

WAREHOUSE MANAGEMENT SYSTEMS (WMS) AND BUSINESS PERFORMANCE: AN EXPLORATION OF POTENTIAL IMPACT OF WMS IMPLEMENTATION ON WAREHOUSE

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ABSTRACT

This paper aims to portray the possible impact of the implementation of a warehouse management system on business performance. It is a case study on 'Delta Pharmaceuticals', in Botswana. It aims to outline if an adaptation of a warehouse management system can influence and effect change to Delta's supply chain warehouse operations. It is a descriptive research and the strategy used was of a survey approach. The target population comprises of 30 of Delta's personnel and the sample size derived is 16 employees. Questionnaires were used for data collection.

KEYWORDS

Warehouse, Warehouse Management System, Delta Pharmaceuticals, Business Performance, Supply Chain etc.

INTRODUCTION

Warehousing plays a vital role in the overall supply chain process and due to this, warehouses are regarded as more than a place where inventory is stored (Gourdin, 2006;&More, 2016). Warehousing being a critical function of logistics, is in today's setting of modern supply chains, a key aspect and has a significant role in the success or the failure of organisations today (Frazelle, 2002). Kearney (2004) adds to this by outlining that if one were to thoroughly look at the break down of operational costs of a certain company, warehousing would contribute to about 20% of logistics costs. On top of these costs, warehouses have continuously been faced with various challenges that include; supply chains that are becoming more lean and integrated, globalized operations, ever-demanding customers and technology innovations that are vastly changing (Ramaa, Rangaswamy, & Subramany, 2012). As a means to adapt to these challenges companies are coming up with innovative approaches that include internet technology (IT) in their warehousing operations such as warehouse management systems (Min & Diew, 2010). A warehouse management system is a database driven internet-technology tool used to improve the efficiency of the warehouse by coordinating warehouse activities and maintaining accurate inventory by recording warehouse transactions (Shiau & Lee, 2009).

PROBLEM STATEMENT

In this era of globalisation, companies are looking for ways to have some competitive advantage in their industries. Implementing the use of a well-managed warehouse system can assist companies to properly moderate their levels of inventory and increase in accuracy, track their inventory, reduce labour costs and ensure proper maintenance as well as housing of stock (Karimi & Namusange, 2014). A management of this kind in the warehouse can ensure that, there is provision of ease and convenience to the suppliers and distributors to keep track of inventory and its maintenance (Harold, 2002). Thus, warehouse management can be very beneficial in storage and maintenance of inventory, where it has been shown by different studies that an efficient warehouse management system is crucial to an organisation's operational performance (Liao, 2007; Kerridge, 2006;& Larson, 2004).

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Today, many organisations have however failed to take seriously the issue of warehousing into consideration, storage of goods and distributions from the same warehouses are haphazardly done, that is without any systematic approach. This is due to the inadequate incorporation of modern information technology which come with good warehouse management systems which has resulted to inaccuracy order management techniques which tends to deal a major blow to many organizations as a whole (Ackerman, 2008;& Cooper, 2002).Delta Pharmaceuticals is one organisation that is faced with these problems of inventory management, stock taking inaccuracies and inefficient cycle and lead times. Delta Pharmaceuticals should note that Information Technology (IT) has been identified as a major influencer in the business environment today (Bartezzaghi 2003) and that the problems they face are those that can be eradicated through the proper implementation of WMS and an incorporation of modern technology in their warehousing operation.

OBJECTIVES OF STUDY

- To outline what a warehouse management system is concerned.
- To describe the need for a warehouse management system in Delta Pharmaceuticals operations.
- To highlight the benefits of using a warehouse management system for Delta Pharmaceuticals.

LITERATURE REVIEW

Warehouse Management System

The warehousing function amounts up to 2-5% of the cost of sales of a corporation and this together with the highly competitive global business environment of today has prompted organizations to emphasize on return on assets (ROA), and hence minimizing warehousing costs has become an important business issue (More, 2016).More (2016) goes on to say that as a result there has been an increase in the number of firms who have resorted to automating their basic warehousing functions to achieve the increase in throughput rates or inventory turns required for their warehousing operations to be cost effective. The deployment of technology and warehouse management systems has been one of the options for many organisation as a means of attaining a competitive advantage (Lazarus, 2000).

According to More (2016) when an organisation takes up implementing a warehouse management system, the organisation should be prepared to change its entire process or a significant part of its process and system storage. The decisions are based on alternatives spanning from conventional warehousing racking and shelving with forklift or even manual operations through to fully automated systems with conveyors and automated guided vehicles and from carousels to robotic applications. A WMS systems operates with a warehouse control system (Ramaa, Rangaswamy, & Subramany, 2012).The primary function of a warehouse control system is to receive information from the upper level host system, being the warehouse management system, and translate it for the daily operations. According to Nynke, Koster, & Rene (2002) there are 3-warehouse management systems that organisations can choose from based on the functionality of the warehouse control system. The **first** type is a Basic WMS. The Basic WMS system is apt to support stock and location control only. It is mainly used to register information. Storing and picking instructions may be generated by the system and possibly displayed on RF-terminals. The warehouse management information is simple and focuses on throughput mainly. The **second** is the Advanced WMS. The Advanced WMS above the functionality offered by a basic WMS is able to plan resources and activities to synchronize the flow of goods in the warehouse. The WMS focuses on throughput, stock, and capacity analysis. The **third** type of warehouse management system is the Complex WMS. Nynke, Koster, & Rene (2002) mention that there is complete warehouse optimization, were information is available about each product in terms of where it is located (tracking and tracing), what is its destination and why (planning, execution and control). Further, a complex system offers additional functionality like transportation, dock door, and value added logistics planning which help to optimize the warehouse operations as a whole.

ANALYSIS OF DATA AND FINDINGS

The data was gathered with questionnaires. The questionnaires were issued out to employees working at Delta Pharmaceuticals in its warehousing function. Sixteen questionnaires were distributed but only 15 were returned. The

data collected is presented under its relevant section, question by question. There are two sections (A and B) section A employed only the Likert Scale whereas section B used both the Likert Scale and a series of yes or no questions.

Section A: Information about warehousing activities / functions. Participants were asked to rate each activity based on their perception level of how the warehouse activity is carried out. The Likert scale ranged from 1 to 5 where: 1 was equivalent to very poor, 2 poor, 3 moderate, 4 good and 5 very good.

Research Question One: What is A Warehouse Management System Concerned?

- **Dispatching**

Question 6: Perception on the overall function of dispatch.

Table-1

dispatch overall					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	1	6.7	6.7	6.7
	moderate	5	33.3	33.3	40.0
	good	7	46.7	46.7	86.7
	very good	2	13.3	13.3	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey 6.7% view the overall dispatch function as poor, 33.3% indicate that is just okay while 46.7% view it as good and 13.3% very good. Though the survey has indicated that most of the respondents view the dispatch function as satisfactory there are more areas in which it can be better improved for the function as a whole to be optimised though the lack of technology employment. According to Lazarus (2000) technology is the most important tool for enterprises to keep their competitive advantage and this can benefit Delta as most of their operations are manually done resulting in slower throughput times within the department's activities.

- **Receiving**

Question 6: Perception on the overall receiving activities.

Table-2

receiving overall					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	2	13.3	13.3	13.3
	moderate	5	33.3	33.3	46.7
	good	4	26.7	26.7	73.3
	very good	4	26.7	26.7	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey, 13.3% perceived the overall receiving function as poor, 33.3% as moderate, 26.7 % as good and 26.7% as very good. Based on the findings the whole of the receiving function is operated well despite it not having any technological aid in some of its key activities such as delivery inspections and product tracing within their receiving bay. According to Cross (2009) more efficiency and flexibility can be attained with the use of RFID technology and bar codes to stimulate more fluid operations within the warehouse. The employment of such could help the receiving department process their tasks faster and efficiently and get a higher overall rating based on the scrutiny from the senior management.

- Storage

Question 3: Perception on the overall storage activity.

Table-3

storage overall					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	2	13.3	13.3	13.3
	moderate	6	40.0	40.0	53.3
	good	4	26.7	26.7	80.0
	very good	3	20.0	20.0	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey 13.3% deem the overall storage activity to be poor, 40% find it moderately done, 26.7% as good and 20% as very good. This indicates that the storage function is less of a problem within Delta is warehousing function. Though the majority of respondents see no major concern with the storage function and how it is carried out, it is imperative that inventory is packaged and stored properly to avoid any inconveniences when employees performing picking tasks and stock taking tasks carry out their duties. Nolan (2017) points out that there are times when inventory is damaged because it will be left on the floor waiting to be put away in racks.

- Stock Taking

Question 6: Perception on the overall stock taking process.

Table-4

stocktaking process overall					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	3	20.0	20.0	20.0
	moderate	2	13.3	13.3	33.3
	good	6	40.0	40.0	73.3
	very good	4	26.7	26.7	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey, 20% of the respondents deem the stock taking process to be poor, 13.3% to be moderate, 40% to be good and 26.7% to be very good. Only 20% of the respondents said it was poor this might be because of their exposure to the activity and it not employing any technology to assist with the process. The majority of the respondents 66.7% viewed it as good or very good respectively; this indicates that though it is manually done there seldom are problems that arise because of stock taking not being implemented properly.

Research Question Two: Need for a Warehouse Management System in Delta Pharmaceutical's Operations

Question 1: Perception on the lead times attained

Table-5

lead times					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very poor	3	20.0	20.0	20.0
	poor	2	13.3	13.3	33.3
	moderate	3	20.0	20.0	53.3
	good	7	46.7	46.7	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey 20% of the respondents view the lead times attained by the warehouse function as very poor, 13.3% as poor, 20% as moderate and 46.7% as good. The findings on the survey show that system doesn't optimise the productivity levels of the employees to enhance the lead times for customer orders as more than half of the respondents perceive that they are unable to deliver products to customers at the time they would want to. According to Nolan (2017) customers are supposed to be able to get their orders within 2 hours but are sometimes unable to, because it takes longer for their orders to get to the dispatch area for them to be documented in the trip sheet. This occurs with orders that are within Gaborone.

Question 2: Perception on the use of space.

Table-6

use of space					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	2	13.3	13.3	13.3
	moderate	4	26.7	26.7	40.0
	good	5	33.3	33.3	73.3
	very good	4	26.7	26.7	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey 13.3% of the respondents view use of warehouse space to be poor, 26.7% to be moderate, 33.3% to be good and 26.7% to be very good. The findings reveal that less than one fifth are unsatisfied with how space is used within the warehouse while more than 80% are either satisfied or happy with how the space is used in the warehouse. According to Frank (2017) use of space is determined by employees in the warehouse and whatever space is available is then utilised. Gupta (2003) points out that the use of warehouse management systems eradicates the problems that may arise because of warehousing space as it manages and controls put away and storage allocation functions.

Question 3: Perception on the overall productivity levels of the warehouse function.

Table-7

overall productivity of warehouse function					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	poor	3	20.0	20.0	20.0
	moderate	3	20.0	20.0	40.0
	good	5	33.3	33.3	73.3
	very good	4	26.7	26.7	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey 20% of the respondents view, the overall productivity levels of the warehouse function to be poor, 20% to be moderate, 33.3% to be good and 26.7% to be very good. The survey indicates that more than half of the respondents believe that the system is able to help them carry out their tasks to a satisfactory level on a daily basis.

Research Question 3: How Can the Warehouse Management System Benefit Delta Pharmaceuticals?

Question 1: What is the level of technology usage in Delta's daily operations?

Table-8

use of technology in daily operations					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	low	4	26.7	26.7	26.7
	medium	7	46.7	46.7	73.3
	high	4	26.7	26.7	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey 26.7% of the respondent said that the level of technology used in the warehouse is low, 46.7% medium or average and 26.7% high. The survey indicates that there is an above average level of technology employment in Delta's warehouse activities. However, the only form of technology that Delta uses in their warehousing function is desktop computers used as workstations for entries of data concerning stocktaking, checking stock availability, invoicing, intra-organizational communication etc. Karimi & Namusange (2014) denote that for a warehouse to be deemed to be automated or partly automated, information technology such as RFID, bar codes scanners, GPS technology e.t.c should be used in some of the main warehouse activities. Delta doesn't employ most of these technologies.

Question 2: Would the use of internet technology yield better results in Delta's operations?

Table-9

would use of internet technology yield better results in deltas operstion					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	12	80.0	80.0	80.0
	no	3	20.0	20.0	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey 80% of the respondents said that Delta's operations would benefit from use of IT while 20% said it would not. It is possible that the 20% of the respondents are unfamiliar with how IT can be implemented to enhance the productivity or performance of an organisation is warehousing function. According to Karimi & Namusange (2014) the use of appropriate technology by organisations can lead to the organisation obtaining competitive advantage over its competitors. Technology improves warehousing activities by reducing labour centred tasks and automating tasks that were manully processed earlier.

Question 3: How frequently are medical returns expected?

Table-10

how frequently are medical returns expected					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high frequency	5	33.3	33.3	33.3
	less frequently	10	66.7	66.7	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

From the survey 33.3% of the respondents said that products are returned at a high frequency while 66.7% of the respondents said that products are returned from customers less frequently. The findings indicate that the system has little impact on trying to mitigate the problem of product returns from customers. Nolan (2017) pointed out that trip sheets are prepared by one employee who is prone to committing errors when assigning customer orders destinations. Furthermore problems can arise due to products not having identification tags or tracking technology in their packaging which help prevent consignments being mixed up when waiting to be delivered.

Question 4: Does the current system show product returns?

Table-11

does systems how product returns					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	3	20.0	20.0	20.0
	no	12	80.0	80.0	100.0
	Total	15	100.0	100.0	

Sources: Authors Compilation

The survey shows that 20% of the respondents said that the current system employed by Delta shows product returns, while 80% said that it doesn't show product returns. Frank (2017)& Nolan (2017) point out that when products are returned back from customers they are put away in a designated space where they await to be credited back into the system. The system doesn't show or indicate that the products are available within the warehouse until the responsible employee checks them in by entering it into the system through the use of the computer.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The importance of warehouse Management System is vital and so much in need in the present days. It was noted that the overall dispatch function performance is satisfactory and the lack of technology usage hinders some activities like order picking and order checking to be carried out effectively. It was also evident that the system does not plan or schedule deliveries for customer orders.

It was also observed that the receiving department manually tracks and identifies orders in the receiving bay and no form of technology is used to track deliveries in the receiving bay. The stock taking process of Delta Pharmaceuticals is manually carried out (performed). The inventory system employed by Delta Pharmaceuticals does not alert or signal to the warehousing function when inventory is about to expire. The lead times attained by Delta Pharmaceuticals when delivering customer orders are not consistent with the standard times they have set in place for customer deliveries. Delta Pharmaceuticals has a low level of technology usage in its daily operations.

Delta Pharmaceuticals still experience regular amounts of medical returns from customers. Most employees believe that the use of technology would yield better performance of the warehouse function.

Recommendations

Based on the conclusions, it is recommended that Delta Pharmaceuticals should integrate tracking and identification technology to assist the receiving department to help them easily locate orders. Further, it was recommended to incorporate bar code scanning technology to reduce the time taken for products to be added into the system, which will improve the process of stock taking efficiently. The system should be changed which alerts the relevant warehousing function when inventory is about to expire to reduce issues of obsolescence. The system should be upgraded which allows for real time tracking so that inventory is accounted for at all times when it is within the warehouse. It was also necessary to upgrade their system to incorporate warehouse management functions like task management and stock put-away to improve labour productivity. The recommendation put forward together with technological interventions in warehouse management system would improve the overall warehouse function thus improves business performance.

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