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The Effectiveness of Inventory and Stores Management on Turnover Performance of Central Medical Stores

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Abstract
Given that Central Medical Store is a distribution industry in a resource limited setting the study was carried out to investigate the effectiveness of inventory and stores management on turnover for Central Medical Store in a resource limited setting. The study uses a cross sectional research design methodology where Central Medical Stores is a case study with an objective of evaluating the effectiveness of inventory monitoring and information management on turnover. Data was collected mainly from primary sources using self-administered questionnaires. The findings arising from this evaluation reveals that inventory management practices are effective on inventory turnover. The established that inventory information management had a strong effect on demand forecasting and direct effect on turnover. The study also finds that it is possible to improve inventory management and optimize inventory turnover, a number of operational strategies are implemented. To achieve a study upward trend in turnover growth, inventory management practices must therefore be carried out efficiently. The study therefore recommended that continuous growth in turnover must be implemented through interventions through organizational policy and operational efficiency affecting inventory management practices.

Keywords: *Inventory and Stores Management, Turnover Performance, Logistics Management, Inventory Information Management*

1.0 INTRODUCTION

Senior management's concern is managing inventory levels because the impact of changing the inventory management procedures on turnover is reflected in turnover growth. There is a lot of research that has been done in this area by developed countries however, for resource poor settings there is hardly any documentation Wawera et al; 2004. There is therefore need for study using company in a resource limited setting as a case study to establish how inventory management practices affect turnover of an organization. Central Medical Stores (CMS) has the responsibility of delivering pharmaceuticals and medical supplies to over 70 district health offices and hospitals spread throughout the nation. Mountainous terrain throughout the country, the fact that some health facilities are located on islands and the poor condition of roads all serve to complicate the distribution operation. Add to this the disproportionately high cost of fuel and the limited resources of the government's health budget and the need for efficient transport management becomes clear. Transaid were invited by Central Medical Stores of Uganda to undertake an assessment of their transport and distribution function in order to provide a series of recommendations as to how they could reduce costs, increase efficiency and improve service delivery.

The result of the operational assessment was the development of a report detailing recommendations for improvement of the existing CMS distribution operation. The recommendations include suggestions for an appropriate policy and system implementation, resolution of organizational process issues, which had been adversely affecting the transport operation, and the subsequent execution of an outsourcing study to determine an effective solution for ongoing expansion of the delivery network. With the adoption of these recommendations CMS will be expected to benefit from reduced transport costs, increased vehicle utilization allowing a reduction in fleet size, improved vehicle availability allowing a faster response to vehicle demand, and overall improved vehicle service delivery. At present the tasks of managing the day to day transport operation are taking considerable time with the implementation of appropriate processes and systems this work will be greatly reduced freeing the transport and logistics officer to concentrate on upcoming projects to increase the distribution network which CMS services.

Comparison of the audited accounts for 1999/2000, 2000/2001 and 2001/2002 with the five year corporate plan of Central Medical Stores indicated that the implementation of the objectives both for its set up and those of corporate plan was done inefficiently. The exact figures for turnover were 7,189,877,006, 6,188,066,486 and

7,449,418,322 respectively. This meant that Central Medical Stores had a shortfall from the targeted sales were 9,528,408,399,718,172,041 and 11,970,611,208 respectively. This meant that Central Medical Stores had a decline in the targeted sales of 24.5 percent, 42.3 percent, 37.8 percent representing an average shortfall 34.8 percent. Rutaagi 2001 attributes the decline in sales turnover to how customer services levels high costs of sales, uncertainty of customer demand and inaccurate procurement needs estimation all of which are inventory management practice aspects. Given the inventory turnover cycle of 1.33 and 2 for the same period compared to 1.05, 1.15, in the corporate plan (CMS 1999) respectively. It is apparent that decline in sales had negative effect on inventory turnover. This strongly suggests that inventory and stores management is not effective on the turnover performance in the analyzed period. This study therefore intends to investigate the effectiveness of inventory and stores management on turnover performance and recommend interventions to mitigate the situation.

1.1 Problem Statement

Central Medical Stores (CMS) reveals Operational Constraints in areas of operations management, fleet management, management information, human resource and aspects which include how customer service levels, high costs of sales, uncertainty of customer demands, Long supplier Leads times, inaccurate procurement needs estimation. This study intends to undertake analysis on the effectiveness of inventory and stores management practices on turnover performance of Central Medical Stores and undertake a series of recommendations as to how these variables could reduce costs, increase efficiency and effectiveness and improve service delivery of Central Medical Stores. The research was conducted to evaluate the impact of the modulating factors that is to say information monitoring and information management practices to turnover performance. To understand the effectiveness of inventory and stores managed practices stretches out study turnover growth.

However, many companies tend to neglect this practices which slackens turnover growth. This study intends to highlight the key inventory monitoring and inventory information management indicators to ensure turnover growth. These therefore can be used by companies in resource limited settings to carry out interventions as proposed by this study to ensure effectiveness of inventory and stores management practices. The study will include customer employees and managers where the study will include 50 of the personnel of (CMS). 50 personnel out of the population of (CMS) in the functional areas are relevant to the study across the organization from various functional areas, departments, positions of respondents, duration of staff in the organization from various functional areas, department, positions of respondents and the duration of the staff in the organization.

2.0 LITERATURE REVIEW

2.1 Inventory Management Practices

Walgemack et al, 1982, inventoriews are the merchandise owned by the company and held for resale to customers in the ordinary course of business. Pandey 1998 concurred and added that inventories are classified as current assets because typically they will be sold within the year or during a firm's normal operating cycle if it should be longer than a year for retailing firms, inventories are often the largest and most valuable current assets. Hsu and Kleiner, 2001 define inventory management as being comprised of two major activities namely the control of inventory and the planning of inventories. The purpose of inventory management being to satisfy customer demands and minimization of stock handling costs in order to achieve higher stock turnover rate. Inventory control involves managing the inventory that is already in one's warehouse, knowing what products are in stock, their quantities, cost and location. Inventory planning involves determining when to order items, how much to order forecasting demand and stock replenishment, identifying the most effective source of supply, inventory information management and inventory monitoring.

2.2 Inventory

Kenneth Lysonss 2000 by definition inventory is assets that are intended for sale, are in process of being produced for sale or are to be used in producing goods. For many companies' inventory represents a large portion of assets and as such makes up an important part of balance sheet. Inventory can also be defined as the consumables, work in progress (WIP) and finished goods stock that are kept or stored for use as need arises. Ballard 2000 cites three inventory- costing methods that a company can use to determine the costs of inventory and argues that they impact directly on the balance sheet, income statement and statement of cash flow. However, the concern with determining the value of closing stock inventory or any quantity of inventory held at a particular point in time cannot be justified by only these three methods.

(a) First in, First –out (FIFO). This method assumes that the first unit making its way into inventory is the first sold.

(b) Last in, First-out (LIFO). This method assumes that the last unit making its way into inventory is sold first. The older inventory is therefore left over at the end of the accounting period.
(c) Average cost (AC). This method takes the weighted average of all available for sale during the accounting period and then uses that average cost to determine the value of cost of goods sold and ending inventory.

The choice of the method to use is therefore dependent on how a company wishes to reflect their inventory in its books of accounts.

2.3 Inventory Control

This area of inventory management involves receiving of purchased goods, storage, stock movement, cycle counting, order processing and dispatching to customers Krejewski and Ritzman 1999. The primary objective of inventory management is to ensure that the company is supplied with the right places. Ballou; 1998 This objective can only be achieved if appropriate management and control system which is efficiently and effectively operated; inventory control is affected by a number of factors including characteristics of demand order cycle time, replenishment lead time, it mixes, business objectives and cost structure of the company.

2.4 Components of Inventory Management Practices

This research purposely focuses on two components of inventory management practices that are relevant to the subject of this research namely; inventory monitoring and inventory information management.

2.5 Inventory Monitoring

This area of inventory planning involves the day today follow-up and evaluation of the key performance indicators in inventory management practice Tersiane et al 1994 argue that measuring and monitoring the key performance indicators that includes inventory control costs and services level can ensure good inventory planning. An effective inventory monitoring system empowers management with the right information to reduce inventory in times of dramatic sales decline and increase it in times of high demand resulting in high returns on investment Nevill, Rush and Sadd 1998. The best system monitors the process rather than just a stock. This means that monitoring and measurement takes place after cash action has occurred, this highlighting error immediately. If errors are eliminated the idea of a periodic check becomes superfluous Ballard, 2000.

2.6 Inventory Monitoring Variables

Watts Hahn and Sohn, 1999 indicated that in order to minimize the occurrence and impact of performance deviations caused by stem fitness problems, a manager must ensure that the inventory management system is consistent with the operating environment through monitoring. The system can be characterized by many environmental variables. For example, demand, costs, lead time, management policies. Decision rules may include order quantity, reorder point and safety stock level. Performance measures like turnover rate, stock out frequency and quality, inventory.

2.7 Performance Deviations

The literature reviews in study on inventory monitoring demonstrated a strong relationship between inventory monitoring and turnover and went further to show that an efficient inventory monitoring system assures accurate economic order quantities for stock. Despite of the extensive work done on inventory monitoring and its impact on turnover before this research, most of this has been done on companies in the developed world; a research gap exists demonstrating the effectiveness of inventory monitoring on turnover.

2.8 Information Management

This is the other variable of inventory planning that includes the systematic processing analysis and feedback of information that determines the accuracy and timely decision on the key data of inventory planning that includes demand history, costing history and stock level history. The key ingredients of efficient information management include accurate outputs ensuring actual representation of system data that is real time. This will ensure timely and correct management decision and inventory forecast Everett and Ebert, 1992. To do this information must be bench marked, captured consistently, and measured correctly. The best measure for good information management being how well system data matches physical inventory Razi and Tam 2003. Narasimhan 2000 argues that inventory turnover rate can be threatened when the physical inventory quantities do not match the on-hand quantities displayed by the information system. This is because information system must be able to display accurate quantities for each item as inaccuracies may lead to wrong sales promises to customers, leaving items unsold yet they are in the system or wrong procurement decisions due to wrong physical stock data.

2.9 Gap Analysis

To assess the gap in information management system, a gap analysis needs to be done the gap analysis tool for assisting the organization to understand what information it holds and where it needs to improve to meet business needs in order to accurately forecast demand namely the data function gap and rationalization, in essence it looks at the extent to which the information required by the function is supported in practice, all information holdings should support some activity or should refer to some elements of the information system.

2.10 Customer Service Level

Skeet, 2001.This indicates how often items must be in stock when customers require them. It is calculated by dividing the number of line items for stocked items shipped complete by the promise data with the total number of line items for stocked products ordered. The customer service level takes into account only sales to stocked items that are filled using warehouse inventory and excludes non stock items. Customer service level should be monitored frequently in order to carry out appropriate interventions and maintain good turnover.

2.11 Demand Forecasting

David Jessop and Alex Morrison 1994 estimates the future needs of stocks and when to order. Its purpose is to ensure that the right items are purchased at the right time, for right customer in the right quality and delivered in right quantities. A balance must therefore be strike between how much to buy and how long it takes to get supplies from the vendor.

2.12 Inventory Costs and Turnover

Goran 2003, in his research of inventory efficiency of turnover rate concluded that there is a part an association between companies' inventories and changes in turnover rate. Occurrence in changes in turnover rate requires some knowledge to be considered in corporate strategic planning of supply chain management. Companies have to carefully consider the impact that their current policies of inventory management have qualitative and quantitative changes in turnover. As a result of increased changes, the financial benefits that may be achieved through being lean in the inventory management areas of one's business might negatively influence the financial costs incurred.

2.13 Inventory Turnover

Drury 2000.This is how much stock is sold in a given period and is measured by the turnover rate which is a ratio that shows how many times the inventory of a company is sold and replaced over a specific period of time normally in the last twelve months. It is calculated by taking the annual cost of sales divided by the average inventory holding of stock. Nevill et al 1999.The result is an indicator of how well the company's products are succeeding in the market place. In general, the higher the number, the better, although, the right amount of inventory turnover depends on industry the company serves and its profits margins. Teresa, Saunders and Show, 1998, argue that every time one sells an amount of a product, product line, or other group of items equal to the average amount of money one has invested in those items they are "turning" their inventory. It is therefore the researcher's opinion that if inventory does not turn rapidly, there is too much money being tied up in unproductive or obsolete inventory.

2.13.1 Inventory Theory

According to Waters D, (2009), Taylor and Russell, (2011) inventory was defined as a list of things held in stock. Kumar and Suresh (2008) also defined inventory as materials in stock. Muller M, (2003) suggested otherwise and said, inventory includes company's raw material, work in process, supplies used in operations and finished goods. Inventory was critical to a processing organisation like AOTML as it was required to keep the organisation going and satisfy its customers. Schmitt A.J and Tomlin B cited in Gurnani and Mehrotra (2008) and supported the above statement by saying that supply chains depended on the successful flow of material in order to function and satisfy customer demands. Techniques had to be employed in order to effectively manage the inventory that was needed and even inventory that was available. Keeping inventory for future use was common in many businesses and it acted as a cushion in times of delivery variability. In modern organisations, the tendency to keep inventory just in case was also becoming out dated. The inventory theory came in to balance the act of having to keep inventory or not keeping inventory. Jaber Y. M, (2009) brought two models to test the two extremes. The first one is the deterministic inventory model which assumed that products in units were withdrawn from inventory continuously at a constant rate.

The objective therefore was to determine when and by how much to replenish the inventory. With the assumption that there will be continuous review of inventory, replenishments were done whenever inventories drop to low levels. This required an order quantity to be set so that when the inventory levels go down, replenishments were done.

The second one was the stochastic inventory model which assumed that there was considerable uncertainty about future demands for stocks. Therefore, inventory levels were reviewed periodically and new orders for replenishments were placed to cover supply variations. This caused conditions of stock outs or excess inventory. From the above extremes of inventory, there were similarities as to inventory being referred to as what is in stock. This meant that inventory models could be used to manage the inventory that was available and some that may not be available. For an organisation to fully manage its inventory, it had to employ the best models to assist in managing it

2.13.2 Inventory Management

Waters D, (2003) described Inventory management as the function responsible for all decisions about stock in the organisation. Wild T, (2002) in his definition asserts that inventory management or control is the activity which organized the availability of items to the customers. Kumar and Suresh (2008) however, said that inventory management or control is a planned approach of determining what to order, when to order and how much to order and how much to stock so that costs associated with storing and buying were optimal without interrupting production and sales. The above statements basically supported the idea that the real test in inventory management rested in managing stocks for an organisation to experience real value in customer service and reduced costs. This was where Taylor and Russell (2010) concluded that the objective of inventory management was to keep enough inventories to meet customer demand and also be cost effective. However, the dominant assumption was to meet customer needs while reducing inventory costs

2.13.3 Why do companies Keep Inventory

There is strong body of evidence that companies keep inventories for the following reasons. According to Muller, M (2003) and Baily et al (2008) respectively mentioned the following:

- Unreliability of supply: inventory helps you from unreliable suppliers or when an item is scarce and it is difficult to ensure a steady supply
- Predictability: inventory buffers what you need from what you process. For planning purposes and production scheduling, you need to have control of how much raw materials, sub-assemblies, spare parts you process at a given time which is not always easy.
- Fluctuations in demand: a supply of inventory on hand is protection to maintain customer service or production demand.
- Protection against the effects of forecast error, inaccurate records or mistakes in planning.
- Cost reduction through purchase or production of optimum quantities
- The convenience of having things as and when required without making special arrangements

Below figure further added on to reasons why companies kept inventory with red arrows from the centre and pointing out to reasons why hold inventory.

Figure 2.3: Reasons why companies keep inventory: Adapted from Scott et al (2011)

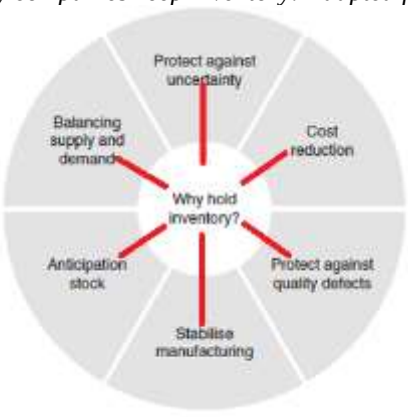


Figure 2.3: Reasons why companies keep Inventory

Waters D, (2009) added on to say that companies held inventories to allow for deliveries that were delayed or too small, allow for demand that was larger than expected. He also mentioned that inventory was kept to give cover during emergencies. Lysons and Farrington (2006) concurred with the above writers and added on to say that

companies held stock to smooth seasonal and cyclical demand, to ensure rapid replenishment of items in constant demand, such as maintenance supplies and office stationery and also to take advantage of lots or purchase quantities in excess of what was required for immediate consumption and to take advantage of price and quantity discounts. Frazelle E, (2002) commented that inventory assists in increasing customer service, reduce downtime, overtime and improve manufacturing capacity utilization. On the other end, Drury C, (2004) mentioned that there were three general motives why organisations held inventory. These were the transaction motive, speculative motive and precautionary motive.

The transaction motive occurred whenever there was a need to hold stock to meet production and sales requirement and it was not possible to meet the requirements instantaneously. The Precautionary motive occurred when there was uncertainty in supply, and the organisation underestimated its future production and sales requirement, it had to hold stock. It applied only when future demand was uncertain. The speculative motive looked at the possibility of future input price change which may spur a firm to maintain higher or lower stock levels to speculate on the expected increase or decrease in future prices. All these reasons for keeping inventory applied to AOTML because as tobacco processing company it relied on the availability of inventory to be able to process tobacco. It could be extremely difficult for the manufacturing plant of AOTML to operate without spares and sub- assemblies. That was particularly the reason why inventory had to be maintained and managed well in order to minimise plant disruptions, but also to maintain processing capacity utilization.

2.13.4 Benefits of Keeping Inventory

Management had to firmly understand the purpose of keeping inventory. Without a proper analysis it could be expensive to hold on to inventory that couldn't bring any return to the business. AOTML's inventory holding policy was not clear as to whether it answered four fundamental inventory questions. According to Muckstadt and Sapra (2010), there were four fundamental questions that had to be answered regarding inventories. The first one was what items should be stocked? Looking at AOTML's FYQ3 report of 2014 (Appendix 5), it showed a grand total of 3050 SKU's and all these materials were available in stock. This was a huge chunk of inventory and required considerable time for management which was a cost. The second question was where should they be stocked? At AOTML, all the inventories were kept within the same premises but under different storage locations according to the nature of the material.

Management of different storage locations was also another cost because it required each storage unit to have an overseer which meant increasing headcount. The third question was how much should be ordered when an order is placed? With regards to ordering, Purchase Orders were placed without comparing with stock on hand (SOH). This created excess stock on unwanted old stock as it remained unused. The last question according to Muckstadt and Sapra (2010) was when should an order be placed? At AOTML, orders were placed when need arose. The tendency to place orders on a daily basis at AOTML increased ordering costs and did not allow order consolidation. According to Zappone, J (2006), the answers to these questions were collectively called an inventory policy.

These four fundamental questions will enlighten us as to whether inventory had any benefit to AOTML. Not all materials must be kept by AOTML but priority must be set as to which materials were crucial and which ones were moderately required. There was need for a Pareto analysis on the inventories kept. According to Waters D, (2003) inventory helps the organisation to respond quickly to needs that may arise and keeping inventory improves customer service which in any case would have been a problem if there were regular stock outs. Another benefit of having inventory readily available was that it helped to minimise operational disruptions hence increasing machine efficiency, minimising downtime and overtime. It follows that inventory had to be kept but not all SKU's.

2.13.5 Drawbacks of Holding Inventory

Carrying stock is expensive (Baily et al, 2008). This ideology was also supported by Monczka et al (2008) who warned that maintaining high levels of inventory contributed to high carrying costs, reduced profit and diminished market share. Furthermore, Atrill and McLaney, (2007) mentiond four significant disadvantages of holding inventory, namely:

- Opportunity cost. It stated that the money could have been put to better use if not held in inventory.
- Risk of obsolescence which indicated that when inventory is kept for too long, it lost taste with fast pace technology.
- Spoilage of inventory which may arise due to limited space and mishandling of inventory.
- Holding/ carrying costs which included payment of rents, supervision of employees to minimise theft and insurance for the inventory.

In addition to the above Muckstadt and Sapra (2010) mentioned that there was a severe financial liability to the company if excess inventory was held.

In as much as AOTML would like to maintain good customer service, keeping 3050 SKU's had repercussions such as pilferage and capital being tied up. This is where the impact of poor inventory management was shown. A trade off on customer service and holding inventory had to be taken. There must have been a continued drive towards improving customer service while reducing inventory costs. Keeping low levels of inventories was an alternative way to run away from excess inventories, however, this had costs attached to it as well. This is where Baily et al (2008) suggested otherwise on constructive approaches to stock reduction such as:

- Making forecasts more accurate, ensuring that records are right, and better planning
- Devising ways to reduce ordering costs, set up costs, and lead times so that optimum quantities are smaller
- Arranging for things to be made and delivered just in time instead of stock piling just in case a need arises

The last point however, was difficult to be implemented because most of the local suppliers except for a few had no capacity to deliver OTIF. The other point was that other suppliers for critical spares were foreign which made JIT impractical due to customs, flight and inspection delays among other factors.

2.13.6 Risks of Holding Low Levels of Inventories

As stated earlier on in the study that holding inventories had its benefits and disadvantages, holding low levels of inventories had its own as well. Low levels of inventories meant a lean and freed up capital which was good for AOTML. However, Atrill and McLaney (2007) identified that as a result of holding low levels of inventory it contributed to lost production due to shortage of raw materials, loss of goodwill by being unable to satisfy customers, loss of sales by being unable to supply goods which were needed immediately, purchasing of inventories at higher price than might otherwise have been possible in order to replenish inventories quickly. The main concept emerging from the above is that a lean approach was not a good solution to AOTML.

When users were not satisfied with availability of required inventories at AOTML, they raised a document called MAIF (appendix 7) which was called Measurement, Analysis and Improvement Form. This document was submitted as a sign of dissatisfaction with the service offered by Procurement and Stores on occasions where the inventories that were required by users were not available. Poor Inventory management at AOTML was visible where there was no stock but also where there was excess stock. Strategies had to be improvised.

2.13.7 Approaches to Inventory Management

Baily et al (2008) mentioned that there were many systems used in determining what time and what quantities to replenish inventories, the same was shared by Waters, D (2003) who asked three questions which could determine an approach to inventory management namely: what items should be kept in stock, when should orders be placed and how much should be ordered? Below were some of the inventory management approaches that the researcher analyzed

2.13.8 Materials Requirement Planning (MRP)

At AOTML, production and engineering departments emphasized that materials must be made available at all times. However, not all times were the materials to be available due to factors such as extended lead times and incapable suppliers which eventually lead to excess inventories when deliveries were done. This was when the materials requirement planning (MRP) was required to assist in managing the inventory. The main objective of any inventory system was to ensure that materials were available when needed. This was why MRP was employed, to make sure that the lowest possible level of inventory was maintained. AOTML as a processing and manufacturing plant was exposed to uncertainties in its production programs as indicated earlier on in the introduction. Furthermore, industrial strikes and machine breakdown compounded to the uncertainties that were mentioned. It was from this background that MRP came to ensure that inventory was made available at the appropriate time. Wild T (2002) describes MRP as a basic dependent demand concept that allows to have stock when it is needed and to have none the rest of the time.

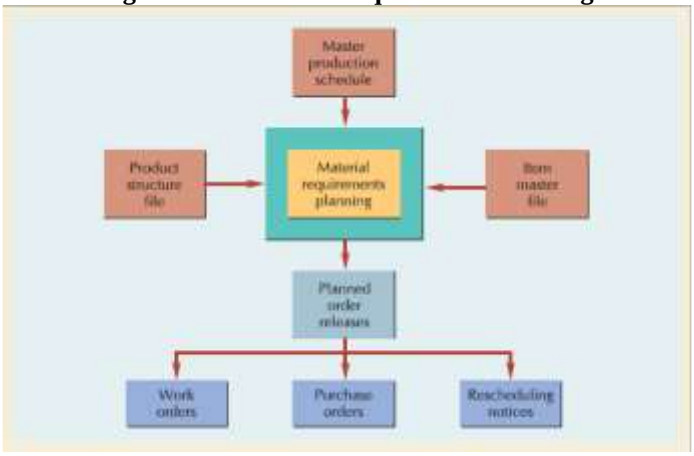
Baily et al (2008) assert that MRP is a standard system for calculating the quantities of components, sub-assemblies and material required to carry out a production program for complex products. It did not only control what item were purchased and in what quantities, but also the timing of its arrival through computerised systems, narrates Muller, M (2003). From another perspective, Waters D, (2009) suggested that MRP uses the master production schedule, along with other relevant information, to plan the supply of materials. Quayle M, (2006) agreed with the above statements and said MRP was a system of supplying the number of components required to produce a known quantity of finished assemblies.

2.13.9 Elements of MRP

According to Muller, M (2002) the key concepts in understanding MRP were master production schedule (MPS), where the MPS sets out what will be built, when and at what quantities. It is based on customer orders, sales

forecasts and manufacturing policy (Baily et al 2008). The other key element was the bill of material (BOM), which is the detailed list of all required parts to make each product by means of parts lists. The other notable element included inventory status file. This file showed what materials, components and sub-assemblies were already in stock together with their lead time (Quayle M, 2006)

Figure 2.4: Material Requirement Planning



Material Requirement Planning (adopted from Russell and Taylor, 2010)

An MRP Matrix (Taylor and Russell, 2010) shown below in figure 2.5 considered all the elements in MRP identified by Muller M. The entries in the matrix were gross requirements, which begun the MRP process with the MPS. Net requirement were what actually needed to be produced after on-hand and on-order quantities had been taken care off. Scheduled receipts were items on order that were scheduled to be received while projected on hand were inventories currently on hand. Planned order receipt were quantities that will be ordered and must be received and planned order releases, this determined when orders should be placed.

MRP Matrix

Item	LLC	Period				
Lot size	LT	1	2	3	4	5
Gross Requirement		*Derived from MPS or planned order releases of the parent*				
Scheduled Receipts		*On order and scheduled to be received*				
Projected on Hand	Beg. Inv	*Anticipated quantity on hand at the end of the period*				
Net Requirements		*Gross requirements net of inventory and scheduled receipts*				
Planned Order Receipts		*When orders need to be received*				
Planned Order Releases		*When orders need to be placed to be received on time*				

MRP Matrix (adapted from Taylor and Russell, 2010)

The concept behind the matrix was to ensure that all ingredients in MRP were present and inventory is available when needed and none if not required. Quayle M, (2006) said that the ingredients were then fed into a computer system. This is where Bowersox et al (2002) warned that implementation of MRP required high level of technological sophistication. It required software applications such as advanced planning, and scheduling systems to deal with issues of complex information from wide areas such as lead times, stock on hand and outstanding orders. similar themes were also captured by Slack et al (2008) who described MRP as simple in principle but complex in execution because even its popularisation was based on availability of computer power to drive the basic planning and control mathematics in a fast, efficient, and most importantly flexible manner. Cohen and Roussel, (2005) criticised

MRP that the enterprise resource planning (ERP) provided organisation with the MRP functionality which meant that there had to be an element of electronic data interchange (EDI) to make MRP possible. However, with the modules in MRP such as bill of material, master production schedule, lead time, stock on hand and orders due, MRP was better placed to assist in inventory management at AOTML because it only allowed stock to be available when needed and nothing if not required.

2.13.10 Benefits of MRP

An organisation like AOTML stood to benefit from an inventory management system like MRP as provided by Quayle M, (2006) below:

- Reduction in inventory
- Improved customer service
- Quicker responses to changes in demand
- Greater productivity
- Better machine utilization
- Reduced setup times and changeover costs

According to AOTML's case fill rate report of mid-August 2014 (Appendix 6), the Manager indicated that the Procurement and Stores department achieved 71 percent rating on inventories procured and issued to customers. Much as the target in the report was 95 percent with consistency, the 71 percent signified that there was improved customer service which was a benefit of using MRP at AOTML. On another note, in the same case fill rate report of mid-August 2014, item two achieved 99 percent case fill rate which indicated that inventories that are procured were not kept in stock but were immediately issued to be used. This corresponded with the aim of MRP of reducing inventory which was an advantage to AOTML.

This followed that machine utilization was improved because machines were kept running through out due to spares availability. Therefore, because of MRP implementation, AOTML improved customer service, reduced inventory holding, improved machine utilization and reduced stock outs.

2.13.11 Challenges of MRP

The main concept emerging was that MRP required software and hardware infrastructure. Muller, M (2003) mentioned one challenge that MRP was highly dependent on accurate. He continued to say that organisations lacking in software and hardware infrastructure will find it difficult to implement the system. On the contrary to the software and hardware challenge, AOTML had a good accounting system called SAP which had MRP built in a one of its modules. The four hundred plus MRP items that were implemented were rolled out successfully with few technical problems. However, it depended on the user's knowledge and expertise to understand the parameters that were set in SAP so that when ordering materials, you were not ordering more or less.

Waters D, (2009) argued that the most obvious problem with MRP is the amount of calculations that it needs. Since MRP works with the master production schedule and then explodes it, accuracy is particularly important considering that large numbers of small stock transactions can cause errors. To agree with the author above, at AOTML the maximum stock level was four weeks of usage per each MRP material. This meant that we were replenishing each MRP material up to four weeks of stock for each item. This required enough knowledge on calculations because if you calculated for fewer weeks, you ended up having stock outs and if you calculate for more weeks you ended up having excess inventories.

2.13.12 MRP Process at Alliance One Tobacco Malawi Limited

All MRP purchase orders were created on every Thursday of the week on materials that had been chosen. A total number of 400 SKU's were selected to be run on MRP from among three thousand also SKU's at AOTML warehouse. The demand planner's responsibility was to run MRP with an aim of ensuring that the right material was available in the right quantity, at the right place and at the right time. The process involves the planner to monitor stocks and demand.

2.13.13 MRP Process Flow at AOTML

The process was systematically generated in SAP or manually uploaded and it calculated net requirements for all the materials selected for MRP. The system then compared the stock on hand, existing open purchase requisitions, materials reservations and existing open purchase orders.

It has to be noted that only materials that were selected MRP SKU's were considered because other inventory items at AOTML were not procured on MRP.
Lot sizing was also important in MRP and in order to avoid holding costs which was a constraint, calculations considered lot sizing as defined in the material master.

2.14 Vendor Managed Inventory (VMI)

VMI systems gained prominence in the private sector as a task shifting approach to strengthening supply chain performance (Watson et al, 2012). Traditionally, organisations used to buy, keep, control and manage their inventory to protect against variations in availability of supplies among other reasons. However, the vendor managed inventory became a modern tool of managing inventory in the supplier-buyer dyad in recent years. It was based on collaboration between buyer and supplier organisation and therefore it focused on inter-organisational issues of inventory management. This was taking place from both the upstream and downstream sides of the supply chain. VMI was described by Baily et al (2008) as a collaborative strategy between a customer and supplier to optimise the availability of products at a minimal cost to two companies. This meant that the supplier took responsibility for the management of inventory in a well agreed contract.

Literature on JIT is also relevant here because Lysons and Farrington (2006) argued that VMI is a just in time technique in which inventory placement decisions are centralised with upstream manufacturers or distributors. Simchi-Levi et al (2004) explained that in a VMI system, the supplier decides on the appropriate inventory levels of each of the product that the company maintains and the appropriate inventory policies to maintain the levels. Monczka et al (2008) supported the above statements and said that VMI is a program that manufacturers or suppliers/ distributors market to manage their customer's inventory for them. This also required a high degree of trust (Frazelle E, 2002) between parties and extensive logistics capabilities on both sides.

While the above writers all agreed, Cohen and Roussel (2005) warned that for the successful implementation of VMI, effective data transmission had to be emphasised in the process. Christopher M (2011), also agreed that with VMI, emphasized on substituting information for inventory. From the above statements, AOTML with its fast moving products, VMI was a better approach to be adopted because it will reduce recurrent ordering costs and take away the inventory value from AOTML's books because the supplier will own the goods. Since VMI is a JIT technique (Lysons and Farrington, 2006) the management of fast moving products and inventories can be left in the control of a supplier to replenish whenever necessary. The frequent deliveries that were in JIT (Bowesox et al, 2002) can now be the role of the supplier and thereby minimising ordering costs on the part of AOTML.

AOTML being one of the major players and bigger organisation in the tobacco industry was a better customer to many local suppliers. Some of its preferred suppliers had long established business relationships with it that dated back many years and operated on a state of the art EDI when sharing information. This could provide a platform for data from inventory forecasts to be easily transmitted and shared between AOTML and the supplier. Among other important inventory information that could be shared with a VMI partner included stock on hand and rate of consumption (Watson et al, 2012). This interface will improve customer service as products and required inventory will be available when needed. Haavik (2000) mentioned that using EDI was needed to realise the full benefits of Vendor managed inventory. The challenge with the last statement is that not all suppliers to AOTML were electronically connected and therefore, VMI would be difficult to implement because of connectivity issues, which is an ERP module. This contradicts with Shatat and Udin (2012), who concluded that implementation of ERP can contribute to integration and enhancement of information flow.

2.14.1 Benefits of VMI

According to Zachariassen et al (2014) VMI brings dynamic inventory control, asset use and customer service to companies and the supply chain as a system. It also eliminates the administrative cost of monitoring inventory levels on the part of the customer (Lysons and Farrington, 2006). For an organisation like AOTML, classified stocks can be put under VMI and the supplier could be given control to monitor the inventory levels and replenish when necessary. The supplier will make sure that inventory never runs out on the customer's side. Hines, T. (2004) Suggested that by allowing the supplier to replenish quickly, stock outs were avoided. Other benefits he mentioned include reduction in the risk of holding unwanted inventories and lowering of stockholding costs.

AOTML would benefit from VMI because the approach recognizes that stock outs will be reduced due to constant replenishment by the supplier. Furthermore, the holding of inventory will be removed from AOTML's books. Russell and Taylor (2010) argued that with VMI, service is improved because customers or distributors have the right product at the right time. Achabal et al (2000) agree to the preceding statement and said that as a result of implementing the VMI system, customer service levels improved dramatically with improvements in inventory turnover. VMI being

a collaborative system, suppliers needed to use customer's consumption rates, forecasts, usage and inventory levels to determine if more inventories were required (Cohen and Roussel, 2005). Zenga, S (2011) commented that with VMI, you don't need to worry about lead time.

2.14.2 Drawbacks of VMI

An organisation like AOTML would benefit from VMI because according to Lysons and Farrington (2006) the system enhances working capital due to reduced inventory levels, obsolescence and improved inventory turn with well managed cash flow. However, Vigtil, (2007), mentioned that forecasting issues contribute to VMI's disadvantage through the type of information that is exchanged between the two parties. Similar themes were also captured by Kaipia, Korhonen andHartiala, (2006) who said that planning nervousness in VMI contributed to bullwhip effect when there is inaccurate data circulating. The best way therefore, was to improve the communication practices between customer and supplier to obtain accurate estimates of production lead times. Furthermore, Kuk, G. (2004) indicated that lack of trust was another major barrier to the effective adoption of VMI. Hines, T. (2004) further mentioned that unwillingness by the customer to share information, which also comes in when there is lack of trust, was a potential problem to VMI's success. AOTML needed to be aware of the above when implementing VMI

2.15 Just in Time (JIT)

AOTML would benefit largely if its suppliers were able to stick to specified delivery dates and were capable to adapt to JIT requirements. This will be one way of curbing unnecessary inventory holding in warehouses. There is strong evidence from literature that JIT concept allowed that production inputs were received only as they were needed for production, and ideally, the company using the JIT concept did not have on-hand inventory. Waters D (2003), Jacobs and Chase (2008). They also concluded that JIT organises all operations so that they occur at exactly the time they were needed. Furthermore, Muller, M (2003) supported that under the JIT system, an item appears exactly when it is needed, not before and not after. The main concept emerging from this literature is that JIT is definitely a time based concept, which required timing on ordering, delivery, processing and distribution. This meant that for an organisation like AOTML to implement the JIT concept, it had to critically look into the timing of its operations and capacity of suppliers.

Bowersox et al (2002) argue that one goal of modern procurement was to maintain supply continuity with minimum inventory investment possible. In this case, the purpose was to have needed materials arrive just at the moment they were scheduled to be used in the production process. The JIT approach also known as the lean approach aims to meet demand instantaneously with perfect quality and without waste (Slack and Lewis, 2008). For the concept to be implemented, it required closer collaboration between the buying organisation and its suppliers but also good geographic proximity because it required multiple deliveries by the supplier. This might be a setback to the implementation of JIT at AOTML because most of its suppliers for critical spares were foreign suppliers and therefore, multiple deliveries are practically impossible to be carried out.

According to CIPS the JIT approach reduced inventory waste, maximises added value and minimises costs. For a few local suppliers that AOTML engaged to be supplying MRP materials, the reduction of inventory was noticeable because, when materials arrived on time for a specific project, they did not stay in the warehouse. They were received by stores and issued out immediately to be used on the project. This was a massive benefit to AOTML because, warehouse duties were reduced such as double handling. Insurance costs and pilferage was also reduced.

Zenga. S, (2011) noted however, that the JIT approach cannot practically work in the tobacco processing companies because it required short distances between customer and supplier. Since most of the products and raw materials for AOTML were imported, the role of JIT is somewhat compromised. Bowersox et al (2002) concurred with the above statement and said that JIT generally required more frequent deliveries of smaller quantities of purchased inputs. This meant that it might be practically impossible to implement JIT on products and raw materials that were imported due to customs and clearing delays on the boarders among other things.

Nevertheless, with the quest by AOTML to reduce inventory holding, JIT that was practiced with a few capable suppliers contributed to less inventory held in main stores, freed space in the warehouse and better customer service. Therefore, JIT was a viable approach to manage inventory but considerations had to be made on the right local suppliers to be engaged.

2.16 Optimum Inventory Levels

According to Drury C, (2004) the optimum order size is the order quantity that will result in the total amount of the ordering and holding costs being minimised. This optimum order size was known as economic order quantity (EOQ). In support of the above statement, a recent study in Inventory management in China by Jiao and LI, (2012)

commented that the purpose of maintaining optimum levels or economic quantities is to reach an order quantity under the condition that the total cost of inventories is at minimum. They concluded that this is usually carried out by using mathematical models. Brady, C (2006) said that optimizing parts inventories was a tradeoff of the cost of keeping inventory and the benefits of holding the parts inventories. While the above writers agreed, Hines, T (2004) argued to say that the challenge with optimum levels was to minimise inventory holding whilst simultaneously satisfying the end user or customer. AOTML maintained a higher level of inventory as buffer stocks, it assisted in responding quickly to emergencies and process continuity but much of it was just idle inventory.

2.16.1 The Concept of Economic Order Quantity

With economic order quantity (EOQ) in place, it was possible to set minimum inventory holding levels for AOTML and be able to maintain a non-disruptive processing system. According to Baily et al (2008) the economic order quantity is the quantity that results in the lowest total of variable costs. Hines T, (2004) agreed with the above statement and acknowledged that the EOQ model illustrated the tradeoffs that occur between ordering inventories and holding inventories. The basic objective for AOTML was to order quantities that minimised the cost of ordering and the cost of inventory holding. Scott et al (2011) argued that EOQ looked at the trade-off in the cost of holding inventory and the cost of ordering it. Figure below illustrates the EOQ concept.

The figure 2.6: The EOQ cost model: adapted from Russell and Taylor (2010)

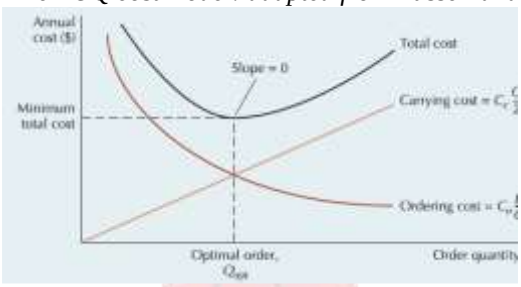


Figure 2.6: The EOQ cost model

- The Carrying cost line slopes upwards because the higher the order quantity, the higher the inventory levels. Therefore, higher holding costs which will contribute to reduced bottom line
- The ordering cost line slopes downwards because the higher the order quantity, the lower the orders will be placed and the lower the minimal ordering costs.
- The total cost line is a summation of all costs. The lowest point on this line represents the point of lowest total cost.

The point at which ordering costs intersected carrying cost is the optimal order level or the EOQ.
Considering the number of SKU's at AOTML basing on the FYQ3 report (Appendix 5), a number of limitation of the EOQ existed. According to Russell and Taylor (2010) the EOQ approach recognises that demand was consistent and does not fluctuate, lead time for receipt of order is constant and there are no bulk discounts.
Norek (1998) cited in Scott et al (2011) that EOQ is a method for calculating order quantities at individual SKU level. AOTML could only use EOQ models on MRP materials only because they were systematically changed to allow EOQ parameters. Therefore, because of the many SKU's that were not on MRP, it was difficult to implement the EOQ model.

2.16.2 Case Fill Rates

Case fill rate measured service level. It represented the magnitude of stock outs rather than probability (Bowersox et al, 2002). In general terms, increasing the order quantity to have safety stocks, reduced the magnitude of stock outs and consequently increased customer service. This was a proposition to maintaining safety stocks in an organisation in order to satisfy customers with inventory availability expressed as the unit fill rate. The greater the fill rate the lower the lost sales, but the higher the inventory levels and associated inventory carrying costs (Frazelle E, 2002). The main concept emerging from the literature here was to maintain safety stock. However, that approach contravenes Baily et al (2008) who mentioned that carrying stock was expensive Duke I, (2013) commented in supply management that tracking fill rates and stock turns as monthly KPI's will reveal trends for longer term inventory management.

2.16.3 Case Fill Rate After MRP at AOTML

As one way of measuring customer satisfaction, the case fill rate report of mid-August, 2014 indicated that it was at 71 percent. The target was to reach 95 percent with consistency. This meant that with the implementation of MRP on four hundred items that were earmarked, it had greatly improved customer satisfaction and reduced stock outs that were experienced before the implementation of the MRP project.

2.17 Supply Chain Factors That Contribute To Inventory Problems

2.17.1 Prolonged Lead Time

A company that wanted to be competitive must ensure that it was better responding to customer needs as they arise. The company must demand responsiveness from its suppliers. Delivery on time and in full was a traditional supply chain objective and emphasised that failure to deliver on time contributed to customer dissatisfaction, lost sales and halted production (Baily et al, 2008). Figure below illustrates the lead time gap

Figure 2.7: lead time gap; Adapted from Christopher, M (2011)

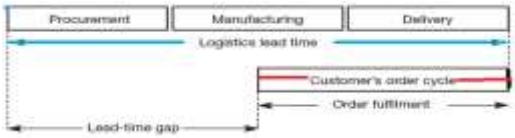


Figure 2.7: The lead time gap

Christopher, M (2011) argued that in a conventional organization, the only way to bridge the gap between the logistics lead time in blue (figure 2.7) and the customer's order cycle pointed by red lines was by carrying inventory. Unrealistic delivery schedules forced AOTML into panic to increase inventory levels. It was good practice to consider supplier lead time and market complexities. However, it should be in the best interest of the organisation to obtain shorter lead times and reliable suppliers. Ratliff, D (2006) mentioned that a company that has low inventories but has high inventory turns is at more risk from lead time variability than another one which has buffer inventories. Several causes of lead time variability included; capacity limitations, customs and inspections, misrouting and security. However, though AOTML may not be at risk but keeping inventory just in case was a cost due to among other things pilferage and obsolescence.

There is strong body of evidence from Muckstadt and Sapra, (2010) that when supplier productive capacity is doubtful and lead time is not fixed, it requires more inventories to ensure that customer service is maintained. In actual fact, variability brings in uncertainty in supply chain. This is dealt with by holding safety stocks to cover against uncertainty (Baily et al, 2008). The expression agrees "uncertainty is the mother of inventory". At AOTML, prolonged lead time contributed to customer dissatisfaction because the necessary stocks were delayed to be delivered. The delays contributed to processing disruption, down time and stock outs. Therefore, because of the prolonged lead time, it was imperative for AOTML to maintain only necessary stocks as buffer so that process continuity could be maintained.

2.17.2 Supplier Capability

According to the world economic forum report on global competitiveness (2014) Malawi ranked 119 out of 144 countries in terms of local supplier quality. This meant that in economic terms, local suppliers did not have the necessary quality standards for international business. AOTML being an international company preferred materials that were of good quality and value for money. The supplier capability ranged from financial, environmental, technical, commercial and quality. The right supplier who was capable could be trusted to do a job that was formerly done in-house. Booth C, (2010) mentioned that allowing an external company or supplier to do an internal job could only become a reality if there were capable suppliers of taking on the activity for you.

Further to the last statement, the local supplier's lack of capacity had a negative consequence to AOTML because most of them could not complete or fulfill deliveries on time. As a result, AOTML experienced shortage of necessary inventories. Similar themes were shared by Monczka et al (2008) who said that in managing inventory, the best customer order is the one that is delivered on time, accurately and in perfect condition by the supplier. However, in our case it was evident that local suppliers failed to meet the best customer order and therefore contributed to inventory problems at AOTML.

On the contrary Bowesox et al (2002) warned that larger purchase quantities increase from discounts affected inventory levels. The discounts much as it was good when buying in bulk, from experience it allowed AOTML to

have excess inventories which was not used but flooded the warehouse. This resulted in engaging more human capital to safeguard the inventory which was unnecessary cost.

2.17.3 Procurement Processes

Hedenstierna et al (2011) mentioned that purchasing order methods and inventory control were vital elements in fulfilling customer orders and building internal performance. This follows that customer service, inventory control and procurement methods were linked. Monczka et al (2008) argued that the purchasing process is the process of identifying user needs, evaluate the need effectively and efficiently, identify suppliers, ensure payment is done promptly, make sure that the need was effectively met and drive continuous improvement. In the definition of the process that was mentioned, there was evidence that more stages affected level of service. At AOTML the procurement function among other objectives was to secure supply of products and services, identify suppliers, negotiate best prices, send out requests for quotations, manage a backlog of requisitions, make purchase orders to suppliers and expedite deliveries. This was supported by Monczka et al (2008) who commented that more often than not, the purchasing department supported the needs of operations through the purchase of raw materials, components, sub-assemblies, repair and maintenance items and services.

At AOTML, the cycle time was inexplicably longer because despite having a robust SAP system, approvers waited to be told verbally to release a PR or PO but the system generated an automatic email to their inbox for them to approve. This contributed to more inventory problems. The procurement cycle time is a massive contributor to inventory management. Stround, A. (2014) elaborates that an organisation has to focus on improving its internal procurement process in order to reduce procurement cycle time. While Handfield, R (2003) and Monczka et al (2008) agreed about various steps in the procurement process, Avery. S, (2000) said that electronic procurement was one tool purchasing uses to reduce costs and improve cycle time. However, system users at AOTML delayed the procurement process intentionally or unintentionally by not approving the requests when they are created. It follows that more delays contributed to longer lead times that consequently contributed to unavailability of inventory on time. Figure below shows the procurement cycle.

Figure 2.8: Procurement Cycle

The stages in figure 2.8 varied in different organizations including at AOTML, depending on whether it was a new purchase or a repetitive one. If it was a first time purchase it would take long, unlike a repetitive purchase.

2.17.4 The Procurement Process for Machinery Spares at AOTML

Appendix 3 shows the procurement procedure for any purchase at AOTML. The dominant assumption was that the process was too long and affected the availability of inventory at AOTML. The longer the process was the less likely goods were going to be available.

2.18 The Knowledge Gap

The approaches that have been covered in the literature review, show that it is more theoretical and mostly its big companies that have fully implemented them practically. It has been observed that challenges and benefits have been encountered in many ways by world class organisations when engaging the different approaches that have been mentioned. In Malawi, a few organisations have implemented the mentioned approaches such as VMI, JIT, MRP and EOQ. Furthermore, apart from Zenga, S. (2011) who looked into JIT at Premium Tobacco there is little research on the implementation of the other models in the Tobacco Industry. This was the reason why the researcher wanted like to fill the gap by assessing the impact of inventory management on customer service.

2.19 Conclusion

The literature reviewed above shows the effectiveness of inventory and stores management practices on turnover as highlighted by several researchers from studies done in high income countries. The degree of the effect on the turnover varies from industry to industry but mainly how efficiently and effective companies implement inventory management practices. The literature indicates that having an efficient inventory monitoring system, information management system will directly have an effect on the company's turnover performance and growth.

However, the studies reviewed the literature focuses on resource rich settings and non in the poor setting. The effectiveness of inventory and stores management practices may behave differently or may have negative results when applied to a company in a resource poor setting. There was need to carry out this research to evaluate the effectiveness of inventory and stores management practices on turnover in a company based in a poor resource setting.

3.0 METHODOLOGY

This chapter focuses on the methodology used to carry out the research. The study looks at the framework within which data is to be collected, analyzed, study designs, instruments to be used and procedure to be followed highlighting the reason for using a specific method

3.1 Research Design

The study uses explanatory research design approach to explain the effectiveness of inventory and stores management on turnover performance for a wholesale distribution company in resource limited setting is based on this study of Central Medical Stores, a whole organization whose business involves the national procurement, storage and distribution of drugs and medical supplies.

3.2 Data Types and Sources

The study uses primary data generated for this specific research using different methods like observation, questionnaires and secondary data from Central Medical Stores (CMS) which will be ready existing prepared or developed. It intends to include both internal and external sources like financial records, adverts, journals, magazines depending on the nature and scope of the information needed.

3.3 Tools and Methods of Data Collection

The study uses self-administered questionnaires observation, focus group discussion as an instrument for document review and participation include questionnaires, tape recorders, and cameras as an instrument for collection of primary data from customers, staff and top management.

3.4 Data Processing and Analysis

The study upon gathering data intends to use word processors to enter key words into the text field notes and print them, use statistical package for social scientists (SPSS) correlation analysis to determine the extent and degree of relationship between inventory and stores management and turnover performance.

4.0 DATA ANALYSIS

This chapter presents analysis and discussion of findings obtained after collecting data from primary and secondary sources, the findings are coded, edited, presented in form of tables, frequencies and final discussions to give insight in answering the research questions by finding out how inventory and stores management practices affect turnover performance.

4.1 Departments on Central Medical Stores

Table 1: Distribution of staff in Functional areas

Departments	Frequency	Percentage (%)
Transport and logistics	9	18
Finance and accounts	12	24
Audit	2	4
Marketing and stores	22	44
Procurement	5	10
Total	**50**	**100**

Source: Primary data

Results in table 1 above indicate that 44 percent of staff were in the marketing functional area and the least staff were in the Audit function. This implies that inventory management practices and turnover information was obtained from relevant staff.

4.2.2 Duration of staff

Table 2: Duration of staff in the organization (CMS)

Period	Frequency	Percentage (%)
1-2 years	9	18
3-4 years	8	16
5-6 years	21	42
7 and above	12	24
Total	**50**	**100**

Source: Primary data

Results in Table 2 indicate that 42 percent of the staff had experience of 1 year and above in the organization implying that they had enough information regarding inventory and stores management practices and turnover performance in Central Medical Stores.

4.3 Effectiveness of Inventory Monitoring

In order to establish the effectiveness of stock out warning mechanism in the system of Central Medical Stores. The following responses were established.

Table 3: Effectiveness of stock out warning mechanism

Response	Frequency	Percentage (%)
Large extent	22	44
Small extent	15	30
Moderately	12	24
Not at all	1	2
Total	**50**	**100**

Source: Primary data

According to Table3, there exists a good stock out warning mechanism in the system of Central Medical Stores portrayed by the results 44 percent of the respondents.

To establish the extent to which stock becomes obsolete in Central Medical Stores the respondents' answers were as follows.

Table 4: Extent to which stock become obsolete

Response	Frequency	Percentage (%)
Large extent	16	32
Small extent	17	34
Moderately	10	20
Not at all	7	14
Totals	**50**	**100**

Source: Primary data

The finding in Table 4 indicate that stock became obsolete at a small extent represented by 34 percent this indicates that there is an efficient system to handle inventory.

Extent to which physical inventory varies from the system's stock taking, the following responses were given.

Table 5: Extent to which physical inventory vary at stock taking

Response	Frequency	Percentage (%)
Large extent	11	22
Small extent	13	46
Moderately	24	48
Not at all	2	4

Total	**50**	**100**

Source: Primary data

Results in Table 5 indicate that physical inventory varied moderately at stock taking indicated by results 48 percent implying that inventory monitoring system were effective.

To obtain information on the extent to which economic order quantities are achieved the respondents provided the following information.

Table 6: Extent to which economic order quantities are achieved

Response	Frequency	Percentage (%)
Large extent	18	36
Small extent	9	18
Moderately	16	32
Not at all	7	14
Total	**50**	**100**

Source: Primary data

Results in table 6 above shows that Economic Order Quantities are achieved to a large extent as reflected in results above with (36%) however there were minimal difference between respondents who said moderately.

4.4 Effectiveness of Information Management

To establish the effectiveness of information management system the respondents were asked how long it took to update the system and the responses were;

Table 7: How long it takes to update the system

Response	Frequency	Percentage (%)
Immediately	29	58
Daily	13	26
Weekly	8	16
Total	**50**	**100**

Source: Primary data

Results above indicate that the system is updated immediately with the transactions made as indicated by the respondents with (58%).

To obtain information on how fast the system generates the required information for corporate use respondents were asked and the following were the responses

Table 8: How fast the system generates required information

Response	Frequency	Percentage (%)
Immediately	29	58
Daily	5	10
Weekly	14	28
Monthly	2	4
Total	**50**	**100**

Source: Primary data

Results indicate that information was obtained for corporate use by the system immediately as the respondents respond immediately with (58%) this indicated that the information collected was relevant to the organization whenever it was required.

To establish the how often the system was backed up respondents were asked the question whether the system was backed up the following results were obtained.

Table 9: How often the system is backed up

Response	Frequency	Percentage (%)
Immediately	25	50
Daily	9	18
Weekly	9	18
Monthly	7	14
Total	**50**	**100**

Source: Primary data

Results above reflect that the system is backup immediately as shown by respondents immediately as respondents in table9 with (50%) by the respondents this meant that loss of information was not essay after the transaction was made.

To obtain information on how often the stock items are forecasted the respondents were asked whether the items ordered were forecasted and the following responses were obtained.

Table 10: How often items ordered are forecasted

Response	Frequency	Percentage (%)
Immediately	22	44
Daily	5	10
Weekly	17	34
Monthly	6	12
Total	**50**	**100**

Source: Primary data

Results in table 10 above show that items that are ordered and forecasted were ordered immediately as reflected in the table 10 above with (44%) indicating clear estimations in transactions.

To establish how often the organization carries out demand forecasting respondents asked whether demand forecasting is done often and following results were obtained.

Table 11: How often demand forecasting is done

Response	Frequency	Percentage (%)
Immediately	8	16
Daily	10	20
Weekly	18	36
Monthly	14	28
Total	**50**	**100**

Source: Primary data

Results in table 11 above show that demand forecasting is done weekly as shown in the table with 36 percent.

4.5 Effect of Turnover Performance on Independent Variables

To establish the extent of change in turnover on inventory the respondents were asked whether the magnitude is bigger when there is change in turnover rate and the following responses were obtained.

Table 12: The extent of change in turnover on inventory

Response	Frequency	Percentage (%)
Large extent	24	48.0
Small extent	11	22
Moderately	12	24
Not at all	3	6.0

Total	**50**	**100**

Source: Primary data

The results in table 12 show that there was a greater change in inventory when the turnover rate changes, reflected in the above results by 48 percent from the respondents who say to a large extent.

5.0 FINDINGS & CONCLUSIONS

5.1 Conclusions

The major aim of the study was to establish the degree effectiveness of inventory monitoring and inventory information management on turnover performance to recommend interventions necessary to achieve optional turnover using Central Medical Stores as a case study. In conclusion inventory monitoring and inventory information management indicated that they were directly influenced; turnover performance, but they were essential for demand forecasting system to achieve accurate results and timely forecasts. However, Central Medical Stores put less emphasis on information management functional gap which affected the accuracy of the demand forecasting input data.

The study further puts insight on high and steadily growing turnovers can be achieved if demand forecasts are efficient and timely Economic Order Quantities in line with customer demand cycles, therefore the decreasing demand forecasting time always yields increases in inventory turnover as long as Economic Order Quantities were accurate.

The results in this study further revealed that inventory information management and inventory monitoring affected turnover, setting of safety stock, reorder cycles and Economic Order Quantities based on demand cycles and information on demand data when monitored efficiently would help to achieve optimal turnover.

5.2 Recommendations

Inventory management practices are the key factor in ensuring continuous improvement in turnover growth. In this regard this recommended that distribution companies should carry out efficient inventory monitoring and operate good inventory information management system to ensure realistic inventory forecasts and high turnover.

Considering the importance of demand forecasting in achieving a good turnover, information that is required as input to demand forecasts must be consistent and based on customer needs. Therefore, companies must strive to see that there is continuous monitoring of inventory, such that the decision rules that include safety stock, reorder points and EOQ on which forecasts are based are up to date and are based on historical data from past sales but also analyzed customer based information.

To minimize expertise, CMS should identify slow moving stock and damages, regular cycle counts should be carried out. This will reduce the cost of stock verification at the end of the accounting periods because it may no longer be necessary to close the company for long periods to handle stock reconciliations.

This research also recommends intervention particularly for CMS' optimization of its turnover. This include automation and instituting an automated customer relationship management (CRM) module to capture lost sales for accuracy of demand forecasting information.

Finally, the manipulation of information to find patterns is increasingly giving companies a competitive edge over the others. Therefore, need to introduce decision support tools that will analyze customer relationship management information and use it to categorize products and services that will improve turnover.

5.3 Suggested Areas of Further Study

This research considered two inventory management practices variables namely inventory monitoring and inventory information management and their effect on turnover. The research did not quantify the effect these two variables have on turnover. Further research needs to be done to quantify this effect so that companies can easily simulate and extrapolate variances for each variable.

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