

Warehouse Management System as locomotive of Supply Chain Management: Some Evidences from United Kingdom manufacturing sector

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Abstract

This Warehouse management system play an important role in the modern world of technology and using the Information technology enhance the performance and efficiency of warehouse management to manage and handle inventories which lead to proactive management of supply chain management process. In this research paper, we investigate the barrier of warehouse implementation along with failures which are associated with warehouse management system and then we move to study of warehouses to understand the problems they were facing and how they handle those issues using warehouse management system, at the end of paper we conclude our discuss by giving recommendation about proactive management of Warehouse Management systems.

Keywords

Warehouse Management System, Supply Chain Management, and barrier of warehouse management system implementation, Distribution Requirement planning, Electronic Data Interchange.

I. INTRODUCTION

The concept of warehousing came from the evolution of this world and since from its very inception the human beings were used to store food and other raw material for their survival such as storage of grain, vegetables, meat etc which they needed to store food in case of emergency like famine. With the progress in trade all over the world the importance of warehouse has also increased and the storage level of products increased because of the manufacturing and due to the purchasing power of the human beings. The trade from one part of the world to the other increased commercial warehousing and the warehouses were built mostly at ports. The first commercial warehouse was built in Venice. In the Second World War fork lifter and pallets were introduced which increased the efficiency of warehouse functions and operations. This gradual growth in warehouses operations now has led towards the well-equipped and multifunctional warehouse [1].

Warehouse is "that part of the firm's logistics system that stores products like raw material, goods in process, finished goods at and between points of origin and point of consumption [2]."

These warehouses are mostly constructed by manufacturers, traders, exporters and by those who are involved in logistics and supply chain business. These warehouses are used to store huge amount of stock of goods. The goods which are required to be exported are stored at seaport and airport warehouses.

Mostly these goods are stored in a warehouse till these goods finally reach the consumers. These goods are in bulk quantity so the warehouses are built at such places where supply of goods can be easily carried out to the customers. This efficient supply of goods enables the business to have a competitive edge among the competitors in the industry.

Warehouse business is still a neglected area of business which needs to be looked into in a greater detail. For this reason still warehouses are less equipped and following the traditional methods for the operations to be conducted in the warehouse. The use of these particular methods gave way to high cost and high risk of loss of goods as well as investment.

II. BARRIERS IN IMPLEMENTING WAREHOUSE MANAGEMENT SYSTEM

The implementation of Warehouse Management System (WMS) is positive for the business in order to compete in the market and to fully satisfy the customers by the provision of services. This system makes the whole logistics process efficient as warehouse is such a place from where the goods are distributed to the customers and if the warehouse is efficient then the whole supply chain will be in a perfect order. During the implementation there are some factors which can be hindrance for the adoption of the new system. Cost of the proper WMS is very high because WMS is a very complex system and its implementing cost is very high. It depends upon the nature of the business and volume of goods which have to be stored and further distributed. Small warehouses cannot afford the cost of high profile WMS system because it affects their profitability and challenges the competitive edge in the market regarding low cost.

Lack of IT awareness is also a major cause for the proper selection and implementation of the WMS. Warehouse Management System is an information system which controls the transaction of the warehouse processes. The Company management is never a specialist in Information Technology and they need to discuss all these issues with the IT manager and it depends on him for proper functioning of the WMS and supplier of the system.

Staff of the warehouse can also be reluctant to accept the change because of lack knowledge of new system and it can challenge their abilities and eventually their job as they are used to work on the old system.

III. FAILURES OF WAREHOUSE MANAGEMENT SYSTEM

Warehouse management system are used in warehouses and result in good performance for controlling all the functions of the warehouse but there is still some deficiencies in the system which can cause the failure of the WMS in the warehouse. If the implementation of the WMS fails it causes a loss of millions and the business have to face a lot of problems and the employees which are involved in the implementation of the system can be fired from their jobs. Sainsbury is UK's biggest retail store which had to face around 700 million dollars because of the failure of the WMS and the whole supply chain team which was contributing in this project was fired from their jobs.

A. Selection of Wrong Product

All the vendors in the market which are providing WMS solutions always claim that their WMS software are most superior according to the requirement of the customers but when the system is implemented it does not meet the requirement of the warehouse.

B. Customization

Most of the businesses focus on the customization of the WMS according to its own requirements and they implement a customized WMS. But that customized WMS is unable to fulfil the need of the warehouse so high cost is paid to the vendor for the implementation of the system which fails the system.

C. Time Constraints

Time is also a cause of the failure of the system because vendor visits the sites many times and cannot implement the whole infrastructure of the WMS in the limited time frame. This causes a low sale volume and a low level of the customer satisfaction.

D. Maintenance

Vendor when implements the system attracts the customers offering free maintenance of the system but customized systems have to face high cost for the maintenance and the upgrades.

E. Non Skilled Human Resource

Due to the implementation of the new technology the employees of the company are unaware of the use of the new system and it causes high cost of training which disturbs the financial structure of the Company.

F. Involvement of Competitors

Competitors can also be a cause of failure of the system because they know that which system a company is going to implement. They work on their systems and try to upgrade their system which does not affect their

performance and they maintain the level of customer satisfaction.

IV. WAREHOUSE MANAGEMENT SYSTEM AND SUPPLY CHAIN MANAGEMENT

The management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole [3]. Supply chain management deals with all the activities such as logistics, procurement distribution of goods and storage of products. It integrates all these functions and other activities of business. SCM addresses manufacturing concerns, distributors and warehouses and transportation and has a keen focus on making efficient supply chain and reduction in cost. Supply chain management plays a vital role to maximize the profits of organizations. Due to the globalization and with the evolution of technology supply chain activities are becoming more strategic for the businesses

Due to globalization supply chain networks are becoming more complex. Supply chain professionals have to think about the diverse supply chain channels in order to meet the demand of the products by the customers and need to develop an infrastructure at distant locations for appropriate distribution of the products.

Supply chain networks work on the push and pull strategies. E supply chain has attracted the business all over the world. The companies have started e-procurement to reduce the cost and other technology developments in the field of supply chain which has made it more efficient. Nowadays Supply chain management software's are available, such as bar coding and RF technology is available in the market to monitor the whole supply chain [4].

WMS is known as a key component of the supply chain management. Businesses are paying attention towards the warehouses doing best for improving warehouse operations which have caused drastic changes in the world of supply chain and distribution of goods. In the recent business environment and to get the competitive edge in the market business organizations are thinking about the reduction of cost and may use a cost cutting tool by making the supply chain management more automated and to achieve the highest level of customer satisfaction.

The basic objective of the WMS system is to improve the supply chain network in the warehouse, monitoring the inventories, efficient customer response and ensuring delivery of goods on time.

V. DIFFERENT WAREHOUSE MANAGEMENT SYSTEM SOFTWARE'S

WMS is a set of functions of warehouse and is integrated with software which makes the automated warehouse management. WMS is single software which is used especially for the warehouse management. Different solution providers are providing such software's which are implemented in the warehouse to

make the functions of the warehouse automatic and efficient.

A. Claidus Warehouse Management System

Claidus WMS is the best breed of the Warehouse Management system in the market Claidus WMS which is adopted in a warehouse to improve the efficiency on the warehouse functions. It contains the functions of the receiving of goods in, stock control, managing picking lists of the products, putaway, replenishment of stock, customers returns also includes tariff, billing, vehicle management and dispatch of products. This system contains the pallets tracking function which reduces the cost of the pallets and this system also support the vendor inventory. This helps in the exchange of data between the customers and suppliers which can be transformed effectively. Claidus also manage the order presentation for the delivery of the goods which includes pallet building and other documents which are required for the order completion. Claidus WMS also deals with the labor which is working in the warehouse and monitors the performance of the labor. This software also helps in the reduction of the stock losses and also checks the real time stock. Moreover the management of the stock rotation, shelf life of product, batch numbering to meet the requirements of the customers and also make effective service level by proper updating of information. Fully facilitates the movement of products inside the warehouse to meet the replenishment requirements.(www.obs-logistics.com)

B. WAMAS

In the recent business environment businesses have to provide its services to its customers at its highest level of efficiency. The warehouses are playing important role in the delivery of products to get more profit. Receiving of inventory and proper design for the internal operations in the warehouse can be a success for the business as well as warehouse performance.

WAMAS is software which is designed by a SSI SCHAEFER company which provides logistics and supply chain solutions. By the highest demand from distribution centers and warehouses WAMAS is such a warehouse solutions which meets the requirements of all the operations of the warehouse. This warehouse system facilitates the tracking of goods and has order picking system. Inventory and stock control is managed by the WAMAS. Dispatch, quality control and management of different warehouse equipment's and other resource management is done by this system. This WMS reduces the cost of the business and provides high quality in controlling the functions of warehouse and with new innovation this WMS is updated on regular basis and is user friendly which leads towards the reduction in the cost of the training [5].

C. SAP WMS

SAP is a famous software solutions provider and can design software according to the customers' needs. SAP Warehouse Management System is ERP integrated and provides solutions of different problems in the warehouse functions. It is complex but highly efficient system in order to manage the warehouse operations. In this system complex structured warehouses are included where enough storage locations are available and high racks are used for storage. Different types of stock movement operations and automated replenishment bins are dealt in this system. It also used RF technology in order to perform some functions in the warehouse [6].

D. Electronic data interchange:

Electronic data interchange (EDI) is basically the transfer of information of business data in an electronic form from one business to another. It implies for the paperless trade and businesses are getting successful by the use of EDI.

The business data which is transferred to other business can be relevant to purchasing of goods, inventory level, scheduling and pricing. Businesses get orders from other parts of the world and trading cycle can be fast by the adoption of the EDI. The rapid changes in the business environment and competition in the market regarding the cost of communication and data transfer has forced the use of EDI. The global trade had to face a lot of problems but due to the evolution of EDI global trade it is much easier and all that paper based processing has reduced up to zero level and connects the trading partners across the world[7].

In warehouse EDI is essential for data flow inside the warehouse departments and to the suppliers, customers of the warehouse. Order is placed electronically by the customers and this information needs to be transferred to the required departments of the warehouse such as continuous replenishment process is done through EDI. Retail Chain stores use the EDI network for the replenishment of the products such as Kimberly Clark and Costco. As the level of inventory goes down to its certain level the automatic information is transferred to Kimberly Clark and suppliers manages the inventory level according to that information. Same is the case in the warehouses where information is received by EDI and warehouses deliver the products to its customers according to that information. In EDI lower level of inventory is stored in the warehouse. Use of EDI system is the strategic edge for the warehouses and enhances the warehouse performance and it can be a sustainable advantage. Warehouse managers always seek to minimize the inventory management cost and in warehouse EDI is used for communication between manufacturer, warehouse and retailers. Warehouse receives products from the manufacturer which sends the Advance shipment notification to the warehouse. When warehouse receives goods it confirms the goods receiving by issuing a stock receipt then a shipping order is received from the manufacturer. After shipment a warehouse issues a

shipping order confirmation and other information like transportation management, overstock positions, direct delivery to store and all these data transactions are done by EDI in the warehouse[8].

E. Distribution Requirement planning Systems

Distribution Requirement planning (DRP) includes all those activities which are involved in the physical flow of goods from manufacturer to consumer. In warehouse distribution receiving, material management inside the warehouse, order processing and shipping of goods are included.

DRP is such a system which manages the logistics of the warehouse as well as inventory management and controls other functions inside the warehouse. DRP system works with MRP because MRP system deals with the material management tasks properly and with the help of distribution requirement planning MRP can forecast the demand and order schedules. In this way a warehouse can reduce the internal level of the inventory. The focus of the DRP in the warehouse is to deal with the safety stock and management of replenishment of the quantity within the minimum lead time. DRP manages the destinations of the shipments and can direct towards shipment routes. On the whole DRP operations are beneficial in improving productivity, and management of shipments which meets the satisfaction level of the customers [9].

VI. CASE STUDIES OF WAREHOUSES

A. Cinram

1) Introduction

For the last 40 years Cinram is the world's largest manufacturer and supplier of the CDs and other multimedia products like cassettes. The company has its head office in Canada. Cinram is a listed company in the stock exchange. Cinram also provides logistics and supply chain solutions. It provides warehousing solutions across the world to ensure the supply of multimedia products in other parts of the world. It has about 9000 employees which are working in Cinram. It has a capacity of supply of 2.6 billion CD's annually. Cinram has a wide range of customers like software companies, computer hardware sellers, music publishers and multimedia services providers. These customers demand high quality of prerecorded discs and on time delivery of the product. Cinram is operating in Europe and has a sufficient customer base in UK. For the efficient supply of products and to capture the market Cinram has developed a large infrastructure across the Europe. It has developed Distribution centre in UK and supplying all the products from this distribution center. This distribution centre is particularly situated in the Dunstable, Bedfordshire Prologis Park. In this centre around 500 workers work in one shift in and satisfying its customers by providing prompt delivery of the products.

2) Problem

Use of modern technology is required after the construction of the warehouse to manage the warehouse functions efficiently, to meet the requirements of the intense pace business environment of multimedia, for better utilization of the distribution's centre resources and for the better performance during the supply of orders to the customers. Cinram was in need to develop such a warehouse management system which could help in the efficiency of picking of products, receiving of goods and allocation of storage space[10].

3) Implementation of KNAPP WMS in CINRAM

KNAPP Warehouse Management System which has been implemented over the 241,000 Sq ft warehouse and this system is fulfilling all the requirements of the customers.

In the warehouse the first thing is the receiving of the goods when goods are in the pallets which contains unpacked goods at Decant and are then put into for further processes. In Cinram CDs and other discs are separated and then these CDs directly go to their specific case and then barcodes are attached on each discs by the Warehouse management system. There are enough bays in the warehouse in which these products are stored and this is managed by the automatic system. These CDs are stored here for their picking and replenishment.

In Cinram picking is done in different ways one is Pick by light system. This system is used for the picking of fast moving items. These fast moving items are mostly stored on the first floor of the warehouse while less moving products are picked at upper levels, KNAPP WMS allows paperless process while picking. Position indicators are displayed on the control zone which guides the pickers about the location of the products. The quantity of the products which has to be picked is mentioned on the packed units which are done by the rocker switch. This WMS updates the inventory invoices and other delivery notes and the final order is acknowledged by the zone controller and then proceeds towards new order.

In pick by Belt system the pickers have to pick full cases from the aisles. The orders are received to pickers in the form of bar codes. Picker scans the bar code and scanner displayed the pallet space and then picker confirms that barcode by the order label and order is confirmed but for double check these orders are placed in the scanner tunnel.

Batch Picking is done when there are small orders and same types of items are picked in batch picking. The WMS tells about the quantity of the picking order and type of the same products and then CDs are picked in a batch and put into sorter unit which sorts the order.

As it has been discussed earlier that when the goods are unpacked and put into appropriate storage locations these products are then unpacked for the dispatch of the order at packing station. These are mostly stored into the corrugated boxes and totes and then the WMS generates the invoice which gives the assurance of the sealed boxes and delivery labels are attached on it.

The orders which are ready for the delivery are reached at dispatch area of the warehouse where addresses are allocated according to the destination. These are placed at delivery gates of the warehouse where carriers are available which carry the orders to deliver to the customers. All packed orders are again scanned and put into the pallets which are finally carried by the carriers.

In Cinram the return goods are again unpacked and entered into the WMS and space is allocated to the CDs on which the barcodes are attached and finally these returns are again transported as the order arrives and all this is done by WMS.

By the application of the KNAPP WMS Cinram has simplified its warehouse operations. Proper allocation of the resources is done through this system and maximum level of customer satisfaction is achieved by the implementation of the WMS [11].

B. Superdrug Plc

1) Introduction

Superdrug Plc is a part of A.S Watson group which operates in about 40 countries of Europe and Asia and has famous brands in retail, health and beauty, food etc. Superdrug is the second largest company in UK which deals in the health and beauty and has about 900 stores across UK. It has three distribution centers which manage the supply of all the products to these 900 stores. It's one warehouse is in Dunstable, Bedfordshire which opened in 2007 in Prologis Park and has total 500000 Sq ft. area. About 800 people are working in this distribution center which ensures the supply of products to the retail stores [12].

2) Problem

Superdrug is a health and beauty retail store and has a wide range of products in its stores. These products are highly demanded by the customers so the supply of goods should be efficient. The delay in the delivery of the products at an appropriate time was the problem, other data relevant to the goods in the warehouse was not available and Superdrug had to make its picking process more efficient. As these are cosmetics products which are small in size and enough quantity is required for every retail store. In order to manage inventory properly and other logistics functions WMS is the only solution for all this process.

3) Solution

The products are delivered in the warehouse in area where the goods are received and then by using the barcode technology these inventory details are put into the system. RETEK is the Warehouse Management System which is designed by the RETEK Inc. This WMS is mostly used by the retail stores and their warehouses.

These goods are contained in the warehouse by using pallets and these products are then put into the aisles in the warehouse. The small products like mascaras, lipsticks and other items are stored into the Bays. Fork lifters are used to put the pallets into the aisles because the aisles are so high. During the peak demand season

and during Christmas days Superdrug's beauty products are high in demand. The product quantity is stored into the Warehouse Management System.

Picking in the Superdrug warehouse is done by using voice picking system. Vocollect voice system is adopted in this warehouse and pickers are directed to use headphones. Pickers have to record their voices and these recordings are then stored into the WMS which is integrated with Vocollect and then that picker can work in picking area. Different authentication codes are given to login and sign off from the picking. This system is so efficient that no other picker can do picking from someone else's device. The implementation of the Vocollect voice system in collaboration with the WMS has improved the efficiency of the Distribution Centre, has also improved the productivity of the labor and has also reduced the cost of training. Initially the warehouse pickers picked a list and they worked according to that list but by the introduction of the Vocollect voice system picking has facilitated the pickers. As the picking list is created by the system and that system tells about the quantity that how much quantity has to be picked which has made the picking system much faster than picking by paper.

In Superdrug warehouse stock management is done by using different RF equipments. These devices are used for the input of data and then this data is transferred to WMS which stores it and provides real time information regarding stock. This warehouse management is directly linked with the retail stores of the Superdrug which put the demand of short product into their system and this information is delivered to the warehouse instantly and demand of the required store is fulfilled.

Quality control is an important aspect in Superdrug and by the use of WMS quality control it has become easier. The order details are stored into the WMS database and when an order is complete it is forwarded to quality control department and it is checked that order is in accordance with the required demand. Although the system is much efficient but there is some chance of mistake during the picking because some of the new pickers have problem while picking so QC department first ensures the order and then transfers it to the dispatch department.

In dispatch these orders are finally ready to ship. Vehicles are available there. The totes are already have the RF labels which have the exact location where the products have to ship and then these totes are put into the container and container is sealed. The container contains the RF label which contains the information about the carrier and ensures the delivery of the order.

By the use of the RETEK WMS Superdrug has been involved in best logistics practices and what of this more important is that it takes order directly from the retail stores and provides them information when the distribution centre sends delivery to the store. Superdrug has a separate Voice Picking system which is the best

picking system of the market and is integrated with WMS to control the functions in the warehouse.

C. Clarks

Clarks is the famous shoe brand of Great Britain. This company started in 1825 when Cyrus Clark started sheep skin business in Somerset and later on manufactured sheep skin shoes. In 19th century Clark's shoes had become the renowned shoe brand of the UK's market. By the addition of the ladies shoes the sale of Clarks increased up to 40 million pairs a year. Clarks now have more than 500 stores in UK and is one of the best shoe stores in the world.

Clarks with such a huge sale of shoes developed a distribution centre in Somerset of about 28000 meter square which has the capacity of dealing with more than half million products. To make the warehouse functions efficient there was a need of WMS which could manage the operations properly. There were problems in the warehouse in managing conveyors for the alignment of the shoe boxes as barcodes were not accessible to the conveyors.

For the solution of these problems Clarks needed to buy new automated conveyor system, WMS and adoption of high bay racking. When the packed goods arrive at Clarks warehouse these are packed and have a label which is called RF label. This RF label scanned by the scanner and then directly sent information to the WMS called Klass-X. After doing all this shoe cartons were placed into the storage locations in the high racks and the WMS contained the ID of each carton because the cartons passed by the printers which printed the storage location which helps the pickers during picking.

Picking and sorting was done by the WMS and due to the implementation of the WMS the picking per hour increased and replenishment of the products is done properly by the information provided by the WMS.

By the above discussion about the use of WMS in different companies it is proved that the companies are using different warehouse management software's which are integrated with other systems and Warehouse Management System has increased the efficiency of the warehouse functions.

CONCLUSION

Warehouse management system is a pivotal part of the warehouse to obtain the maximum level of efficiency. By the adoption and implementation of the warehouse management system the issues with the functions of warehouse such as inside movement of material, storage management, receiving of goods, picking process, and shipping can be resolved and the productivity of the warehouse can be improved. Warehouse management system gives the real time information to all the functions.

Future recommendations: By the use of WMS software's the inventory management has become efficient like the implementation of VMI between retailer and supplier. It automatically gauges the inventory level

in each store and where ever the inventory level reduces VMI provides prompt information to the supplier and short products replenish very soon. Labour productivity level can be checked by the use of WMS. Warehouse management system is also integrated with ERP because ERP is a centralized program which is used by the entire organization. These systems have logistics and supply chain function and can work as WMS. These systems can perform some other roles like finance, marketing, management etc. These functions may provide the necessary demand from the customers and warehouse's personnel can perform according to the WMS. The above examples of different warehouses which are using WMS have proved that the use of WMS has increased their productivity level and there is sufficient increase in the best customer satisfaction level. Use of RFID in the warehouse is the best way to allocate the storage space, inside logistics of warehouse, shipping of goods. Evolution of Voice warehouse has also enabled warehouse to be competitive in warehouse functions and to get a positive feedback from the customers.

In this competitive scenario the infrastructure of most of the warehouses is outdated as businesses think more about other functions of the business like marketing, finance and human resources but due to competition and decline in sales because of high cost has compelled business management to think about lowering cost and to offer good prices to the customers. Logistics and supply chain is such a function of business where a business can reduce its cost and can get competitive edge in the market. Reduction in the transport cost, products storage costs can be done instead of concentrating on other functions of business. Warehouse is such a part of supply chain which contributes in cost reduction and Warehouse management system is the only tool to make warehouse functions efficient. Before the implementation of WMS there was a slow movement of material inside the warehouse and high inventory cost which increases the operating expenses incurred in the business. By considering the research on the warehouse management systems it shows that most of the warehouses are adopting new technology and improving their performance. Scope of automation is increasing in the warehouses like use of RFID for identification of the products and voice systems are mostly used for picking of products. It is also observed that implementation of WMS is costly but has a lot of benefits.

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