to increase its efficiency. Here we will take a look at three technologies that can help the business manage their supply chain better.

RFID – Radio Frequency Identification

RFID alternatively known as automatic identification data capture is a tag that contains all the data that distinguishes from another product even of the same category. These are used to track the product or packages over long distances wirelessly. This chip which is made out of silicon is attached to a transmitting antenna but is small enough to fit in the size of a label. The RFID is different from bar code because it works on the basis of radio and electromagnetic waves rather than a form of light which reads the codes. This reduces the requirement of human labour and as a result some fixed cost can be avoided. This is different from the bar code system where human intervention is required. This system provides greater

[7] Radjou, N. (2003). U.S. manufacturers' supply chain mandate. *World Trade*, 16(12), pp 42–46.

[8] Casanovas, A. and Cuatrecasas, L. (2001), Logı´stica Empresarial, Gestio´n 2000, Barcelona. pp 191

flexibility as everything can be tracker for longer durations or even through the entire logistics process. RFID tags comes in three types, active tags which uses a battery to send signals, passive tags that use electromagnetic waves and semi passive which uses a battery but simultaneously sends electromagnetic waves. [9]

This technology was first implemented in 1984 by General Motors and all major car manufactures use this for tracking the necessary parts during their production. The goal of the RFID is to ultimately have all ends, from the production to the final consumer be involved in the process. Just from the when the materials start arriving, to during the different processes in the production, to shipping out to the markets and until consumers use and if it can be used for recycling. Although the concept is very futuristic it has some of its own challenges. There are currently no set or fixed standards to the use of these tags. There are various manufacturers using different technologies and signals. So, companies are not willing to contribute much resources into this as it may be a case that a supplier's device is not compatible with the one the concerned organization is using. This would hamper the smooth operation of the process. Also, some of this technology uses specific radio waves for identification which many European countries do not allow. It is also severely restricted in air cargo movements. Another significant factor is, as this technology is not so widespread it is slightly expensive to use. So, it would be interesting to see as the technology becomes readily available if companies are willing to try this in order to have better control over their supply chain systems or continue the old traditional practices and risk becoming uncompetitive. [10]

[9] Angeles, R. (2005). Rfid Technologies: Supply-Chain Applications and Implementations Issues, Information System Management, 22(1), pp 51-65

[10] Twist, D. (2004). The impact of radio frequency identification on supply chain facilities. *Journal of Facilities Management*, 3(3), pp 226-239

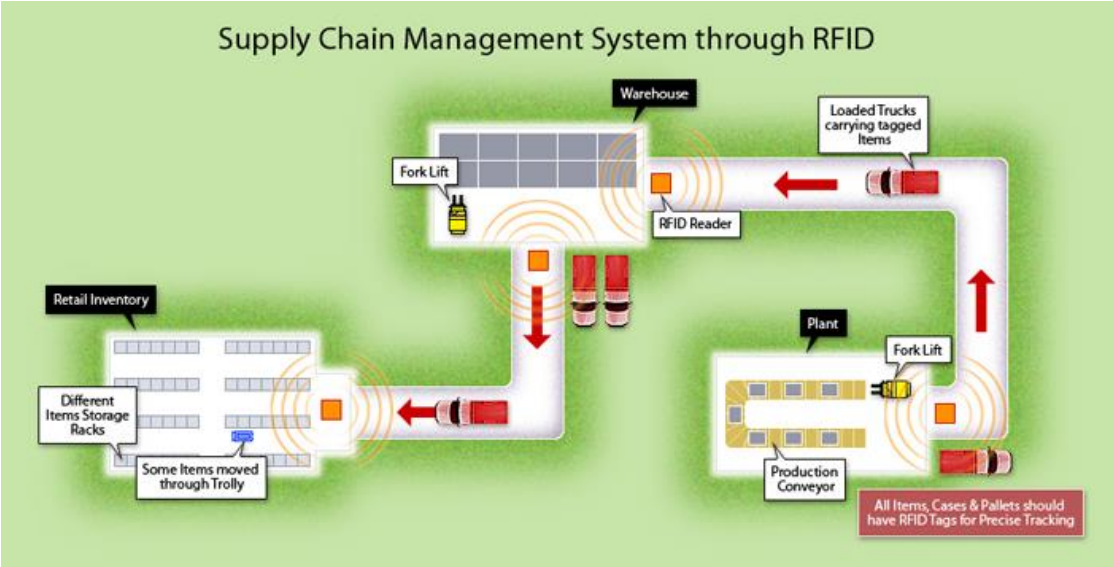


Figure 4: Supply Chain Management System through RFID [11]

EDI - Electronic Data Interchange

EDI can be defined as transfer of standardized information between two computers. Information in this case means business transactions. EDI helps in increasing co-ordination between the departments and also increases the alliance within the supply chain members. The information is always on a set standard basis as it is to be recognized by different computers and no humans are involved in the process. This method does not involve the use of paper. Co-ordination between the respective trading partners is of very high importance in this process. [12]

EDI affects the organization in mainly three ways. Firstly, it helps in faster transmission of the information between the concerned partners, next the information is transferred with full accuracy unless a human error is made during the process of transfer and lastly there is more data of the transaction that a person can see. Since there is less time required for transmission

[11] Satcom Limited. Supply chain management system through RFID. Available at: http://www.satcomlimited.com/system_integration.html [Last accessed: 24th May 2017, 12:37 pm]

[12] Hill, C. and Scudder G. (2002). The use of electronic data interchange for supply chain coordination in the food industry. *Journal of Operations Management*, 20, pp 375-387

the transactions can take place quicker and hence decreases lead times generating higher revenues. The decrease in lead times can also make a buyer increase the frequency of their purchase. The advantages of the EDI system greatly help in the customer service as the response time is faster. This can help the company to keep up with its competitors. [13]

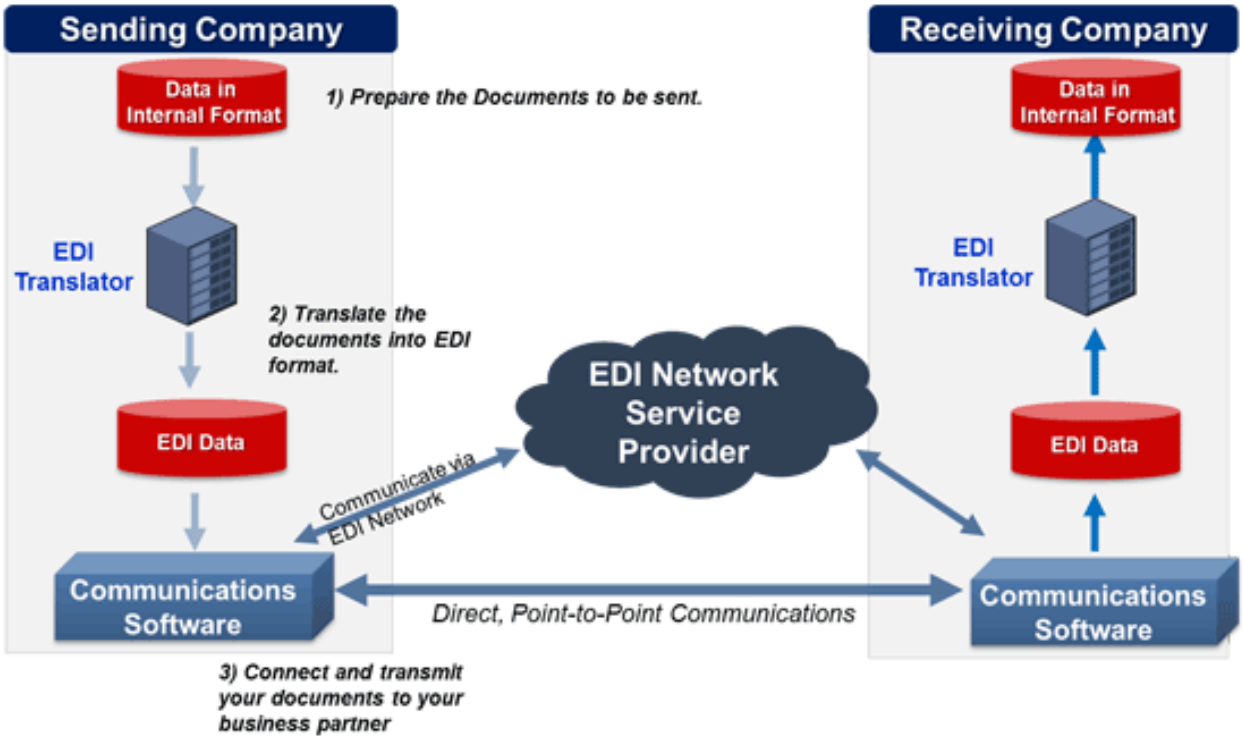


Figure 5: EDI Process [14]

ERP - Enterprise Resource Planning

ERP is a process by which the core functions of the company operates under a single platform. This is a software based system that allows key functions like planning of production, manufacturing, tracking of inventory, and finance to all work simultaneously. If there is any order to be shipped to the customer the ERP is able to track the data real time as it goes through the departments thus helping to have a more customer centric approach.

[13] O'Callaghan, R. Kaufmann, P. and Konsynski, B. (1991), *Adoption correlates and share effects of electronic data interchange systems in marketing channels*. Prof. University of Navarra. pp 2-4

[14] EDI Basics. [online] Available at: https://www.edibasics.com/what-is-edi/how-does-edi-work/ [Last accessed: 6th July 2017, 03:17 pm]

Before the concept of ERP came these units had to be operated individually and as result had very less co-ordination and every task that passed through these processes was time consuming. [15]

The key factor in the success of the ERP software is it provides integrated information as this was highly preferred when organizations started to lean towards more of a process oriented approach rather than a function oriented approach. The functional approach had the same data collected in various places and sometimes these data did not match with each other leading to errors and a botched-up supply chain. The implementation of the ERP system needs a clear organizational structure. [16] For example, if there is an order cancellation the finance team should have access to the necessary tools for it and not someone from the sales department. Similarly, if there is a purchase order coming in, only the inventory and procurement manager should be able to access that information.

Although an effective software to manage the supply chain, the ERP has some limitations. Firstly, the ERP system is designed to manage the supply chain in a single organization under a specific control, but nowadays the supply chain of various organizations is inter-connected and the lack of information because of this can hamper the process. And then there is the problem of non-flexibility in the ERP systems. As a result, if the process needs a bit of modification to the constant changes in the supply chain system it takes a lot of time and finance to do so. [17]

2.3 Demand Management and Customer Service

Demand management is a process by which an organization can plan and manage the demand that it is expected to have in line with its supply chain structure. Demand

---

[15] Madu, C. and Kuei, C. (2004). ERP and Supply chain management. Fairfield: Chi Publishers, pp 1-3

[16] Kurbel. K. (2013). Enterprise resource planning and supply chain management. Heidelberg: Springer, pp 94-100

[17] Akkermans, H. A., Bogerd, P., Yucesan, E., & van Wassenhove, L. N. (2003). The impact of ERP on supply chain management: Exploratory findings from a European delphi study. *European Journal of Operational Research*, 146(2), pp 284-301.

management is undertaken to have more control over the operational process and limit the unexpected situations. Generally anything that a customer has an influence on is hard to predict but demand management helps to remove organizational processes that aid increases the uncertainty and lay out plans to have a better have a forecasting system. In case of any unforeseen situations demand management helps in preparing backup ideas so that the customer is served in the best way possible. Demand management also has a direct effect on the profitability of the company. Materials can be collected in advance anticipating when there can be a rise in demand helping the company avoid last moment purchases which generally comes at a higher cost and also keep a stable flow of the inventories. The cost of manufacturing can be kept low as production can be planned months ahead in advance reducing the last moment production pressures. [18]

The Strategic Demand Management Process:

Determine Demand Management Goals and Strategy - This is the first step of the strategy where the people who determine the process gets to know the workings of the company, the process of how the goods are manufactured and distributed to its customers.

Determine Forecasting Procedures – This process aims at predicting the when the demand of the products would be higher than the typical flow. The data needed for this process needs to be verified and cross referenced to get an accurate picture.

Plan Information Flow – Once the above two processes are completed it is time to plan the flow of information. Here it is decided what and how the data gathered is to be shared. These plans are the shared among the team members explaining the structure to them thus maintaining clarity between the all parties involved.

Determine Synchronization procedures – The next process involves merging the forecasted data with the actual supply chain process. The synchronization process will be the backbone

[18] Keely L. Croxton Douglas M. Lambert Sebastián J. García-Dastugue Dale S. Rogers, (2002). The Demand Management Process. *The International Journal of Logistics Management*, 13(2) pp 51

for the entire manufacturing process. The plan developed here is integrated right from the beginning of production till the end of distribution. This process involves the other departments like manufacturing team, the department involved in sourcing the material, the logistics and the financial team.

Develop contingency management system – Like all plans it is crucial to always have a backup idea in case things do not go way as planned. Contingency management system is undertaken to determine the flow of processes in case the firm is hit with any natural disasters like floods, earthquake etc. or some unforeseen events like sudden closure of plants and factories. The other things that is taken into consideration is also how to re structure the process if some of the information is not communicated properly in the supply chain.

Develop Framework of Metrics – And lastly the framework of metrics is in place to measure and track the progress made. This in turn helps to further strengthen and improve the process by working on all the inefficiencies that slows down the process. The end process also gives an understanding as to how the organization is performing financially by implementing the above processes in the demand management system. [19]

The overview of the Strategic Demand Management Process:

[19] Keely L. Croxton Douglas M. Lambert Sebastián J. García-Dastugue Dale S. Rogers, (2002). The Demand Management Process. *The International Journal of Logistics Management*, 13(2) pp 54-59

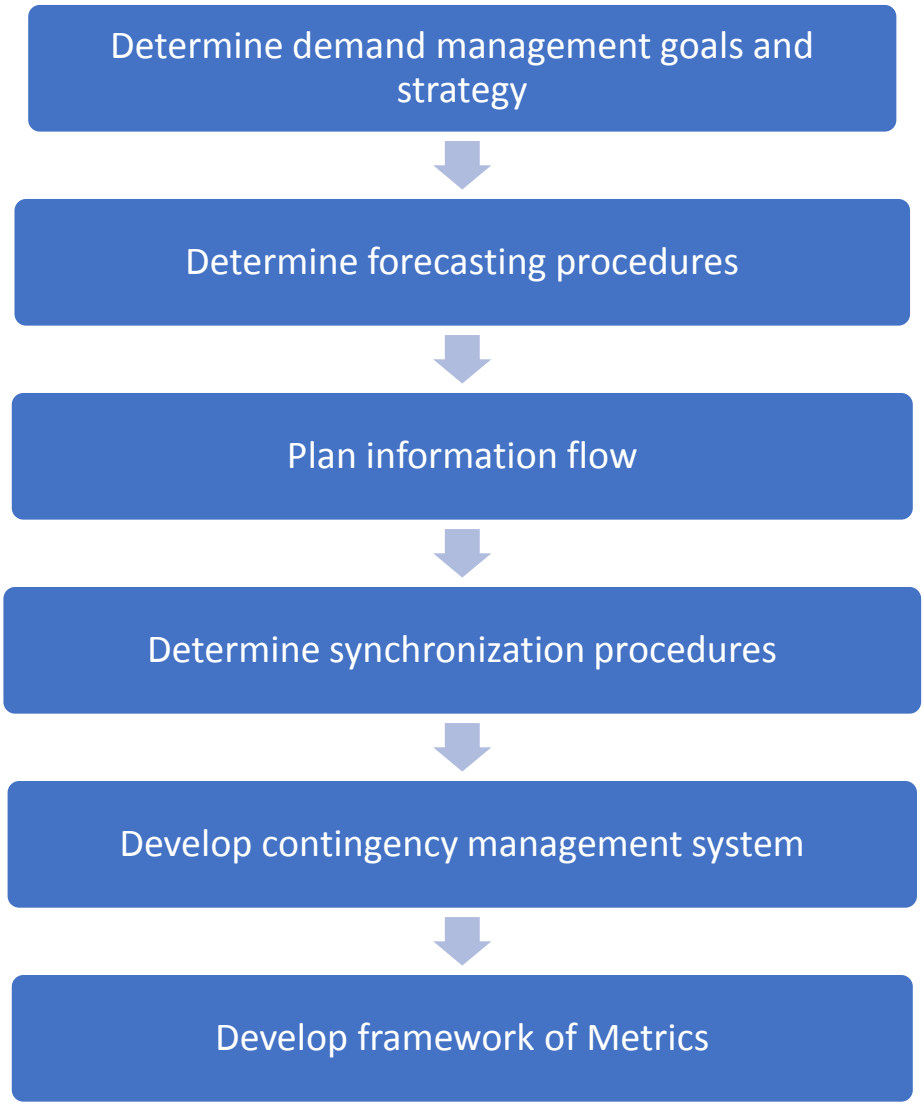


Figure 6: Strategic Demand Management Process (Illustration at own construction)

Customer Service – As competitions get tougher each day, companies are routinely turning to better customer service to improve get an advantage over their rivals. Thereby companies are always on the lookout to improve their process affecting the customer service. The logistics process varies for every company. So, firms with a unique logistic process have used this process to their advantage by advertising the process to the customers creating a unique selling proposition. [20] Customer service also helps create a new customer base for the companies. With the option of having new e-commerce companies in the same segment customers now have diverse options to choose from and if price and product being in the

[20] Muller, E.J. (1991). Selling the Process, Not just the Product, *Distribution*, 90(1), pp 40-50

same range they tend to select companies with smoother and efficient logistics process.

Upon research, it is found out that customers prefer the following nine qualities in their logistics service, "Personnel contact quality, order release quantities, information quality, ordering procedures, order accuracy, order condition, order quality, order discrepancy handling, and timeliness". The first point on personnel refers to the people direct in line dealing with customers. The customers would like these people to know all the required processes and help them whenever the need arises. Order release quantities mean the products ordered should be available even if there is substantial or bulk order. The readiness of the products as per their need is one of the factors that helps a customer come back to the particular company. Information quality is the genuineness of the description along with the number of options provided for the product to be sold. This creates a sense of trust among the customers. Ordering procedures means the process followed by the seller by which a customer can order the products. If the process is easy, it automatically relieves the stress on the part of the buyer as they do not have to go through a tedious process. Order accuracy comes under that stage when the customer receives their products and verify with the quality and the quantity they had initially ordered. The next obvious step after this for a customer is verifying the order condition, where they check if the products are not destroyed in transit. If this is the case, then the order needs to be replaced again. The next process is use of the product and is measured by order quality. This checks the use of it in the real-world scenario and if it confirms with the display information. After this comes the order discrepancy handling which is checking how the orders are corrected if there is flaw or discrepancy. This is a good judge of the logistics system of the company. And lastly timeliness refers to the on-time arrival of the products. The time taken for delivery is generally told at the time of order. If there is a high rate of late deliveries then the companies must take appropriate action to rectify the process. [21]

[21] Mentzer T.J, Flint J.D and Hult M.T.G. (2001). Logistics Service Quality as a Segment-Customized Process. *Journal of Marketing*, 65(4), pp 82-104

2.4 Procurement

Procurement is the process of acquiring the materials required for the product to be a step closer to being finished. The procurement process should be such that the required materials are bought at the cheapest available prize without compromising on quality along with the right amount volume within a precise time so that the holding time from raw materials to finished product is not long. During the process of procuring it is essential to have an open vision and see if the demand can be satisfied with an alternate method, if the company already has an existing supplier to that product so that the relationship can be leveraged, if the product can be made with a temporary solution rather than acquiring on a permanent basis, and if the material can be recycled or gained some value even after its use. [22]

The faces of procurement have been steadily changing. From focussing only on purchasing it has moved to a position where it starts implement the bottom line of the company through branding, advertising etc. Let us take a look at few of the objectives:

Continuous Supply – One of the core functions of procurement is to keep the production unit moving. This mainly includes the purchase of critical materials which are necessary for the manufacturing process or no-critical materials which may be required later on in the process. If there is not a continuous supply of parts there may be total confusion in the manufacturing belt as the assembling process would be incomplete and companies would have to incur losses.

Reduce Inventory Load – The traditional method to keep the factory ticking is to maintain a sizeable portion of inventory to draw from. This however has its downside. It requires huge amount of capital to but the inventory upfront and to top that there is also the cost of holding the inventory. The holding of inventory is defined as warehousing which we will discuss later in the dissertation. This has brought in another concept where the inventory to be used is just brought before some time; it may last from a few hours to a few days. This is also known as just-in-time principle. This method has brought in a change in how the materials

[22] Emmett S. (2008). *Excellence in Supply Chain Management*. Cambridge: Cambridge Academic. pp 73

are acquired to benefit the company.

Quality Improvement – It can be said that the quality of the final products available is largely dependent on the procurement process. The procurement manager is responsible for acquiring all the materials that is to be used. If there is any compromise in the core components then the products do not last long and the image of the company is shattered. And if there is any lapse on the non-core materials like finishing materials etc then the product may not look as attractive as it was advertised and the consumers might ditch it.

Supplier Development - The key component of the success of procurement is the development of their suppliers. If the suppliers are competent enough and doing well then, the firm faces no short-term problem. Many at times it has been seen that when a supplier has faced financial difficulties or other social problems like strike by labour unions, the production unit of the importing firm suffers massively as they have to find a balance between switching to a new supplier or continuing with the same. Furthermore, it is also imperative that the firms share as much details as possible with the supplier about the current production process or for the upcoming quarter or ear so that the supplier is also ready for the increase or decrease in demand and adjust their production schedule accordingly. [23]

The above points indicate the objective of procurement. Now let us a take look at the strategies applied by the managers for the procurement process. Broadly speaking there are four methods by which this is done.

Continuous information exchange – This is a basic interaction between the firm and the supplier about the materials needed; i.e. the quantity, specifications, and the time of delivery. The information shared should be communicated from both the sides and should also highlight if there are any problems that may occur so both sides are prepared for it. A proper information exchange helps in forecasting the prices of the commodity as the company is already aware of the existing prices it must incur in the future.

---

[23] Bowersox, D J, Closs, D J, Cooper M B, Bowersox J C. (2002). *Supply Chain Logistics Management*. 4th edition. New York: McGraw-Hill, pp. 79-81

Single firm sourcing – It was a case earlier that companies used to have many suppliers to choose from and at times had several firms supplying for manufacturing the same product. This has however declined drastically and more effort is being put on having a single supplier. The advantages to this are manifold. There will be less effort and manpower required to address a limited number of suppliers as against placing orders with a host of other suppliers. The economies of scale can be achieved as placing order with a single vendor will give it an advantage to negotiate better price for the materials. Also, the transportation will be streamlined in comparison to multiple vendors as the goods would now be flowing between two designated places. And lastly, the supplier can achieve greater consistency as they would have bulk orders and can dedicate their resources completely in it.

Formal Contracts – When companies start sourcing their materials internationally it becomes difficult to have relaxed relationship as the difference of culture, environment starts taking place. To curtail this a formal agreement is drawn where every detail is established like the order contents along with the specific characteristics and time and date of the delivery. And there are also clauses which specify what steps are to be taken in case the requirements ae not fulfilled. Since these are complex matters revolving around complex international laws, it is taken care by the legal team to come up with the terms that needs to be used to draw up the contract agreement.

Informal Partnership - When the relationship between the firm and the supplier gets better over the years and if both are found to be reliable then are times when informal agreements are made for purchase of any materials. These strategy is applied when both the companies understand the value it brings to each other and wish to maximize their profits. [24]

[24] Bozarth C, Handfield R, Das A. (1998). Stages of global sourcing strategy evolution: an exploratory study. *Journal of Operations Management*, 16, Pp 241-255

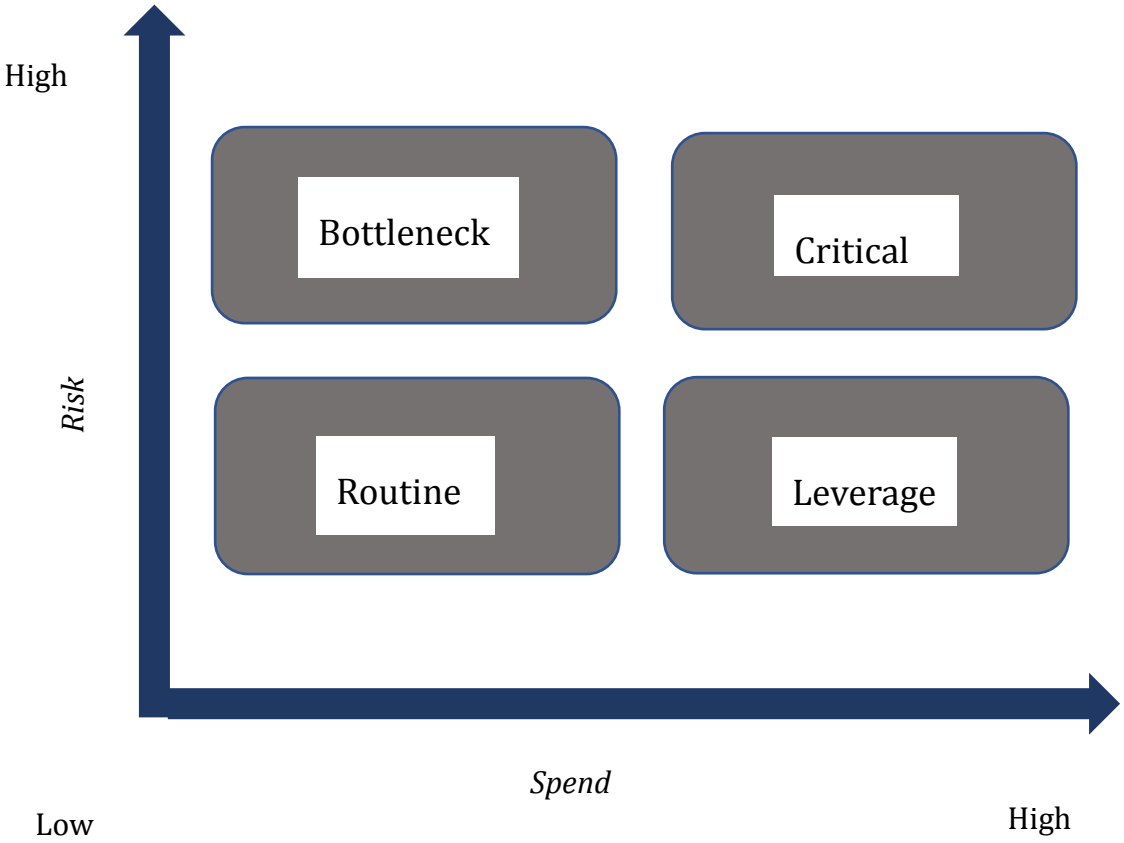


Figure 7: Kraljic's Risk / Spend Model for procuring (Illustration at own construction) [25]

E-Procurement – This type of procurement is the new process of acquiring materials in the new century. Gone are the days when buyers had to meet the suppliers individually at their factories and see the materials for themselves to purchase it. With the advancement of technology, the entire process has moved into the online sphere where purchases can be made by the click of a button. This can be done by two ways: either by issuing a tender or purchasing the material directly. The process for issuing a tender is, where the buyer uploads the specific requirements on the internet with all the necessary details like time and date of delivery etc and all global companies can compete for winning the contract. From the perspective of the suppliers, they can check online if they supply the specific required goods and calculate all the other variable costs like transportation and put quote a price for which they are ready to supply the materials. This way the purchasing firm may receive many offers

[25] Emmett S. (2008). *Excellence in Supply Chain Management*. Cambridge: Cambridge Academic. pp 74

and it is up to them to select the supplier based on the price, reliability or any factors that suit them best. The other method for procuring materials is acquiring it in an instant from the suppliers. The suppliers in this case list their goods on line along with the specifications and if the purchasing firm is interested they can purchase them online and it is the obligation of the supplier to fulfil the obligation of the agreement from there forward.

The benefits of E-procurement – The advantage of this system is very evident. Firstly, it helps to cut down significantly on the head count required in the procuring process. With less people and reduced paperwork involved the firms are able cut costs drastically. The next point is the ability to choose from various vendors reduces the cost to some extent as there may be suppliers who are willing lower their price in anticipation of further orders from the company. Some other soft rewards for this type of system is it helps the managers save some time and they have some extra hours to work on initiatives to make the process better. [26]

Challenges of E-procurement - Given the advantages there are still some challenges faced by companies. To start off with firms complain that the time taken for the complete process is painfully long as companies wait till the end moment to see if they can get a better offer. And there is also a lot of comparison between the various marketplaces that have been involved in the process. There are companies who are unwilling to share some crucial information which may be relevant some parties. The reason for not sharing the data is they do not trust the safety and security of the system and believe their data might be leaked. This makes the purchaser have doubts on the process and may think that the right products may not be delivered to them. This circle of misinformation creates disharmony and the entire procuring process is affected. Some traditional businesses still debate over the expenditure to create a functioning E-procurement set up as this will involves arranging the IT systems and may also require new personnel. They fear their costs would far exceed the benefits out of this system. The age-old system of seeing and believing also plays an effect since

26 Presutti W D. (2003). Supply management and e-procurement: creating value added in the supply chain. *Industrial Marketing Management,* 32, pp 219– 226

companies cannot see their trading partners there are some trust and reliability issues with their partners. [27]

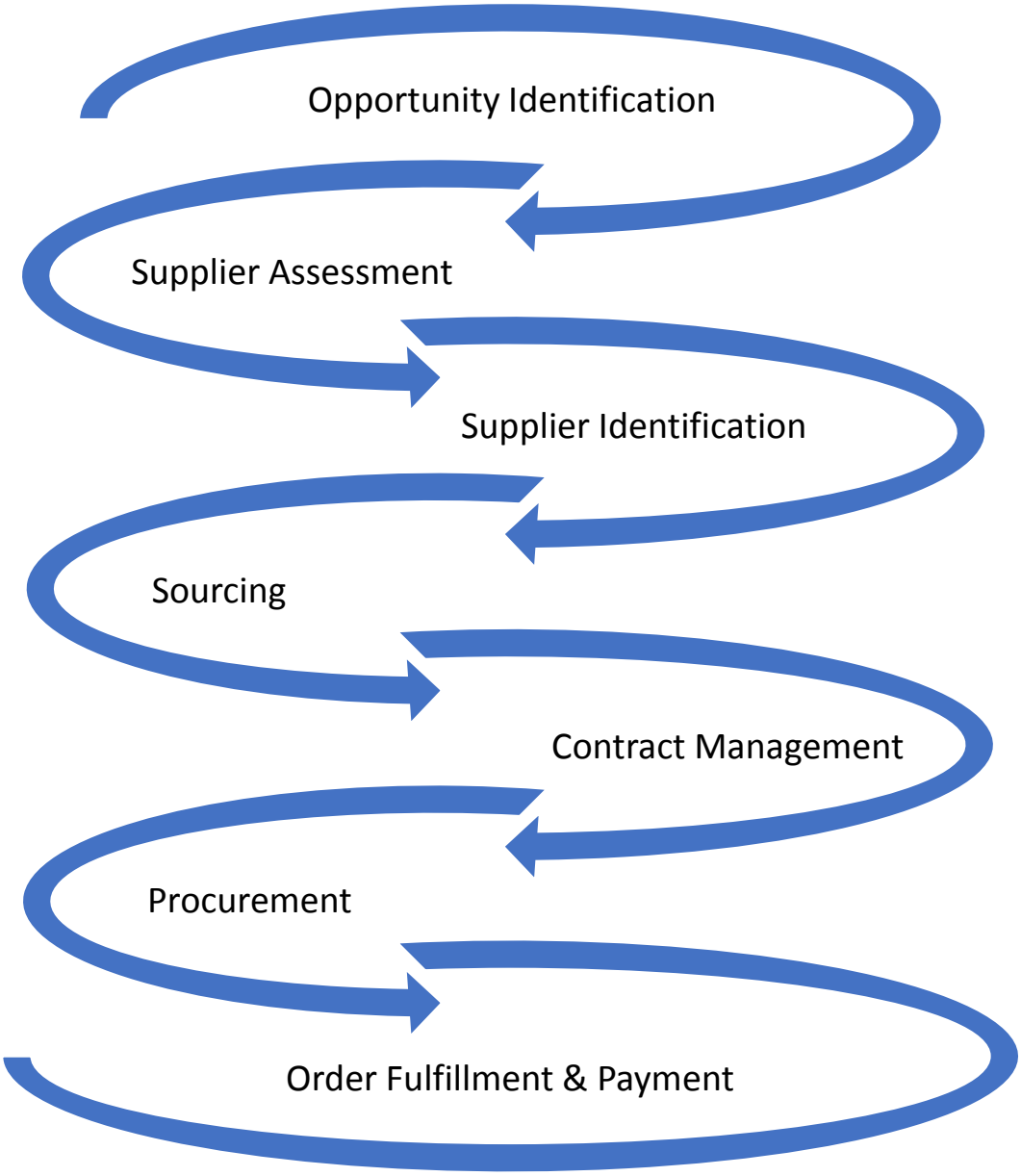


Figure 8: E-procurement process [Illustration at own construction] [28]

[27] Angeles R, Nath R. (2007). Business-to-business e-procurement: success factors and challenges to implementation. *Supply Chain Management: An International Journal*, 12(2) pp. 104 - 115

[28] Subramaniam A. (2009). eProcurement / Sourcing MRO Environment. [online]. Available at: https://www.slideshare.net/anandsubramaniam/Strategic-Sourcing-eProcurement [Last accessed: 23rd July 2017, 10:43am]

2.5 Packaging

Packaging is of significant importance in the logistics process as it paves way for safe movement of the packages and avoid it from incurring any damages. But it plays much more role than that. It is a more like an informal guide to the cargo handlers and customers showing how different packages are to be transported or opened. It also helps create a brand image by striking out among all competitors. Since the packed material is handled in all parts of the supply chain its shape the overall dynamics of the packaging plays a crucial role. The size of the packets needs to be perfect so as to maximize the given space and reduce costs as it is one of the factors that determine the transportation price of the product. The shape of the package needs to be optimal so the handling of the item can be easy yet needs to protect the goods inside. And lastly the it needs to have the required strength to prevent any unfortunate accidents, this is provided by the structure of the packaging. [29]

Packaging can be classified broadly under three diverse types:

Primary packaging - This is the first layer of the packaging which aims to protect and keep the content of the package in place. It is essential for primary packaging to keep the products inside it out from any outside influence that may damage its contents inside. Although that is not its main function but primary packaging also gives the items its shape and dimensions which is important for when it is shipped. The examples of primary packaging include bottles, packets, cases etc.

Secondary packaging – Secondary packaging is a further layer after the primary packaging is done. There are many functions of this layer of packaging. First it is the intention to keep it safe from intentional damage meaning, theft and misappropriation. Then it serves as a great source of information for the customers, where they can get all the relevant details during the purchase or even during the after-sales. And lastly it is a great source of marketing or advertising the product to the consumers who have not made the purchase yet. Typically,

[29] Harol A, Cardona O, Argueta C and Sarmiento A. (2014). A cost - efficient method to optimize package size in emerging markets. *European Journal of Operational Research,* 241(3), pp 917-926

the secondary packaging is discarded after purchase.

Tertiary packaging – The third type known as tertiary packaging is generally not seen by the end customers. This type is mainly used during the transportation of the package in order to reduce the damage it may incur during the supply chain. Some example of tertiary packaging can be wooden pallets, boxes, crates and even polymer materials that helps to absorb the pressure. [30]

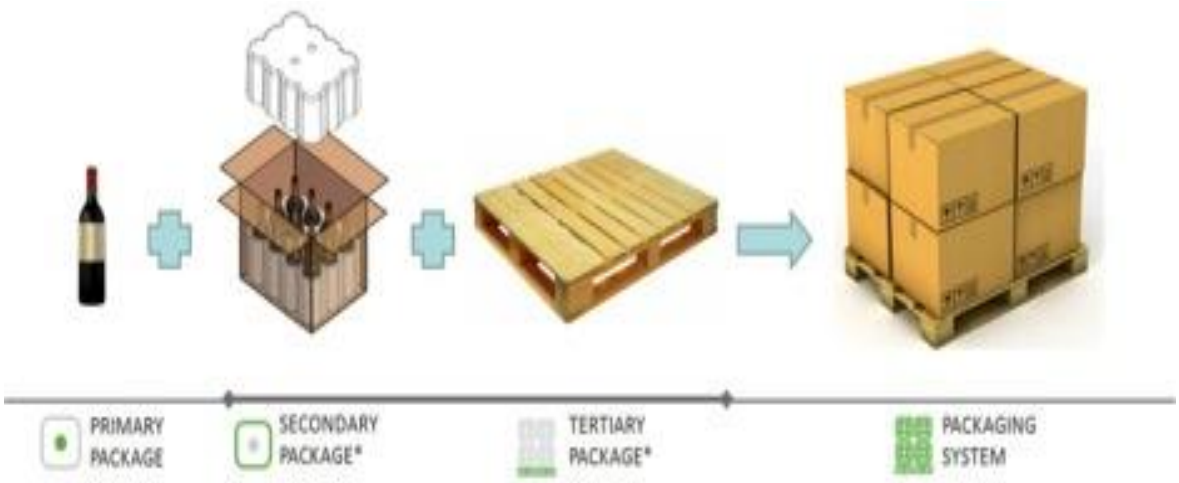


Figure 9: Different types of packaging [31]

Packaging and the environment: Somewhere during the 1980's there started a revolution to move to a more environment friendly packaging system. Led by a few organizations the consumers started becoming really conscious of the waste generated and started to reuse and recycle products. Along with the help of a few international groups few regulations were passed to protect the environment from the excessive use of ecologically unfriendly practices. One such practice adopted was "packaging and unitizing load". This was essentially putting

[30] Verghese K.& Lewis H. (2007). Environmental innovation in industrial packaging: a supply chain approach. *International Journal of Production Research*, 45(18-19), pp. 4381-4401

31 Mistry, M. (2013). Life Cycle Assessment – A Blending of Art and Science. Available at: http://greenblue.org/part-4-life-cycle-assessment-a-blending-of-art-and-science/ [Last accessed: 19th June 2017, 03:20pm]

together the small boxes into a single unit for dispatch from the earlier practice of putting the same into bigger packages or being tied together by polyester materials. Some manufacturers also take the burden of retrieving packing materials from their customers and is known as reverse flow logistics. As an example, Colgate-Palmolive in Germany rents pallets from privately owned companies and then the same company is authorized to collect the pallets from its clients to use it again in the future or clear it away safely if it non-usable. Another company DuPont manages the total packaging end to end process for its packaging materials. Therefore, the packaging manufacturers and users had to alter the use of non-reusable products to more environment and consumer friendly products. [32]

Logistics Activity	Pro's / Cons
Transportation	
Increased package information	Helps to find packages quickly while dispatch and speeds up the tracking process if package is lost.
Increased package protection	Reduces disturbance in the package content and provides a better chance against theft but also pushes up the weight of the package.
Increased standardization	Helps the transporter to send the packages in the same container rather than having many specialized vehicles or equipment, thus reducing the overall cost.
Inventory	
Increased product protection	Helps to reduce damage to the products and minimize misappropriation but this again pushes up the price of the product and along with it the transportation costs.
Warehousing	
Increased package information	Helps to quickly sort the packages when order comes in, thus reducing time taken and personnel costs.

[32] Lockamy III A. (1995). A Conceptual Framework for Assessing Strategic Packaging Decisions. *The International Journal of Logistics Management*, 6(1) pp. 51 - 60

Increased product protection	With additional protection, packages can be kept on top of each other thereby reducing the storage space. The drawback here is it increase the product sizes significantly.
Increased standardization	Cost to have specialized equipment to transport the packages in nullified. Hence it saves costs.
Communications	
Increased package information	Reduces costs and time as personnel can easily track products by information provided in packaging rather than making phone calls to specify the items.

Table 1: Importance of packaging in Logistics. [33]

Rising Packaging Substitutes – Companies are getting aware of the need of sustainable and low-cost materials to keep up with the demand in packaging. Therefore, new forms of packaging are hitting the markets. Let's take a look at few of them:

Film Based Packaging – These are adjustable lightweight materials that can be used on small packages. The advantages of this are, it reduces the need for various shapes of boxes as these can be packaged over materials of all shapes. And since these materials weigh the bare minimum it saves tremendous amount of money in terms of carrying cost as the weight and size of the packages are reduced.

Blanket Wrapping – This is a method mainly undertaken to move items by household transporters. This includes surrounding furniture or other similar goods with blankets to cover its odd shape. Once completed the material is protected from any bumps that may be incurred and eliminates the need of boxes. Now a day's transporters undertake the entire responsibility of blanket wrapping the goods before moving and undo it once the destination is reached.

Returnable Containers – Returnable containers are just another way of moving on from the traditional methods of packaging and going more towards sustainability. The most common

[33] Lambert DM, Stock JR, Ellram LM. (1998) Fundamentals of Logistics Management. Singapore. McGraw-Hill.

reusable materials are from steel and polyester. Common example of this type of packing can be seen in the auto industry where components are transferred between plants in reusable parts. The considerations for this type of arrangement are how long does it take for the containers to return to its original destination so that it can be used again and the costs for handling, washing for its use again. [34]

2.6 Transportation management

Transportation is the most important linking point in the entire logistics chain. An integrated and well-connected transportation management system reduces great deal of cost for a company. It also provides a better customer centric approach which in turn helps in projecting a better brand image. So, all in all having a good transportation system is essential to increase the profitability and service of a company.

A quick look at a chart provided from Chang (1998) shows the effect transportation has to play in the logistical process. The chart is based on the data from the Air Transportation Association. It is important to note that almost a third of the cost of the logistics is borne by the transportation segment followed by inventory and warehousing cost. The overheads included in transportation are also the cost of hiring containers, pallets and the number of man hours put in. This chart provides an overview as to where companies can look to in order to improve their processes.

[34] Bowersox D J, Closs D J, Cooper M B. (2002). *Supply Chain Logistics management*. New York: Mc Graw Hill. pp 416-418

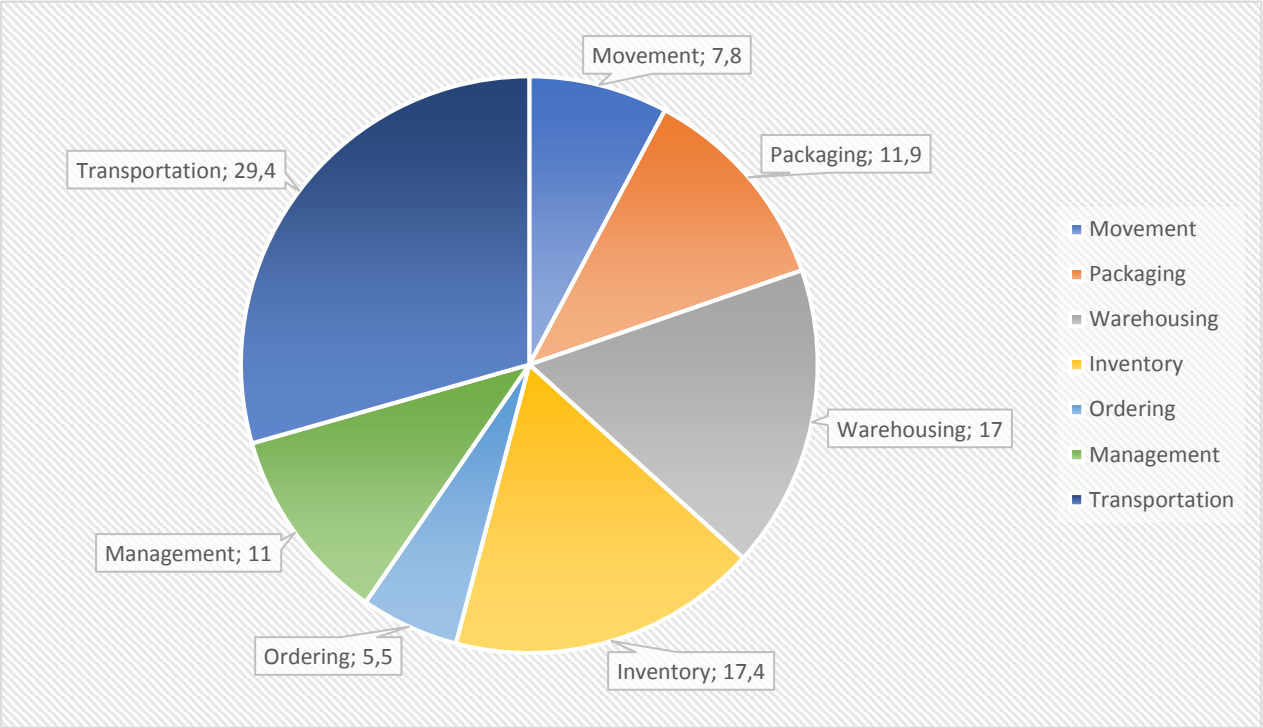


Figure 10: Cost ratio of logistics item (Adapted) [35]

Transport Functionality and Participants – The main function of transport can be divided into two parts. Firstly, it is the common idea we all get when thinking about transport is product movement and the second point being the storage of products.

Product Movement – The basic idea of transport is the movement of products, it may be a finished product, a product which is to be completed or even parts of a final product. The product movement also applies when customers return the products back the shipper (reverse logistics). But product movement typically needs to be fast as materials / parts may be on their way for a long time thus increasing the cost of the company. A production cannot afford to wait for a long time for their inventory to arrive. The aim is always to reduce the 'in-transit inventory' so that higher efficiencies and profitability is maintained.

Product Storage – An important but not highlighted feature of transportation is the storage of products. The vehicle transferring the goods can be used for storing it in some cases when the goods are to be processed in a few days. For example, if a Factory A manufactures a

[35] Tseng Y, Yue W L, Taylor A. (2005). The Role of Transportation in Logistics Chain. *Proceedings of the Eastern Asia Society for Transportation Studies*, Vol. 5, pp. 1657 - 1672

product and needs to be transported in two days, then it is better to store the goods in the transport vehicle rather than having a warehouse, involving further labour and workforce in order to store it and then again take them out in a couple of days. This greatly increases the cost. But it is to be noted that this is only an alternate solution and is not designated to take over the role of traditional warehousing. Another function that is served during transportation that falls under the purview of product storage is 'diversion'. So, if there are goods on its way and for any reason the goods are to be sent back or directed to another facility, then at times there may not be necessary to again go to a warehouse and storing it for another vehicle to transfer it. The transport vehicle carrying the particular goods which are to be returned can transfer it to another vehicle which is destined for where the goods are to be returned or can be diverted itself to the new destination. This method may seem expensive but when taken into the context of having a new facility, labour costs and time taken, this method may turn to be more profitable. [36]

Participants in the transportation system:

Shipper and Consignee – The shipper or consignee is the entity who is responsible for the delivery of the goods to the end customer. The shipper is to select the transportation system that suits them best and takes the least amount of time and money for the successful delivery of the goods.

Carriers and Agent – These are a type of middlemen who provides transportation for a various group of people. If an individual has to send out some goods it may be expensive to hire an entire vehicle, so the carriers comes into play here and organizes to ship goods from various people travelling to the same destination. This help them earn the economies of scale.

Government – Although not a direct participant but the role of government is important in the transportation system. If there is a free-flowing movement of goods all over the country it provides a boost to the economic activity and higher the economic activity the more taxes

[36] Bowersox, D J, Closs, D J, Cooper M B, Bowersox J C. (2002). *Supply Chain Logistics Management*. 4th edition. New York: McGraw-Hill, pp. 186-188

it can get from businesses. Therefore, the government takes an active participation to monitor the movement of goods and regulate the pricing so achieve smoother process.

Internet – The idea to have internet as one if the participants of the transportation system is because of its ability to dissipate information in an instant. The tracking of goods and containers has become really easy with the advancement of technologies plus a shipper knows when and where his vehicles are free and can be used for the next transport. Also, if there is any disruption in the transportation because of damage to vehicles or special fuel needed, it can easily be done via the internet to save time on the process.

Public – This is an end participant in the transportation system. The public at the end determines the price it pays to access these. The public is also aware of the environment damage caused by transportation and will select the goods or products that a greener footprint to it. So, all the participants are inter-related for the formation of regulations in the transportation sector. [37]

Transportation Modal Structure – The transportation system consists of various modes. Transportation via trucking or by roads has been the on the rise since the last few decades. It is a very easy to operate trucks as this can be accessed by any type of terrain and is also easier to facilitate in comparison to other systems. Cargo operated by sea goes back hundreds of years. With the advent of bigger ships, huge amount of goods can be transported over long distances with a fraction of cost than the other modes. Railways has always been a reliable source of transportation. Railways can handle huge quantities of cargo and now it is starting to deliver them cross continent. It's unique selling point is handling heavy materials and goods like specialized equipment, heavy machinery, cars etc. Although air transport makes up a very less amount of goods transported by percentage, it in fact contributes more in terms of value than some of the above-mentioned transport modes. As per IATA the goods transported by air consists of less than 1% but when the aggregate value is considered it

[37] Bowersox, D J, Closs, D J, Cooper M B, Bowersox J C. (2002). *Supply Chain Logistics Management*. 4th edition. New York: McGraw-Hill, pp. 188-190

consists of more than 35% (2016). This amounts to businesses worth $18.6 billion each day.[38] Pipelines are important for in the transportation chain mainly for transfer of fossil fuels like crude oil, natural gas and other petroleum related products. The advantages of pipelines are that products can be transferred non-stop all thought the day and possibly years. It only needs to be halted if there needs to be some repairs and upkeep in the pipelines. Economically speaking it is very capital intensive to start with, but once in operation it is the most cost-efficient method for transportation.

Taking the European Union (2013) as an example the most common transport was the roadways followed by sea, railways, inland waters, pipelines and lastly air transport.

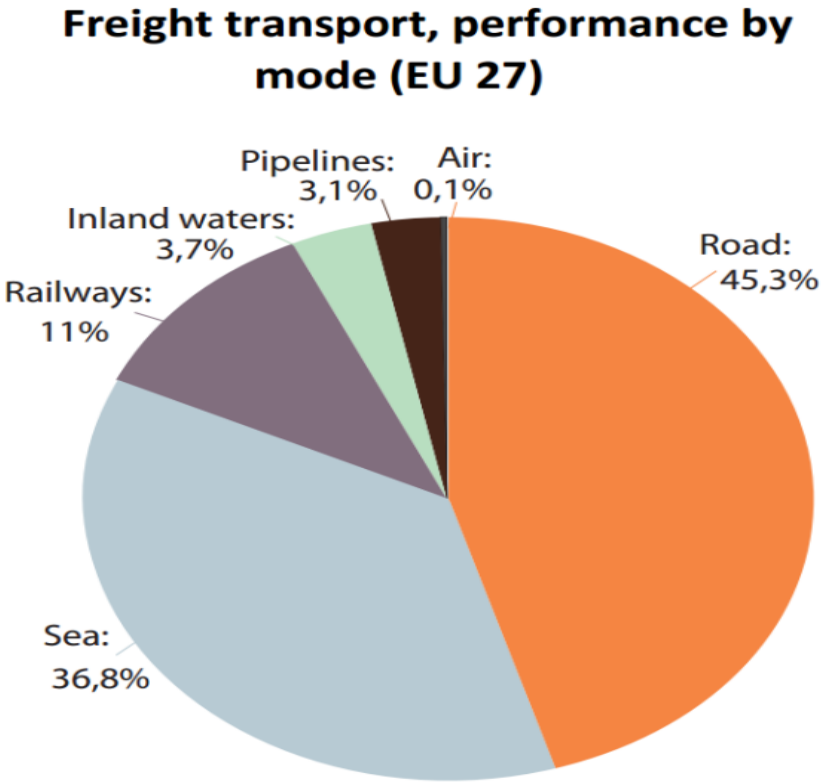


Figure 11: Share of transportation used in the E.U. [39]

[38] Air Cargo. (2016). IATA. Available at: http://www.iata.org/whatwedo/cargo/Pages/index.aspx [Last accessed: 19th June 2017, 05:34pm]

[39] Inland Waterways in the EU. (2014). European Parliamentary Research Service Blog. Available at: https://epthinktank.eu/2014/02/05/inland-waterways-in-the-eu/ [Last accessed: 19th June 2017, 02:27pm]

2.7 Warehousing and Inventory management

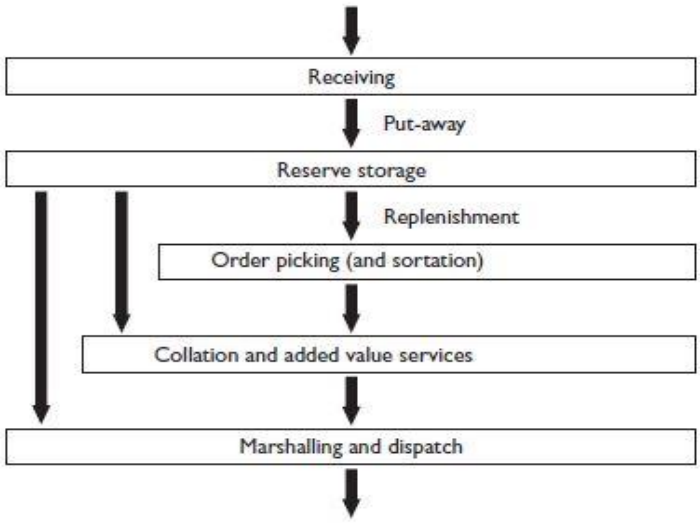
Warehousing is a critical component in the supply chain process. It is associated with storing of goods and materials; this can be a both a final destination for the goods or a transit hub where it is stored temporarily and another carrier picks up the goods to be delivered to a different location. It serves as a link between from where the products have come from and the place from where the products will be delivered to the final customer. In the book Transportation-Logistics Dictionary it is defined as "a warehouse of finished; also applied to the facility from which wholesale and retail orders may be filled; a materials warehouse would also be distribution centre for the buyers of its stock." [40]

Different types of warehousing – Companies can have various ways of managing their warehouses. The most common methods are public, private and contract warehousing. Public Warehouse - Public warehousing is the process where the participating company do not own the warehouse and takes it based on hire. The hiring time period may vary from company to company and is generally taken considering the requirements of the firm. In general, public warehouses are sub divided into distinct types, like some which have general goods along with products. Others are which require unique requirements like, chilled goods which require to be kept in some certain sub-zero temperatures to keep it from spoiling or bonded warehouses where goods stored needs special paperwork or some taxes need to be paid to take the goods out of the designated warehouse. Overall, if a firm is not big enough then it is financially advisable to go for this type of arrangement as there is no fixed cost and companies can use the services as per their requirement and the downside to this is that warehouses may not always be available in the required areas and as a result companies may have to look for other option in the vicinity. Another beneficial aspect of public warehousing is, if the same warehouse is shared by other firms as well then goods going to the same place can be transported in the same carriage to save costs for both.

[40] Cavinato, J L. (1989). *Transportation-Logistics Dictionary*. 3rd Edition. Washington D.C: International Thomson Transport Press, pp 72

Private warehouse – These are units operated by the company who are either manufacturing or selling the product. But it is up to the owner if they want to use the entire facility for their own purpose or rent out the unused portion to other companies so that use their facility to capacity. Private warehouses are constructed by companies who need a control of their entire logistics system and at times when the products to be stored require special capacity as they cannot be kept in other warehouses. The cost advantages are huge for companies who can use the facility it to the fullest as other rented warehouses have a high charge in order to maintain profitability. Private warehouses require more capital expenditure as the cost for construction is a lot and it also requires a fixed cost to maintain the facilities. Private warehouse may also provide a sense of security to its customers of the company as they might see this as a financial strength of the company.

Contract Warehouses – These are a mix between both private and public warehousing. Companies go into contract warehousing to secure the site for a long term and in the process, reduce costs. This type of arrangement also brings stability into the company in terms of its warehousing options as they know they are secured. Contract warehouse also provides companies with additional benefits such as transportation facilities and inventory management. [41]



[41] Bowersox D J, Closs D J, Cooper M B. (2002). *Supply Chain Logistics management*. New York: Mc Graw Hill. pp 393-396

Figure 12: General Warehouse functions [42]

Role of a warehouse:

Storage point of stock – This is the most common function of a warehouse i.e. it is designated to hold the inventory for transfer to other locations. However, it may also hold emergency components which may be required in case any facilities need them urgently and transporting to them from their source may be too time consuming.

Holding point – This is very relevant in case of E-commerce companies where consumers have the options to choose from thousands of products. All the products are not kept in a specific location. A customer may order various products at once which may be kept in various locations but would like to receive them all in the same time. These warehouses then can be used as a point of get together for all the different products and can be shipped to the customer all together from there.

Categorization Point – Warehouses can serve as a point for sorting of assorted products. All the goods manufactured from a factory can be brought together in a warehouse and then it can be figured which products, or sizes or colours can be sent to the locations of their choice.

Aggregation Centre – Warehouses can be used as a final destination point for joining together all the post-productions units into a complete product. It can be a ground for the final check of the products and marking them according to their categories.

Reverse logistics hub – Warehouses are no longer only meant for one-way flow of goods. With the introduction of e-commerce, the chances of good returned is higher than traditional brick and mortal retail stores. Thus, every single item returned cannot be sent back to the seller directly and needs to be accumulated in a specific location. When there are enough materials or if there are products going in the direction the seller then it is economically

[42] Rushton A, Croucher P, Baker P. (1989). *The Handbook of Logistics and Distribution Management*. 4th Edition. Great Britain: Kogan Page Limited. pp - 230

feasible to send the goods back. [43]

Mismanagement of warehouses can lead to some serious problems. Below is a table highlighting the source of the problems along with some results that might be seen if the correct processes are not followed.

Problems	Possible Outcomes
Lack of Supply chain performance indicators	Every site has their own ways of measuring the efficiency. Lack of uniformity creates problems for inventory performance measurements and change implementation.
Unfulfillment of customer service	Delay in delivery and continuous pile of back orders, thus creating additional inventory which in turn leads to higher cost.
Mismatch of delivery status data	Imprecise delivery status of goods might show the product is still in the warehouse even if it is out for delivery thus creating a false impression of the warehouse status.
Incorrect Information systems	Disconnected information from the central database leading to wrong and untimely information being communicated to all other warehouses under its server.
Trouble of the unknown	If the uncertainties that can be caused due to a change from the regular methods in not clear or there is no backup option the warehousing process can be in a disarray at times.
Improper Co-ordination	No effective communication between members may lead to products handling individually thus creating imbalances in

[43] Rushton A, Croucher P, Baker P. (1989). *The Handbook of Logistics and Distribution Management*. 4th Edition. Great Britain: Kogan Page Limited. pp – 227 - 228

	the warehousing system.
Not planning for supply chain constraints during product design	Failing to design products in line with the ease of supply chain especially warehousing can cause problems for storing as various shapes & sizes of materials need to be stored thus enhancing the need for more space.
Organizational roadblock	Lack or absence of communication between different department of the organization can cause dumping of inventory in a warehouse regardless of space thus creating confusion and additional burden.

Table 2: Importance of Supply Chain Warehouse Management [44]

Inventory Management – Inventory is the stock of raw materials or goods (finished or semi-finished) held at a point to either be used again in the manufacturing process and be sold out to the final customer. Inventory can be held for a variety of reasons.

Reasons for holding inventory:

- Minimize the overall manufacturing cost – When the demand for a product is high it is natural economics to keep producing the goods at the optimum level to earn higher profits. But this would also require higher capital expenditure to set up new units to meet the demand and if the demand falls these units would no longer work for the desired time and would remain idle thus costing huge losses. In order to avoid this, the existing units can be used to run extra hours during non-peak demand seasons and store the additional items as inventory thus saving the company some capital expenditure.
- Take cover for the unforeseen – It is often the case that production needs to be halted

[44] Lee H L, Billington C. (1992). Managing Supply Chain Inventory: Pitfalls and Opportunities. *Sloan Management Review*, 33(3), pp 65 -73

due to the non-arrival of certain materials or components from suppliers. This has an effect on the entire chain. So, in order to cushion this companies, prefer to keep some of materials as stock so that their production process is not halted.

- Estimate future trends – The price of goods increases and decreases by the season. So, it is always wise to buy during the off-season and store the goods to be used as and when required. The holding costs are to be taken into account when this sort of arrangement is made and if the financial benefits of buying during off season outweigh the holding cost then this is a lucrative proposition.
- Advantage of quantity – Often goods sold in bulk qualify for a special offer or discount. So, the buyers take huge quantities to get this special advantage which lessens their price in comparison to their competitors. And if the deal values some million euros then even a single digit discount can count a lot of money.
- Taking a chance – Another reason for stocking up is that, if the buyer expects to go up significantly soon then they may increase the inventory to benefit from it. This practice is highly risky and if the results are not favourable then huge losses may occur.
- Immediate Customer Service – Sometimes the customer may require immediate materials for their use. Creating an inventory for the customer for this type of need adds goodwill and reputation to the firm which help in the long run in the business.[45]

So, we see that inventory can be held for a lot of reasons. But these can be taken a bit further and classified into the types of inventory. The types of inventory define every stock for the purpose of their storage.

Cycle Stock – These are the regular stock that is kept in order to refill the certain stocks that is due to get over in time. In these cases, all conditions favour the firm, meaning the it is known how long it takes for the material to be moved from the raw material to the work

[45] Rushton A, Croucher P, Baker P. (1989). *The Handbook of Logistics and Distribution Management*. 4th Edition. Great Britain: Kogan Page Limited. pp – 173 - 174

in progress phase, how long it takes for the stock to arrive one the order has been placed and when the next order is to be placed taking into consideration the whole cycle.

In Transit Inventories – These are type of inventory which is on its way between two locations. The transit inventories may also be a part of the cycle stock which has not reached its destination. From the point of the sender these should still be considered as stock as they are not ready to be used.

Safety or Buffer Stock – Safety stock are those which are held for times during emergency or if there is a sudden spurt in demand forcing for the use of more materials. It is a frequent practice to keep a fraction of the average inventory to cover for the unforeseen situations.

Speculative Stock – These are stocks held for any other situation other than the immediate satisfaction of the needs of the company. This may be done in case if there are some lucrative offers for buying in enormous quantities or price change forecasting.

Seasonal Stock – This is also a type of contemplation where the inventory is bought early in the season before the production is underway. This is done to provide a reliable working conditions as the temporary workers can be hired on that basis.

Dead Stock – These are typically waste inventory which has no use in the foreseeable future. Dead stock can be created for several reasons, like if there is a change in technology and the materials used in the system are no longer useful then it is likely to end up as a dead stock. And if there is no way to recycle the dead stock, there may be huge losses for the firm. [46]

[46] Lambert D M, Stock J R. (1987). *Strategic Logistics Management*. 3rd Edition. Boston: Richard D. Irwin Inc. pp 403-407

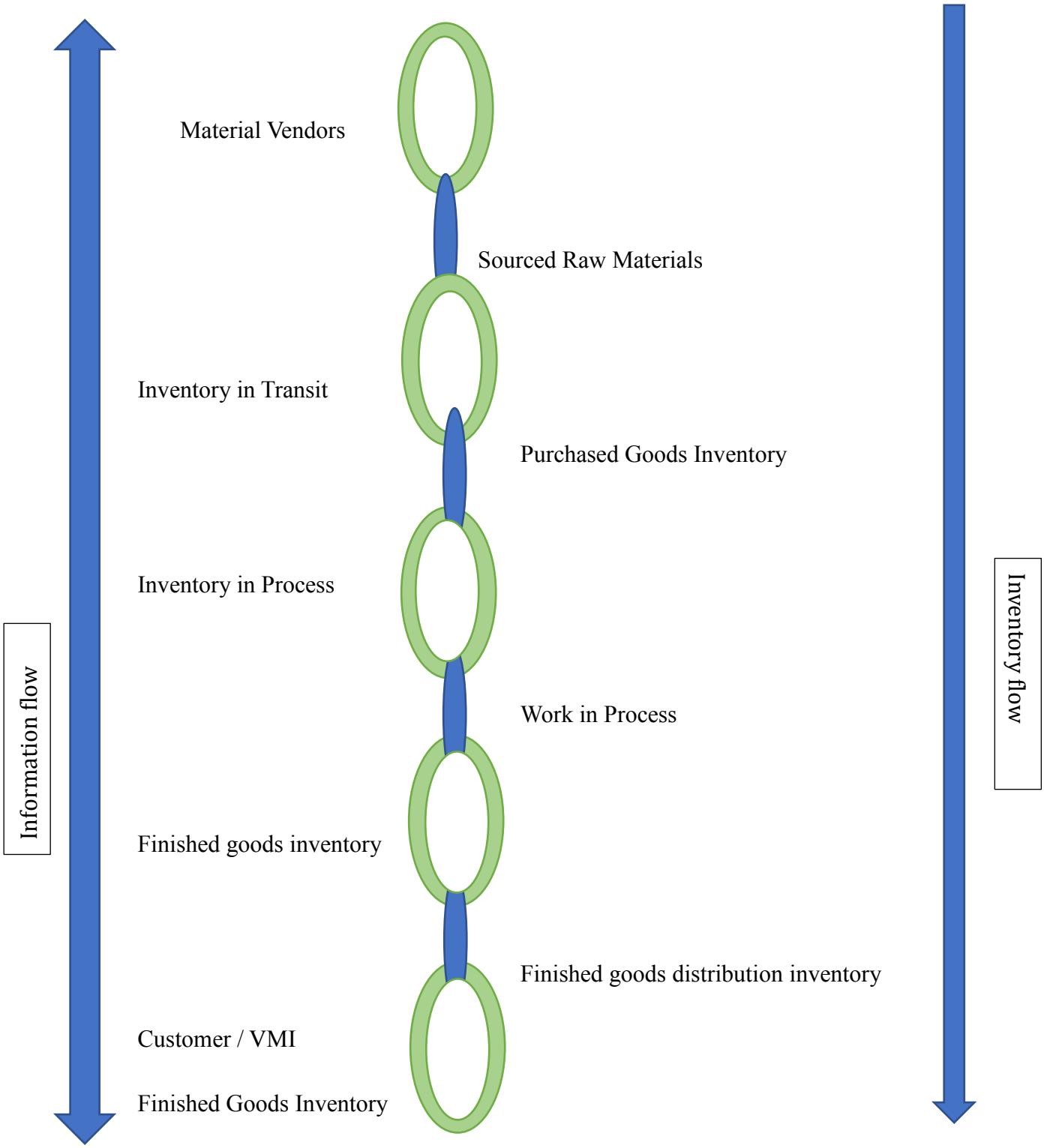

Material Vendors
Sourced Raw Materials
Inventory in Transit
Purchased Goods Inventory
Inventory in Process
Work in Process
Finished goods inventory
Finished goods distribution inventory
Customer / VMI
Finished Goods Inventory
Information flow
Inventory flow

Figure 13: Inventory chain optimization (Illustration at own construction) [47]

3. Business of E -Commerce

3.1 Background

The E-commerce industry is growing at a rapid pace and in 2013, sales of 1.2 trillion US Dollars was registered in B2C segment alone. Almost 40% of the internet users globally have had some form of exposure to E-commerce. [48]

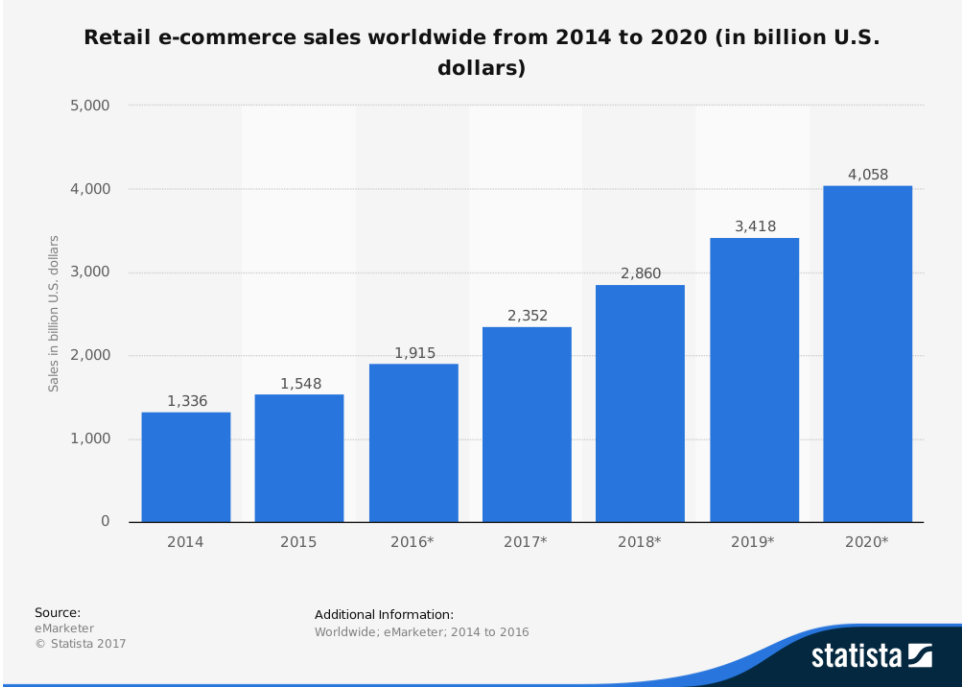


Figure 14: Retail e-commerce sales worldwide [49]

Currently all companies are moving to the online platform. Even brick and mortar stores are

[47] Benton W. Inventory Chain Optimization. [online] GRA. Available at: http://www.gra.net.au/resources/insights-and-publications/2003/11/46-inventory-chain-optimization [Last accessed: 6th August 2017, 03:06 pm]

[48] Statista. Statistics and Market Data about E-commerce. [online] Available at: https://www.statista.com/markets/413/e-commerce/ [Last accessed 29th July 2017 at 05:54pm]

[49] Statista, (2017). Retail e-commerce sales worldwide from 2014 to 2020 (in billion U.S. dollars) Available at: https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/ [Last accessed 6th July 2017 at 05:56 pm]

making sure they have an online platform to offer. Earlier e-commerce was done mainly by computers but now major transactions are taking place via the mobile devices which offer easy on the go opportunity to purchase products or services.

3.2 Characteristics of E-marketplace:

The e-market place boasts of a few distinct features. Businesses pay negligible amount of money to middlemen for selling their products compared to the traditional methods. Almost all the companies sell their products directly to the customers via their platform. Understanding the customer's preference and choices is also here. Since it is digital based and with the web analytics a user's a user can be shown the products they have wishing to purchase. So, for example if a person looks at some watches online they can be shown targeted advertisements of watches while they browse something else. This is a significant advantage unlike traditional marketing, where the preferences of users remain largely unknown. Customer feedback for the products is also easier to obtain as survey forms take only a couple of minutes to fill out and the statistics can be mapped easily from it.

Prices too can be determined and set easily in e-commerce. However different pricing strategies are followed for several types of products. A customer-related price differentiation offers different prices to customers based on numerous factors like age, demographics, income status etc. So, for example customers over a certain age, or students can get products for a certain amount which may be less than what is offered to the general public. A quantity-related price differentiation is followed when a designated number of items are purchased or when a certain threshold amount of money is spent of shopping. These qualify for additional discounts and in most of the cases a free delivery is offered. These offers are generally time bound or the products need to be purchased in a single shopping window. The last one is service-related price differentiation, here the prices of products vary from the additional service that is offered to the customer along with the main purchase. There can be a few examples for this, so with an intangible item like software services a lesser price can be paid if someone does not wish other features like tutorials. In tangibles items like furniture a

customer may need to pay a higher amount if they wish the furniture to be assembles at their home and wish not to do it themselves. [50]

Right now, most of the purchases made in the online sector attributes to the garments and sports related goods with the highest users being in the 16-24 years old category, followed by booking for travelling for work or vacation purposes which is mostly used by people in the age group between 55-74 years. Interestingly electronic learning materials are not so popular till now even among the young group. The graph below shows the most popularly bought services on the e-commerce platform.

[50] Meier A, Stormer H. (2009). *eBusiness & eCommerce – Managing the Digital Value Chain*. Heidelberg: Springer, pp 20-40

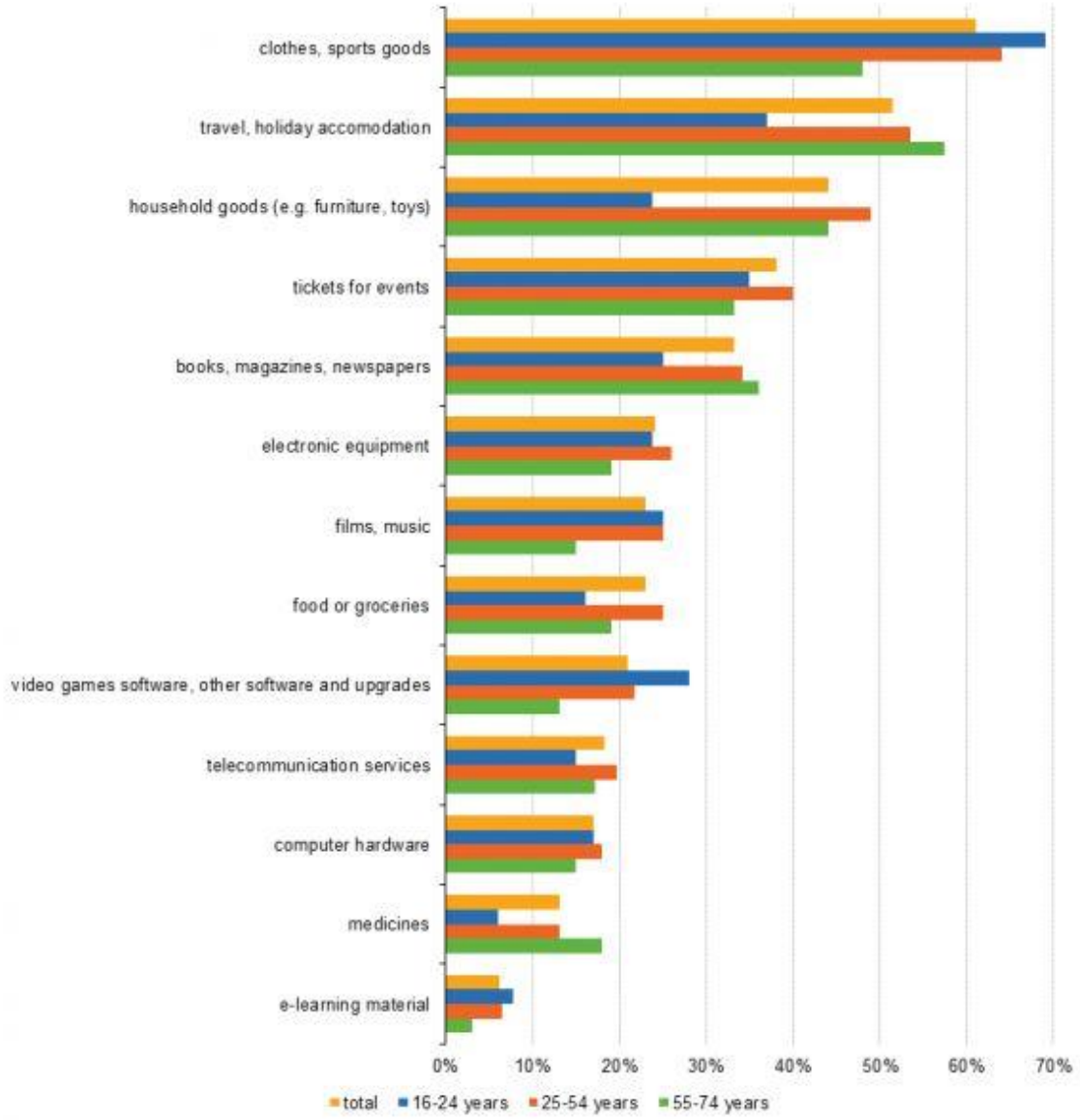


Figure 15: Different goods or services via online purchase (2016) [51]

Below is a figure for the amount of money spent by users in 3 months ending December 2016. Maj Users across all age groups spent between 100 to 500 euros in those 3 months. An interesting thing to note is that users in the higher age bracket spends more than their younger counterparts when it comes to purchases above 500 euros. This might stem due to the fact that customers in the age group of 16-24 do not have stable or high income.

51 2016. E-commerce statistics for individuals. [online] Eurostat Statistics explained. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/E-commerce_statistics_for_individuals [Last accessed: 6th July 2017 11:57 am]

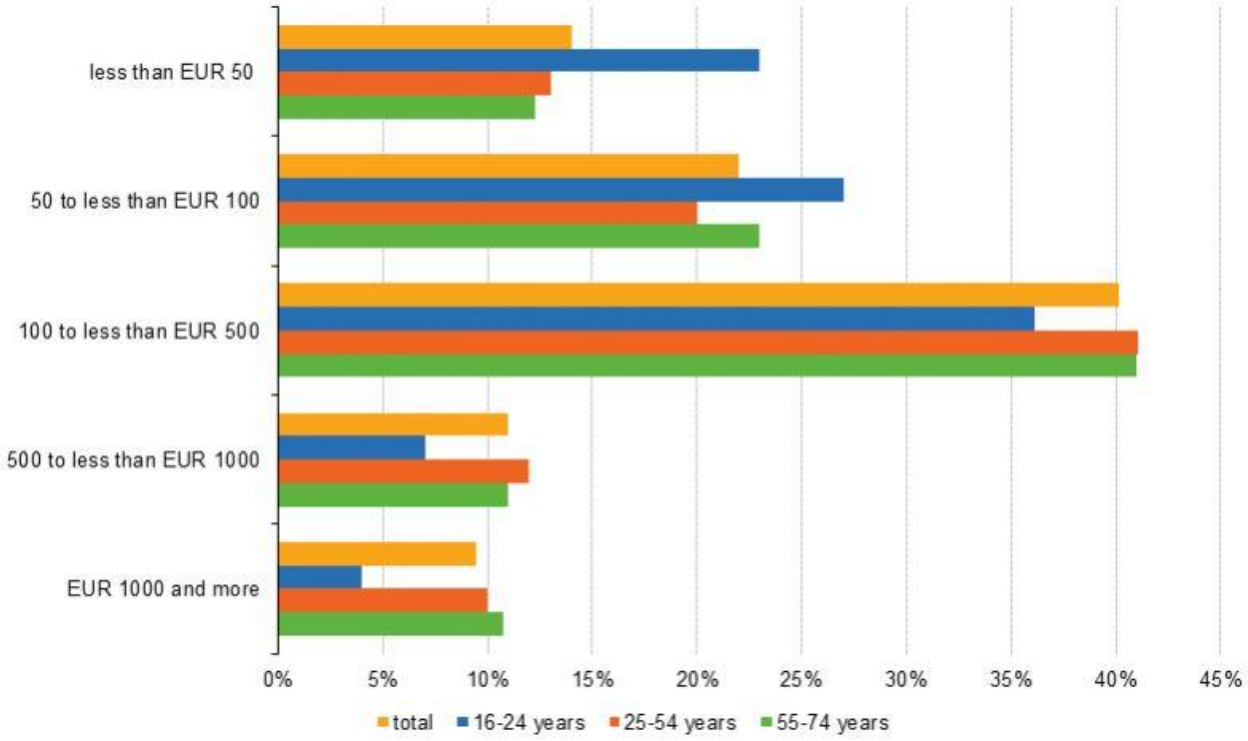


Figure 16: Average money spent by age groups [52]

3.3 Types of E-business models

Electronic shops – This is a website of a company selling some products of their own make. This serves as a channel for customers to directly purchase if they know what they wish to buy. The customers have some relief that. From the perspective of the firms it serves as a major area to grow their business and understand the demands of the customer. If the firm sees they are getting a lot of orders from different areas it might be a good indication for them to expand.

Electronic malls – This is a bigger version of the electronic shops where a lot of them are pooled together in a single place. The e-malls are made up of companies which have something in common like products sold, types of settlement system or section of society

[52] 2016. E-commerce statistics for individuals. [online] Eurostat Statistics explained. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/E-commerce_statistics_for_individuals [Last accessed: 6th July 2017 11:59 am]

that it aims for. The revenue model for the operators if e-malls are, it can promote products through advertisements and provide other facilities. The advantage for the customers is that they have access to various shops of their genre and can compare products for purchase easily.

E-auctions – This is a process where products are offered for everyone to see and buy it at their convenience. If the seller has an excess of any product they can list it and businesses or retail customers can purchase it. The buyers of these products can potentially have access to all types of products and since generally excess or wanted stock is listed they can get it at a discount too. The providers of the platform can earn commission for providing the technology platform and additionally earn some revenue from advertising on its site.

Buyer aggregator model - The buyer aggregator model is to avail the benefits of buying substantial number of items to avail a bulk discount. This model essentially pools in a lot of buyers who wishes to buy tiny amounts of particular product but does not wish to pay the retail price. Thus, via the platform the buyers can form one community and purchase the product for a lesser price. However, this is not such a successful model and it is not seen much now.

Classifieds – This is similar to the concept of print media. Here the seller or buyer puts up their advertisement and describes what they are selling or willing to buy. If any interest is generated they contact the lister and settle the deal amongst themselves. The lister here pays a transaction fees for putting up the advertisement in the portal.

Third party marketplaces – These types of marketplaces are owned and operated by firms who have experience in publicizing products on the web. The firms selling the products may not have expertise or digital infrastructure to sell online, therefore take the help of these experts to list and sell their products. The platform and the payments system is taken care by the third party lister. These marketplaces may include various products in a single place or it may be industry specific.

Affiliate Model – This is a business model where affiliate partners enter into an agreement with the sellers to promote and sell their products by providing a clickable link which can lead to purchase. The affiliate partners provide an advertisement in their websites and lure the customers to buy the products from their link. The affiliate partners earn a commission every time a product is purchased through their advertised channel. [53]

3.4 Marketing and Promotions

Majority of the e-commerce users tend to purchase products which are rated and reviewed by peers. This instils a sense of trust and confidence into the buyer's mind on the authenticity and the value for the products. The e-tailors also tend to sell additional products based on the customer reviews. For example, if a customer purchased a sofa and they write on the reviews that they would have also liked cushions displayed along with it, the companies can add an additional section displaying items that are complementary with the purchased product. This role is however being taken over by computer algorithms which is integrated into a recommendation search engine which displays additional items after every product is put in the electronic shopping cart. The obtained user data from customers is also used for boosting sales in some products. If statistics are put forward that a specific percentage of people prefer an item over another which even may be slightly costlier with the same benefits, human psychology tends to go for the items which is brought by peers. Since every industry is different so the collection of feedback for each of the sites may be different. Some of the common methods of marketing using feedback collection and user data to improvise for further sales are:

- Customers Who Bought - This is a simple recommendation system to give information from the customers who have purchased the product. In this process, the person who has selected a product gets additional details as to what other products are purchased along with it. This makes the shopping experience much more

[53] Combe C. (2006). *E-business Management and strategy*. 1st Edition. Oxford: Elsevier Ltd. pp 68-76

fulfilling as the customers do not have to search for complementary products because it is just a click away.

- Direct Recommendations – This is just giving feedback on the product purchased. With different e-commerce having their own scale of measurement, it generally ranges from number of stars with higher the number the of stars to better the product or even with emoticons where the best experience is rated with a smiling emoticon.
- Newsletter Signup – Signing up via newsletters is the effective way being in touch with the customers all the time. If the users like a particular e-commerce company for whatever reasons, it may be the quality of products, price or the shopping experience they can register themselves in the database of the company. This way if there is any latest offers or new products available an email or a text in their phone is sent. The customers also have an option to choose if they wish to receive updates on specific categories of products which interests them. This helps to keep the customers updated on their offerings.
- Purchase Circles – This is a special type of recommendation where the person browsing or wishing to purchase is shown recommendation s depending on the area of residence or the preferences. For example, if a person is registered with a particular institution then he or she may get recommendations based on what others from that institutions prefer. Or in another example a person may get recommendation on the city of their residence. This helps the customers relate to the products. [54]

The next type of activity that E-commerce companies engage in for generating higher sales is via promotions. It is a way to highlight customers of their presence and the products they are selling. They can also target as to why they are superior to their competitors. The internet can provide a cheap opportunity for brands to connect with their customers. It is seen that new customers to e-commerce tend to purchase products which they had bought offline. Thereby effective promotions are needed for companies who have just started off their store

[54] Schafer J B, Konstan J A, Riedl J. (2001*). E-Commerce Recommendation application*. Data Mining and Knowledge Discovery. (5), pp 115-153

in the online format. [55] A few ways of promotions are:

- Banner promotion– This is an interactive way of getting the customers attention to and generally redirecting them to a particular product, a product range or the company website. A banner is generally presented in the form of a clickable hyperlink attached with a picture or a text message is sent to the users. There is some information provided in the pictures or texts and it then suggests the viewers to have a look by clicking on the banner. Overall a lot of users do not click on the banners but the e-commerce companies are successful even a few percentage of the people click on it and go on to make the purchases.
- Buttons – These are an extended version of banners but in a way subtler. These are small images with hyperlinks which is kept in the same position of a page unlike the banners which may differ. The buttons do not occupy huge spaces but going forward over the years these help in building a better image of the company in the eyes of its customers.
- Nano sites – Nano sites are basically websites which that come along with the banners. So, when a banner is being displayed users can make purchases without the need to go to the company website. All necessary actions like purchases or subscription can be done through the nano site.
- Microsites- These are specifically designed for some particular events. Also, commonly known as landing pages, these target users who have shown some affinity towards the products. For example, if the user has downloaded a white paper or uses the pricing calculator of a company, then they can be given a micro site that suits their needs. This type of promotions is very effective as it addresses the concerns directly.
- Branded Content – These are specially created contents made accessible to all users to promote itself. So, a company can make a research and upload it on the web to for

[55] Allen E, Fjermestad J. (2001) E-commerce marketing strategies: an integrated framework and case analysis. *Logistics Information Management*, 14 (1/2) pp 14-23

all users to see. The advantage being that users can use the information as well as recognize the brand. This instils a sense of trust. [56]

4. Logistics in E-Commerce

4.1 Introduction

The advent of the internet not only had an impact on the way we do business but the overall supply chain process has been changed because of this. The supply chain process has become more technology driven and all processes whether big or small requires the use of the internet services. This however has made all the processes faster and smoother and businesses have been able to grow their turnover quickly. Due to this fast-increasing sale, traditional businesses also had to adopt and change their logistical strategy. Companies with lower sales and lesser financial independence operate a distinctive style of logistics whereas bigger companies with better financial power use a different approach for their supply chain processes. The logistics system of the e-commerce companies varies from the traditional methods in a number of ways. It does not need to transport bulk order goods at once but smaller order sizes. The success of an e-commerce company is determined by quickly it is able to cater to the logistics process. [57] The E-commerce logistics can be differentiated into various types depending on the model of operation they choose.

4.2 Types of logistics in E-commerce

Self-Logistics Model – In this type of logistical systems, the entire process is operated by one single entity. The E-commerce company manages both its retail business and operates the logistics too. The advantages of this type of system is the manner and the reliability in which the system can be set up. When the organization starts decides for having their own logistics model they are aware of all the data that needs to be processed and with over time

---

[56] Meier A, Stormer H. (2009). *eBusiness & eCommerce – Managing the Digital Value Chain*. Heidelberg: Springer, pp 83-84

[57] Cho J K, Ozment J, Sink H. (2008). Logistics capability, logistics outsourcing and firm performance in an e-commerce market. International Journal of Physical Distribution & Logistics management, 38(5), pp 336-359

the system automatically corrects itself by trial and error. [58] Another aspect is that the company can always maintain the control and secrecy of their operations as it is not operated by someone else.

Third Party Logistics Model – Commonly known as 3PL model, it is one of the most used source of logistics. In this type, the goods are transferred only by a logistical company known as the third party. It can be understood as a system where the goods are transported by someone who has no direct connection with the sender or the receiver. Their job is limited to just collecting it from the sender and delivering it to the receiver. The third-party logistics company in their capacity manage the other process related to the transportation like warehousing etc. [59] To start off during the 1970's third party logistics was limited to just warehousing for the companies who faced temporary shortages of warehouses due to factors like peak season demand and others. Seeing the opportunity during the 1980's it slowly began assisting the companies with managers who would help oversee the handling of the goods adding an additional dimension to improve the customer satisfaction. By the end of the decade third party logistics was able to integrate both the features well and started to offer full-fledged services. Organizations were quickly able to understand the benefits of this model as it provided additional services which would have cost more if companies were doing it individually. It is estimated that the third-party logistics industry has an annual growth rate between 18-22 percent. [60] The reasons why 3PL is selected over other methods has changed over the years. Price was the 11th most crucial factor in 1994 and moved to the 4th position in 1999 but by 2003 it had become the first criteria. This translates down to cost reduction which was ranked 14th in 1994 then 6th and 5th in 1999 and 2003 respectively.

---

[58] Bartholdi J J, Eisenstein D D, Lim Y F. (2010). Self-Organizing Logistics Systems. *Annual Reviews in Control*,34(1), pp 111-117

[59] Yang X. (2014). Status of Third Party Logistics – A Comprehensive Review. *Journal of Logistics Management*, 3(1), pp 17-20

[60] Aghazadeh, S.M. (2003). How to choose an effective third party logistics provider. *Management Research News* 26(7), pp 50-58.

Interestingly reliability as criteria remained in the second rank for all the three years. [61]

The table below shows the services for which third party logistics is used:

Logistics Service	Percentage of Users
Domestic transportation	80%
Warehousing	66%
International transportation	60%
Freight forwarding	48%
Customs brokerage	45%
Reverse logistics (defective, repair, return)	34%
Cross-docking	33%
Freight bill auditing and payment	31%
Transportation planning and management	28%
Inventory management	25%
Product labelling, packaging, assembly	22%
Order management and fulfilment	19%
Service parts logistics	12%
Fleet management	12%
Information technology (IT) services	11%
Supply chain consultancy	11%

[61] Aguezzoul A. (2007). The Third Party Logistics Selection: A Review of Literature. *International Logistics and Supply Chain Congress*, Nov 2007, Istanbul, Turkey. pp 7

Customer service	7%
LLP / 4PL services	6%

Table 3: Services third party logistics used for. [62]

There are a few reasons as to why the 3PL model is popular. Organizations tend to prefer to concentrate on their core activities and transfer all non-core work to a reliable partner. In case of e-commerce organizations their main aim is to provide a platform to the buyers and sellers. They are also involved in mitigating in conflict that may arise due to quality of goods, commission structure etc. But once the goods are to be interchanged it is safer to transfer the activities to a 3PL company who with a expertise in the field handles the process on their behalf. Then comes the point that some companies might just want the packing and delivery as their business model does not require any inventory. Since 3PL companies offer a range of services, organizations are free to choose and pay in proportion. If again there arises a need for inventory then too just by paying proportionately the request can be adjusted. If the entire process were to be managed by E-commerce companies they would need to huge amount of capital to manage the entire supply chain. [63] The service levels rise as well with the implementation of third party logistics model. As the whole supply chain process is bound together the customers start getting the benefits as all transactions are smooth and hassle free. And lastly the goal of every organization is cost reduction and the 3PL method solves this problem as well. Companies do not have to spend a single dime on resources that they may or may not operate to the full extent. This makes the company's margin economically viable and can challenge their counterparts on a global scale. [64]

There are a few challenges that are faced by this logistics model. There is a major concern

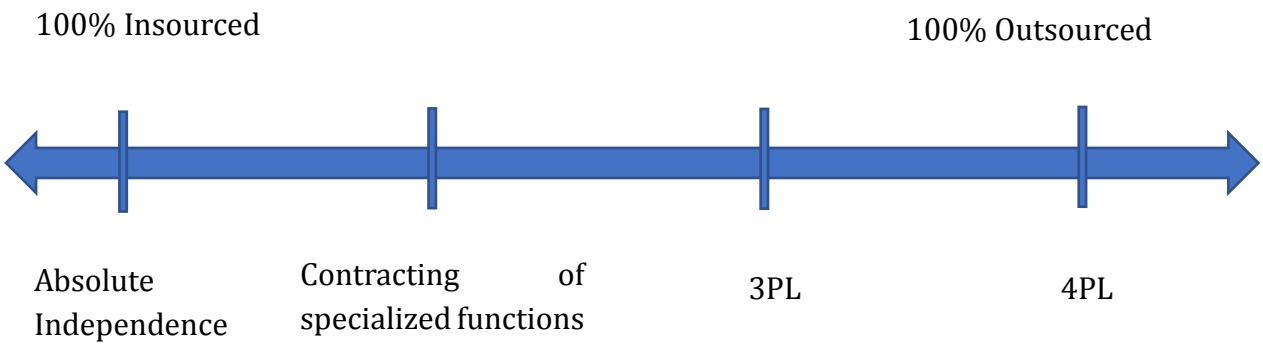
[62] Langley J Jr and Capgemini. (2015). 2016 Third-Party logistics Study. *The State of Logistics Outsourcing*. 20th Annual Study. pp 13

[63] Zhang C, Okoroafo S C. (2015). Third-Party Logistics (3PL) and Supply Chain Performance in the Chinese Market: A Conceptual Framework. *Engineering Management Research*, 4(1), pp 38-48

[64] Yang X. (2014). Status of Third Party Logistics – A Comprehensive Review. *Journal of Logistics Management*, 3(1), pp 17-20

with the maintenance of confidentiality in the use of third party logistics. There is always a chance that the key information on which the business is set up may be given out to a competitor. The user of the 3PL service will always be dependent on this model as they have never gained experience handling the supply chain processes like how these companies. [65] Not a direct challenge faced because of the 3PL model but the board members of many companies do not trust this model as they feel the clients would not be satisfied by the type of assistance provided by 3PL as opposed to their own employees. Their internal employees may too be affected with the involvement of outside help of companies and they might as well be less secured in their jobs. Sometimes the firms cannot find the balance between having their own logistics or outsourcing it and result in miscalculating the actual financial impact on them. This results in losses for companies. [66]

Fourth Party Logistics – Known as 4PL logistics it is an advanced form of the third part logistics system. It can be defined as a supply chain which encompasses all the activities of a manufacturer and provides additional support which was not possible to be achieved via the third-party logistics model. It is a process which fits in between the businesses and the outsourced logistics model thus making the latter redundant. [67]



[65] Kimura T. (1998). The emergence of third party logistics. *NLI Research Institute*. Tokyo, Japan, pp 3-12.

[66] Sheikh Z, Rana S. (2014). The Role of Logistics Service Providers in Supply Chain Performance Management: A Comprehensive Literature Review. *International Journal of Academic Research in Business and Social Sciences*, 4(5), pp 608-613

67 Kutlu S. (2007*). Fourth Party Logistics: Is It the Future of Supply Chain Outsourcing?* Brentwood, England: Best Global Publishing Limited, pp 13-14

Figure 17: Variations of logistics outsourcing (Illustration at own construction) [68]

The picture above provides us a basic knowledge for which the logistics is outsourced. In companies with absolute independence all logistics is performed within the organization. There are no outsiders involved. In the second case only few of the work in which the company has no experience is outsourced. It is only a little amount that is outsourced. In case of 3PL figuratively speaking almost seventy five percent of the logistics is outsourced. And in case of 4PL the total supply chain is handled by a different entity. As 4 PL encompasses a lot of other factors, it is expected that while going with this model companies are expected to smoothen their logistics service by reducing costs and providing additional assistance. For example, it can help companies provide up to date knowledge of the industry and provide innovative ideas to organizations. When a company declares itself as a 4PL provider it moves away from being just the medium for which the movement of goods is facilitated. It takes the role of a supervisor overlooking the flow of goods through the entire supply chain process. The goal of the 4 PL service providers is to provide reliable and concrete action plans which the organizations should be ready to implement.

The table below shows the comparison between the element distinguishing 3PL from the 4PL method:

Factors	3PL	4PL
Association in the Supply Chain Process	Totally involved in the transportation of the goods.	Takes a supervisory role and controls the administrates the process.
Use of resources for facilitation	Tremendous use of resources like transport cars,	Less use of resources; restricted to Information

[68] Buyukozkan G, Feyzioglu O, Ersoy M S. (2009). Evaluation of 4PL operating models: A decision making approach based on 2-additive Choquet integral. *Int. J. Production Economics* ,121, pp 112–120

	inventory units.	technology and communication channels.
Requirement of Expertise	Low; as functions are routine.	High; as different units need unique understanding to manage the product flow.
Customers point of association	Pre-decided and arranged contract.	Dedicated contract; and responsible for the entire process.
Need for manufacturers for demand fulfilment	Medium; can be serviced from various other providers.	High; as the entire delivery network in based on this.
Performance	Measured in terms of cost saved, time bound service and efficiency.	Vast; includes qualitive factors like client service.
Information exchange	Restricted to the execution of assigned duties.	Complete sharing of data to study the process and remove inefficiencies.

Table 4: Differences between 3PL and 4 PL [69]

Let us take a look at the attributes that completes the 4PL method:

- Market Research – The 4PL helps in doing an overall market study of the nature of processes and technologies available. It helps to categories where the bulk of the industries are and if there are any new opportunities. This also gives it a chance to evaluate the competitors in each category and what sets them apart. And lastly it

[69] Vivaldini M, Pires S R I, DeSouza F B. (2008). Collaboration and Competition between 4PL and 3PL: A study of a fast-food supply chain. *The flagship research journal of international conference of the production and operations management society*, 1(2), pp 17-29

helps to identify what drives the industry as a whole.

- Design and Development – Once the research is complete it moves to the phase where the product is tailor made to the requirements by the customer. Once the product has been designed it is to be assessed that all the function is taken care of and there is no error in the development process. If any abnormalities are found then it is rectified immediately.
- Arrangement of resources – The first two processes set up the background and the product itself, but for its implementation resources needs to be arranged. This step help to evaluate the resources that would be required to complete the process and the potential of each of them. The process also includes to understand the expectations of the company and go about their process.
- Inform the value created – The value created should be communicated the organizations. The 4PL entity should point out the benefits it provides not only to supplier but also to the end consumer, at the same time increasing customer satisfaction.
- Deliver results – The promises made are to be delivered during the process. The distributor should have an entire network where all the process designed can be applied to. Special attention is to be paid to the reliability and frequency of the process.
- Customer suggestion and further product improvement – The customer is to be briefed on the processes and look into any suggestions if offered. The operators must be given proper handling instructions to keep the process smooth. If there is a new requirement then the product must be developed to suit it. [70]

Challenges faced in 4PL method- Majority of the organizations are not well informed about the benefits this model brings to an organization. Hence the lack of knowledge keeps them away from implementing this model. Due to the lack of understanding the management

[70] Win A. (2008). The value a 4PL provider can contribute to an organization. *International Journal of Physical Distribution and Logistics Management*, 38(9), pp 674-684

board do not feel the 4PL method would bring any cost benefits to their company. The legal requirements and bureaucratic order keeps away new potential companies. The lack of experts in an organization is blamed upon 4PL companies when their market share starts to diminish. Companies have unrealistic expectations and expect everything to be managed by 4PL. And as companies keep using this method they are somehow trapped in the situation where over dependence renders them unable to manage their own logistics in the future. This is popularly called the login-effect. Taking all the above criteria into effect and also to maintain the authority, profitability and some core work functions not many are yet ready to implement the 4PL model. This method is best suited to large organizations who use extensive technology and have a global presence. [71]

4.3 Progression of the last mile

The E-commerce industry has brought in a lot of innovation the technology used in the supply chain for door to door delivery of products ranging in all sizes and shapes to being on the extreme ends of the value side as well. Well, the service done currently is not so different from the work done when mail orders were prevalent during the 80's and the 90's. But the sheer size and scale now is different. This has led to a new set of problems usually faced during the ultimate stages of the delivery popularly known as the last-mile. This can be defined as the final delivery which goes from B2C. This last chain is the money consuming and unproductive stages of the delivery. The reasons range from not being able to deliver the products to the customer, as unlike letters or postcards the packages need to be validated by the receiver. In many a case, the receiver is not present during the delivery and as a result the package has to be taken back to the sorting centre for a future possible delivery date. This brings into the concept of reverse logistics which we shall deal later in the dissertation. [72] The final stage of the delivery is regarded as the costliest and estimates put

[71] Cherneva D, Voigt K. (2015). Outsourcing to 4PLs – Opportunities, Challenges, Future Outlook. Proceedings of the Hamburg International Conference of Logistics (HICL), 20, pp – 232-255

[72] Macharis C, Melo S. (2011). Characteristics and typology of last-mile logistics from an innovation perspective in an urban context. In: R Gevaers, E V de Voorde, T Vanelslander. *City Distribution and Urban Freight Transport*. Cheltenham, United Kingdom: Edward Elgar Publishing Limited. pp 56

the cost at 28% of the total value incurred due the transportation process. [73]

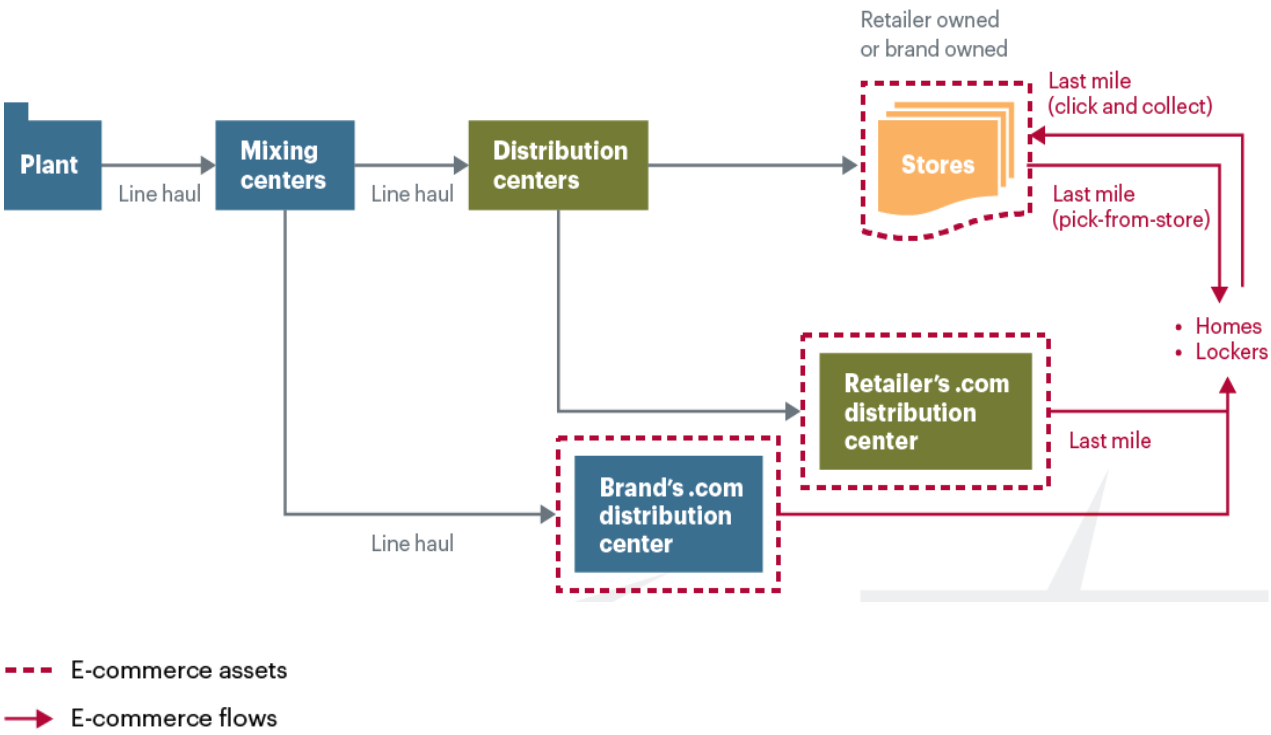


Figure 18: Last mile logistics process [74]

Current Challenges – The industry of the last mile network is currently disintegrated. Every vehicle on the delivery network contributes to the traffic woes and results in more pollution. And since every company prefers to use their own choice of providers there are times when there is a half empty van delivering products. This results in high operating costs for the company. In developing countries, the effect is felt even higher as limited road space is taken

[73] Scott M. (2009). *Improving Freight Movement in Delaware Central Business Districts*. Associate Policy Scientist. Institute for Public Administration College of Education & Public Policy University of Delaware.

[74] Kearney A T. (2017). US E-commerce Trends and the impact on logistics. [online]. ATKearney. Available at: https://www.atkearney.com/transportation/ideas-insights/featured-article/-/asset_publisher/4rTTGHNzeaaK/content/us-e-commerce-trends-and-the-impact-on-logistics/10192?inheritRedirect=false&redirect=https%3A%2F%2Fwww.atkearney.com%2Ftransportation%2Fideas-insights%2Ffeatured-article%3Fp_p_id%3D101_INSTANCE_4rTTGHNzeaaK%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-2%26p_p_col_count%3D1. [Last accessed: 18th July 2017, 06:54 pm]

up larger delivery vehicles. The emissions out of these vehicles contributes significantly to the rising temperatures. [75]

Some examples of studies done on the last mile with respect to the problems faced in the last mile logistics system and solutions for the same.

A study done on the last mile for e-grocery system in Finland showed some results as to what can be done for smoother operations. The challenge was whether to deliver the products directly to the doorstep of the customers and run the risk of not being able to deliver because of their absence and the need to come again or deliver to a box where users can collect it from. But the setting up of delivery boxes was cost intensive in the beginning because it needed to be secure at the same time keep the food in perfect condition. It was seen that customers preferred the groceries to be delivered at their doorstep rather than collecting it from an external box. However, companies were able to save 60% of the costs more while using the delivery box rather than the home delivery. With respect to the cost for the set up, it could be recover its investment within two years. And if the order is to be delivered at the doorstep of the customers then they should not be able to select their delivery timings as this puts tremendous pressure on the resources of the company. The only options they should have is the date on which the products to be delivered. If there is an option of the customers the time will be varied and the delivery vans have to do a lot of extra trips resulting is escalated costs for wages and fuel as the van would be used for multiple times. [76]

Another study done in the United Kingdom regarding last mile logistics found similar results. Due to the presence of delivery vans, it was expected there would be a rise of almost 19-20% by the year 2010. It identified three practised solutions to the problem of a failed delivery. Firstly, it could be given to household living immediately next door where the recipient could collect it later from. Secondly the package can be left outside the recipient's house. This

---

[75] De Souza R, Goh M, Lau H C, Ng W S, Tan P S. (2014). Collaborative Urban Logistics – Synchronizing the Last Mile. *Procedia - Social and Behavioral Sciences,* 125 pp 422-431

[76] Punakivi M, Yrjölä H, Holmström J. (2001). Solving the last mile issue: reception box or delivery box? *International Journal of Physical Distribution & Logistics Management,* 31(6) pp 427 - 439

involves some risk as there is a high possibility that the package may get damaged or pilfered. And lastly it could be returned to the hub from where two options are possible. Either the recipient asks for a re-delivery which may be recovered from the customer or the customer themselves can get the item from the hub. It is estimated that if no prior arrangement has been made with the customer regarding the time of delivery the chance of return ranges from 12% - 60%. It was concluded that some public utility services could be served as collection or delivery points like the post office, railway station or even the supermarkets. Customers would gladly walk to their nearest collection points rather than taking a longer route to the hub. But there is some limitation to the delivery points. If the logistics operator does not have partners for the collection points and there is a spurt in demand then it could pose a significant challenge in the short term. Also, the size of the package plays a role because generally the larger packages cannot be accepted into delivery collection centres as they may not have been for that role. [77]

4.4 Future of E-commerce logistics

The demographics in the world is changing very quickly. It is expected that by 2050 we would have over two billion people than what we have today. Simultaneously the age group of the people will keep changing and some countries might have a higher growth rate of population than what they have due to movement of people from various other countries or continents. The movement may be caused due to economic, social or political factors. The United Nations estimates that currently half the inhabitants in the world live in the cities and by 2050 the number would rise to 70%. This additional influx of people in the urban areas would mean more congestion and from the view point of logistics this would mean more time required for delivery of goods. This would require us to innovate the current structure as this would be not at all effective. The growth is mega cities which is defined as an urban area with a population of more than 10 million would require us to understand and innovate

[77] Song L., Cherrett T., McLeod F., & Guan W. (2009). Addressing the last mile problem: transport impacts of collection and delivery points. *Transportation Research Record: Journal of the Transportation Research Board*, (2097), pp 9-18.

the 'city logistics'. The global supply chain now focusses on economic wealthy countries. The western world and few Asian economically well to do countries is the focus of the supply chain, which makes sense as they are driving the businesses. But it is estimated that the US would lose 4% of their wealth in the coming 20 years. At the same the Asian countries would double their wealth and would control almost 50% of the global wealth. This would largely be driven by the people from the middle class which is expected to rise to over 1 billion by the end of 2030. [78]

With the call for being more tech driven the E-commerce industry has already started responding. Companies are starting to adapt to the latest changes and technologies coming in and shave set up mechanisms to adapt further to the changes when the need comes. Let us take a look at few of the technologies in the supply chain that have already been put to use or is in the final stages of implementation.

Warehousing is a tedious process which requires vast amounts of space and lots of manpower for the proper maintenance of the facility. One of the daily jobs include tagging the goods that have arrived and also which are departing. The height of some of the racks in the warehouse is high making it difficult for the employees to reach up to. Thanks to the drones in the warehouse now that this job can be done in an easier way. The drones can just fly corresponding the goods stacked in the rack and scan it while airborne. This solves the problem of workers using forklift to reach the high roof areas while estimated reducing an 80 members three days job to two days using a drone system. [79] The other possible areas for the use of drones in logistics is in the physical transfer of the goods from one location to another. This can be simulated in four ways:

- Load – Drop – Return – This a fairly simple idea to use the drone for logistics. Here

[78] Christopher M. (1992). *Logistics & Supply Chain management*. Fourth Edition. Great Britain: Pearson Education Limited. pp 257-258

[79] ITE Transport & Logistics, (2016). 10 warehousing tech innovations from around the world. [online] Available at: http://www.transport-exhibitions.com/Market-Insights/Cold-Chain/Archive/10-warehousing-tech-innovations-from-around-the-wo [Last accessed; 20th July 2017, 07:21 pm].

the drones can be loaded with the packages that needs to be delivered and can be set on it way. The drones then fly to the customers house and drop the packages from while it is still airborne and return to the hub. This can be repeated multiple times and the packages can be delivered quickly. The only challenge is fragile items needs to be dropped off very carefully or the packaging needs to be perfect in order to avoid damage to the contents in it.

- Load – Land – Unload - Return: In this process, the drones can be stocked with the package they are due to deliver and sent to the destination with a GPS guided system. Once the drones reach the destination it would then land and the packages can be taken off. The additional feature is that since the drone's land on the surface it can return to their base carrying goods from the delivery point. This may be helpful in the future of E-commerce where the customer can try the products and if it does not suit the drones can bring it back to the hub. This can save hugely on the cost of reverse logistics. This process may take slightly longer than the previous method and the time consumed for each of the operations would be increased.
- Heavy Load Ship take off – Drops Smaller Drones – Drones Land – Return: In this case the are no single drones going back and forth to the hub for getting the packages. It can be said that the hub is literally in the air. Here a large aerial vehicle carries a lot of smaller drones and a variety of packages along with it and places itself somewhere centrally towards a location with heavy demand. When an order comes in the packages then can be put in the smaller drones and delivered to the customers doorstep. The smaller drone can take packages that needs to be delivered and land at the customers doors.
- Heavy Load Ship take off – Drops Smaller Drones – Return – This is just another way to make the delivery process faster than the above method suggested. In this case after the smaller drones are deployed from the bigger ship consisting of the packages, these do not land in the customers place but only deliver the package from air by dropping it in their premises. After doing this they return to mother ship for

further delivery orders. The challenge with this type of deliveries would that the larger ship needs to carry variety of items for quick deliveries and there may be some that will be left out in the process. It can be redeemed by deploying various bigger ships carrying smaller drones with different items on each ship. Currently this idea is very futuristic and would require a lot of capital. But we can expect this to be reality in the coming years. [80]

Figure 19: Drones used in the warehouse [81]

The next system technology that can be used is called on-demand warehousing. As the E-commerce companies starts to grow in numbers they would need space to store their goods. Some of these companies are not so big that they require a warehouse of their own and even some big e-commerce companies' short spaces in warehouses for a brief period of time. With on demand warehousing companies can register themselves on a website and see available spaces. This would help them make decisions quickly and companies can book their slots accordingly. The reverse is also possible where warehouses can list their free spaces

[80] McCoy J V. (2003). *Unmanned Aerial Logistics Vehicles: A concept worth pursuing?* M.S. U.S. Army Command and General Staff College.

[81] Morlin-Yron S. (2016). *Are flying robots the perfect co-workers?* [online] CNN. Available at: http://edition.cnn.com/2016/05/12/africa/drone-scan-inventory-technology-south-africa/index.html [Last accessed: 25th July 2017, 07:32 pm]

available and companies whose requirements fit can book the slot at will. Another significant technological change is the use of robots in the warehouse. As we have written earlier about the use of drones in warehouses, and with the inclusion of robots it would almost turn fully autonomous. There are already companies offering services with robots that are now making a list of the inventory available and helping to pick out goods that are to be packed. Amazon which is a leader in the E-commerce are using this technology extensively after buying out on of the competitors to merge it into their own arm of Amazon Robotics. These robots from Amazon has their own designated space to work in and is on the training to find the inventory themselves from the various and carry it to the representatives so that it can packed and sent to the customer. [82]

Figure 20: Robots used in the warehouse [83]

[82] ITE Transport & Logistics, (2016). 10 warehousing tech innovations from around the world. [online] Available at: http://www.transport-exhibitions.com/Market-Insights/Cold-Chain/Archive/10-warehousing-tech-innovations-from-around-the-wo [Last accessed; 20th July 2017, 07:45 pm].

[83] Gonzalez A. (2016). *Hands, heads and robots work in sync at Amazon warehouses*. [online] The Seattle Times. Available at: http://www.seattletimes.com/business/amazon/at-amazon-warehouses-humans-and-robots-are-in-sync/ [Last accessed: 22nd July 2017, 07:58 pm]

The packaging industry produces a lot of waste which ends up polluting the environment. This is also costly for the companies as they have no further use and all of it gets dumped. The industry is now responding to these types of challenges with their own solutions. The idea of a packages which can be used multiple times s gaining traction along with materials that eco-friendly materials that composts itself if thrown in a natural environment. The pallets which is majorly used in the moving and handling of goods were earlier made of wood completely. This is made it very sturdy yet there was a fundamental weakness. These blocks of pallets need to be moved and carried by a forklift, and during normal usage it would get easily damaged thus reducing its life shelf than originally designed for. The other alternative is plastic pallets which are very costly by nature. So, using neither of them individually was an option. Therefore, hybrids pallets were introduced where plastic were used towards the edges which was in contact with the forklifts most of the time. This resulted in having the rigidity of the wooden pallets at the same time it made the pallets last longer. Another importance of packaging earlier was the need to label the products in accordance to the law. This, although useful created unnecessary wastages. The EU has taken a step where it has allowed the products to be labelled directly on it. There is the need to use additional technology for this i.e. the use of laser printers. There can also be labels marked on to the outer layer of vegetables or fruits which can be later scanned. These marks can later be removed by washing it off and is completely safe. If this was not suiting some of the packaged products, on which codes cannot be printed there has also been use of consumable wrappers or packages. So, this reduces the packages being discarded while the product is being consumed. Companies are also moving away from use of secondary packaging where the items like tapes and materials filling spaces in boxes do not end up with the customers. But in the years to come we can expect some innovative designs in packages to combat this problem. [84]

[84] Adaptalift Hyster, (2013). *Packaging of the future*. [online] Available at: http://www.aalhysterforklifts.com.au/index.php/about/blog-post/packaging_of_the_future [Last accessed: 22nd July 2017, 09:53 am]

The next automation we may see is in the delivery of packages from the e-commerce companies. Although quite impossible to think a decade back, but there may not be the need of delivery vehicles or drivers who work in the last mile logistics. This might now be taken over delivery vehicles which can operate both on the ground and in the air. There has been tests to deliver packages by the use of drones by a leading E-commerce giant and it looks very likely to get inducted into operation soon.

The advantages of using this type of system for delivery is that it is very environment friendly. In the sense that to deliver a single package a delivery vehicle does not need to be sent saving a lot of road space and fuel. In general cases if the customer is unable to collect the package it is sent to a pack station where it is stored with other items or to the nearest hub, for both the cases the customer needs to drive there personally which again goes back to the basic concept of causing pollution and increasing the number of cars on the road. So, when a drone is used for delivery and by any chance the parcel is not delivered it can be flown back and sent again on some other day. As the drones are operated by batteries, it is very environment friendly. The use of drones entails less use of ground personnel. As people delivering small sized products will be less, the companies can save tons of money relying on automation. In all the advancement of use of drone technology for deliveries, the consumers might be real winners. The E-commerce companies are planning to use this service for quick deliveries similar like the one we currently have i.e. the same day delivery. The advantage is that this is going to be even faster. The drones can be launched in as little as thirty minutes and the products delivered in an hour or two.

Though the process is really eye catching and there is a lot of future in this, there has been some doubts raised over the process. The foremost challenge is maintaining the data security. Since the drones know the location of the house and use modern technology to monitor and assess the environments around, it might not be good if the data falls into the wrong hands or even be sold to federal governments. These uses of data collected for other purposes other than the e-commerce business might be morally, ethically and legally wrong on the part of

the companies. The next challenge is for the delivery drones is to navigate around areas which may not be safe. It is worried that without any human intervention these drones could become the target of crooked individuals who may shoot it down and go away with the packages. This method might be common in cities that country sides given the advantage it has in terms of population density. The packages can be difficult to deliver in case of high rise buildings as there is not enough scope for delivery. And lastly the delivery drones may also be subject of attacks by birds. There have been cases where the birds mistake these drone for food or other threat and bring it down. The industry must try to solve these challenges as early as possible to make the logistics process faster for the consumers. [85]

The other technology after the drones for delivering packages are small robots which travel on the pavements and popularly known as droids. These are really small that it can move along with the pedestrians and travel at low speeds so there is no chance of an accident. It has average speed of four to five kilometres an hour. These droids are fitted with all the latest technology and has built in cameras and collision avoidance technology. If it detects a pedestrian it stops till the person moves. These droids have been in tests for a lot of time and some select restaurants have now partnered with for the delivery of their take away food. The cost advantages of a droid and drone would be slightly different to measure. For example, a droid is easily available now and can be used since it travels along the pedestrian route so the regulatory permissions are easy to get. Comparatively the delivery drones require a lot of permissions because it is relatively new and new laws need to be drafted for it. [86] The challenges of droids are that these might be easily stolen or damaged. The contents in it are also not safe as people may try to force open the lids. Currently it has security measures where customers are a secret pin on their phones via messaging which can then be used to open the droid for its content. The droid manufacturers also need to get the users on board

[85] Treacy M. (2013). *Amazon drones: a look at the pros and cons.* [online] Treehugger. Available at: https://www.treehugger.com/gadgets/amazon-drones.html [Last accessed: 22nd July 2017, 10:31 am]

[86] Kahn J. (2016). *Droids, not drones, are the future of e-commerce deliveries*. [online] Chicago Tribune. Available at: http://www.chicagotribune.com/business/ct-delivery-droids-20160419-story.html [Last accessed: 23rd July 2017, 10:43 am]

quickly as many may be sceptic of its use in the beginning.[87]

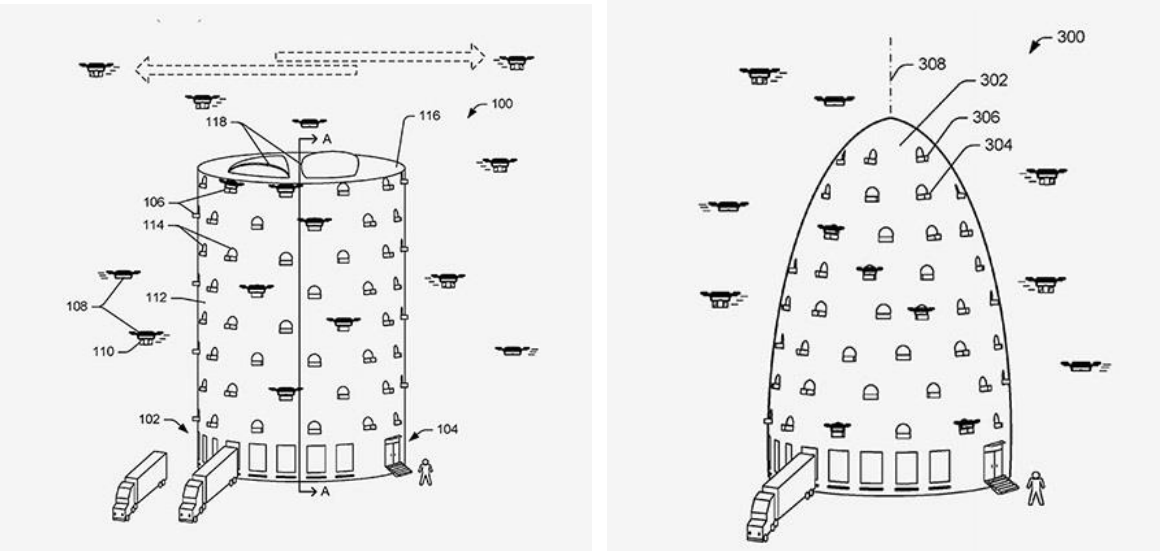


Figure 21: Expected drone delivery in the future [88]

[87] Berman N. (2016). *How Starship Technologies Could Eliminate Human Delivery Service*. [online] Money Inc. Available at: http://moneyinc.com/how-starship-technologies-could-eliminate-delivery-service/ [Last Accessed: 23rd July 2017, 11:09 am]

[88] Yurieff K, (2017). *Amazon patent reveals drone delivery 'beehives'*. [online] CNN Tech. Available at: http://money.cnn.com/2017/06/23/technology/amazon-drone-beehives/index.html [Last accessed: 22nd July 2017, 11:32 am]

Figure 22: Droid delivery to customers [89]

E-commerce companies now face severe competition from each other. There is always cut-throat competition and the products sold are more or less of the same make in each of the E-commerce sites in the same category. The only way to distinguish itself is the user experience it can provide. So, companies are trying their best to provide the ultimate experience which persuade the shoppers for a repeat order. This section comes mainly under demand management in logistics which is responsible to create sustainable pipeline of orders for its continuity. To maintain the exclusivity companies are trying to provide Augmented or Virtual reality (AR/VR) experience to its shoppers. The current challenge faced by shoppers sometimes is how would the products which looks very interesting on the web would look at their home. Sometimes the scale of products shown on website is not right as a result shopper are misled to purchase small or big items that do not suit them. To solve this problem AR/ VR simulates the users home with the products placed in it. This gives a complete picture and the users can select items based on the size and colour that perfectly match their surroundings. The shopping experience can too be enhanced with the help of this technology. Instead of spending time on the website, the users can quickly put on the glasses and have an interactive shopping experience. [90]

The consumers are also bullish on the how technology would evolve in the E-commerce business in the coming few years. An online poll conducted for the edition of Global E-commerce Logistics 2017 showed that 32.6% of the respondents were very positive about the automation of warehouses. 28.3% of the respondents believed that Artificial intelligence would also contribute significantly in the field of logistics in the coming few years. These were followed by automatic or self-driving vehicles (17.4%) which could help to deliver the

[89] Curtis S. (2016). *Just Eat launches world's first ROBOT takeaway delivery service in London*. [online] Mirror. Available at: http://www.mirror.co.uk/tech/pizza-side-droid-just-eat-9372159 [Last accessed: 22nd July 2017, 12:13 pm]

[90] Chen E. (2017). *How Augmented Reality Will Shape the Future of Ecommerce*. [online] Entrepreneur. Available at: https://www.entrepreneur.com/article/287687 [Last Accessed: 23rd July 2017, 09:45 am]

goods themselves without the need of human intervention and then by 3D printing (15.2%). Although 3D printing is ranked as fourth in the list, it will not be a major challenge to the e-commerce industry but will help to further make the products much more customized. [91]

4.5 Reverse Logistics

Traditional supply chain viewpoints consider an arrangement of procedures, driven by demand from clients. The items reach the hands of the clients after going through the chain of suppliers, manufacturers and distributors. Be that as it may, this is not where the supply chain process closes each time. It is not that the physical products or their worth disappear once they get delivered to the client. Many of these products go beyond the traditional scope of supply chain and set off extra business exchanges. Such additional exchanges can be in the line of being sold on secondary markets, being upgraded for latest features, used as spared parts, packaging that can be reutilized upon return and used items turned into raw materials through recycling. [92]

Through this we come to the issue of sustainability. Sustainable advancement is initially described as the combination of three bottom line components. The factors are economic, ecological or environmental and social dynamics. More and more firms are progressively mindful that decisions made about products and procedures can have significant ecological as well as social ramifications. Nonetheless, they should adjust environmental and conservative objectives to guarantee a sensible profit and long-haul feasibility for investors. According to German literature, the essence of sustainability is hugely based on three main principles of responsibility, co-operation and closed loop. The principle of responsibility talks about generational duties for protecting, preserving and enhancing the environment for

---

[91] Buxbaum P. (2017). *Technology and the future of Ecommerce*. [online] Global Trade. Available at: http://www.globaltrademag.com/global-logistics/technology-future-ecommerce [Last Accessed: 22nd July 2017, 10:34 am]

[92] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 27th July 2017] pp 91-92

both the present and the future generations to come. The principle of co-operation participation standard communicates the capacity of interlocking and making the understanding among different procedures and partners to achieve a chain of value. In the interim, the closed loop principle directs us to the reliance and combination of financial and environmental objectives of attaining sustainable improvement. This integration and reliance is not only crucial from the perspective of society and environment but also from business' viewpoint.

Demands from customers as well as the burden from the investors, coupled with legal regulations needing increased ecological responsibilities from organizations can have a positive impact on the monetary flow. An economic development model named 'Closed Loop Economy', in line with sustainable advancement showed up in Europe during the latter half of the 1980s. The standards of which are 'Reduction', 'Reuse' and finally followed by 'Recycle'. Reduction talks about utilizing less energy as well as resources so that less pollution is produced at the end. Reuse involves maximizing utilization of returned items by proper repair. Recycling alludes to the best course for recovery of materials meaning lesser waste disposal and transforming waste into resources. [93]

[93] Nguyen T V. (2012). *Development of Reverse Logistics – Adaptability and Transferability*. MBA. Technische Universitat Darmstadt.

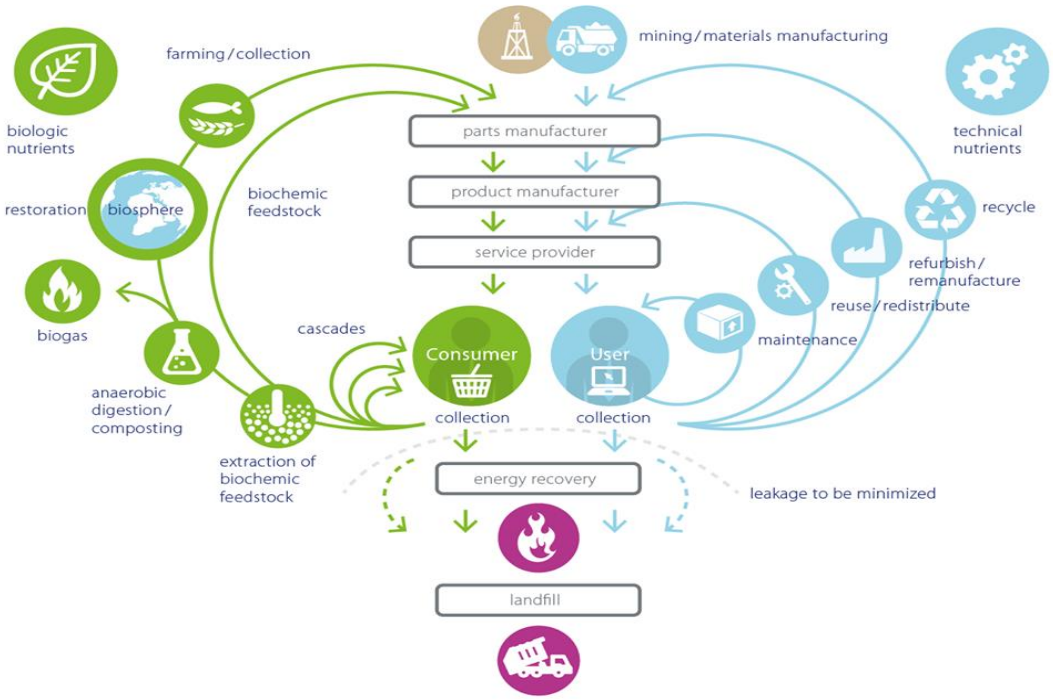


Figure 23: Closed Loop economy [94]

From closed loop economy, came the term - closed loop supply chain management. It basically means recovering an item from the client for an exchange of value, and then repairing and recycling the product for financial gain. Along with it, came a similar new type of logistics, that is: reverse logistics. It is accumulation of packaging materials and parts that can be recycled for manufacturing new items. The contrasting factors between closed loop supply chain and reverse logistics is that, closed loop supply chain is meant for manufacturing an item for resale and financial gain, whereas the latter focuses on recycling materials or disposing hazardous materials for the betterment of the environment.

Lately, the service market has been rapidly changing and we are experiencing a pressing need for effective, real-time service and logistics support as a line of trade. This is all the truer in the field of supply chain management which involves the full cycle administration and control of materials and items to end customers. On a conventional note, supply chain management is based on the fact that an item needs to go through all the steps of being

[94] Ellen Macarthur Foundation. (2014*). Towards the Circular Economy*. pp 15

manufactured, sold and ultimately delivered. The prime objective of the process is to deliver the item to the end user or, on the other hand the purchaser. Little attention has been given to what happens after the item reaches it's the user or purchaser. [95] This is where the relatively new term comes into sight, Reverse Logistics. Reverse Logistics can be defined as a process that manages the returns from users back to the senders. It can also be defined as last step or the closing of the supply chain process by re-collect the value of the item. The increasing multifaceted nature of maintaining and supporting innovative gear and items in the field, especially with the initiation of advanced computer innovation in information handling, office robotization, medical and therapeutic innovation prompted the requirement for administration as well as control of entire units straight to the field and back once more to focal offices for repair, disposition and possible reciprocation to the field. [96]

Definition:

Reverse logistics is a generally new research bearing in the region of inventory network administration and co-ordinations. According to the Council of Logistics Management, the term is frequently used to allude to the part of logistics involved in reusing, proper disposal of waste, and administration of perilous materials. A more extensive point of view incorporates all identifying with logistics exercises done in source cutting, reusing, substitution and disposal. Reverse logistics has been characterized as the motion of item or materials in the inverse course with the end goal of making or, recovering worth, or for correct disposal. The reverse stream may comprise of items as well as packaging materials. [97] The reverse logistics are not quite the same as the conventional logistics operations on the grounds that the conduct of shoppers presents vulnerabilities in the quality, amount, and timing of item returns. Reverse logistics involves returns preparing as well as repair, client

[95] Blumberg D F. (2005). Introduction to management of Reverse Logistics and closed loop Supply Chain Processes. Boca Raton, Florida: CRC Press. pp 5

[96] Emmett S. (2008). *Excellence in Supply Chain Management*. Cambridge: Cambridge Academic. pp 108-109

[97] Tibben-Lembke R, Rogers D. (2002). Differences between forward and reverse logistics in a retail environment. *Supply Chain Management: An International Journal*, 7 (5), pp 271-282

service, parts administration and order satisfaction. [98]

This viewpoint on Reverse Logistics keeps the embodiment of the definition which is basically co-ordinations and logistics. Notwithstanding, it sums up 'purpose of utilization' to 'an assembling, dissemination or utilize point' and 'purpose of inception' to 'a state of recuperation or purpose of appropriate disposal.' Through this, we offer an edge to return streams that were not utilized in the first place. We utilize the articulation 'purpose of recuperation' rather than 'purpose of inception' since streams may backpedal to different points of recuperation than the authentic once. Other than this, 'purpose of recuperation' focuses on the differentiation we need to make between reverse logistics and unadulterated waste administration exercises. Also, we incorporate the reverse course through the expression 'reverse streams' in order to reject what might be considered as forward recuperation. In outline, the meaning of reverse logistics has evolved over period of time, beginning with a feeling of reverse route, experiencing an excessive focus on ecological viewpoints, returning to the first mainstays of the idea and lastly enlarging its extension. [99]

All the more accurately, reverse logistics is the way of moving items from their regular last goal with the end goal of gaining worth. Remanufacturing and restoring exercises likewise might be incorporated into the meaning of reverse logistics. This reverse logistics deals with more than just reusing holders and recycling materials used for packaging. Upgrading packaging in order to utilize less material, or lessening the vitality and contamination from transportation are vital exercises, however they may be better put in the domain of 'green logistics'. In the event that no items or materials are being sent 'in reverse', the exercise is most likely not a reverse logistics exercise. Reverse logistics additionally incorporates preparing returned stock because of harm, occasional stock, restock, rescue, reviews, and

---

[98] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 27th July 2017] pp 91-93

[99] Brito M. (2003). *Managing Reverse Logistics or Reversing Logistics Management*. PhD. Erasmus University Rotterdam.

overabundance of stock. Moreover, it also incorporates recycling and reusing programs, perilous material projects, disposition of out of date equipment, and resource recuperation. [100] Reverse Logistics is a procedure in which a maker methodically accepts already dispatched items or parts from the point for utilization for possible reusing, remaking, or disposal. A reverse logistics framework involves a production network that has been overhauled to deal with the stream of items or parts bound for remanufacturing, reusing, or transfer and to utilize assets adequately. [101]

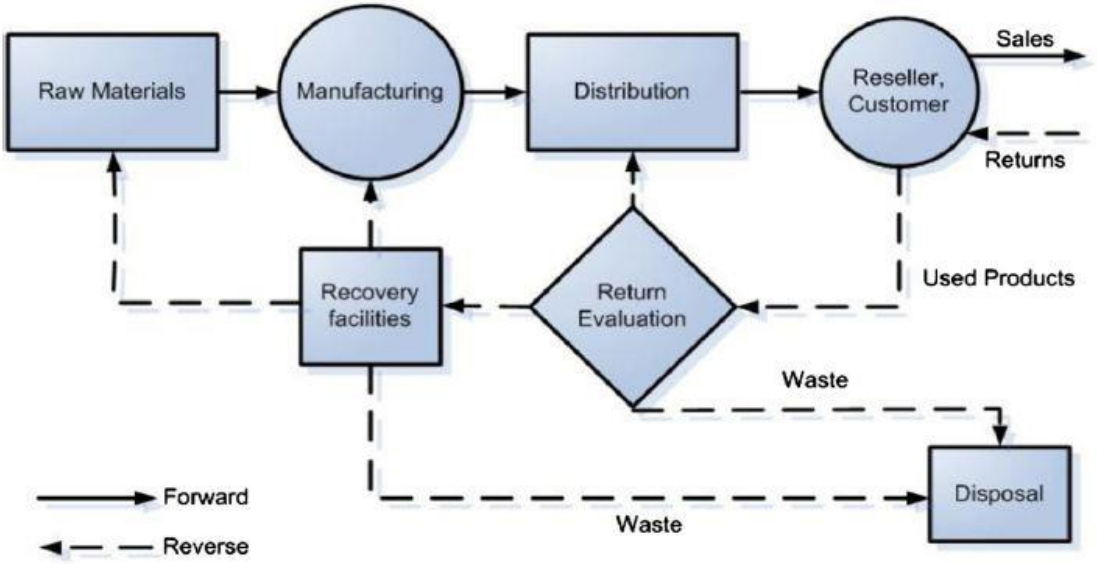


Figure 24: Reverse Logistics Framework [102]

Reverse logistics is different from traditional logistics or forward logistics in many ways. The contrasting aspects of reverse logistics is discussed in detail as follows:

Complexity in prediction – Since the inverse stream originated from the customers' side, it is almost totally unverifiable. Be that as it may, a certain pattern can be seen, which is that reverse logistics has a tendency to take after patterns in forward streams, but with some slack.

---

[100] Rogers, D. S, & Ronald S. (1998). Going backwards: reverse logistics trends and practices. *Reno Center for Logistics Management*. pp 2-3

[101] Dowlatshahi S. (2000). Developing a theory of Reverse Logistics. *Interfaces*, 30(3), pp 143-155

[102] Govindan K., Soleimani H., & Kannan, D. (2015). Reverse logistics and closed-loop supply chain: A comprehensive review to explore the future. *European Journal of Operational Research*, 240(3), pp - 603-626

For instance, deals and promotional activities will be trailed by an influx of returned item. This basically implies that all the data related to the demand, the occasional picks, the sales and promotional activities is a key component required to be shared from the marketing division, with the forward and reverse logistics keeping in mind the end goal to plan ahead of time the resources and assets required whenever.

Anyway, different items have different rates of returns and this rate is absolutely dependent on quality of the product and various other aspects coming from the viewpoint of the clients. This makes predicting or estimating the return all the more difficult compared to estimation of demand.

Converging transportation - The run of the mill exchange of the transportation is to be able have a combination of forward and reverse transportation. Such a combination has the potential to save a lot by one party but at the same time, they also need to overcome some challenges and implement some limitations to their supply chain network.

Challenges are mostly from the logistics point of view, for example, if one truck must be utilized for both new items and also in order to keep returned ones from the retail locations, then trucks with a First-In First-Out methodology ought to be brought into existence keeping in mind the end goal to permit this sort of operations. Besides, the distance between distribution centres and that of the return centres must be kept as less as possible in order to save on the travel time of the trucks.

Quality of product as well as packaging - Gathering returned items is further convoluted by packaging. Most of the times, the packaging is not finished, opened or disfigured, paving the way to making handling more difficult. An inadequate packaging gives rise to the danger of harms for the item as well as the distinguishing proof of the item in the reverse stream. Standardization in packaging is extremely necessary for the reverse stream.

Unclear destination - Because of the immense scope of conceivable goal of each returned thing, figuring out where a specific one will be sent may require a lot of time. Deciding the final address for the returned items should be more programmed as well as faster.

Unclear disposition choices – Many a times there are guidelines and restrictions in the secondary marketplace which are generally forced by the sellers. This makes it all the harder to recognize the address of the items.

Varied Pricing - The scope of prices in the reverse stream for a particular item is quite broad and this is because of the fact that not all items in this stream have the original level of quality. The issue of product life-cycle issues assumes an essential part here. It might be hard to perceive when an item is no longer alluring to a specific representative/purchaser.

Speed is not prioritized - The return procedure is not regulated. Many a times, an item stays in the centres of return for a really long time which makes them diminish their esteem. The prospective customers of the returned item do not have the possibility to whine about it.

Costing based on various factors - As the flow for the reverse stream is not very structured, the costs for the same are way higher than that of forward or traditional logistics. Costs for handling are also higher due to the fact that there is a variety of products and there is no uniform packaging for such wide range of products. Challenges in the act of distinguishing of returns makes the cost of the inverse stream to go even higher.

Inconsistent inventory administration - The arrival of items has a tendency to be extremely arbitrary in the reverse stream of logistics. Also, there is obscurity in the price at which the item will be sold. This makes the theory for conventional stock administration conflicting in case of reverse logistics. Most of the management instruct to sell the returned items as soon as possible in order to minimize the inventory costs even if that mean not being able to recapture the right value of the item.

Complex product life-cycle stages – It is the length of the life-cycle of an item that decides the engaging quality of it and impacts the esteem that is conceivable to recover. A

progression of key market information is required with a specific end goal to decide if the particular item is as yet alluring or not.

Unclear and complex negotiation - Arrangement is made more convoluted than with new item in light of the fact that the nature of the item is not consistent, as a result of the buyer's unique and uncommon solicitations and also due to the vendor's worries regarding the secondary market.

There are unique principles concerning the estimated worth of the products, that is, based on the agent's desires. This fluctuates according to the quantity of item present with the agent. Anyway, this is just consistent to a certain degree.

Inconsistency in marketing - Promoting challenges ascend from vendor's point of view and also from the need of the fact that price of the returned items should be essentially lower than that of the new item. Additionally, a retailer also needs to concern himself with an inconsistent item supply as there is always a variety in returns.

Process ambiguity - Since reverse logistics mostly has lesser importance in most firms, there is not much technical support available to build its productivity and viability. This division, because of the depicted vulnerability that leads it, would require more data in order to plan the process effectively. [103]

[103] Tibben-Lembke R, Rogers D. (2002). Differences between forward and reverse logistics in a retail environment. *Supply Chain Management: An International Journal*, 7 (5), pp 271-282

Forward Logistics	Reverse Logistics
Uncomplicated forecasting	Relatively complex forecasting
Diverging transportation	Converging transportation
Orderly product quality	Disorderly product quality
Uniform product packaging	Usually flawed product packaging
Distinct destination	Indistinct destination
Regulated channel	Irregularity driven
Definite disposition options	Unclear disposition options
Pricing quite straightforward	Pricing based on various factors
Priority given to speed	Speed is commonly not prioritized
Accounting systems oversee distribution costs	Costs are less clear
Uniform inventory management	Inconsistent inventory management
Feasible product lifecycle steps	Relatively complicated product lifecycle steps
Uncomplicated negotiation between parties	Quite complicated negotiation process due to additional factors
Marketing technique quite common	Marketing technique not straightforward due to additional influences
Easy product tracking with real-time available information	The process is not that transparent

Table 5: Difference between Forward and Reverse Logistics [104]

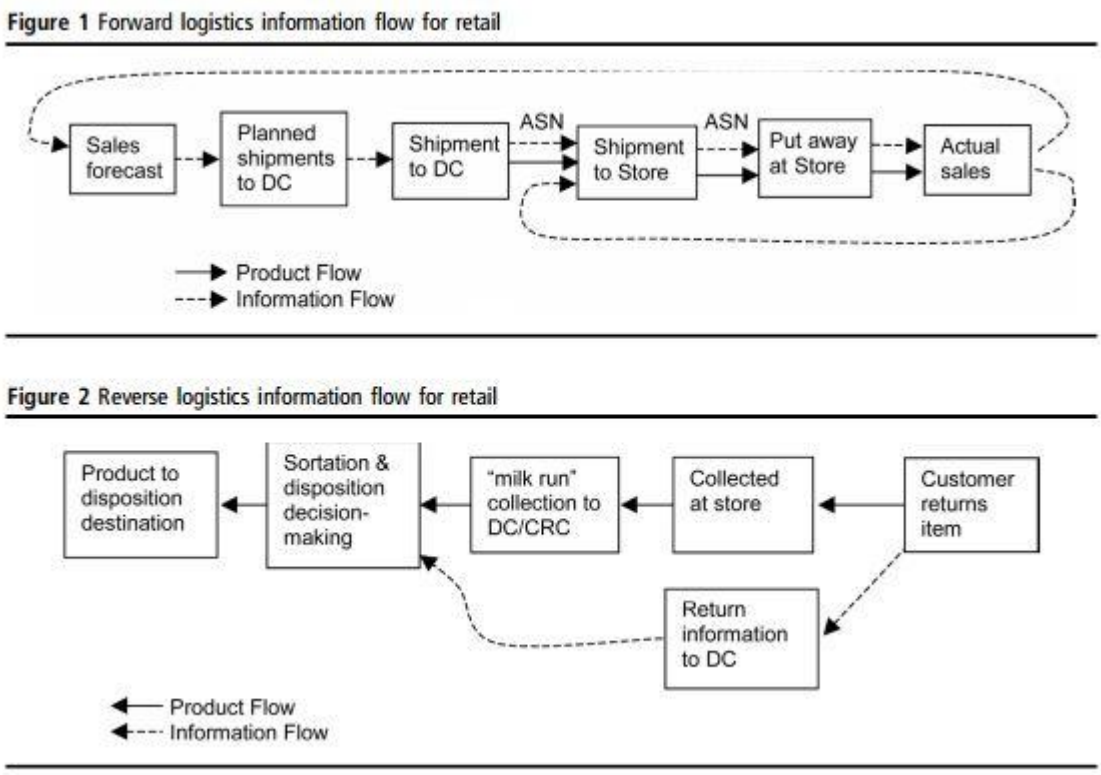


Figure 25: Forward and Reverse Logistics in retail environment [105]

Reverse Logistics focuses on those streams where there is some an incentive to be recouped and the result enters another supply chain. It contrasts from green logistics since that involves ecological viewpoints to all logistics exercises and it has been centred particularly around forward logistics, that is, from manufacturer to client. Greenness has turned into a special term used for a scope of natural concerns, and has positivity associated with it. It is used to propose similarity with the earth, and along these lines like logistics, is a valuable thing. With these words coming together, it suggests an eco-friendly and proficient transport and distribution framework. Conclusively, reverse logistics can be viewed as a component of practical development. An ever-increasing number of companies now understand that

[104] Tibben-Lembke R, Rogers D. (2002). Differences between forward and reverse logistics in a retail environment. *Supply Chain Management: An International Journal*, 7 (5), pp 271-282

[105] Tibben-Lembke R, Rogers D. (2002). Differences between forward and reverse logistics in a retail environment. *Supply Chain Management: An International Journal*, 7 (5), pp 271-282

reverse logistics is an independent business procedure and requires top expertise to effectively oversee it. [106]

Reverse Logistics Model:

The essential reverse logistics plan of action just manages the return of undesirable materials and items to a focal area for handling and disposal. It works autonomously of the direct supply chain network, which initially conveyed it. In this model, which can be kept running as a business or as a service carried out by the government, the focus is on the economic disposal or reusing. A great part of the earliest literature was centred around this model. [107]

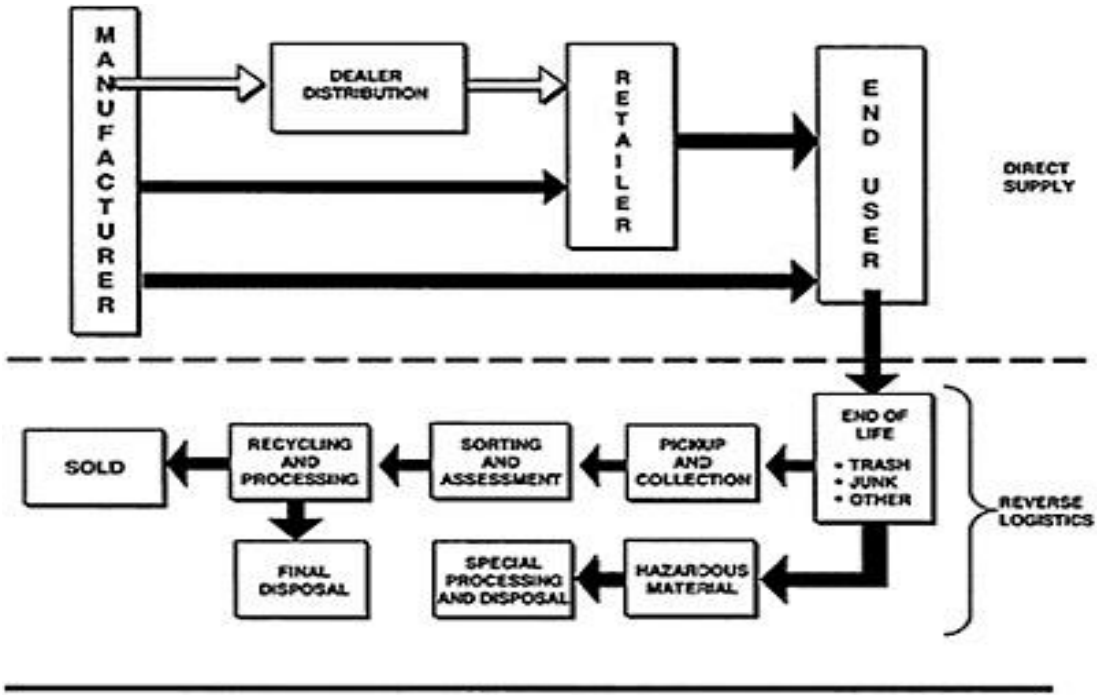


Figure 26: Independent Reverse Logistics Procedure [108]

[106] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 27th July 2017] pp 91-94

[107] Blumberg D F. (2005). Introduction to management of Reverse Logistics and closed loop Supply Chain Processes. Boca Raton, Florida: CRC Press. pp 9-10

[108] Blumberg D F. (2005). Introduction to management of Reverse Logistics and closed loop Supply Chain Processes. Boca Raton, Florida: CRC Press. pp 10

Attention to the craftsmanship and exploration of logistics proceeds to grow. Furthermore, extraordinary enthusiasm for reverse logistics has been provoked. Numerous firms that beforehand did not commit much time or vitality to the administration and comprehension of reverse logistics, have started to consider it. These organizations are benchmarking the return performance with best-in-class administrators. A few firms are notwithstanding getting to be ISO (International Organization for Standardization) certified on their return processes. Driving edge organizations are understanding the vital benefit of having a reverse logistics administration framework set up to keep items both on the retail and in the warehouse new and sought after. [109]

Components of Reverse Logistics:

It is fundamental to see, in a more extensive point of view, the practically progressive changes which have occurred in the area of logistics that help benefit service organization. Considerable changes have, and are occurring as for the administration, course, as well as the control of the entire logistics flow in the technologically advanced world. Though a lot is being currently carried out in the zone of upgrades for call dealing as well as diagnostics and dispatch, it belongs to the area of closed loop control of administration parts and the management of the entire logistics administration unit where the most amount of innovation and advancement has taken place. [110]

The significance of the accompanying components for a successful execution of reverse logistics frameworks are as follows:

- The operations for re-manufacturing are required to be adaptable with the present assembling forms. It is for the most part desirable to depend on present and well demonstrated manufacturing processes. This takes out the need to rehash a

[109] Rogers D S, TIbben-Lembke R. (1998). Going Backwards: Reverse Logistics Trends and Practices. PhD. University of Nevada, Reno Center for Logistics Management.

[110] Blumberg D F. (2005). Introduction to management of Reverse Logistics and closed loop Supply Chain Processes. Boca Raton, Florida: CRC Press. pp 57

completely new remanufacturing process for reverse logistics. Shaping up reverse logistics into the present manufacturing process is a practical suggestion that can conclusively enhance the manufacturing as well as the re-manufacturing operations. Reverse logistics along with the recycling operations have the capability of identifying possible shortcomings within the present manufacturing processes.

- An in-depth analysis of costs should be carried out.
- A special focus is needed towards the list of materials.
- Effective administration and regulatory methods for managing the prerequisites of reverse logistics must be set up.
- Modes and structure of transportation must be very much coordinated with the current transportation frameworks.
- The packaging utilized as a part of reverse logistics ought to be less exorbitant, simple to deal with, and ecologically well disposed. [111]

Drivers of Reverse Logistics:

An organization's reverse logistics exercises are influenced by intra-organizational aspects and that includes an earnest sense of duty regarding natural issues and successfully executed moral norms. There are business policy visionaries who make commitments and assume individual liability in order to make their respective organization take up an eco-friendly philosophy. The outer environment might be characterized as the particular association or gathering that is significant to objective defining and objective fulfilment, and that again goes on to influence choices, activities, and results. It incorporates areas with which the firm cooperates precisely and that have a guiding effect on the firm's capacity to accomplish its objectives such as rivals, clients, methods of production, securities exchange, suppliers, crude materials, government and maybe also the global aspects. Initially, the government can possibly control, administer, or generally impact a firm's practices. The governments of

[111] Dowlatshahi S. (2000). Developing a theory of Reverse Logistics. *Interfaces*, 30(3), pp 146

the developing nations have advanced toward becoming progressively worried over the danger to human and ecological security postured by a range of electronic items that are sent there for disposal. [112]

On the inside, a firm should evaluate the vital factors in planning its reverse logistics framework, for example, key costs, by and large quality, client benefit, ecological concerns and administrative concerns. Which fields should the reverse logistics operations exceed expectations at in order to be ready to accomplish the objective. Reverse logistics chiefs should concentrate on those basic inside operations that would empower them to fulfil the client needs. The accessibility of fast and precise data with which the reverse logistics chiefs can predict the items that would be returned is very helpful. Because of such easily available information, the return procedure has become more proficient. The item recovery administration is the capacity of a supply chain network in recouping the monetary as well as ecological worth of an item as sensibly as conceivable, in order to lessen definitive amounts of waste. A very important concern internally are the operational factors, for example, cost-benefit examination, transportation, supply administration, warehousing, remanufacturing, reusing, and packaging. These elements are crucial and must be considered preceding operational components. Though all the exercises of operation concerns do not hold the same level of importance in all organizations, still they must consider all of the above-mentioned parameters according to the weightage true for their organization. An earnest and conferred exertion from the best administration is vital for fruitful arrangement of reverse logistics frameworks. New advancements are needed as well. Many firms have item development programs which includes plan for ecological benefit dismantling. [113]

---

[112] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 29th July 2017 08:32 pm] pp 94

[113] Ravi V, Shankar R, Tiwari M K. (2005). Analyzing alternatives in reverse logistics for end-of-life computers: ANP and balanced scorecard approach. *Computers and Industrial Engineering*, 48, pp 327-356

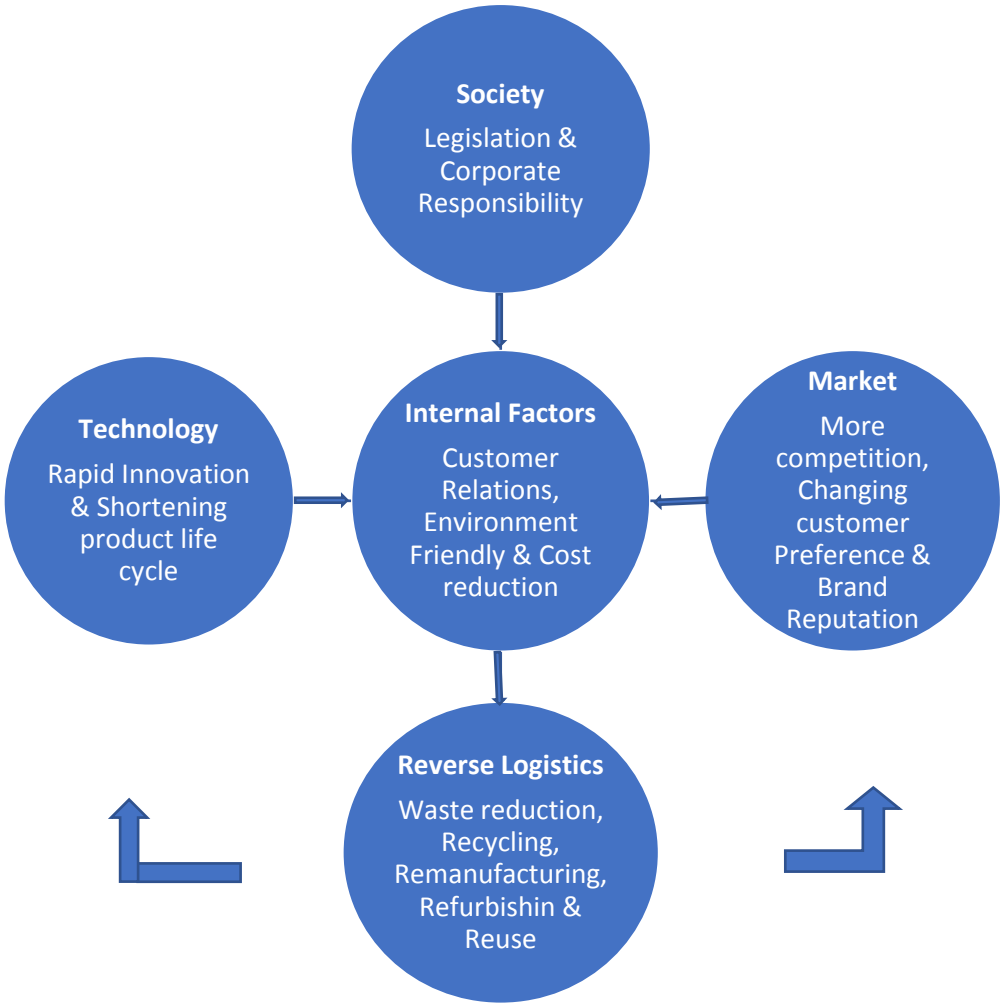


Figure 27: Drivers of Reverse Logistics [114]

The external drivers of reverse logistics are discussed in detail as follows:

Economic: A program of reverse logistics has the capability to fetch straight forward profits to organizations, like for example, Original Equipment Manufacturers (OEM), by diminishing on the utilization of crude materials, by including an incentive along with recovery, and to add to that, by diminishing costs for disposal. New individual parties have

[114] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 27th July 2017 09:08 pm] pp 95

likewise entered the field of reverse logistics, in view of the opportunities to earn money available in the open market of returned or unutilized of items and goods. Like for instance, multiple metal piece intermediaries have made a lot of money just by gathering metal piece and offering the same to various steel companies. These steel companies have mixed these pieces of scrap metal with their raw resources and have brought the production costs down to a large extent. Indeed, even with no prompt expected benefit, a firm can get more included and invested with the entire reverse logistics process due to competitors and other vital issues and can gain backhanded profits. For example, organizations may get included with the steps of recovery as a key stride to get readied for future legal enactment or even to forestall such enactment. An organization may also participate in recovery in order to avoid other firms coming to know of their innovation and technology, or to avert them from stepping into the market. [115] A great part of the interest in a reverse logistics framework ought to be for enhancing long haul quantifiable profit, that is, Return on Investment or ROI, in order to ensure the investors' advantage. Key expenses generally incorporate the expenses of hardware for remanufacturing items, the expenses for qualified specialists to run the inverse logistics framework, and the expenses of additional stockroom offices. Chiefs ought to guarantee full usage of current gear, work, and offices in order to lower the aggregate cost of a reverse logistics framework. To utilize current assets for inverse stream operations, the remanufactured items must be well blended with the overall product viewpoint of the organization.

Remanufactured items ought to be of an indistinguishable high calibre and quality like that of the virgin items. Clients for the most part expect uniform quality from a maker paying little heed to the producer of the item. Low quality remanufactured items can unfavourably influence a firm's image as well as overall profitability. Distinguishing and satisfying the needs and necessities of the clients is fundamental. This key factor of the reverse logistics framework ought to mirror the fundamental governing factors of logistics of right time, place,

[115] Brito M. (2003). *Managing Reverse Logistics or Reversing Logistics Management*. PhD. Erasmus University Rotterdam.

price and lastly, amount. Late moves in shopper mindfulness have expanded the vital significance of making money out of service provided to the clients, for example, Just in Time conveyances as well the services provided after sales and also repairs. [116]

Some other retail-related issues which that reverse logistics have the capability to influence in a useful manner from the financial perspective are:

1. Service provided to the client – Great approaches of returns may give a retailer an edge over other contenders who happen to be less liberal.

2. Effective usage of stock – Expelling old or moderate moving stock and supplanting with more current, more attractive items can help advance deals;

3. Recovering the worth of the item – If it is possible to dispose unsold items fast and successfully, then a portion of the item's worth might be recovered.

4. Protection of technology – If a firm is able to recoup all its own particular items, the firm can counteract contenders from getting aware of their technological advancements, and along these lines may hold leverage commercially. [117]

Legislation: Another imperative driver for the reverse logistics framework is legal enactment. This alludes to any and every ruling that forces organizations to either recover its own items or acknowledge these back once the item reaches the end of its life cycle. These may incorporate accumulation and reuse of items once they reach the end of their life cycle, move the administration expenses of disposition to manufacturers, lessen volume of waste being created and also the utilization of expanded reused materials. For instance, the WEEE, also known as the Waste Electrical and Electronics Equipment, promotes a certain arrangement of basis for gathering, treatment as well as recuperation of all electrical and electronic gear

---

[116] Dowlatshahi S. (2000). Developing a theory of Reverse Logistics. *Interfaces*, 30(3), pp 150

[117] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 3rd August 2017 06:23 pm] pp 98

that has now turned into waste. The mandate also makes the manufacturers responsible for the expenses of these exercises. There has moreover been a limitation on the utilization of unsafe substances during the stages of production. The inverse stream choice taken up for computers at the end of their life cycle ought to guarantee that items that have reached the end of their life cycle are resigned in a way that is agreeable with existing enactment. [118]

Corporate Responsibility or Citizenship: Organizations utilize this particular term in order to show that they regard society coming from good values. Other terms such as social obligation or morals are also used at times to denote the same. In spite of the fact that this particular term is not well acknowledged by many, still suits our objective quite well. This term expresses the feeling of responsibility of the organization towards the betterment of the society as a whole. Coming to reverse logistics, it means that there are certain rules that incites the firm to end up dependably drawn in with reverse logistics procedures. As a matter of fact, there are multiple firms with broad projects on capable corporate responsibility giving both societal and ecological concerns importance. [119]

Internal Factors: The present-day clients request that manufacturers diminish the amount of disposal required for their items. They request clean and vitality sparing generation forms from their providers. These clients need that the conceivably hazardous materials utilized as a part of the generation procedure be supplanted by those that limit harm to clients, more in accordance with the present-day 'eco-good' values. Today the clients are prepared to pay more for a green item. Truth be told, clients drive the partnership for going green. There has been an expanded acknowledgment from the clients for reused products as well as packaging because of worries with the earth. Reverse logistics likewise impacts the client administration and fulfilment. The capacity of companies to handle the arrival of items fast as well as effectively for useful repair is absolute fundamental for its survival. In this manner,

---

[118] Ravi V, Shankar R, Tiwari M K. (2005). Analyzing alternatives in reverse logistics for end-of-life computers: ANP and balanced scorecard approach. *Computers and Industrial Engineering*, 48, pp 327-356

[119] Brito M. (2003). *Managing Reverse Logistics or Reversing Logistics Management*. PhD. Erasmus University Rotterdam.

it is seen that the reverse logistics operations should offer administrations in light of the client perspective. Manufacturers and clients can reengineer their organizations to better serve a definitive set of clients, instead of being directed into positions that may not be worthwhile to channel individuals. This is exceptionally important to take the upper hand as the client's progress towards becoming even more environmentally concerned. The natural supportability as well as environmental execution of an organization likewise rely upon the providers. Such a variety of organizations have begun joining forces and tutoring with their providers, for example, giving direction to set up a natural administration framework to enhance the operational efficiency. Strategic organizations together are made with different individuals from store network as the organizations are understanding that the individual endeavours at item recovery have neither rhyme nor reason both financially or ecologically. Reverse logistics operations take into account the investors' money related destinations. This shows whether the organization's technique and execution are adding to main concern change. This can be empowered by following reverse logistics exercises of waste diminishment, cost reserve funds and recapturing worth from the recovered items. Successful reverse logistics adds to recovering an incentive from reusing items or parts or from reusing materials. [120]

Categories of Returns: The abnormal state of instability emerged because of the diverse attributes as far as amount and nature of the returned items, makes more convoluted the creation arranging errand and builds the multifaceted nature of the stock control process. A decent approach to comprehend this instability is to investigate the most widely recognized reasons for items' arrival.

- Returns from manufacturing – Excess of raw or crude material, returns due to quality, remains after production.

[120] Ravi V, Shankar R, Tiwari M K. (2005). Analyzing alternatives in reverse logistics for end-of-life computers: ANP and balanced scorecard approach. *Computers and Industrial Engineering*, 48, pp 327-356

- Returns from distribution – Recalls of items, business returns (unsold items and off-base or, on the other hand harmed conveyances), stock alterations.
- Returns from clients – Returns with repayment assurance, returns for services, returns arising from after use or end of life cycle of item. [121]

The returns can be divided also in the following categories:

Returns from production or by-products: In order to explain it better, we can take an example from the pharmaceutical business. Amid the assembling procedure, substance side-effects are discharged. These side-effects contain important substances that can again fill in as contribution to the creation process. Along these lines, the producer can straightforwardly pick up from recouping these substances. In this particular case, the sender and collector is having a similar association, that is, the maker. After recovery, the profitable substances are utilized again in the creation process. In any case, the side-effects disintegrate quickly. This immediately affects the sorting process of the procedures. For example, recuperation is incorporated with generation in a similar generation plant. As a result, both generation and recovery of substances go after physical space and labour.

Functional or utilitarian returns: Such returns are items that come the reverse stream because of their inborn attribute like distribution products. A normal industry where this kind of profits happens is the beverage or refreshment business. A distribution product as a rule can be re-dispersed multiple times, since it was intended to be sufficiently powerful to ensure item trustworthiness in any case. This makes redistribution or re-conveyance a characteristic as well as financially suitable recuperation choice. The recovery drivers are financial aspects. Since the characteristic capacity of distribution or conveyance things is to backpedal and

[121] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 3rd August 2017 08:34 pm] pp 99

forward in the chain, holders are painstakingly investigated as well as cleaned, so they can be used for secure redistribution once again. Also, multiple other factors are included.

Commercial Returns with repayments: This is widespread in retail industry. Subsequent to accepting the requested item, the client has a restricted sum of time to return it and claim repayment. The business offers repayments. This is on account of, from one viewpoint, organizations need to enhance client relations, and, then again, there is legitimate implementation. Theoretically, items like clothing do not break down physically during the time, yet because of occasional trends, they resort to the ill effects of financial crumbling.

Returns for service: In numerous organizations which deal business to business, the first equipment or gear producer offers post sales services on significant industrial as well as modern items like for instance, ranging from computers to aircrafts. Most of the times providing such post sales services are quite bankable since this benefit is exceptionally basic to keep up modern frameworks and terms are most often negotiated and consulted for as long as possible.

Returns after use: To understand this kind of returns, we should consider an example of business to business leasing of any particular modern equipment, like machinery. Typically, once such a leasing contract lapses, the machinery is returned. As such machineries are intended to be extremely sturdy and durable, even returned machineries most often can be used again and hence have a good amount of worth.

Returns after end of life: To understand this type of return, it better if we take the example of a famous closed loop system of recovery, that is the paper business. Paper that is gathered towards the finish of life can fill in as mass contribution for the industry and business itself. Along these lines, the industry has a direct monetary pick up from the recuperation of paper. In Europe, legal enactment is likewise a driver as the paper business is pressurized to enhance and improve the percentage or amount of paper reused or recycled. Since paper is

a material, the best way to treat it both as an input as well as recovery solution is through recycling. [122]

Recovery Options & reverses logistics exercises:

Once an item comes back to an organization, the firm has numerous transfer alternatives to choose from: Straight forward reuse or direct resale, item recovery administration which involves processes like repairing, renovating, remanufacturing, reusing or recycling and waste administration which includes processes like land filling and burning.

On the off chance that the item comes back to the provider for a full discount, the company generally takes the first choice. On the off chance that the item has not been utilized, it might be exchanged to an alternate client, or it might be sold through some other channel. On the off chance that it is not of adequate quality to be sold through either of these choices, it might be sold to a salvage or rescue organization that will send out the item to an outside market. In the event that the item cannot be sold in the state of 'as it is', or if the organization has the possibility of incrementing the price of the item by reconditioning, restoring or even remanufacturing the item, the firm may play out these exercises before offering the item. Subsequent to playing out these exercises, the item might be sold only as a reconditioned or remanufactured item and not as original or new. In the event that the item cannot be reconditioned in any capacity whatsoever, in light of its 'not so good' condition, then the company needs to comply with legal formalities or ecological responsibilities and attempt to discard the item for the slightest cost. Any part of the item that has the slightest worth can be recovered will be recovered and other parts which have the possibility to be recycled will be expelled before the rest of the item at last sent for burning or to a landfill. The primary inverse logistics procedures are the accompanying:

- Accumulation or also known as collection
- Investigation and processing

[122] Brito M. (2003). *Managing Reverse Logistics or Reversing Logistics Management*. PhD. Erasmus University Rotterdam.

- Straight forward recovery or re-processing
- Redistribution

Accumulation: The main as well as the very first step in the process is accumulation or also known as collection. This step includes each one of those exercises that are vital for recovering returned items as well as sending them to a state of recuperation where they will be further investigated and handling that is their quality and state is evaluated and a choice is made on the sort of recuperation.

Investigation and processing: This is the step where the choice must be made as to what happens to the item or parts of the item. If the item will be sent to be reused, remanufactured or sent away for disposal. For most products, physical investigation is mandatory for deciding further.

Straight forward recovery or re-processing: Once an item comes back to an organization, the company has numerous transfer alternatives to pick from. On the off chance that the quality is in the same class as new, items can be encouraged almost straight away into the market through the process of direct recuperation or recovery. Immediate recuperation includes three alternatives: reutilization, reselling and finally redistribution. The first option alludes to times when the returned items have a really good quality, maybe almost like a new item. Such items reutilized nearly instantly either in the same or maybe another market. This is most common in case of reusable containers, holders, bottles and also equipments for rent or leasing. In case of reuse, the item is used utilized once more but no purchase is made. Resale is meant for those items that are sold once more.

Redistribution: At long last, redistribution alludes to equipments like bearers, that are essentially dispersed over and over. The next alternative is processing it again and that generally incorporates the accompanying choices of recovery repair – repairing, refurbishing, remanufacturing, retrieval and recycling. [123]

[123] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-

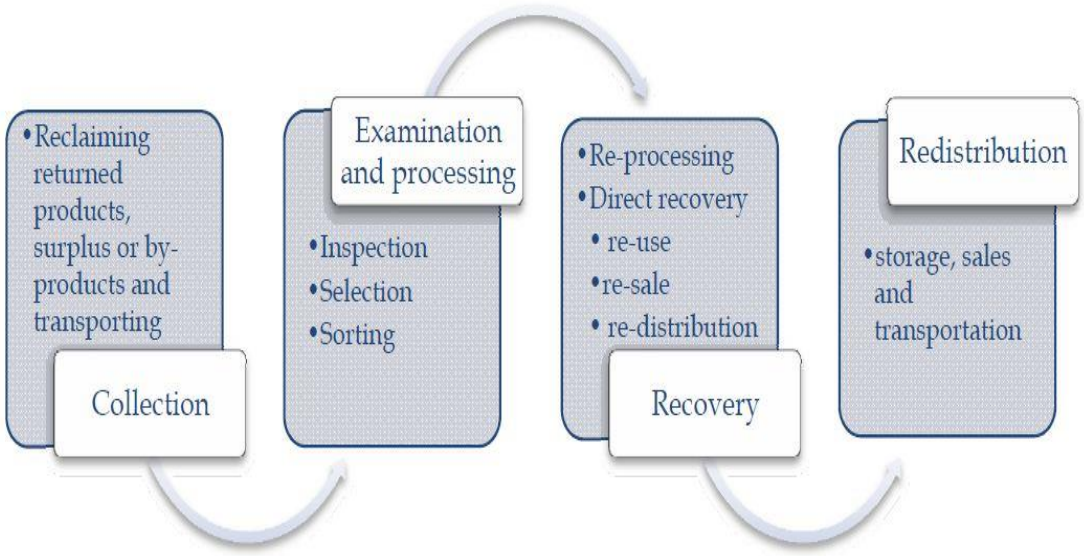


Figure 28: Reverse Logistics Processes [124]

Disposition Options:

A variety of disposition options await a returned product and all these different options come with different income streams. Conceivable goals for item are:

- back to seller
- offer as new
- repackage, offer as new
- offer by means of outlet
- remanufacture/repair
- pitch to representative/broker
- give to philanthropy
- reuse

chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 3rd August 2017 08:57 pm] pp 99

[124] Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies [Last accessed: 3rd August 2017 09:25 pm] pp 101

- landfill

On the off chance that conceivable, the retailer's first inclination by and large is to offer the product as new. If that does not work out, a full discount from the seller is the following most fruitful option. Reverse Logistics is not quite the same as waste administration as the last basically alludes to gathering and handling waste proficiently and successfully. [125]

Choosing the most profitable disposition option can reinforce an organization's prosperity. Nonetheless, not exclusively do the management members need to comprehend the laws and directions that represent legitimate material dealing and transfer or disposal, they should likewise have the capacity to perceive potential monetary benefits that might be acknowledged by gaining the chances to reuse operational items, recondition harmed or utilized items, or recuperate important materials from items that are past their helpful life. Three separate disposition choices are identified in earlier times. An organization reusing or selling the returned item again in an as-is condition. Next, a firm may utilize a complete recovery management for the item. At long last, a company resorting to waste management system. [126]

The ever-increasing popularity of the internet and the expansion of web based business has brought a significant change for economy as well as our society. Web based business and logistics are the perfectly complementary to each other, very closely related to each other. Logistics is the crucial assurance for internet business, and web based business is the future for logistics, and both of them have the tendency to blend and harmonize together with the advancement of data innovation and the field of information technology. As of late, the fast improvement of web based business has been going beyond the horizons of not only local but also national markets. Gradually they tend to open up bigger opportunities for themselves through the internet and logistics also have a similar scope of development. Simultaneously,

---

[125] [125] Tibben-Lembke R, Rogers D. (2002). Differences between forward and reverse logistics in a retail environment. *Supply Chain Management: An International Journal*, 7 (5), pp 271-282

[126] Hazen B T, Hall D J and Hanna J B. (2012). Reverse logistics disposition decision-making. *International Journal of Physical Distribution & Logistics Management*, 42(3) pp 244 - 274

web based business exchanges are not coming from a place of experience. The consumers are getting information about the products solely from the pictures available on such e-commerce websites and many a times these pictures are quite different from the actual look and feel of the product. So lately, the volume of products that are being returned have been increasing quite sharply. The absence of good and reliable return path is the fundamental explanation behind numerous clients abandoning purchases over the internet. Nowadays many famous organizations take reverse logistics methodology as a critical tool in order to decrease their costs, improve consumer loyalty and this is also a huge advantage over their opponents. As a matter of fact, web based business improvement relies heavily on the presence of a strong reverse logistics strategy and framework. And at the same time, the effective and reliable operations of reverse logistics require the likes of web based businesses. [127]

The prime reasons behind the requirement of a strong framework of reverse logistics in web based business exercises are:

- Inconsistent data: As mentioned before, the customers primarily rely on the pictures available on the websites of the e-commerce business to gauge the product. They also depend on the descriptive texts present along with the pictures in order to make the purchase decision. The buyer cannot have a far reaching and overall understanding of the product from only two sources of information. So, it is pretty obvious of the customer decides to return the product in case the product is not as expected.
- Gaining edge over opponent: Because of the present market economy structure, there is some opposition between the same industry as well as distinctive ventures belonging to different industries. Organizations have various promoting instruments, like for instance, they offer return policy in case of shipping to pull in the

[127] Xu J and Jiang Y. (2009). Study of reverse Logistics in the E-commerce Environment. International Business Research, 2(1). pp 128-130

consideration of shoppers. In any case, despite everything it is almost impossible to dodge the activity of return as there is still quite a long distance between virtual and reality. [128]

Now we can try and analyze the above-mentioned causes furthermore. Apart from the prime reason explicitly discussed before, there are other factors as well. With each day, there are new web based businesses entering the market and so there is a cut-throat completion among these e-commerce companies. As the market rivalry turns out to be progressively savage, keeping in mind the end goal to pull in more clients some online traders have a tendency to embellish the photographs of the products available with them. Some companies also tend to have exaggerated descriptions of the products or offer promotional conditions like returning the product if the customer is not satisfied with it. These mostly work quite well in luring customers into buying the items online, but ultimately results in the products being returned. Many returns take place as there are discrepancies with the products. The discrepancies can be of various types like the inconsistency between the actual item and the description, imperfections or quality issues, incorrect size, amount and even products being on the verge entering the end of its life cycle, damaged or incorrect items delivered caused by carelessness in logistics conveyance. Instability of inclinations and preferences of buyers is also another factor in the need of reverse logistics in web based businesses. Due to the nature of the attributes of online shopping, most of the times customers make uninformed purchase decisions and this leads to the phenomenon of blind shopping. When purchase decisions are made based out of impulse or even interest to know more about the product, it leads to the need of returns. Another attributing factor is flawed forward logistics framework. A specific level of harm to products is possible during the time of transportation, stacking and emptying, handling as well as distribution. The possible types of harms are loss of parts of the product, expiration of items, change in consistency of materials caused by bad item conservation and delivery of ill matched products.

[128] Chen L, Li W and Zhai H. (2016). The Analysis of Reverse Logistics Model in the E-commerce Models. *International Journal of Grid and Distributed Computing*, 9(9), pp 173-184

Let us now pay some attention to the problems in relation to managing the framework of reverse logistics:

Most of the online vendors do not five enough significance to reverse logistics flow-work. In the conventional operation method of returns administration, most of the vendors put much consideration towards pulling in clients as opposed to featuring returns administration. If there should be an occurrence of reverse logistics, most organizations are unclear of the procedure. Also, the huge imparity in the number, type as well as location of the products add to the increment of the troubles of returns administration.

Absence of proficient returns administration system. We mostly find costumers who are worried about the current way in which returns issues are dealt with. The customers get influenced by the competency of the returns administration while making online purchase decisions. So, for instance, in China, the returns administration is muddled, moderate as well as expensive.

Inefficient processes and expensive returns management. Currently as there is an absence of skilled third-party reverse logistics players, the majority of the online vendors need to develop their very own expensive reverse logistics administration frameworks. Too high costs for reverse logistics restrict companies in investing in the same. And the slacking current reverse logistics system keep restraining the enthusiasm of the buyers which leads to diminishing profits for the companies at the end.

Low quality of service for inverse logistics. Currently the service of reverse logistics is exceptionally poor. From one viewpoint, it is hard for clients to connect with the client service department and then again even on the off chance that they get connected it is most often an unsatisfactory exchange. [129]

[129] Wang W, Liu Y and Wei Y. (2013). Research on management strategies of reverse logistics in e-commerce environments. *Journal of System and Management Sciences*, 3(2), pp 45-50

Categories	Time	Factors	Method of Processing	Instances
Complaint Return: Item Quality	Short Term	Marketing & Promotion, Customer Service	Checking for validation, shipping and return	Electronic gadgets like computers, mobile phones, etc.
Return after Complete Use	Long Term	Marketing, Legislation, Recovery of Assets	Recycling, remanufacturing, handling	Remanufacture of computer component, household appliances
Return with reimbursement	Short to medium Term	Marketing	Reuse, recycle, remanufacture, handling	Clothing
Repair Return	Medium Term	Marketing, Legislation	Maintenance & handling	Defective household appliances & mobile phones

Table 6: Return classification in E-commerce environment [130]

[130] Chen L, Li W and Zhai H. (2016). The Analysis of Reverse Logistics Model in the E-commerce Models. *International Journal of Grid and Distributed Computing*, 9(9), pp 173-184

There are various ways to improve the quality of reverse logistics framework present within the e-commerce domain.

Businesses should reinforce consideration of reverse logistics. The senior administration should pay complete consideration to reverse logistics as well as returns administration. The responsibility to improve the co-dependence between retailers and service professionals lies on the shoulders of the business. Venture data administration requires accelerating the pace, so all the business exercises related to logistics will be carried out under the direction of data framework. This will enable convenient and precise input, detail and evaluation. Businesses ought to reinforce the workforce's consciousness towards reverse logistics cost administration. Once the cost gets reduced in the reverse administration, it can be stretched out to all other business parts.

No return policy for certain products. There are many online vendors who offer products with relatively low worth or even at times one-time use products. In such cases companies do not provide a return policy on these products. By selling such products, the online vendors get no returns and this in turn reduces the cost for inverse administration. The consumers also make informed purchase decisions for these products as they are aware that no return is possible on the product.

Getting a skilled workforce – Human resources are the wellspring of improvement for any organization and reverse logistics is no different. The development of the inverse logistics stream also falls into the periphery of the advancement of planning of human resources. Currently the human asset for reverse logistics is moderately frail. The overall level of education and training is quite low. IT is not an easy task to be able to adapt the requirements of the advancement of reverse logistics. There is a dearth of talent or human assets who fully understand the latest idea of reverse logistics and the mechanism of these latest concepts. So, it is absolute mandatory to take steps towards designing timely productive methods as well

as to be able to meet the dire needs of human assets. [131]

Faithful clients are without a doubt, are the most significant aspects to the survival of a business. When it comes to a business setting via the internet, the web is used to influence and administer the customers. It is very much possible to create relations with the customers even when the customers and business have never met physically, spoken or even seen each other. They can have a mutually rewarding bond. To be able to do that, the crucial factors for the web based businesses is to be able to provide the right service quality that the customers are looking for. As already discussed extensively, logistics or more accurately for e-commerce logistics, a strong and efficient reverse logistics framework paves the way to gaining a huge number of loyal and satisfied customers. Since the customers are buying products without the complete knowledge and understanding of the product, it is more often than not that the web based business gets return requests. It is crucial in knowing how to handle such request successfully to gain the customer for life. Customers always go back to those e-commerce sites that have provided them with a great service quality. The e-commerce businesses also gain a huge competitive edge over its competitors if they have an efficient reverse logistics mechanism and have the strategy to keep improving it.

[131] [131] Xu J and Jiang Y. (2009). Study of reverse Logistics in the E-commerce Environment. International Business Research, 2(1). pp 128-130

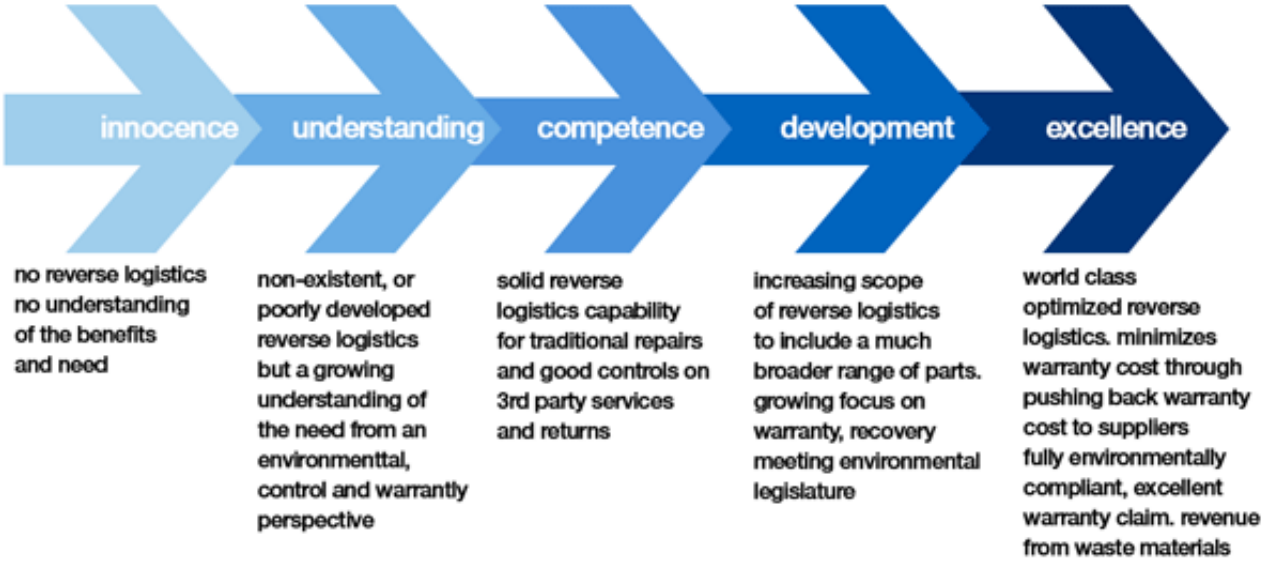


Figure 29: Development of reverse logistics mechanism [132]

4.6 Cross-Border E-commerce

Through the development of the web it is not quite convenient to buy products from foreign nations. As cross-border e-commerce is now possible, the consumers have more options to choose from and select the one that works the best for them. Though from the viewpoint of customers, cross-border logistics is very convenient, there are many obstacles that the e-commerce businesses need to take care of. The most important are the rules and regulations valid in the country that the web based business has decided to enter, the sales channels that would play out best in the country, the entry strategies, the payment solutions for the customers for smooth transaction, the logistics mechanism, marketing and localisation, protection of intellectual property and finally the third-party providers. [133]

---

[132] Robinson A. (2015). Reverse Logistics: Managing the Business Circle of Life. [online] Cerasis. Available at: http://cerasis.com/2015/07/08/reverse-logistics/ [Last accessed: 6th August 2017, 12:43pm]

[133] Kassim N M and Abdullah N A. (2008). Customer Loyalty in e-Commerce Settings: An Empirical Study. *The International Journal on Networked Business*, 18(3). pp 275-290

Figure 30: Steps of Cross border entry for E-retailers [134]

The number of cross-border customers has been growing steadily. There are many reasons as to why a customer decides to shop abroad. The fundamental reasons behind the same are the availability of the desired product, a better offer for the product its price and the brand reputation and trust towards the particular e-commerce business. From the view point of the web based businesses, a positive brand image as well as wide presence is a strategic move for the business and it also acts as a competitive edge over its competitors. Products like clothing and apparel as well as electronic gadgets are available to the customers for a fairly long time and so now the customers crave for more. There are many categories where the e-commerce business can offer more, like that of pet care items, beauty and cosmetic items, sporting goods and gears, food and beverage. And what is even more interesting for the e-commerce businesses is that each of these categories has a place for a premium section. On the contrary, there is also a huge potential for premium cross border logistics and shipping.

[134] Ballering T. (2017). *China Cross Border E-commerce Guidebook*. Consulate General of the Kingdom of the Netherlands Shanghai.

Currently, most of the web based businesses are planning to improve their sales by 10 – 15% on an average by being available to international customers and they expect that this number would further increase. For the companies who are not planning to widen their presence have a big threat of missing out on a straight forward and simple way of boasting their sales as well as brand image. It is not that the option of going over borders is available only to giant e-commerce players; small and medium sized web based business can also go beyond borders and make more money. The e-commerce retailers have the responsibility of setting the standards for shopper experience for cross-border e-commerce. And in case of manufacturers, it is even better as they can get rid of the intermediate agents and improves their margins. The manufacturers emerge to be the biggest winners out of this. The manufacturers have the potential to grow 1,3 times faster than the already benefitting electronic retailers. For the electronic retailers, it means that they need to look for a clear value proposal to be able to compete with the manufacturers. These web based retailers should also make sure to strengthen their places within this value chain. [135]

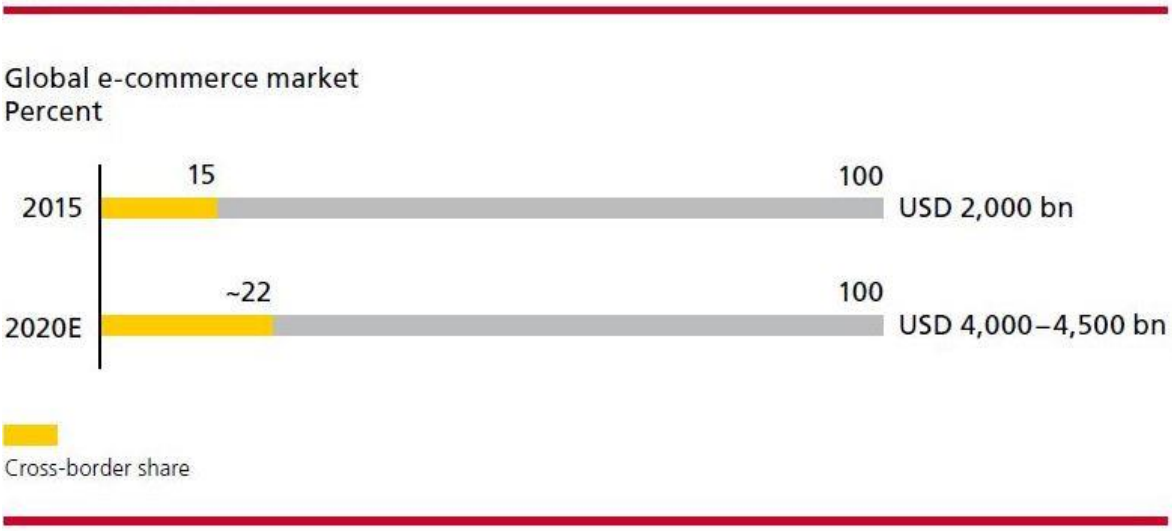


Figure 31: Development of Cross-Border E-commerce Share [136]

[135] DHL. (2017). The 21st Century Spice Trade – A guide to the cross-border E-commerce opportunity. pp 4-5

[136] DHL. (2017). The 21st Century Spice Trade – A guide to the cross-border E-commerce opportunity. pp 7

Figure 32: Motivations of Consumers for Cross Border E-commerce purchases [137]

5. E-commerce Company Insight: PAMONO

PAMONO is an online marketplace which connects buyers of exclusive vintage décor with the sellers from all over Europe. Back in 2012 there were two companies who were doing a similar business, L'Arco Baleno based out of the U.S, which was selling very high-end furniture and Pamono based out of Berlin which was selling mid to high range furniture. So, in 2013 both of them merged under the brand name Pamono. Customers from all over the world use Pamono to give a unique look to their home, the main buyers being from Central Europe and the United States of America. Pamono works with individual boutiques that are well established in their local market, that is, already immensely successful in their own geographical area and have a great reputation. These boutiques offer wide range of styles from mid-century classics to industrial design. These boutiques are often remotely based and their customers are limited to walk-ins. Pamono gives these businesses an opportunity to

[137] DHL. (2017). The 21st Century Spice Trade – A guide to the cross-border E-commerce opportunity. pp 11

show case their product globally and provides all the necessary technology, logistics and marketing so that everyone can have their home decorated with the dream furniture they always wanted. Currently they have 30000 different products showcased online contributed by over 1200 vendors.

Some of the products from PAMONO:

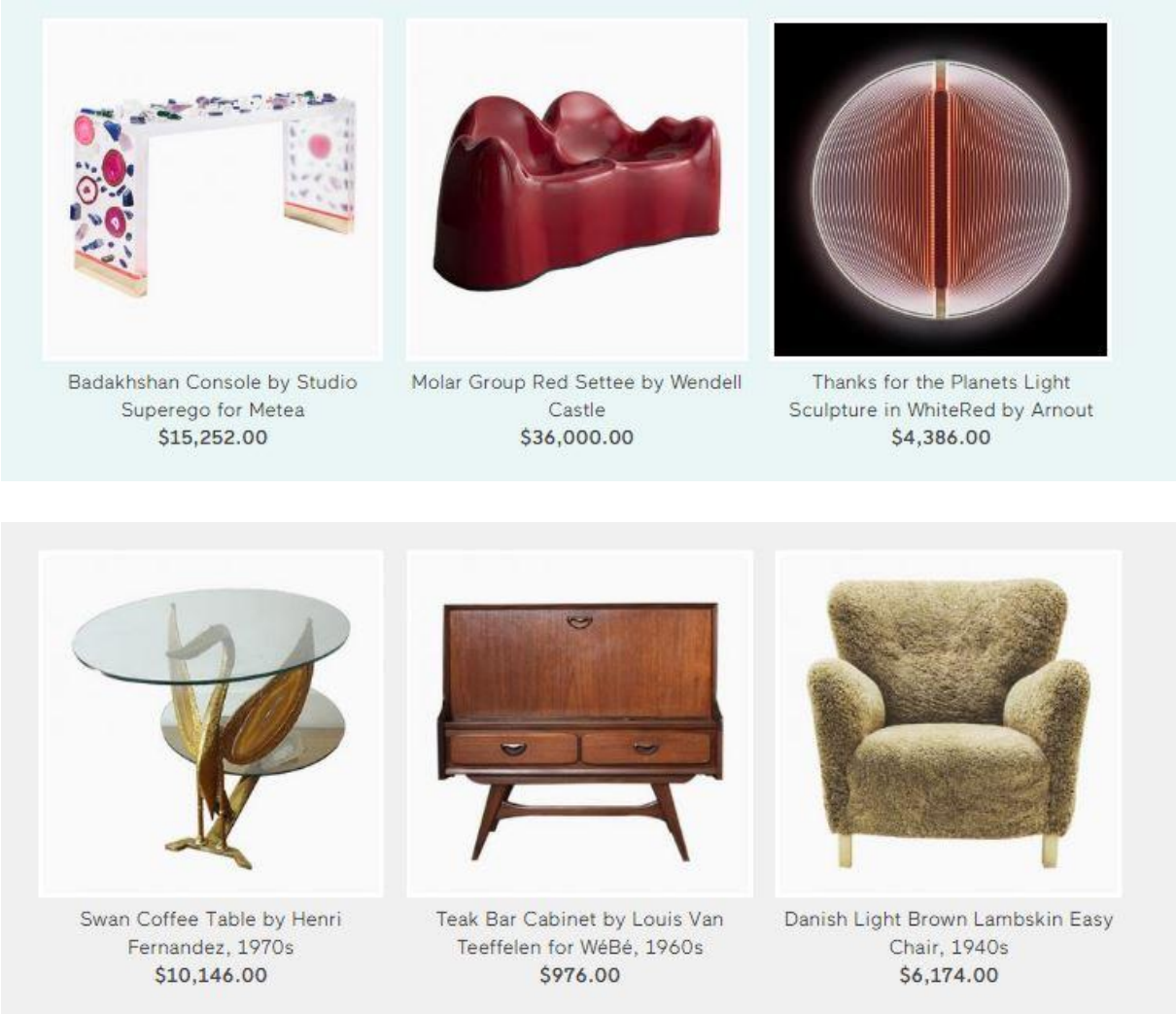


Figure 33: Products from PAMONO [138]

Initial Scenario in Logistics at PAMONO: Initially when the company started PAMONO followed a Pure Market Place model where they only provided a platform for the buyers and sellers. The sellers themselves were responsible for the packaging and transport of the

[138] Pamono. [online] Available at: https://www.pamono.com/ [Last accessed: 30th July 2017, 10:21 am]

products. This created a lot of problems as the products were damaged in transit or arrived late. The vendors were also managing their own boutique and did not have enough logistical expertise and know-how of preferred and feasible logistics mode for different countries.

How the process was carried out:

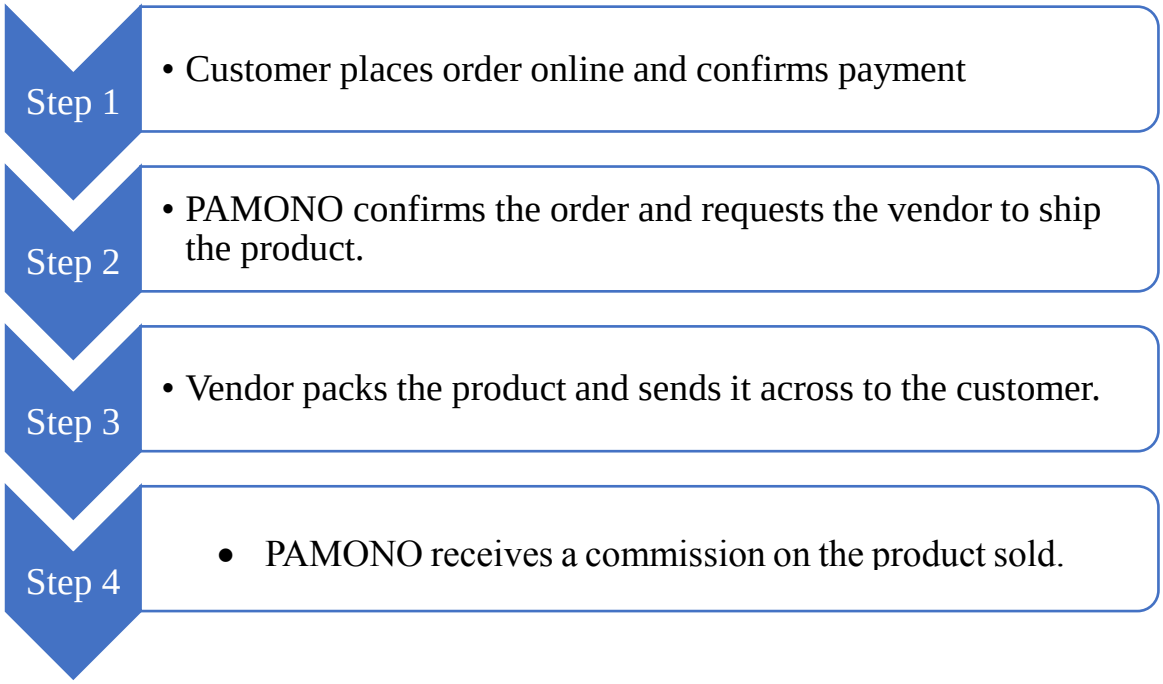


Figure 34: Earlier business model of PAMONO (Illustration at own construction)

Current Logistics Process at PAMONO:

Currently PAMONO handles the logistics of the vendors through their shipping partners. All the logistics is outsourced. They now have 5 partners in Europe and 15 worldwide. In order to process the deliveries of the products PAMONO has three types of partners for different kinds of deliveries.

First is the Parcel Services. These are mainly big logistical companies like FedEx which help them deliver the products. Once an order has been placed along with payment, the vendors just need to pack the products, print an auto generated label and stick it on the product. Then the vendor can call the Parcel service who come and collect the product and duly deliver it to the customer. Parcel service is used for any item fitting in a box less than 60*60*60 cm.

Figure 35: Current parcel service process (Illustration at own construction)

Secondly there is the Van Service. This is the service used mainly within Europe. The van service is the use of cars/trucks to deliver the products from the vendor to the recipient's home. This process may seem simple but a single product cannot be delivered from Point A to Point B as this would hamper the economies of scale. So, a transit stop is made in between ad the products are kept there and another van delivers the products to the recipient's home. In a simple illustration if a person sitting in Germany orders a product from Portugal and another from Belgium then the products may be picked up by different van service and kept in a transit warehouse say somewhere in Netherlands and then shipped from there to Germany together. The following diagram will be an accurate illustration of their process:

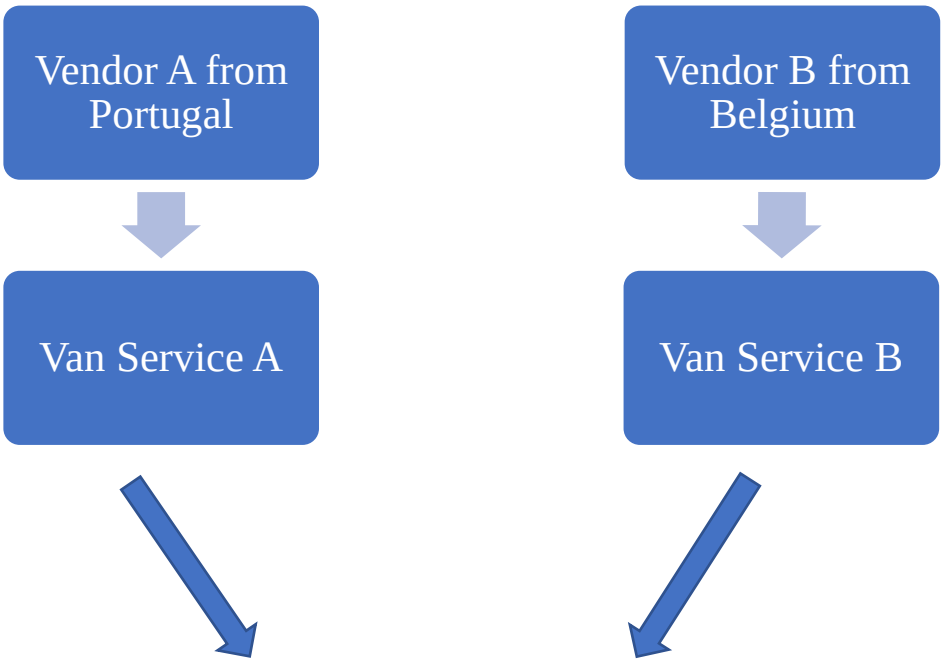


Figure 36: Current van service process (Illustration at own construction)

And thirdly there is the Freight Forwarder / International Freight Forwarder. These are mainly companies that help to organize shipments from specified points. They themselves do not move the products but has a variety of logistics network and with the help of multiple carriers help to reach the goods to the customers. These companies are really helpful as they have the technical know-how of the customs and other related documents. Freight Forwarder is used for overseas shipments.

Figure 37: Current Freight forwarder process (Illustration at own construction)

Challenges Faced and Growth Strategies: PAMONO

Currently PAMONO has a policy where if a product does not reach a customer within four weeks from the date of the order delivery then it is considered as late. This is really challenging as there are more than a 1000 connection points between the deliveries and all the shippers need to be in the right place at the right time. In case of any unforeseen events, like snowstorm etc. the process is disrupted. The typical reasons for an item being delayed are:

- Item not ready to be collected, that is, not packed
- Vendor on holiday
- Customer on holiday
- Remote pick up location
- Remote delivery location

However, considering all the challenges PAMONO is trying to make inroads into the industry. It is currently relying heavily on online marketing and the traditional method of direct sales. The company also has strategic partnerships with interior decorators who help them by recommending PAMONO's products to their clients.

This information was provided by Mr. Clément Ouizille via a brief discussion on 11.05.2017 in the headquarter of PAMONO located at Uhlandstrasse 175, 10719 Berlin.

Name: Clément Ouizille

Designation: Logistics Manager

Email- clement.ouizille@pamono.com

Company Website: https://www.pamono.com/

6. Conclusion

It is evident in today's business environment that proper service is the key to its survival. The e-commerce industry started off as a remarkable success because of the innovation and convenience it offered. It has steadily picked up businesses and spread its wings across all products. Almost every product worldwide can now be purchased via e-commerce. This has

led to thousands of companies both in the mature stage and early start-ups offering their own products or operating as a third-party marketplace. With so many companies to choose from and product differentiation being not much the customers are the king in the game. Their choice of going for a particular company would be generally on the basis of price difference, product quality, shopping experience and the delivery service provided. With equivalent products offered in all spheres customers then look for the price of it. The prices also tend to remain the same unless some heavy discounts are offered which is generally from the pockets of the e-commerce company. This is not a long term sustainable business model and is done during the initial founding years to attract customers or to ramp up the sales immediately. The next area for competition is the shopping experience. This can be measured by the digital experience the customer has for example the smoothness of the checkout area, security of the payments system etc. This can be further integrated with the demand management in the supply chain, where companies are trying various methods to increase its offering by providing greater customer experience like providing Augmented or Virtual reality glasses for shopping which projects a three-dimensional image to enhance the shopping experience. The last factor influencing is the logistics that delivers the products finally to the customers. From the view point of the firms cost reduction is essential in the cut-throat market hence new processes implementation are undertaken in all the field of supply chain like information technology, demand management, warehousing, procurement, transportation etc.

The use of RFID (Radio-frequency identification) in e-commerce business is a crucial step forward for maintaining the timeliness in the delivery for customers. This has benefitted the customers and the firms alike. The RFID helps to track and monitor the movement of products throughout all stages of the logistics process and keep in check the time delay and pilferage. This way a businesses and customers can track their products and has a concise idea as to where their products are during each step of the logistics process and when they can expect to receive it. The entire process of providing a tracking mechanism for the customers purchase cycle i.e. from the moment of order to the delivery at their door enhances

the shopping experience and gives a sense of reliability.

The advancement in supply chain technologies in some areas is more beneficial on the business side of the e-commerce industry than to the consumers directly like in the fields of warehousing, procurement, packaging and material handling. The growing list of e-commerce companies has made the long-term survival of the firms a primary aim in this business. Hence companies have started all possible methods to keep costs under check and move towards profitability at the earliest. For the warehousing space firms have started listing out their extra spaces no matter how big knowing that there might always be takers for it. Overall all firms can use this type of facilities but the smaller e-commerce companies benefit greatly who do not have enough financial power to rent out entire facilities can take the little storage units for their requirements. The use of drones in warehousing has also resulted in more work done in fewer man-hours as these machines can take care of processes like tagging goods. Most e-commerce companies now use the e-procurement method for their regular purchases. The use of the electronic medium for these roles reduces the manpower and paperwork required and thus helping e-commerce firms which just started off. These e-commerce companies can then concentrate on their activities as a single person can take care of the process like e-procurement, e-auctioning unlike the traditional firms. Another area which has immensely benefitted the e-commerce companies is in the area packaging. As we know packaging can be a costly affair. With two to three layers of packages going into every product, the cost of the products rises significantly not to mention the increase in size and weight of the product while being transported. This takes up more space in the vans and costs rose significantly. Again, an improvement in the logistics procedure has helped products of e-commerce companies viable. There has been development of alternative packaging types like the film based packaging or blanket wrapping which tremendously reduces the weight as it does not require boxes to be carried with. Sustainability in the e-commerce sphere to some extent can be achieved by the use of these innovative methods.

From the view point of the consumers there has been a significant improvement in the last-mile stage both in terms of service and technology. This is the final part where the products are delivered to the customers and the changes in this particular field is making e-commerce all the more attractive to the consumers. The overall delivery efficiency has been increasing. With more and more orders coming in and the with limited van movements throughout the city due to high costs and traffic, the last mile logistics is going to be something that we have all been dreaming. Already there are companies which have started delivering products via droids – which are small robots capable of moving along with the human traffic in the pedestrian lane. And with companies already in trial over product deliveries via aerial drones there is not going to be much of a delay between the order of a product and the delivery to our doorsteps. This will to increased orders where instead of going to a nearby store or the supermarkets consumers can just sit in the comfort of wherever they are and expect the products to be delivered. This way, the last-mile logistics will significantly boost the E-commerce industry.

As Jeff Bezos, the CEO of the e-commerce giant Amazon puts it: "The logistics and the customer service – the non-glamorous parts of the business – are the biggest problem with e-commerce. A lot of these companies that are coming online spend all their money and effort building a beautiful Web site and then they can't get the stuff to the customer" [139]

This change in dynamics in the logistics process is challenging and improving how e-commerce business is done.

[139] Cho J K, Ozment J, Sink H. (2008). Logistics capability, logistics outsourcing and firm performance in an e-commerce market. International Journal of Physical Distribution & Logistics management, 38(5), pp 336-359

Bibliography

2013, E-commerce boom triggers transformation in retail logistics: Driving a global wave of demand for new logistics facilities, Jones Lang LaSalle, p9

2016. E-commerce statistics for individuals. [online] Eurostat Statistics explained. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/E-commerce_statistics_for_individuals [Last accessed: 6th July 2017 11:57 am]

2016. E-commerce statistics for individuals. [online] Eurostat Statistics explained. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/E-commerce_statistics_for_individuals [Last accessed: 6th July 2017 11:59 am]

Adaptalift Hyster, (2013). *Packaging of the future*. [online] Available at: http://www.aalhysterforklifts.com.au/index.php/about/blog-post/packaging_of_the_future [Last accessed: 22nd July 2017, 09:53 am]

Aghazadeh, S.M. (2003). How to choose an effective third party logistics provider. *Management Research News* 26(7), pp 50-58.

Aguezzoul A. (2007). The Third Party Logistics Selection: A Review of Literature. *International Logistics and Supply Chain Congress*, Nov 2007, Istanbul, Turkey. pp 7

Air Cargo. (2016). IATA. Available at: http://www.iata.org/whatwedo/cargo/Pages/index.aspx [Last accessed: 19th June 2017, 05:34pm]

Akkermans, H. A., Bogerd, P., Yucesan, E., & van Wassenhove, L. N. (2003). The impact of ERP on supply chain management: Exploratory findings from a European delphi study. *European Journal of Operational Research*, 146(2), pp 284-301.

Allen E, Fjermestad J. (2001) E-commerce marketing strategies: an integrated framework and case analysis. *Logistics Information Management*, 14 (1/2) pp 14-23

Angeles R, Nath R. (2007). Business-to-business e-procurement: success factors and challenges to implementation. *Supply Chain Management: An International Journal*, 12(2) pp. 104 – 115

Angeles, R. (2005). Rfid Technologies: Supply-Chain Applications and Implementations Issues, Information System Management, 22(1), pp 51-65

Ballering T. (2017). *China Cross Border E-commerce Guidebook*. Consulate General of the

Kingdom of the Netherlands Shanghai.
Bartholdi J J, Eisenstein D D, Lim Y F. (2010). Self-Organizing Logistics Systems. *Annual Reviews in Control*,34(1), pp 111-117

Benton W. Inventory Chain Optimization. [online] GRA. Available at: http://www.gra.net.au/resources/insights-and-publications/2003/11/46-inventory-chain-optimization [Last accessed: 6th August 2017, 03:06 pm]

Berman N. (2016). *How Starship Technologies Could Eliminate Human Delivery Service*. [online] Money Inc. Available at: http://moneyinc.com/how-starship-technologies-could-eliminate-delivery-service/ [Last Accessed: 23rd July 2017, 11:09 am]

Blumberg D F. (2005). Introduction to management of Reverse Logistics and closed loop Supply Chain Processes. Boca Raton, Florida: CRC Press.

Bowersox D J, Closs D J, Cooper M B. (2002). *Supply Chain Logistics management*. New York: Mc Graw Hill.

Bozarth C, Handfield R, Das A. (1998). Stages of global sourcing strategy evolution: an exploratory study. *Journal of Operations Management*, 16, Pp 241-255

Brito M. (2003). *Managing Reverse Logistics or Reversing Logistics Management*. PhD. Erasmus University Rotterdam.

Buxbaum P. (2017). *Technology and the future of Ecommerce*. [online] Global Trade. Available at: http://www.globaltrademag.com/global-logistics/technology-future-ecommerce [Last Accessed: 22nd July 2017, 10:34 am]

Buyukozkan G, Feyzioglu O, Ersoy M S. (2009). Evaluation of 4PL operating models: A decision making approach based on 2-additive Choquet integral. *Int. J. Production Economics* ,121, pp 112–120

Casanovas, A. and Cuatrecasas, L. (2001), Logı´stica Empresarial, Gestio´n 2000, Barcelona. pp 191

Cavinato, J L. (1989). *Transportation-Logistics Dictionary*. 3rd Edition. Washington D.C: International Thomson Transport Press, pp 72

Chen E. (2017). *How Augmented Reality Will Shape the Future of Ecommerce*. [online] Entrepreneur. Available at: https://www.entrepreneur.com/article/287687 [Last Accessed: 23rd July 2017, 09:45 am]

Chen L, Li W and Zhai H. (2016). The Analysis of Reverse Logistics Model in the E-commerce Models. *International Journal of Grid and Distributed Computing*, 9(9), pp 173-184

Cherneva D, Voigt K. (2015). Outsourcing to 4PLs – Opportunities, Challenges, Future Outlook. Proceedings of the Hamburg International Conference of Logistics (HICL), 20, pp – 232-255

Cho J K, Ozment J, Sink H. (2008). Logistics capability, logistics outsourcing and firm performance in an e-commerce market. International Journal of Physical Distribution & Logistics management, 38(5), pp 336-359

Christopher M. (1992). *Logistics & Supply Chain management*. Fourth Edition. Great Britain: Pearson Education Limited. pp 257-258

Combe C. (2006). *E-business Management and strategy*. 1st Edition. Oxford: Elsevier Ltd. pp 68-76

Curtis S. (2016). *Just Eat launches world's first ROBOT takeaway delivery service in London*. [online] Mirror. Available at: http://www.mirror.co.uk/tech/pizza-side-droid-just-eat-9372159 [Last accessed: 22nd July 2017, 12:13 pm]

De Souza R, Goh M, Lau H C, Ng W S, Tan P S. (2014). Collaborative Urban Logistics – Synchronizing the Last Mile. *Procedia - Social and Behavioral Sciences,* 125 pp 422-431

DHL. (2017). The 21st Century Spice Trade – A guide to the cross-border E-commerce opportunity. pp 4-5

Douglas M. Lambert, Martha C. Cooper, Janus D. Pagh, (1998). Supply Chain Management: Implementation Issues and Research Opportunities, *The International Journal of Logistics Management*, 9 (2), pp. 2

Dowlatshahi S. (2000). Developing a theory of Reverse Logistics. *Interfaces*, 30(3), pp 143-155

EDI Basics. [online] Available at: https://www.edibasics.com/what-is-edi/how-does-edi-work/ [Last accessed: 6th July 2017, 03:17 pm]

Ellen Macarthur Foundation. (2014*). Towards the Circular Economy*. pp 15
Emmett S. (2008). *Excellence in Supply Chain Management*. Cambridge: Cambridge Academic

Gonzalez A. (2016). *Hands, heads and robots work in sync at Amazon warehouses*. [online] The Seattle Times. Available at: http://www.seattletimes.com/business/amazon/at-amazon-warehouses-humans-and-robots-are-in-sync/ [Last accessed: 22nd July 2017, 07:58 pm]

Govindan K., Soleimani H., & Kannan, D. (2015). Reverse logistics and closed-loop supply chain: A comprehensive review to explore the future. *European Journal of Operational Research*, 240(3), pp - 603-626

Harol A, Cardona O, Argueta C and Sarmiento A. (2014). A cost - efficient method to optimize package size in emerging markets. *European Journal of Operational Research,* 241(3), pp 917-926

Hazen B T, Hall D J and Hanna J B. (2012). Reverse logistics disposition decision-making. *International Journal of Physical Distribution & Logistics Management*, 42(3) pp 244 – 274

Hill, C. and Scudder G. (2002). The use of electronic data interchange for supply chain coordination in the food industry. *Journal of Operations Management*, 20, pp 375-387

Hudson, S. (2004), The SCOR Model For Supply Chain Strategic Decisions. [online] NC State University. Available at: https://scm.ncsu.edu/scm-articles/article/the-scor-model-for-supply-chain-strategic-decisions [Last accessed on 15th May. 2017, 12:11pm]

Inland Waterways in the EU. (2014). European Parliamentary Research Service Blog. Available at: https://epthinktank.eu/2014/02/05/inland-waterways-in-the-eu/ [Last accessed: 19th June 2017, 02:27pm]

ITE Transport & Logistics, (2016). 10 warehousing tech innovations from around the world. [online] Available at: http://www.transport-exhibitions.com/Market-Insights/Cold-Chain/Archive/10-warehousing-tech-innovations-from-around-the-wo [Last accessed; 20th July 2017, 07:21 pm]

Kahn J. (2016). *Droids, not drones, are the future of e-commerce deliveries*. [online] Chicago Tribune. Available at: http://www.chicagotribune.com/business/ct-delivery-droids-20160419-story.html [Last accessed: 23rd July 2017, 10:43 am]

Kassim N M and Abdullah N A. (2008). Customer Loyalty in e-Commerce Settings: An Empirical Study. *The International Journal on Networked Business*, 18(3). pp 275-290

Kearney A T. (2017). US E-commerce Trends and the impact on logistics. [online]. ATKearney. Available at: https://www.atkearney.com/transportation/ideas-

insights/featured-article/-/asset_publisher/4rTTGHNzeaaK/content/us-e-commerce-trends-and-the-impact-on-logistics/10192?inheritRedirect=false&redirect=https%3A%2F%2Fwww.atkearney.com%2Ftransportation%2Fideas-insights%2Ffeatured-article%3Fp_p_id%3D101_INSTANCE_4rTTGHNzeaaK%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-2%26p_p_col_count%3D1. [Last accessed: 18th July 2017, 06:54 pm]

Keely L. Croxton Douglas M. Lambert Sebastián J. García-Dastugue Dale S. Rogers, (2002). The Demand Management Process. *The International Journal of Logistics Management*, 13(2) pp 51-66

Kimura T. (1998). The emergence of third party logistics. *NLI Research Institute*. Tokyo, Japan, pp 3-12.

Kurbel. K. (2013). Enterprise resource planning and supply chain management. Heidelberg: Springer, pp 94-100

Kutlu S. (2007*). Fourth Party Logistics: Is It the Future of Supply Chain Outsourcing?* Brentwood, England: Best Global Publishing Limited, pp 13-14

Lambert D M, Stock J R. (1987). *Strategic Logistics Management*. 3rd Edition. Boston: Richard D. Irwin Inc. pp 403-407

Lambert DM, Stock JR, Ellram LM. (1998) Fundamentals of Logistics Management. Singapore. McGraw-Hill

Lambert, D. Garcia-Dastugue, S. and Croxton, K. (2005). An Evaluation of Process-oriented Supply Chain Management Frameworks, [online] Vol 26(1), pp 27-30. Available at: http://onlinelibrary.wiley.com/doi/10.1002/j.2158-1592.2005.tb00193.x/full [Last accessed on 15th May. 2017, 02:34 pm]

Langley J Jr and Capgemini. (2015). 2016 Third-Party logistics Study. *The State of Logistics Outsourcing*. 20th Annual Study. pp 13

Lee H L, Billington C. (1992). Managing Supply Chain Inventory: Pitfalls and Opportunities. *Sloan Management Review*, 33(3), pp 65 -73

Lockamy III A. (1995). A Conceptual Framework for Assessing Strategic Packaging Decisions. *The International Journal of Logistics Management*, 6(1) pp. 51 – 60

Macharis C, Melo S. (2011). Characteristics and typology of last-mile logistics from an

innovation perspective in an urban context. In: R Gevaers, E V de Voorde, T Vanelslander. *City Distribution and Urban Freight Transport*. Cheltenham, United Kingdom: Edward Elgar Publishing Limited.

Madu, C. and Kuei, C. (2004). ERP and Supply chain management. Fairfield: Chi Publishers.

McCoy J V. (2003). *Unmanned Aerial Logistics Vehicles: A concept worth pursuing?* M.S. U.S. Army Command and General Staff College.

Meier A, Stormer H. (2009). *eBusiness & eCommerce – Managing the Digital Value Chain*. Heidelberg: Springer.

Mentzer T.J, Flint J.D and Hult M.T.G. (2001). Logistics Service Quality as a Segment-Customized Process. *Journal of Marketing*, 65(4), pp 82-104

Mistry, M. (2013). Life Cycle Assessment – A Blending of Art and Science. Available at: http://greenblue.org/part-4-life-cycle-assessment-a-blending-of-art-and-science/ [Last accessed: 19th June 2017, 03:20pm]

Morlin-Yron S. (2016). *Are flying robots the perfect co-workers?* [online] CNN. Available at: http://edition.cnn.com/2016/05/12/africa/drone-scan-inventory-technology-south-africa/index.html [Last accessed: 25th July 2017, 07:32 pm]

Muller, E.J. (1991). Selling the Process, Not just the Product, *Distribution*, 90(1), pp 40-50

Nguyen T V. (2012). *Development of Reverse Logistics – Adaptability and Transferability*. MBA. Technische Universitat Darmstadt.

O'Callaghan, R. Kaufmann, P. and Konsynski, B. (1991), *Adoption correlates and share effects of electronic data interchange systems in marketing channels*. Prof. University of Navarra. pp 2-4

Pamono. [online] Available at: https://www.pamono.com/ [Last accessed: 30th July 2017, 10:21 am]

Pinna R and Carrus P P. (2012). *Reverse Logistics and the Role of Fourth Party Logistics Provider*, 1st Ed [online]. Rijeka, Croatia: In Tech. Available at: https://www.intechopen.com/books/pathways-to-supply-chain-excellence/reverse-logistics-and-third-party-logistics-providers-capabilies

Presutti W D. (2003). Supply management and e-procurement: creating value added in the

supply chain. *Industrial Marketing Management,* 32, pp 219– 226

Punakivi M, Yrjölä H, Holmström J. (2001). Solving the last mile issue: reception box or delivery box? *International Journal of Physical Distribution & Logistics Management*, 31(6) pp 427 – 439

Radjou, N. (2003). U.S. manufacturers' supply chain mandate. *World Trade*, 16(12), pp 42–46.

Ravi V, Shankar R, Tiwari M K. (2005). Analyzing alternatives in reverse logistics for end-of-life computers: ANP and balanced scorecard approach. *Computers and Industrial Engineering*, 48, pp 327-356

Robinson A. (2015). Reverse Logistics: Managing the Business Circle of Life. [online] Cerasis. Available at: http://cerasis.com/2015/07/08/reverse-logistics/ [Last accessed: 6th August 2017, 12:43pm]

Rogers D S, TIbben-Lembke R. (1998). Going Backwards: Reverse Logistics Trends and Practices. PhD. University of Nevada, Reno Center for Logistics Management.

Rogers, D. S, & Ronald S. (1998). Going backwards: reverse logistics trends and practices. *Reno Center for Logistics Management*. pp 2-3

Rushton A, Croucher P, Baker P. (1989). *The Handbook of Logistics and Distribution Management*. 4th Edition. Great Britain: Kogan Page Limited.

Rushton, A. Croucher, P. and Bakep, P. (2011). The Handbook Of Logistics And Distribution Management. Kogan Page Limited. Pp- 27-28

Satcom Limited. Supply chain management system through RFID. Available at: http://www.satcomlimited.com/system_integration.html [Last accessed: 24th May 2017, 12:37 pm]

Schafer J B, Konstan J A, Riedl J. (2001*). E-Commerce Recommendation application*. Data Mining and Knowledge Discovery. (5), pp 115-153

Scott M. (2009). *Improving Freight Movement in Delaware Central Business Districts*. Associate Policy Scientist. Institute for Public Administration College of Education & Public Policy University of Delaware.

Sheikh Z, Rana S. (2014). The Role of Logistics Service Providers in Supply Chain Performance Management: A Comprehensive Literature Review. *International Journal of*

Academic Research in Business and Social Sciences, 4(5), pp 608-613

Song L., Cherrett T., McLeod F., & Guan W. (2009). Addressing the last mile problem: transport impacts of collection and delivery points. *Transportation Research Record: Journal of the Transportation Research Board*, (2097), pp 9-18.

Statista, (2017). Retail e-commerce sales worldwide from 2014 to 2020 (in billion U.S. dollars) Available at: https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/ [Last accessed 6th July 2017 at 05:56 pm]

Statista. Statistics and Market Data about E-commerce. [online] Available at: https://www.statista.com/markets/413/e-commerce/ [Last accessed 29th July 2017 at 05:54pm]

Subramaniam A. (2009). eProcurement / Sourcing MRO Environment. [online]. Available at: https://www.slideshare.net/anandsubramaniam/Strategic-Sourcing-eProcurement [Last accessed: 23rd July 2017, 10:43am]

Teece, David J. (1986). Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. University of California. 15 (6), pp 285-305

Tibben-Lembke R, Rogers D. (2002). Differences between forward and reverse logistics in a retail environment. *Supply Chain Management: An International Journal*, 7 (5), pp 271-282

Treacy M. (2013). *Amazon drones: a look at the pros and cons.* [online] Treehugger. Available at: https://www.treehugger.com/gadgets/amazon-drones.html [Last accessed: 22nd July 2017, 10:31 am]

Tseng Y, Yue W L, Taylor A. (2005). The Role of Transportation in Logistics Chain. *Proceedings of the Eastern Asia Society for Transportation Studies*, Vol. 5, pp. 1657 - 1672

Twist, D. (2004). The impact of radio frequency identification on supply chain facilities. *Journal of Facilities Management*, 3(3), pp 226-239

Verghese K.& Lewis H. (2007). Environmental innovation in industrial packaging: a supply chain approach. *International Journal of Production Research*, 45(18-19), pp. 4381-4401

Vivaldini M, Pires S R I, DeSouza F B. (2008). Collaboration and Competition between 4PL and 3PL: A study of a fast-food supply chain. *The flagship research journal of*

international conference of the production and operations management society, 1(2), pp 17-29

Wang W, Liu Y and Wei Y. (2013). Research on management strategies of reverse logistics in e-commerce environments. *Journal of System and Management Sciences*, 3(2), pp 45-50

Win A. (2008). The value a 4PL provider can contribute to an organization. *International Journal of Physical Distribution and Logistics Management*, 38(9), pp 674-684

Xu J and Jiang Y. (2009). Study of reverse Logistics in the E-commerce Environment. International Business Research, 2(1). pp 128-130

Yang X. (2014). Status of Third Party Logistics – A Comprehensive Review. *Journal of Logistics Management*, 3(1), pp 17-20

Yurieff K, (2017). *Amazon patent reveals drone delivery 'beehives'*. [online] CNN Tech. Available at: http://money.cnn.com/2017/06/23/technology/amazon-drone-beehives/index.html [Last accessed: 22nd July 2017, 11:32 am]

Zhang C, Okoroafo S C. (2015). Third-Party Logistics (3PL) and Supply Chain Performance in the Chinese Market: A Conceptual Framework. *Engineering Management Research*, 4(1), pp 38-48

Statement of authorship

We hereby declare that we are the sole authors of this master thesis and we have not used any sources other than those listed in the bibliography and identified as references. Furthermore, we have not made any payments to third parties for any part of the submitted dissertation. The paper has not been submitted in a different program at the same time or in a similar form and has also not been published yet as a whole.

_____ _____

(Place, Date) (Signature, S. Saha)

_____ _____

(Place, Date) (Signature, S. Pal)