PressAcademia Procedia - (PAP), ISSN: 2459-0762

PressAcademia Procedia

Global Business Research Congress (GBRC), May 24-25, 2017, Istanbul, Turkey

EVALUATION AND IMPROVEMENT OF WAREHOUSING SYSTEMS: A CASE STUDY OF X FIRM IN TURKEY

DOI: 10.17261/Pressacademia.2017.386
PAP-GBRC-V.3-2017(1)-p.1-8

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To cite this document
Erdil, A. and M. Erdil, (2017). Evaluation and improvement of warehousing systems: a case study of X firm in Turkey. PressAcademia Procedia (PAP), V.4, p. 1-8.
Permanent link to this document: http://doi.org/10.17261/Pressacademia.2017.386
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ABSTRACT

In today's rapidly growing and changing business environment, keeping their competitive edge in the market is becoming harder and harder for organizations. Thus, today's organizations have to constantly re-engineer their business practices in order to meet the increasing competition and at the same time to meet customer expectations. This requires smoothly operating a process that yields high-quality products/services in a short response time with a low cost in an organization. This can be achieved by integrating a well-operating supply chain system into the businesses conducted. With this scope, being a member of the supply chain, warehousing and distribution systems play one of the key roles in achieving competitive advantage. However, in Turkey, warehousing has not been given the degree of consideration that it deserves. Yet, recently, few companies have realized the vital of warehousing and studies regarding the subject have begun accordingly. One of the companies in Turkey that have acknowledged the need for innovation in X Textile Firm. It has undertaken to re-engineer of its core operations. Within this frame, this research handles one of the branches of the study, Analysis, Assessment and Improvement of the Warehouse System. With the reviews that the results of the studies have presented, proposals are formed and existed what should have been done in order to achieve the objectives that have been stated at the beginning of the study. Then, after interviewing with top management of the firm on needs, constraints, and specifications, detailed proposals covering the core issue are prepared. When warehousing operations are considered as a whole, the issue inherently requires an elaborate analysis of the supply chain. However, because of time constraints and the scope designated at the outset, detailed design proposals are kept and sustained within the initial frame. At the end of the study, the proposed structure and concept is presented to the management and this research provides as an initial step and it supports on how the firm should follow throughout the progress of the research.

Keywords: Business, management, re-engineering, supply chain system, warehouse.
JEL Codes: R41, Z20

1. INTRODUCTION

A well-integrated warehouse system ensures that lower inventory and operational costs occur while customer service levels are maintained or improved.

As a result, warehousing operations have grown infinitely more complex. Faster, quicker, better warehouse systems are needed in every part of the organization to ensure an ever-increasing improvement in operational efficiencies to support a competitive sales environment (Gu et al., 2007). Warehouse Management (WM) shows flexible, automated support to help you in operating all products movements and in maintaining current stock inventories in your warehouse complex (see figure 1).

While inventory control may provide a primary force increasing the competitiveness of any business, most operations are still become involved in tedious, order-hedging, and misplaced inventory. The fast-paced, decentralized nature of the warehouse in today's business environment demands a comprehensive, dedicated solution that provides timely, accurate and relevant information to everyone from on-the-floor operators to top management (Gu et al., 2007).

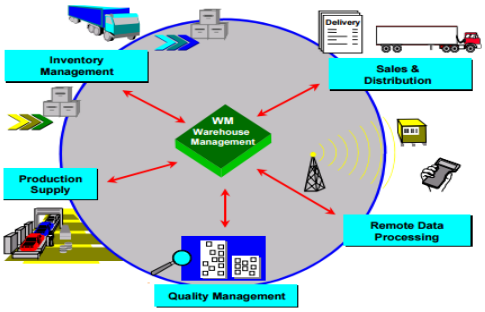
WM helps warehousing operations by making it possible for you to

-Determine and direct warehousing structures

-Stabilize material flow using advanced putaway and picking methods

-Operate product receipts, products issues and stock transfers quickly and easily

Figure 1: **General Warehouse Management Structure (Url 1; Best Prac.Guide, 2007)**



WM is also interconnected to Sales and Distribution (SD) owing to the transportation module to perform delivery documents for both the complexed WM application and decentralized WM system. The WM interface to Quality Management (QM) supports warehouse administrators to track and handle views lots that are stored in the warehouse. WM is also interfaced to Production Planning (PP) system to provide in supplying materials to support locations in production (Url 1; Best Prac.Guide, 2007).

In this manner, one of the companies in Turkey, This X firm has required for adopting more developed comprehensive systems to extensive ahead of the textile bazaar. In this scope, the subject to be handled will be Analysis and Improvement of Shipping Warehouse System (Url 1; Best Prac.Guide, 2007).

2. SYSTEM ANALYSIS AND DESIGN

A system is a composition of resources relating together to convert inputs to usable outputs. Any system comprises of interrelated and interdependent components, and within these, the individual pieces integrate to perform specific tasks (Edwards, 1993).

2.1. Systems Analysis

Systems analysis involves studying the ways an organization currently retrieves and process data to produce information with the goal of determining how to make it work better. To do so, alternative systems may be developed and evaluated each in terms of cost/benefit and feasibility (Edwards, 1993; Fitzgerald and Fitgerald, 1987).

2.2. System Design

System design modifies the theoretical solution declared by the feasibility study into a logical reality During the design phase, the following steps should be taken (Tompkins, 1996; Edwards, 1993; Fitzgerald and Fitgerald, 1987; Senn, 1993):

-Drawing a model of the new system, using data flow and entity relationship diagrams

-Devising formats for all the reports that the system will generate

-Developing a technique for gathering and inputting data

-Explaining the detailed data requirements with a data dictionary

2.3. Systems Implementation

Systems implementation includes actual programming, testing, training, use of the new system Upon completion of the system, the analyst, management, users evaluate the system to ensure that it fulfills all its goals. During the implementation phase, the system actually takes physical shape. In that phase, the system actually takes physical shape.

-Establishing a maintenance procedure to repair and enhance the system.

-Completing system documentation.

-Evaluating the final system to make sure that it is fulfilling original needs and that it began on time and within budget.

The implementation phase is completed with an evaluation of the system after placing it into operation for a period of time During this time, errors usually show up and most costs become clear (Tompkins, 1996; Edwards, 1993; Fitzgerald and Fitgerald, 1987; Senn, 1993).

2.4. System Maintenance

System maintenance, which is the final phase, includes repairing the system when errors are detected, enhancing the system when the user needs new functions, or changing the system to meet new laws or changes it the organization's purpose or goals (Tompkins, 1996; Edwards, 1993; Fitzgerald and Fitgerald, 1987; Senn, 1993; Faber et al., 2002; Frazelle, 2002).

Maintenance, the issues that are handled are:

Resolving necessary changes; Correcting errors; Enhancing or modifying the system; Assigning staff to perform maintenance activities; Providing for scheduled maintenance

2.5. Statement of the Problem

As a case study, X-Firm has been recently adopting new policies to help it strengthen and improve its place in the competitive. This X firm has the following departments Design, Buying, Sourcing, Human Resources, Financial Affairs, Sales and Marketing departments. From its start of being a wholesale company, it has developed a retail organization.

The general scope of its activities involves working with circular and flat knits, together with wovens, sourced from associated companies. They are distributed through its own distribution systems in the domestic and foreign market.

3. WAREHOUSE OPERATIONS

Warehouse operations have been according to business, logistics, and government initiatives including Just-In-Time production, quick response, the quest for quality, enhanced customer service, operator safety, and environmental protection, and also have been revolutionized.Designing an effective warehouse system supports to have reduced the amount of time allowed to respond to customer demands (Fechner, 2009). The quest for quality has also moved from manufacturing into warehousing and distribution

A renewed emphasis on customer service has increased the number and variety of value-added services in the warehouse. Eventually, an increased concern for the preservation of the environment, the conservation of natural resources, and human safety have brought more connective government adjustments into the design and management of warehousing operations. The traditional response to increasing demands is to acquire additional resources. In the warehouse, those resources include people, equipment, and space. Unfortunately, those resources can be difficult to obtain and sustain (Gu et al., 2007; Fechner, 2009).

In the face of rapidly increasing demands on warehouse operations and without a reliable pool of additional resources, the planning and management of warehousing operations are very difficult for this firm. This issue is tried to solve.

3.1. Missions of a Warehouse

In a distribution network, a warehouse may provide any of the following requirements:

-The warehouse is usually supported near the stage of manufacture. A warehouse performing this function can have requirements from monthly to the quarterly replacement of stock to the next level of distribution.

- A warehouse may be used to accumulate and consolidate products from various points of manufacture within a single firm or from several firms, for related shipment to general customers. Such a warehouse may be located centrally to either the production locations or the customer base.

-Warehouses may be distributed in the field in order to shorten transportation distances to allow the rapid reaction to customer demand. Regularly, distinct components are picked, and the same item may be shipped to the customer daily (Smith, 2007; Gu et al., 2007).

Figure 2:Warehouse Roles within the Distribution Network (Gu et al., 2007)

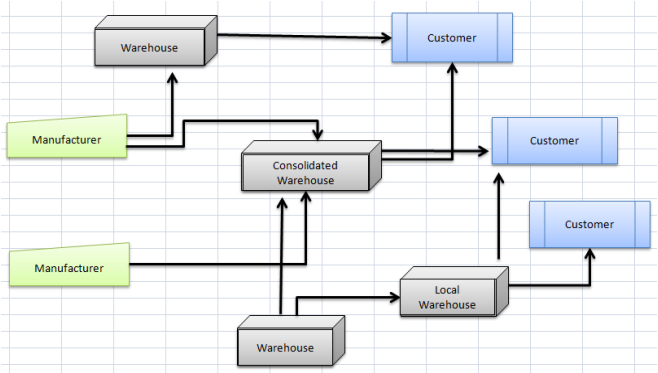


Figure 2 illustrates warehouses performing these functions in a typical distribution network, Unfortunately, in the networks of the warehouse, a single item will put in and out of a warehouse supporting each of these functions at the spot of manufacture and the customer. When feasible, two or more activities should be related to the same warehousing operations. Current changes in the availability and cost of transportation options make the union possible for many products(Gu et al., 2007).

3.2. Functions in the Warehouse

Although it is easy to think of a warehouse as being dominated by product storage, there are many activities that occur as part of the process of getting material into and out of the warehouse. The following stream includes the activities perceived in most warehouses. These functions are presented on a flow route in Figure 3 (Smith, 2007; de Koster et al., 2007; Petersen and Aase, 2004).

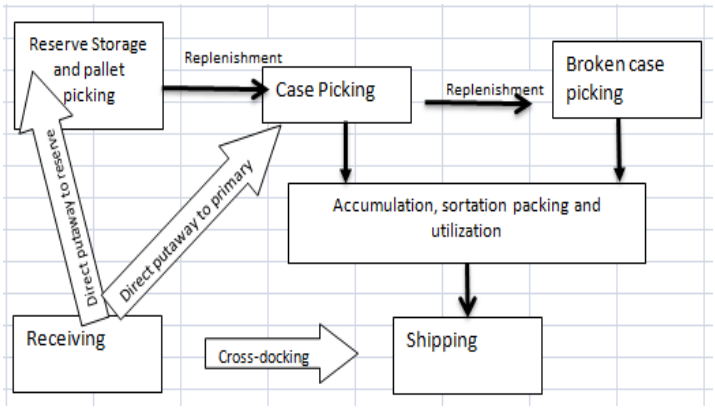
1-Receiving; 2-Prepackaging (optional); 3-Put away; 4-Storage;

5-Order picking (pallets) 6-Packaging and pricing (elective)

7-Sortation and/or accumulation 8-Packing and shipping

9-Cross-docking (elective) 10-Replenishment (elective)

Figure 3: Typical Warehouse Functions and Flows



The functions can be declared briefly as follows (de Koster et al., 2007; Smith, 2007; Siu and Heiser, 2005):

1-Receiving is the collection of activities involved in the orderly receipt of all materials coming into the warehouse, in providing the assurance that the quantity and quality of such materials are as ordered.

2- An entire receipt of merchandise may be processed at once, or a portion may be held in bulk form to be processed later. This may be done when packaging greatly increases the storage cube requirements or when a part is common to several kits or assortments.

3-Put-away is the act of placing merchandise in storage. It involves transportation and arrangement.

4-Storage is the physical comprising of merchandise while it is awaiting a demand. The structure of storage depends on the size and quantity of the items in inventory and the manipulation characteristics of the product.

5-Order picking is the process of removing components from storage to support a specific demand. It includes the basic service that the warehouse supports for the customer and it has significant criteria for warehouses designs

6-Packaging and/or pricing can be done as an elective stage in the picking process. Waiting until after picking to support these functions has the advantage of providing more flexibility in the use of on-hand inventory. Individual components are available for use in any of the packaging regulations and combinations right up to the time.

7-Sortation of batch picks into individual orders and accumulation of distributed picks into orders must be done when an order has more than one item and the receipt of all accumulation is not done as the picks are made.

8-Packing and shipping may include the following tasks:

-Weighing orders to determine shipping charges, - Accumulating orders by outbound carrier

-Preparing shipping documents, including packing list, address label and bill of lading

-Checking orders for completeness

9-Cross-docking inbound receipts from the receiving dock directly to the shipping dock.

4. CONFIRMATION OF PROBLEMS

Regular Increase in Warehouse - in the current season, there has been a significant increase in production rates. This is one of the results of a rapid growth strategy that the company has assumed recently. In addition to increased amounts of production, more importance is presented at the same time.

4.1. Disorder and Untidiness in the Storage

The addition of new stores in a very short time and the subsequent transfer of accumulated or newly coming goods to these new buildings without any system or any order has resulted in accommodation of one type of an item in more than one store. Picking up an order of items lasts so long that the shipping process almost always starts later than planned. This causes it to finish later than planned. The addition of the problem that the location of remaining items in the temporary

waiting area takes very long time causes the shipping process to finish in late hours. Also, records of these transfers are either do not exist or full of errors. All these issues cause a significant inefficiency in workflows.

4.2. Workflow Problems

One of the significant problems observed in workflows depends on the delay resulting from the late arrival of goods from suppliers. Warehouse optimization supports to take the most from overall processes, rather than the individual process stages, by determining the optimal technique to perform and supply orders given all constraints. Instead, optimization regulates the most cost-effective way to pick and ship while also supplying requirements of customer service. The suppliers support the required components that will be supplied to the warehouse after it has obtained the goods receipt request form. This process supports a noticeable amount of time; the items prepared are transported to the storage. (Faber and de Koster, 2002; Rouwenhorst et al., 2000).

4.3. Arranging New Settlement Layouts

New settlement layouts of the warehouses should be organized by determining the inventory situations and goods receiving plans. This assessment at the beginning of each season supports a technique for determining a required location for each component. As a result of this, some components can be replaced in more than one place. As a case study, this firm needs a convenient storage and warehouse optimization because it has an engagement, difference in production and stocking of goods.

Development of Items Coding System

Mostly, some coding systems cause confusion in picking the items. The current items coding systems should be analyzed and should be developed to prevent confusion in processes. According to this issue, a new item coding system could be improved.

Establishing a New Addressing System

Received items are put in the temporary storage area. The next day (shipping day) the items to be shipped are firstly picked from the area. The arrangement and ordering of items put in that area are made without any rule or specification. Only the employees that put and arrange the items know exactly where a specific item is stored. The employees in charge of picking find the necessary items by asking each other or searching them one by one among hundreds of boxes of items. After shipping process is complete, the remaining items are carried to their permanent storage bins. This operation lasts until midnight and results in overtime work. In order to prevent this disorder, an addressing system should be established. By applying this, every item would have its own address so that the received items would be stored directly in their permanent storage bins and the items to be shipped are picked from their predefined addresses (Siu and Heiser, 2005; Rouwenhorst et al., 2000).

5. A SEARCH OF APPROPRIATE WAREHOUSE SYSTEMS FOR IMPLEMENTATION

In the scope of implementing the new system, new software should be designed to respond all the requirements of warehouse operations. In this manner, the current software should be studied whether it can be improved according to the new design specifications.

5.1. Analysis of the New Warehouse

Architectural designs should be gathered in order to determine the technical opportunities, technical infrastructure for electricity and communication systems and the positions entrance doors.

Making Scheduling Plans for Movement

Items should be transferred to the new warehouse after the new system is applied or developments in the current system are extended.

New Warehouse Decision

The main reason for new warehouse decision has nearly no physical and technical information about the building that was assumed to exist the new warehouse.

Packaging Style

Packaging the items in nylon bags would require more work than packaging in boxes because items packed in nylons would be packed again in larger boxes before shipment. These boxes could involve all the components. When types of items are examined, it is predicted that the employees in the warehouse could spend most of their over time periods with unpacking and repack the components.

New Addressing system

With the new hardware, a preliminary addressing system was organized according to the types of items (for instance, t-shirts, trousers etc.) such as a region is specified to exist the place of garment product ranging in size and colour. This system provides workers to find components easily.

A new warehouse addressing program, which is supported by a software packet program, being improved via the IT department. This structure purposes to present which kinds of products are convenient in the warehouse. In this new addressing system, each storage can involve three types of products depending on their quantity and capacity of the storage.

6. CONCLUSION

Industrial Revolution supports many improvements into the manufacturing environment. Automation is one of these new concepts. But manufacturing environments which are automated are very complex. This complexity can not be managed by the structure of systems without fundamental interaction with each other. So many systems integrate with another one. In this research, two of these structure of systems are Supply Chain Management and Capacity Planning. The problem of this study is combined with supply chain and capacity planning in the warehouse.

In the scope of this research, by following the technique and concept of systems life cycle, firstly the research topic has been determined that is Analysis and Evaluation, Design of X WareHouses. Then the current system has been observed and scopes of improvements have been declared. Same assessments had to be performed several times because of changes in processes and updates of data on which alternative solutions would be focused.

It is seen that firstly developments in these scopes should be existed prior to support developments in the warehouse such as the flow of information. In this fact, the scope of this research, it is the initially physical design of X warehouses, converted to be system depending on the supply chain according to the manufacturers, buyers, and storages.

In the processing period, focused on the issues determined as a result of the observational assessment, new system requirements have been settled and new alternative structure of system designs have been improved accordingly taking into account the logistics system as a whole. As a result of this conception, feedback data is taken, gathered from them regarding proposals of system designs and then, some changes are provided to improve on them accordingly, to support satisfaction according to their requirements

REFERENCES

Gu, J., Goetschalckx, M. and McGinnis, L. 2007. Research on warehouse operation: A comprehensive review. European Journal of Operational Research. Vol. 177, No. 1. p. 1- 21

Best Practices Guide, 2007, Warehouse Management System, WERC and Supply Chain Visions.

de Koster, R., Le-Duc, T., Roodbergen, K.J. 2007. Design and control of warehouse order picking: A literature review. European Journal of Operational Research. Vol. 182, No. 2. p. 481-501.

Edwards, Perry. System Analysis and Design, McGraw-Hill, 1993.

Faber, N., de Koster, R.B.M., van de Velde, S. 2002. Linking warehouse complexity to warehouse planning and control structure. International Journal of Physical Distribution & Logistics Management. Vol. 32, No. 5. p. 381-395.

Frazelle, E.H. 2002. World-class warehousing and material handling. New York: McGraw-Hill

Fechner I., 2009. Determinants of warehouse space market development in Poland, LogForum, Vol. 5, Issue 1, p. 1-10

Fitzgerald, J. and Fitgerald, A. 1987. Fundamentals of System Analysis, 3rd ed., John Wiley &Sons, Inc.

Gu, J., Goetschalckx, M. and McGinnis, L. 2007. Research on warehouse operation: A comprehensive review. European Journal of Operational Research. Vol. 177, No. 1. p. 1- 21.

Senn, J.A. 1989. Analysis& Design of Information Systems, 2nd ed., McGraw-Hill.

Smith, J.D. 2007. Storage and Warehousing, in Handbook of Industrial Engineering: Technology and Operations Management. 3rd Edition. John Wiley & Sons, Inc., Hoboken, NJ.

Petersen, C.G., and Aase, G.R. 2004. A comparison of picking, storage, and routing policies in manual order picking. International Journal of Production Economics. Vol. 92, No. 1. p. 11-19.

Petersen, C.G., Siu, C. and Heiser, D.R. 2005. Improving order picking performance utilizing slotting and golden zone storage. International Journal of Operations & Production Management. Vol. 25, No. 10. p. 997 - 1012.

Rouwenhorst, B., Reuter, B., Stockrahm, V., van Houtum, G.J., Mantel, R.J. and Zijm, W.H.M. 2000. Warehouse design and control: Framework and literature review. European Journal of Operational Research. Vol. 122, No. 3. p. 515-533.

Tompkins, W.; Bozer, F.; Tanchoco, T.1996. Facilities Planning, 2nd ed., John Wiler & Sons, Inc.

Url 1: Help.LEWM, 2001, Warehouse Management Guide, SAP AG, April 2001.