

**INVENTORY MANAGEMENT STRATEGIES EMPLOYED BY
KENYAN MOTOR VEHICLE DISTRIBUTORS IN MANAGING
THEIR PARTS INVENTORY**

By



Leo Mielizu Lulu

A research project submitted to the School of Business in partial fulfilment of the
requirements of Master of Business Administration


School of Business

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DECLARATION

This project is my original work and has never been presented for a degree in any other university.

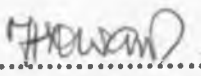
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Date:.....10 NOVEMBER 2011.....

Leo Mielizu Lulu

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This project has been submitted for examination with my approval as the University Supervisor.

Signature:..........

Date:.....15-11-2011.....

MR. TOM KONGERE,
SCHOOL OF BUSINESS, UNIVERSITY OF NAIROBI.

DEDICATION

To my colleagues in the industry who sift through thousands of part numbers trying to satisfy their customers' parts requirements while safeguarding their share holders' interest in inventory management.

ACKNOWLEDGEMENTS

First and foremost I thank God for bringing me this far and enabling a number of individuals offer me much needed support. I extend my sincere gratitude to all of them.

I thank my parents Alfred and Mary Lulu for all the encouragement and provision they have given me over the years.

I thank my wife Maurine and daughter Tracy for encouragement and allowing me time to work on this project.

I thank my supervisor Tom Kongere, moderator Tom Ombati and members of the defence panel for their keen scrutiny of my work and for their honest, constructive criticism that enabled me develop an idea into this project.

Lastly and not least, I thank my colleagues in the industry who readily shared their opinions and experience when completing the questionnaires.

ABSTRACT

Motor vehicle distributors provide after-sales service for vehicles sold through sale of parts and maintenance repairs. They are also expected to run an efficient and profitable parts department, which means parts are also to be available when required and in the desired quantity at the right price. Evaluation of the effectiveness of strategies employed to achieve this form the basis of this research.

The objectives were to determine the different parts inventory management strategies employed by motor vehicle firms in Kenya and to determine impact of these inventory management strategies on efficiency and customer service. The outcome is expected to assist vehicle distributors assess effectiveness of current strategies as well as finding new ways of improving inventory management. It will also provide intellectuals with an opportunity to test inventory management theories and pave way for further research into strategies relevant to motor vehicle companies in developing economies.

Primary data was collected from managers in the industry responsible for managing inventory and descriptive statistics such as frequency, percentages, mean and standard deviation were used as the study sought to measure the effect of various variables and combinations of variables on efficiency and customer service. Cross tabulation was also used to check of the relationship and differences of opinion from one company to another. This assisted in making comparison analysis amongst the companies. The findings were presented in tables and bar graphs.

Conclusions were drawn and recommendations made from the analysis with gaps for further research identified.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Companies distributing motor vehicles are charged with the responsibility of providing after-sales service for vehicles sold through sale of parts and maintenance repairs. They are also expected to run an efficient parts department, which means parts are also to be available when required and in the desired quantity at the right price to ensure proper inventory management and profitability. Profit here is the margin between the cost of parts and the price at which they are sold. As inventory carrying costs are deducted in calculating the net profit, two issues immediately arise, namely, the need to satisfy parts demand and the need to run an efficient operation through minimal stocking. These two factors are in competition and companies in Kenya which is a developing country face challenges in attempting to achieve a balance between the two factors. The challenges encountered and strategies put in place to solve them form the basis of this study.

1.1.2 INVENTORY MANAGEMENT STRATEGIES

Kumar and Suresh (2009) define inventory as materials in stock also called the idle resource of an enterprise. Inventories represent those items which are either stocked for sale or they are in the process of manufacturing or they are in the form of materials, which are yet to be utilized. In this study, inventory refers to vehicle parts stocked for sale.

Lysons and Gillinham (2003) define inventory control as the techniques used to ensure that stocks of raw material work in progress and finished goods are kept at levels which provide maximum service levels at minimum costs. Ballou (2004) states that inventory

management involves balancing product availability, customer service and cost of providing a given level of product availability. Bowersox (2010) defines availability of inventory as capacity to have inventory when desired by a customer. This means that as much as possible, the right items must be available as and when required by the customer. It also means that items that are not likely to be required, should not be held in inventory. According to Leenders, Johnson, Flynn and Fearon, (2000), the functions of inventory are to provide good customer service, allow smooth flow of goods through the productive process, provide protection against the uncertainty of supply and demand and obtain a reasonable utilization of people and resources. To full fill these functions on inventory, firms therefore need to hold some level of inventory to keep the business running hence the use of different strategies to maintain an appropriate level of inventory.

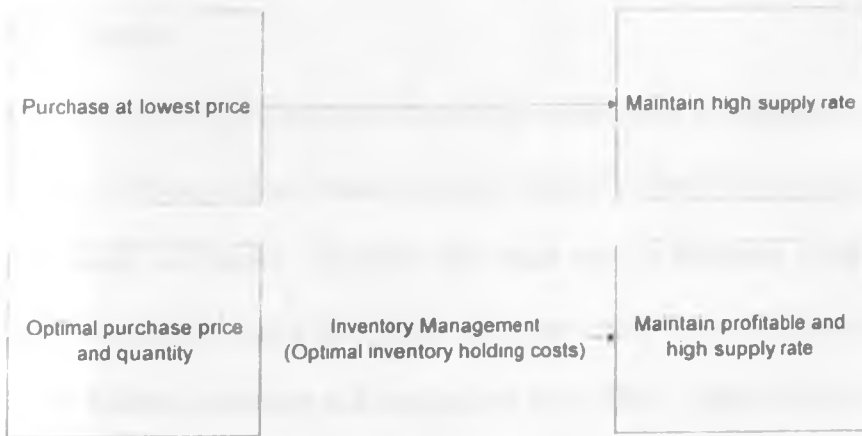
1.1.3 DEVELOPMENT OF INVENTORY MANAGEMENT

According to Burt, Dobler and Starling (2004), purchasing and materials management main focus towards the end of the 1960's was purchase price and prevention of stock outs. Inventory management and cost of holding inventory was accorded less attention but by the end of the 1970's the market place had become more international from both a marketing and supply chain point of view and management of inventory had more emphasis. Burt et al (2004) cite firms such as Wal Mart which increased their profitability in the 1980's through cost reduction largely due to careful management of their inventories. Arguments exist both in favour of and against holding inventory. For instance, Ballou (2004) cites customer service and cost economics as pro inventory arguments. On the downside he points out wastefulness and promotion of lack of

planning as anti inventory arguments. It is very difficult to convert physical inventory into money that would then be used for other investments thus resulting in opportunity cost yet inventory is necessary to ensure availability of stock for customer service and an opportunity to make a sale and thereby profit.

The figure shows the shift in deliverables resulting from development of inventory management.

Figure 1.1: Changing roles of inventory



Source: Researcher, 2011

1.1.4 KENYAN MOTOR VEHICLE DISTRIBUTORS

Kenya motor industry association defines a vehicle distributor as a sole or main agent directly appointed by a source manufacturer to procure and market a brand of vehicle in a particular region. Distributors are normally the “franchise holders” in their region and formally represent the brand in that area. Kenya hosts sixteen vehicle distributors which are either privately owned by local or foreign investors as well as public companies. These companies import vehicles, parts and equipment from Japan, Germany, England,

Italy, America, China, France, India and South Africa. According to the Kenya Motor Industry Association, the largest motor vehicle distributors in Kenya in terms of turnover are Toyota, General Motors, CMC Motors, Simba Colt and DT Dobie all of which were established between 1948 and 1975.

Parts orders are transmitted directly into manufacturer's systems via the internet, picking and invoicing have been automated and stock is transported by both air and sea. Automation has played a major role in the development of the parts business but despite these advancements, companies in Kenya still face challenges in their quest for efficient inventory management.

According to Leenders et al (2000) the following factors pose a challenge to holding optimal inventory: Managers must make purchase decisions often a long time before the actual requirements are known. Therefore they must rely on forecasts of not only of future demand but also of lead times, prices and other costs. Secondly, there are costs associated with holding inventory and running out of it. Third, suppliers may not have materials in the desired quantities. Fourth, suppliers may offer reduced prices for buying larger quantities. Fifth, shortages on some items may cause more serious disruptions than on others. This research seeks to answer the question on what monetary considerations a firm must consider in defining a policy that will result in efficient inventory management

1.2 STATEMENT OF THE PROBLEM

Chopra and Mendl (2007) state that the optimal level of product availability is one that maximizes supply chain profitability. The product must therefore be available to satisfy demand but not be in excess.

Motor vehicle dealers are faced with maintaining thousands of parts for a variety of vehicle models. In Kenya, parts suppliers are overseas and the lead time is usually over one and a half months. Despite this relatively long lead time, motor vehicle dealers still need to satisfy customers' parts requirements and maintain a high rate of return on capital invested. Stock turn ratios, order fill rates and profitability are used to check service level and return on investment

In Kenya, companies such as Davies and Shirliff and Mantrac have inventory turn ratios of about six times. Kenyan motor vehicle distributors are only able to achieve a maximum of three times thus raising the question whether or not it is possible to attain greater inventory turn ratio hence higher return on investment. Vehicle distributors in Kenya have increased order cycles, opted for faster modes of transport, written off slow moving inventory and fine tuned internal operations and ordering formulae in their quest to achieve optimal inventory holding but despite actions taken, these companies do not report total success. In an attempt to reduce the proportion of slow moving and excess inventory, parts availability has dropped, while concentration on high parts availability has resulted in accumulation of excess inventory. A compromise must therefore be made to achieve optimal inventory levels for maximum profitability. This needs be done urgently to ensure correct stocking from as early as possible rather than attempt to correct an unfavourable inventory situation later. Studies specific to the motor vehicle industry in Kenya have not been found parts managers say that local benchmarks to guide companies on inventory management do not exist.

Urgent research is therefore required to answer the question on what inventory management strategies lead to a good balance between customer service and efficiency of inventory holding.

1.3 OBJECTIVES OF THE STUDY

- i. To determine the different parts inventory management strategies employed by motor vehicle firms in Kenya.
- ii. To determine impact of these inventory management strategies on efficiency and customer service.

1.4 VALUE OF THE STUDY

This study would be useful to vehicle distributors, who would be very interested in assessing effectiveness of current strategies as well as finding new ways of maintaining or improving customer service and profitability with efficiently managed parts inventory. It would also help come up with local benchmarks that could be used to measure the efficiency of their inventory management.

To intellectuals, the study would provide an opportunity to test inventory management theories and pave way for further research into strategies relevant to motor vehicle companies in developing economies.

To the local economy, the study would add to the knowledge base in Kenya regarding efficient use of inventory in similar industries and therefore contribute to the country's achievement of its vision.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter looks at literature on the purpose of inventory management, existing inventory management strategies, challenges encountered in inventory management and measures of efficiency of inventory management strategies.

2.1 Inventory and Inventory Management

Nissan Motor Company Limited summarizes the purpose of inventory management as maximizing the off-shelf supply rate with minimum inventory. This means that there must be sufficient inventory to fill all or most of your customer's orders with minimum inventory holding. Inventory management is the process that allows you to have the right part at the right time to satisfy your internal and external customers' needs.

The right quantity of part to stock depends on demand for the product, inventory policy, whether the demand is dependent or independent, required service level, market conditions and factors determining economic order quantities. To enable proper inventory management, demand, both historical and forecasted must be managed accurately. The American production and inventory control society (APICS) defines demand management as the function of recognizing and managing all of the demands for products to ensure that the master scheduler is aware of them. It encompasses the activities of forecasting, order entry, order promising, branch warehouse requirements, interplant requirements and service parts requirements.

Schonberger and Knod (1991) point out that in the absence of a committee with a strong link to both marketing and operations at the demand management level, the likelihood of numerous errors and surprises is high. Information must therefore be accurate and resulting actions timely if optimal inventory level is to be achieved.

2.2 Inventory management effect on profitability

Profitability is the ability of a firm to earn profit of a desired value and percentage from sale of a given amount of inventory. Profitability is generally measured in two ways; as an absolute value and as a percentage of the cost of sales. In vehicle spare parts business, profitability is achieved through sale of parts and efficient use of capital to acquire and hold inventory. However controlling inventory does not mean eliminating them. Inventories like rivers must flow. They should neither dry up nor flood.

According to Frazelle (2002), while, inventory availability is the most important aspect of customer service, excessive inventories can lower profitability in two ways: net profit is reduced by out of pocket costs such as insurance taxes, storage, obsolescence, damage, pilferage and interest expense and, secondly, assets are increased resulting in a decrease in asset turnover which is a reduction on return on assets and return on net worth. Leenders et al (2000) states that the other costs in conflict/trade off with cost of holding inventory are stock out costs which include opportunity costs, clerical cost of follow up and transport of orders placed to meet requirements not supplied due to insufficient inventory.

2.3 The need for inventory management

Since one of the firm's most important aims is to make profit, there is need to understand what role inventory management will play in achieving this. Lysons and Gillinham (2007) state that the economics of inventory management is determined by an analysis of the costs incurred in obtaining and carrying inventories vis a vis the costs of stock outs. Acquisition costs are usually incurred irrespective of order size and include computerized or manual reports, seniority of staff involved, fixed charges and taxes while holding costs are proportional to inventory value and include bank interest, insurance and loss through deterioration, obsolescence, pilferage, storage space, labour incurred in handling and clerical costs relating to documentation. In trade off are costs of stock outs which include cost of idle time, loss of customer goodwill and cost of action taken to deal with the stock out such as expensive courier orders and personnel time. Costs of stock outs are however difficult to measure accurately and incorporate into inventory models. Achieving a balance between these two classes of costs helps determine optimal inventory levels and forms the basis of the economics of inventory management.

2.4 Fill rate, customer service level and safety inventory

Chopra and Meindl (2007) define fill rate as the fraction of orders satisfied. That is number of line items fully supplied given as a percentage of total number of line items demanded over a given period. Product fill rate is the fraction of product demand satisfied within a specified period.

They further define customer service level as the fraction of replenishment cycles that ends with all the customer demands being met. A replenishment cycle is the interval between two successive replenishment deliveries. Customer service level may also be measured periodically say monthly regardless of number and timing of new receipts of inventory.

Safety inventory, also known as buffer inventory, is stock carried to satisfy demand that exceeds forecast for a given period. There lies a challenge in determining how much safety inventory to hold as Simchi, Kaminsky and Simchi (2008) point out that everything else being equal, the higher the service level, the higher the inventory level. Similarly for the same inventory level, the longer the lead time to the facility, the lower the level of service provided by the facility. That is the lower the inventory level, the higher the impact of a unit of inventory on service level and hence on expected profit. Firms therefore must make a decision on what amount of security or buffer inventory they need to hold to maintain the desired availability. According to Leenders et al (2000) the desired service coverage can be used to determine buffer inventory quantity thus aiding firms define policies on effective inventory management.

Determining appropriate level of safety inventory depends on uncertainty of both demand and supply and the desired level of product availability. The optimal level of product availability is one that maximizes supply chain profitability. This is because the closer the required product availability is to 100%, the larger the number of line items and quantity of each to be stocked and this represents increase inventory holding costs thus reduced

profitability hence the optimal level of product availability is thus influenced by the cost of overstocking and the cost of under stocking.

2.5 Strategies employed in inventory management

Stock and Lambert (2001) suggest a number of ways to manage inventory levels including multi echelon inventory planning such as ABC analysis, lead time analysis and shortening, elimination of low turnover and obsolete items, analysis of pack size and discount structure, encouragement of product substitution, installation of formal reorder/review systems, measurement of fill rate by stock keeping unit (SKU), analysis of customer demand characteristics and development of a formal sales plan.

ABC analysis segments inventory into three classes, A, B and C where the percentage of items in inventory will be approximately 5%, 15% and 80% while the amount of money tied up in each category will be 80%, 15% and 5% respectively. This principle of separation allows concentration of efforts in areas of highest payoff. One must therefore ensure that there are no stock outs in category A which produces the highest turnover and that stocks in category C are closely monitored to avoid excess inventory and risk of obsolescence. Category B should be checked so that items are handled appropriately depending on if they are moving towards category A or C thus achieving effective inventory management.

Leenders et al (2006) cite supplier managed inventory as another strategy where the supplier replenishes inventory as soon as it reduces to a preset reorder level. They give as a disadvantage the lack of control in ordering inventory.



Just in time (JIT) philosophy has also been employed as a strategy to manage inventory such that inventory is received just when it is required. According to Benton (2007), if JIT systems are not properly implemented and managed, the synergies will be lost and the system will collapse. However significant advantages will be realized if the systems are implemented successfully.

2.6 Demand forecasting

Lysons and Gillinham (2007) identify two methods as being commonly used in forecasting demand. These are moving averages and exponentially weighted averages

With moving averages, suitable number of periods found by trial and error to smoothen out fluctuations perhaps count periods between successive peaks or troughs. The disadvantage they have is they require large number separate calculations. Also data is weighted equally yet older data less is relevant hence the sensitivity of a moving average is inversely proportional to the number of data values in the average.

These problems with moving averages taken care of by weighting such as:

$$a + a(1-a) + a(1-a)^2 + a(1-a)^3 + \dots = 1 \text{ where } a \text{ is a constant between } 0 \text{ and } 1$$

Forecasting is estimation of a future situation. In inventory management, managers have got to estimate future demand and lead times. Depending on the nature and number of different line items in question, this could be a complex exercise.

In vehicle parts business, demand for different parts varies widely with some selling daily and others not receiving an enquiry. Properly managing inventory calls for paying

attention to all these groups of parts to ensure availability of parts required. Different strategies will then be applied in replenishing inventory for forecasted demand.

2.7 Strategies of inventory replenishment

According to Lysons and Farrington (2006), economic order quantity which is the optimal ordering for an item of inventory which minimizes cost, is one strategy applied in inventory replenishment. The basic EOQ formula was designed by F.W. Harris in 1915 and is as follows:

$$EOQ = \sqrt{\frac{2(\text{Annual usage in units})(\text{Order cost})}{(\text{Annual carrying cost per unit})}}$$

The EOQ problem can be summarized as determining the order quantity that balances the order cost and the holding costs to minimize total costs. The greater the order quantity is, the less we will spend on orders, since we order less often. On the other hand, we spend on inventory. The price of items as a variable is not of interest since the intention is to meet the demand for these items hence the value of the order quantity has nothing to do with this quantity.

The underlying assumptions of the economic order quantity problem are that orders for items arrive instantly and all at once. Secondly, the demand for items is perfectly steady.

This approach would find a lot of use in motor firms for items whose demand is regular and constitute the portion of line items that represent the highest rate of movement and revenue. Such parts are also the ones customers would be disappointed if not available or more expensive than the competition hence the usefulness of calculating an economic order quantity.

Lysons and Farrington (2003) add two approaches to inventory replenishment which are fixed order point and period review system. With fixed order point system, items are ordered when inventory reaches reorder quantity level while with periodic review system, stocks are topped up to maximum inventory when periodic orders are placed.

Fixed order point has a number of advantages in that on average, lower stocks, economic order quantity is applicable and there is enhanced responsiveness to demand fluctuations through automatic on time replenishment. It is appropriate where inventory categories differ widely. The disadvantages with this system are that reordering is random and the reordering system may be overloaded.

The periodic review system on the other hand offers a greater chance of elimination of obsolescence allows even spread of purchasing load with possible economies in placing orders and gives an opportunity to negotiate quantity discount. Its disadvantages are that on average, larger stocks are required, economic order quantities are not applied and spikes occurring soon after reorder could go unnoticed hence making it difficult to determine order quantity if demand not consistent.

Periodic review replenishment policies require more safety inventory than continuous review policies for the same lead time and level of product availability. Regardless of the approach employed, of importance is to accurately forecast the demand and lead time. Kenyan motor firms generally apply periodic review system.

2.8 Classification of inventory

It makes sense to tightly manage costly materials and to loosely manage cheap ones. That logic is the basis of ABC analysis which finds application in determining level of

authority for purchasing decisions, frequency of inventory checks, effort in forecasting for each group and safety inventory levels.

ABC dipped in popularity in the 1970s as experts said that fast dropping computing costs made it economical for a materials requirement planning system to give B and C items as much attention as A items thus one ordering system could be used for all items. Schonberger and Knod (1991) note that the emergence of JIT brings us back to more conventional ABC thinking because class A items are best proposals for full JIT treatment because volume justifies frequent small deliveries. This is not in line with the principles behind economic order quantity and thus motor vehicle distributors in Africa need to establish which system best helps them guarantee product support while keeping risk of obsolescence low. Inventory strategies may be measured by setting standards and measuring performance against them.

2.9 Measures of inventory management efficiency

Success in inventory management may be determined through a number of measures including product fill rate or availability, customer service level, inventory turn ratio and profitability. Lysons and Gillinham (2007) define inventory turn ratio as the number of times a year's sales equivalent to inventory value are sold.

That is inventory turn ratio = $12 \text{ months cost of sales} / \text{Av. Stock value}$

or $\text{Cost of goods sold} / 0.5(\text{Sum of th value of inventory at start and value of inventory at the end of the period})$

Shelf months is the inverse of inventory turn ratio and refers the number of times inventory value exceeds average monthly cost of sales.

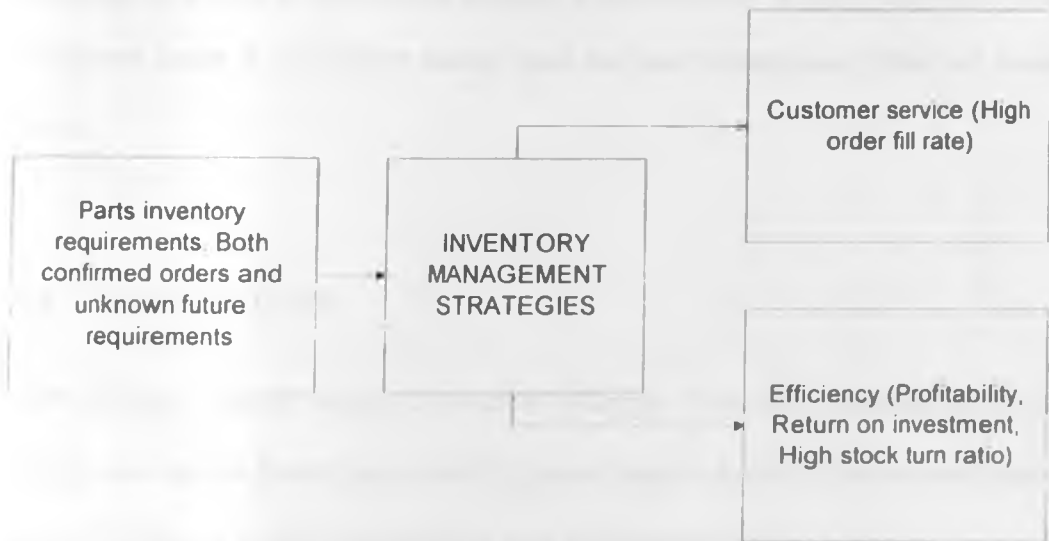
Fill rate and customer service level measure the number of parts supplied as a percentage of the number of parts ordered by customers over a given period.

The percentage of carrying costs as a percentage of inventory value will also give an indication of the efficiency of the operation.

In addition to these, staff productivity may be calculated by dividing the parts turnover by the number of staff and hours worked.

These measures will help check the effectiveness of inventory management methods.

2.10 Conceptual Framework



Source: Researcher, 2011

CHAPTER 3: RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

According to Kombo and Tromp (2009), the major purpose of descriptive research is description of the state of affairs as it exists. They cite Kerlinger (1969) who pointed out that descriptive studies are not only restricted to fact finding but may often result in the formulation of important principles on knowledge and solution to significant problems.

The study covered companies whose operations were very similar and all face the challenges described in the research problem. It also relied on comparisons between these companies hence a descriptive survey was the most appropriate choice of research design.

3.2 POPULATION

There are twelve motor vehicle distributors in Kenya. These are companies which are a sole or main agents directly appointed by source manufacturers to procure and market a brand of vehicle in a particular region as well as provide after sales service.

3.3 SAMPLE DESIGN

The five largest motor vehicle distributors in terms of turnover as classified by the Kenya Motor Industry Association were selected as the sample. These are Toyota, General Motors, CMC Motors, Simba Colt and DT Dobie. These have been selected not only due

to size but also due to having been in the market significantly longer than any of the other distributors. With the exception of CMC Motors which has seven divisions each with a Parts Manager and a Central parts manager who oversees all parts functions, these companies all have a General Manager heading the parts department and assistants handling other roles including parts ordering, sales and marketing and warehouse operations.

Purposive sampling was used to select the respondents because a homogenous sample was desired. The selections consisted of parts department heads and their assistants as they are knowledgeable in the field and were directly involved and responsible for parts inventory management in their companies. The sample comprised of 19 respondents.

3.4 DATA COLLECTION

Primary data was collected from the respondents by way of questionnaires. The researcher filled in the questionnaire during interviews with each respondent. This was effective because the researcher made clarifications where required as the interview proceeds to ensure all questions were answered. The size of population was also small enough to support personal interviewing of all respondents.

The questionnaire consisted of four sections. Section A covered issues relating to ordering criteria and processes applied in the different companies, section B looked at personnel and levels of authority required to execute orders, section C involved handling of obsolete inventory and section D completes the questionnaire by seeking an insight

into the effectiveness of inventory management practices discovered in the other sections of the questionnaire on efficiency and customer service.

3.5 DATA ANALYSIS

Descriptive statistics such as frequency, percentages, mean and standard deviation were used as the study sought to measure the effect of various variables and combinations of variables on efficiency and customer service. Cross tabulation was also used to check of the relationship and differences of opinion from one company to another. This assisted in making comparison analysis amongst the companies. The findings were presented in tables and bar graphs.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1: Introduction

The chapter presents the findings of the study. Section 4.2 discussed main challenges experienced in parts inventory management, factors influencing how much stock to hold, frequency of stock order, mode of transporting stock and what determines the transportation mode. Section 4.3 presents findings on number of franchises the companies hold and division of responsibility for inventory. Section 4.4 presented findings on categorization of stock parts and provision of obsolescence on stock and section 4.5 represent summary of stock turn ratios and order fill rates.

4.2: Challenges in inventory management and stock holding decisions

4.2.1: Main challenges experienced in part inventory management

The respondents were asked to state the main challenges experienced in part inventory management in their respective firms. Amongst the identified challenges were; inaccurate lost sales reporting, security and adherence to procedural controls, demand forecasting, overstocking due to number of franchise and variant models, desperate lead times and delay in updating manual transactions, maintenance of optimum stock at all times, frequent upgrades/facelifts of the models, back ordering from suppliers, stock outs, pricing change due to fluctuations in exchange rates, in adequate stocks due to financial constraints, misplacement of parts, theft, shortage of manpower, restriction due to company policy and creation of new business locations with the new receipts.

4.2.2: Factors considered by firms when deciding how much stock to hold

When asked to state the factors they do consider when deciding how much stock to hold, the respondents indicated that their firms consider the following factors when deciding how much stock to hold; stock movement category, lost sales tracking, lead time, sales, safety stock to cater for unforeseen demand, demand, company policy, service levels, stock on hand, stock on order, stock on backorders, rate of returns as compared to alternative investment, delivery time and shelf life.

4.2.3: Frequency of placing part stock order

As shown in table 4.1, majority (86.7%) of the firms place part stock order on monthly basis (General motors, DT Dobie, CMC and Simba Colt). 13.3% places orders on weekly basis (Toyota) while only one firm places orders twice a month for MEDC (Dubai) and South Africa (General Motors).

Table 4.1: Frequency of placing part stock order

Monthly	13	86.7
Weakly	2	13.3
Total	15	100.0

Source: Researcher, 2011

4.2.4: Mode of transportation of part stock orders.

Transportation modes varied from sea to air depending on the weight of the consignment. More specific 26.7 percent of the firms used air only as a mode of transportation of part stocks orders, 26.7 percent used sea only and 46.7% used both sea and air to transport

part stock orders. The respondents further indicated that the choice of mode of transport used depend mainly on cost, convenience and lead time.

Table 4.2: Mode of transportation of part stock orders

	Frequency	Percent
Air	4	26.7
Sea	4	26.7
Sea and Air	7	46.7

Source: Researcher, 2011

4.2.5: Average lead time

Average lead time varied from one firm to the other. The findings indicated that average lead time for the firms were more or less the same with 33.3% of the firms operating with a lead time of less than one month, 33.3% between one and two months period and 33.3% for two to three months period of lead time.

Table 4.3: Average lead time

	Frequency	Percent
Less than 1 month	5	33.3
1-2 moths	5	33.3
2-3 months	5	33.3
Total	15	100.0

Source: Researcher, 2011

4.2.6: Rating of the effectiveness ordering intervals

As shown in table 4.4, of the company (Toyota) which orders on weekly basis, the ordering period was very effective in managing inventory levels while of the companies which orders on monthly basis 38.5% rated the ordering period to be effective, 53.8% as slightly effective and 7.7% as the period to be not effective at all.

Table 4.4: How frequently do you place part stock order * How effective do you think this ordering period is in managing inventory? Cross tabulation

How frequently do you place part stock order		How effective do you think this ordering period is in managing inventory?				Total
		Very effective	Effective	Slightly effective	Not effective	
Monthly	Count	0	5	7	1	13
	%	.0%	38.5%	53.8%	7.7%	100.0%
Weekly	Count	1	1	0	0	2
	%	50.0%	50.0%	.0%	.0%	100.0%
Total	Count	1	6	7	1	15
	%	6.7%	40.0%	46.7%	6.7%	100.0%

Source: Researcher, 2011

4.2.7: Effectiveness of stock holding value in providing customer service and maintaining efficiency

When asked to rate Effectiveness of stock holding value in providing customer service and maintaining efficiency, Toyota company rated their system to be 100% very effective, CMC had 66.7% rating of effective, Simba Colt have 50% rating of being both very effective and effective, DT Dobie had 33.3% effective and General Motors had 100% effective rating of the stock holding value in providing customer service and maintaining efficiency. In general 26.7% of the companies had very effective rating of their stock holding value, followed by 53.3% effective rating and 20% slightly effective rating.

Table 4.5: Company name * How effective do you consider your stock holding value in providing customer service and maintaining efficiency Cross tabulation

Company Name		How effective do you consider your stock holding value in providing customer service and maintaining efficiency			Total
		very effective	effective	slightly effective	
Toyota	Count	2	0	0	2
	%	100.0%	.0%	.0%	100.0%
CMC	Count	1	4	1	6
	%	16.7%	66.7%	16.7%	100.0%
Simba Colt	Count	1	1	0	2
	%	50.0%	50.0%	.0%	100.0%
DT Dobie	Count	0	1	2	3
	%	.0%	33.3%	66.7%	100.0%
General Motors	Count	0	2	0	2
	%	.0%	100.0%	.0%	100.0%
Total	Count	4	8	3	15
	%	26.7%	53.3%	20.0%	100.0%

Source: Researcher, 2011

4.3: Division of responsibility for inventory

4.3.1: Number of franchises

The respondents were asked to state the number of franchises the company's represent.

The results indicates that 53.3% of the firms represents less than 5 franchises, 20% represents between 5 to 10 franchises and 26.7% represent more than 10 franchise.

Table 4.6: Number of franchises

	Frequency	Percent	Cumulative Percent
Less than 5	8	53.3	53.3
5 to 10	3	20.0	73.3
More than 10	4	26.7	100.0
Total	15	100.0	

Source: Researcher, 2011

4.3.2: Number of days allocated to prepare a stock order for each franchise

The respondents were asked to state the number of days allocated to prepare a stock order for each franchise, that is, from running the order to making amendments and sending to suppliers. The findings indicated that 26.7% allocated less than 5 days to prepare a stock order for each franchise, 53.3% allocated 5 to 10 days and the rest 20% allocated more than 10 days to prepare a stock order for each franchise.

Table 4.7: Number of days allocated to prepare a stock order for each franchise

	Frequency	Percent	Cumulative Percent
Less than 5days	4	26.7	53.3
5 to 10 days	8	53.3	80.0
More than 10 days	3	20.0	100.0
Total	15	100.0	

Source: Researcher, 2011

4.3.3: Persons involved in preparation and authorization of orders.

When asked to state the persons involved in preparation and authorization of orders, the respondents identified the following persons; warehouse and supervisor manager, part

managers, divisional managers, logistics and central parts managers, chief accountant, parts operations manager, procurement manager, parts inventory coordinator and parts sales manager.

4.3.4: Effectiveness of distribution of responsibility for franchise between managers

The respondents were asked to rate the effectiveness of distribution of responsibility for franchise between managers in achieving efficient inventory management and parts availability. From the findings companies with less than 5 franchises were of the opinion that the distribution of responsibility for franchises between managers was very effective (71.4%) and effective (28.6%). Of the companies with 5 to 10 franchises, distribution of responsibility for franchises between managers was rated as 50% slightly effective and 50% not effective. While the ones with more than 10 franchises had 75% effective rating and 25% not effective at all.

Table 4.8: Number of franchises * How effective do you think the distribution of responsibility for franchises between managers is in achieving efficient inventory management and parts availability? Cross tabulation

Number of franchise		How effective do you think the distribution of responsibility for franchises between managers is in achieving efficient inventory management and parts availability?				Total
		Very effective	Effective	Slightly effective	Not effective	
< 5	Count	5	2	0	0	7
	%	71.4%	28.6%	.0%	.0%	100.0%
5 to 10	Count	0	0	2	2	4
	%	.0%	.0%	50.0%	50.0%	100.0%
> 10	Count	0	3	0	1	4
	%	.0%	75.0%	.0%	25.0%	100.0%
Total	Count	5	5	2	3	15
	%	33.3%	33.3%	13.3%	20.0%	100.0%

Source: Researcher, 2011

4.3.5: Effectiveness of time allocated to order preparation for efficient inventory management.

The respondents were asked to rate the effectiveness of time allocated to order preparation for efficient inventory management. From the findings company (Toyota) which takes less than 5 days to prepare a stock order for each franchise held considered the time allocation to be very effective (100%), the ones which takes 5 to 10 days considered the time allocation to be effective (50%) and the ones allocating more than 10 days to prepare the order considered the time takes to be slightly effective (100%).

Table 4.9: Number of days allocated to prepare a stock order for * How effective do you think of time allocated to order preparation for efficient inventory management? Cross tabulation

Number of days allocated to prepare a stock order for each franchise held		How sufficient do you consider time allocated to order preparation to be?				Total
		Very effective	Effective	Slightly effective	Not effective	
Less than 5 days	Count	2	0	0	0	2
	%	100.0%	.0%	.0%	.0%	100.0%
5 to 10 days	Count	3	5	0	2	10
	%	30.0%	50.0%	.0%	20.0%	100.0%
More than 10 days	Count	0	0	3	0	3
	%	.0%	.0%	100.0%	.0%	100.0%
Total	Count	5	5	3	2	15
	%	33.3%	33.3%	20.0%	13.3%	100.0%

Source: Researcher, 2011

4.4 Aging stock and obsolescence

4.4.1: Criteria used to categorize a part as slow moving

The respondents were asked to state criteria used by their firms to categorize a part as slow moving. Amongst the methods of categorizing parts as slow moving identified by respondents were; no sales in the last 12 months, only one sale in 24 months period, no sales in the entire year, number of years part has been on the shelf/warehouse. The respondents further indicated that their respective companies makes provision for obsolescence on stock after a period of three years and above for slow moving goods and a period of six months for excess stock.

4.4.2: Effectiveness of the provision period for obsolescence in managing inventory efficiently

When asked to rate the Effectiveness of the provision period for obsolescence in managing inventory efficiently, there was no significant difference in the opinion of rating the effectiveness with respect to the time companies take to make provision for obsolescence. More specific majority (46.7%) felt that the period was slightly effective while 40% rated the period as effective.

Table 4.10: After how long does the company make provision for obsolescence on stock * How effective do you think this period in 16 is in managing inventory? Cross tabulation

After how long does the company make provision for obsolescence on stock		How effective do you think this period is in managing inventory?				Total
		Very effective	Effective	Slightly effective	Not effective	
After 12 Months	Count	1	5	2	0	8
	%	12.5%	62.5%	25.0%	.0%	100.0%
Between 12 to 24 Months	Count	0	1	1	0	2
	%	.0%	50.0%	50.0%	.0%	100.0%
More than 24 Months	Count	0	0	4	1	5
	%	.0%	.0%	80.0%	20.0%	100.0%
Total	Count	1	6	7	1	15
	%	6.7%	40.0%	46.7%	6.7%	100.0%

Source: Researcher, 2011

4.4.3: Frequency of use of the following actions in dealing with aging/obsolete stock

When asked to rate the frequency of use of same predetermined actions in dealing with aging/obsolete stock. The results shows that Sell individual items at reduced prices are normally done on monthly basis (40%) and on annual basis (46.7%), Lot disposal to the highest bidder is carried out on annual basis (85.7%), Write off and destroy obsolete parts on annual basis (38.5%) while majority do not take this action (never at 46.2%).

Table 4.11: Frequency of actions taken to deal with aging/obsolete stock

Actions		Monthly	Quarterly	Annually	Never	Total
Sell individual items at reduced prices	Frequency	6	0	7	2	15
	Percent	40.0	.0	46.7	13.3	100.0
Lot disposal to the highest bidder	Frequency	1	1	12	0	14
	Percent	7.1	7.1	85.7	0.0	100.0
Write off and destroy obsolete parts	Frequency	0	2	5	6	13
	Percent	0	15.4	38.5	46.2	100.0
Retain parts in stock	Frequency	3	1	3	6	13
	Percent	23.1	7.7	23.1	46.2	100.0

Source: Researcher, 2011

4.4.4: Level of effectiveness of the actions taken to manage inventory efficiently

As shown in table 4.9 below, the respondents unanimously rated Sales of individual items at reduced prices as very effective/effective method of managing inventory effective, lot disposal to the highest bidder was rated as 46.7% effective and 26.7% slightly effective, Write off and destroy obsolete parts was also rated as 28.67% effective/slightly effective. On the other hand Retain parts in stock was rated as 73.3% to be not effective method of managing inventory efficiently.

Table 4.12: Rating of effectiveness of the actions taken to manage inventory efficiently

		Very effective	Effective	Slightly effective	Not effective	Total
Sell individual items at reduced prices	Frequency	7	8	5	0	15
	Percent	46.7	53.3	33.3	.0	100.0
Lot disposal to the highest bidder	Frequency	2	7	4	2	15
	Percent	13.3	46.7	26.7	13.3	100.0
Write off and destroy obsolete parts	Frequency	2	4	4	4	14
	Percent	14.3	28.6	28.6	28.6	100.0
Retain parts in stock	Frequency	2	0	2	11	15
	Percent	13.3	.0	13.3	73.3	100.0

Source: Researcher, 2011

4.4.5: Effectiveness of the actions taken to manage inventory in recovering capital spent in procuring stock being written off.

When asked to rate the Effectiveness of the actions taken to manage inventory in recovering capital spent in procuring stock being written off, the respondents were of the opinion that Sales of individual items at reduced prices (mean of 1.2000), Lot disposal to the highest bidder (mean of 1.4000) and write off and destruction of obsolete parts (mean of 1.9333) were the most effective methods of recovering capital spent in procuring stock being written off.

Table 4.13: Effectiveness of the actions taken to manage inventory in recovering capital spent in procuring stock being written off.

	Mean	Std. Deviation
Sell individual items at reduced prices	1.2000	.32808
Lot disposal to the highest bidder	1.4000	.12808
Write off and destroy	1.9333	.25820
Retain parts in stock	3.8000	.56061

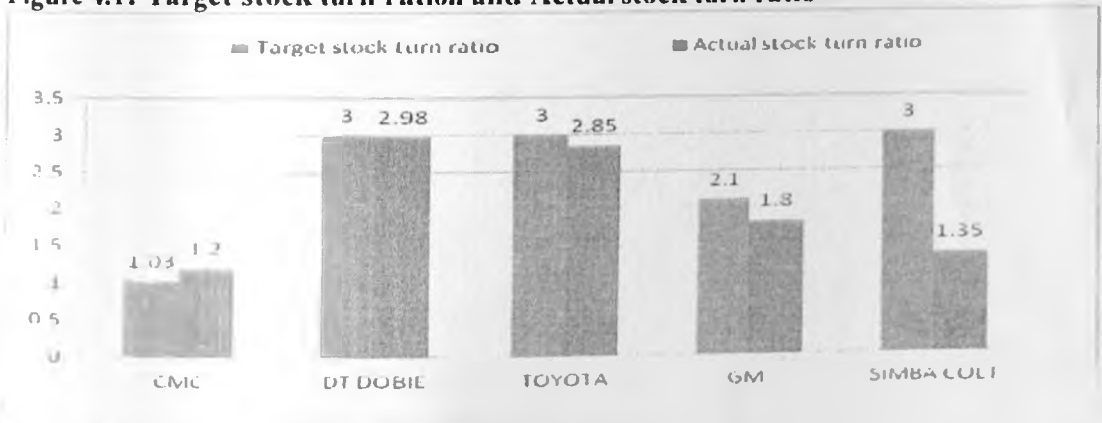
Source: Researcher, 2011

4.5: Stock turn ratio and order fill rate

4.5.1: Target stock ratio and Actual stock turn ratio

As indicated in figure 4.1, only CMC surpassed its target stock turn ratio while the rest of the firms operated below their target stock turn ratio. However, DT Dobie, Toyota and Simba colt all had equal target stock turn ratio of 3 while CMC had a lower target stock turn ratio of 1.03. DT Dobie had the highest actual stock turn ratio achieved followed by Toyota, Simba colt and CMC respectively. The respondents also indicated that targets were determined on the basis of; stock held against moving stock (12 months moving average sales against shelf life), company policy/management decision, benchmarking with other warehouses with similar operating conditions and model range

Figure 4.1: Target stock turn ration and Actual stock turn ratio

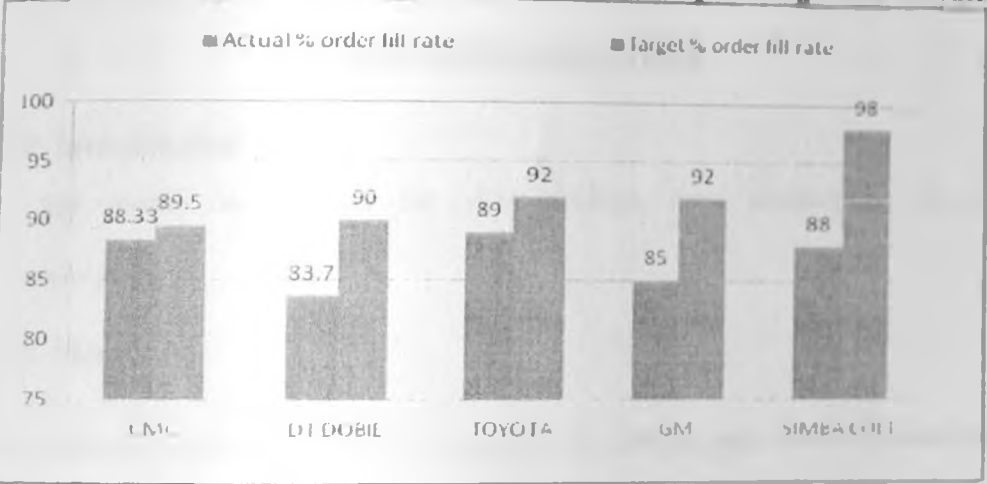


Source: Researcher, 2011

4.5.2: Target percentage order fill rate and Actual percentage order fill rate

As indicated in figure 4.2, none of the firms achieved its target percentage order fill rates. On the other hand Toyota recorded the highest performance of actual percentage order fill rate of 89% followed by CMC at 88.33%, Simba colt at 88% and DT Dobie at 85% respectively.

Figure 4.2: Target percentage order fill rate and Actual percentage order fill rate



Source: Researcher, 2011

CHAPTER FIVE: SUMMARY CONCLUSION AND RECOMMENDATIONS

5.0: Introduction

In this section we discuss the main findings, draw conclusions and make recommendations

5.1: Summary

The objectives of the study were to determine the different parts inventory management strategies employed by motor vehicle firms in Kenya and to determine impact of these inventory management strategies on efficiency and customer service.

The study identified the following as the main challenges experienced in part inventory management; inaccurate lost sales reporting, security and adherence to procedural controls, demand forecasting, overstocking due to number of franchise and variant models, long lead times and delay in updating manual transactions, maintenance of optimum stock at all times, frequent upgrades/facelifts of the models, back ordering from suppliers, stock outs, pricing change due to fluctuations in exchange rates, inadequate stocks due to financial constraints, misplacement of parts, theft, shortage of manpower, restriction due to company policy and creation of new business locations with the new receipts.

The study indicated that the company (Toyota) which orders on weekly basis, the ordering period was very effective in managing inventory levels while of the companies which orders on monthly basis 38.5% rated the ordering period to be effective/slightly effective.

In terms of the effectiveness of distribution of responsibility for franchise between managers in achieving efficient inventory management and parts availability, companies with less than 5 franchises were of the opinion that the distribution of responsibility for franchises between managers was very effective (71.4%) and effective (28.6%), companies with 5 to 10 franchises had a rated o 50% slightly effective and 50% not effective. While the ones with more than 10 franchises, had 75% effective rating and 25% not effective at all.

Methods of categorizing parts as slow moving identified by respondents were; no sales in the last 12 months, only one sale in 24 months period, no sales in the entire year, number of year's part has been on the self/warehouse. These time period was felt to be slightly effective by majority of the companies (46.7%) and effective by 40% of the companies in general. The respondents further indicated that their respective companies make provision for obsolescence on stock after a period of three years and above for slow moving goods and a period of six months for excess stock. Selling of individual items at reduced prices as an action in dealing with aging/obsolete stock was carried out on monthly basis, lot disposal to the highest bidder and write off/destroy obsolete parts carried out on annual basis while retention on stock was rarely used.

The most effective methods of recovering capital spent in procuring stock were Sales of individual items at reduced prices (mean of 1.2000), Lot disposal to the highest bidder (mean of 1.4000) and write off and destruction of obsolete parts (mean of 1.9333).



Only CMC surpassed its target stock turn ratio while the rest of the firms operated below their target stock turn ratio. DT Dobie, Toyota and Simba colt all had equal target stock turn ratio of 3 while CMC had a lower target stock turn ratio of 1.03. DT Dobie had the highest actual stock turn ratio achieved followed by Toyota, General Motors, Simba colt and CMC respectively. These targets were determined on the basis of; stock held against moving stock (12 months moving average sales against stock value), company policy/management decision and benchmarking with other warehouses with similar operating conditions and model range. On the other hand none of the firms achieved its target percentage order fill rates, Toyota recorded the highest performance of actual percentage order fill rate of 89% followed by CMC at 88.33%, Simba colt at 88% and DT Dobie at 85% respectively.

5.2 Conclusion

Strategies involving more frequent ordering cycles, allocation of more management time to each individual franchise and closer monitoring of aging stock were found to contribute to higher stock turn ratios and order fill rate. It was also found that there was no clear method of establishing targets for stock turn ratio and order fill rate as the respondents generally indicated that these were decided by management

5.3: Recommendations

5.3.1. Recommendations on inventory management policy

From the findings of the study, the recommendations to policy makers are that orders be placed more frequently say weekly or twice a month. The responsibility for inventory

should also be shared out such that any one manager concentrates on few franchises.

Aging stock should be analysed before it gets to one year with no sales and parts sold individually at discounted prices as this will give the best chances of recouping capital spent to procure it. These strategies were found to increase chances of higher stock turn ratios and order fill rate signifying higher efficiency and customer service.

Other areas that were found to require attention involve fine tuning of operations as suggested in the section on challenges being encountered in inventory management.

These are updating of manual transactions in the computer system, accurate recording of lost sales, parts security and ensuring optimal human resource.

5.3.2. Recommendations for Further Research

Due to limitations on the degree of detail available, this study could not assess exact costs resulting from each of the strategies employed. It would be of interest to work out the cost of holding inventory as a percentage of inventory value per month based on both fixed costs and overheads. This figure will be very useful for comparison with competing cost such as cost of achieving higher fill rate and for further evaluation of financial benefits of strategies such as those used to deal with aging stock and modes of transport used for stock orders.

Further research may also be carried out on other motor vehicle distributors in developing countries to allow for benchmarking and establishment of best practices to guide the companies in their operations.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

Thank you for taking time to fill this questionnaire. The responses will solely be used for academic purposes only and actual inventory value and sales figures will not be requested. Your assistance is highly appreciated.

Section A

1. What are the main challenges you experience in parts inventory management?

2. What factors do you consider when deciding how much stock to hold?

3. How frequently do you place parts stock orders? _____

4. What mode of transport do you use for your parts stock orders? _____

5. What determines the choice of transportation?

6. What is the average lead time for your parts stock orders? _____

		Very effective	Effective	Slightly effective	Not effective
7	How do you rate the effectiveness of your ordering intervals?				
8	Without necessarily mentioning actual stock values, how effective				

	do you consider your stock holding?				
9	How do you rate your ratio of slower moving parts to total stock? (Consider the percentage of stock value formed by such parts)				

Section B

10. For how many franchises' inventory in you company is any one manager in charge of? _____

11. How many days are allocated to preparing a stock order for each franchise you hold?

12. Who in your organization is involved in order preparation and authorization?

		Very effective	Effective	Slightly effective	Not effective
13	How effective do you think the distribution of responsibility for franchises between managers is?				
14	How sufficient do you consider time allocated to order preparation to be?				

Section C

15. What criteria do you use to categorize a part as slow moving?

16. After how long since stock was procured does the company begin to make provision for obsolescence on this stock? _____

		Very effective	Effective	Slightly effective	Not effective
17	How effective do you think this period in 16 is in managing inventory?				
		Monthly	Quarterly	Annually	Never
17	How often do you use each of the following actions in dealing with aging/obsolete stock?				
a	Sell individual items at reduced prices?				
b	Lot disposal to the highest bidder?				
c	Write off and destroy?				
d	Any other				

		Very effective	Effective	Slightly effective	Not effective
18	How effective is each of the methods mentioned in 17 above in managing inventory efficiency				
a	Sell individual items at reduced prices?				
b	Lot disposal to the highest bidder?				
c	Write off and destroy?				
d	Any other				
19	How effective is each of the methods mentioned in 17 above in recovering capital spent in procuring stock that is now being				

	written off				
a	Sell individual items at reduced prices?				
b	Lot disposal to the highest bidder?				
c	Write off and destroy?				
d	Any other				

Section D

20. a. What is your target stock turn ratio? _____

b. What is your actual stock turn ratio? _____

c. How do you determine this target?

21. a. What is your target percentage order fill rate? _____

b. What is your actual percentage order fill rate? _____

c. How do you determine this target?



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TO WHOM IT MAY CONCERN

The Director of Studies,

Registration Office,

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the student to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be made available to the relevant regulatory authorities.

Thank you.

JUSTINE MAGUTU
ASSISTANT REGISTRAR
MBA OFFICE, AMBANK HOUSE