AN EVALUATION OF THE USE OF ELECTRONIC - POINT - OF SALE SYSTEM IN INVENTORY MANAGEMENT. A CASE OF CHEMISTS IN NAKURU TOWN.

EGERTON UNIVERSITY LIBRARY

FREDRICK ODHIAMBO NDEDE

CM11/0065/02

A RESEARCH PROJECT REPORT SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILMENT FOR THE REQUIREMENTS OF THE MASTER OF BUSINESS ADMINISTRATION IN THE FACULTY OF COMMERCE, OF EGERTON UNIVERSITY.

AUGUST 2005

Eger241001

Declaration

I hereby wish to state that this is my original work and has not been presented for purposes of examination in any institution.

Fredrick Odhiambo Ndede.

REG. NO. CM 11/0065/02

Signature: Ndede

Date: 24/08/2005

This work has been presented with our approval as University Supervisors:

(i) Mr. Christopher Ngacho

Signature: Ngacho

Date: 24/8/2005

(ii) Mr. Akuno Nyang'aya, R. O:

Signature:

Date: 24/8/2005

Dedication

I would like to dedicate this work to my parents Moses and Dorcas whose motto is and has always been "Education has no limit," and to my dear wife Loice Atieno who has always encouraged me to keep on working hard when the going was tough. I also dedicate it to my supervisors for their continuous encouragement.

May God bless you all abundantly.

Acknowledgement

Many people have contributed in one way or the other towards the success of this work, and to whom I would like to convey my sincere thanks.

First and foremost I would like to acknowledge the input of my supervisors, Mr. C.Ngacho and Mr. R.O. Akuno Nyang'aya for their guidance, patience and support throughout the project period. They took time out of their busy schedules to assist me and for this I will always be grateful. I also wish to extend my gratitude to the lecturers of Egerton University (Nakuru Town Campus) for all their invaluable comments, suggestions and advice throughout my course work and all the chemist operators who took time out of their busy schedules to respond to the questionnaires, my brothers Walter, Jared and Tom and the late uncle Peter for their support.

I cannot forget to mention and thank my friends in particular S.Omondi, D. Rogito, D. Kaguri. P. Mutuku and P. Ochieng and their family for the moral support in pursuit of this work. Special thanks go to the MBA 2002 class members for their spirit of unity and teamwork that has made us all achieve our goals. Specific members here include Caroline, Waringa, Ogola, Rose, Maranga, Romona and Elisha.

Last but not least, I would like to thank the typists Susan and Pauline and all those who contributed either directly or indirectly for the success of this work.

Abstract

This study sought to evaluate the use of Electronic – Point – Of – Sale systems in inventory management. The target population consisted of the chemists firms in Nakuru town from which a sample of 30 chemist firms were taken through stratified random sampling. The data was taken through a structured questionnaire, which was hand delivered by the researcher. The response rate was 100%. The data collected was analyzed through factor analysis for null hypothesis one and chi-square as a test for association for null hypothesis two at both 1% and 5% level of significance. Hypothesis two was proved as stated at both 1% and 5% levels of significance of which the coefficient of contingency revealed a moderate association between EPOS and EOQ model. The result of the study is expected to be of great use to the chemist firms, members of the public especially drug consumers, suppliers/manufacturers of drugs and the relevant government agencies health policies and tax collectors.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AIDS – Acquired Immune Deficiency Syndrome

GOK - Government of Kenya

HIV – Human Immune deficiency Virus

KNH – Kenyatta National Hospital

MLG – Ministry of Local Government

NCC – Nairobi City Council

UoN – University of Nairobi.

Chapter 1: Introduction

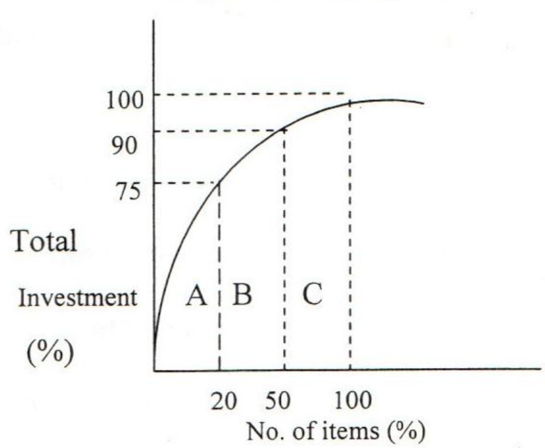
1.1 Background to the study.

Inventories cover a special place in any business organization because it contains finances of a firm held in the form of stocks. Inventories always seem to be too big, too small, of the wrong or in the wrong type or in the wrong place. With the changes in the economic conditions, what is too little in one period may easily become too much in the next.

According to Leenders, Fearon, and England (1986) suppliers, often located very near the plant, deliver items directly to the point of use with plant at very frequent intervals. Inventory management models in use include:

1. Pareto (ABC) analysis - This model was developed by an Italian called Vilfredo Pareto (1848 - 1923). In his study he found out that out of a large range of inventory 10% or so account for 70% - 80 % of the annual inventory usage value whereas a relatively small usage value of say only 5% is contributed by the bulk, say 70% of the items in inventory. This can be presented in the following graph:

Figure 1: A graph of A B C analysis.



Source: own 2003

The figure above shows the nature of items carried and frequency of use classified as A, B and C items respectively. The above model can be used in inventory management.

2. Economic Order Quantity Model. This model is appropriate for fixed quantity orders and are deterministic in nature.
3. Probabilistic models - The model mentioned in no. 2 above assume that all parameters are known absolutely. It is far more common to have some variation in forecast demands, lead times and so on. Probabilistic lot size models take variations into account. The models are more complex than the deterministic ones above but the probabilistic approach gives much more information on likely outcomes.
   Holding a large inventory to prevent stockout and that's to maintain high service coverage is expensive. Similarly a high number of stockout is costly. Stockout costs are often difficult and expensive to determine but nevertheless real. Setting service coverage requires managers to make explicit and implicit evaluations of this cost so that the appropriate balance between carrying and stockout can be achieved. In independent demand situation the appropriate service coverage can be determined by the following ratio called the *critical fractile*:

$$\text{Critical fractile} = \frac{Cu}{Cu+Co}$$

Where Cu = cost of understocking

Co = cost of overstocking

The complexity of probabilistic models increases greatly when lead times, usable quantities received, inventory shrinkage rates, and so on, also vary. Under conditions of uncertainty, when non normal distributions are obsevered and when the variation change with time. Simulation models and other more advanced statistical techniques can be used to solve these complex situations.

4. Materials requirement planning (MRP) - One of the Assumptions behind the lot - sizing models above is that demand for the item being purchased or made is independent of all other demands. However, such assemblies, raw materials and parts do not exhibit this independence. Demand for these items is independent on the assembly schedule for finished goods. Similarly many maintenance, repair, and operating (MRO) items depend on maintenance schedules. Recognition of the existence of demand dependence lies behind the technique known as Material Requirement Planning (MRP). MRP differs from EOQ - type systems in a number of dimensions namely:

	MRP	EOQ - type systems
i)	Product/ component oriented	i) Part oriented (every item)
ii)	Dependent (derived) demand	ii) independent demand
iii)	Discrete/lumpy demand	iii) continuous item demand
iv)	Time-phase ordering signal	iv) reorder point ordering signal
v)	Future production base	v) historical demand base
vi)	Forecast end items only	vi) forecast all items
vii)	Quantity and time based system	vii) quantity based system.
viii)	Safety stock for end items only	viii) safety stock for all items

These are important differences in philosophy between the two inventory management systems.

5. Just -in -time (JIT)-This is an inventory management Philosophy that originated from the Japanese companies. JIT production means that components and raw materials arrive at work center exactly as they are needed. The feature greatly reduces queues of work -in- progress inventory. The goals of JIT production are similar to those of MRP- providing the right part at the right place at the right time- but the ways of achieving these goals are radically different and the results impressive. Whereas MRP is computer based, JIT is industrial engineering based.

   In summary JIT is a mixture of high quality working environment, excellent industrial engineering practice, and a healthy focused factory attitude that operations are strategically important.

   In modern inventory management systems the use of electronic systems has became highly significant and useful. One such system is the Electronic- Point- Of -Sale systems. The EPOS originated from Europe in the early 1990's through use of various codes to identify an item. The code that has been adopted worldwide is referred to as European Article Numbering (EAN), which has a total of 13 digits and is ranged vertically as follows:

   1. The first 2 digits - country of origin.
   2. The next 5 digits - name of manufacturer, and manufacturer's code.
   3. The next 5 digits - identification of product.
   4. Final digit - a check digit.

This has been facilitated by the use of computers in retail business

6. Distribution Requirement Planning - This is an inventory control and scheduling technique that applies MRP principles to distribution inventories. It may also be regarded as a method of handling stock replenishment in multi-echelon environment. The term multi-echelon means that instead of independent control of the same item at different distribution points using EOQ formulae, the dependent demand at a higher echelon (e.g. a central warehouse) is derived from the requirements of lower echelons (e.g. regional warehouses). DRP is useful for both manufacturing organizations such as car manufacturers that sell their cars through several distribution points e.g. regional and local distributors and purely merchandising organisations e.g. supermarkets
7. Optimized Production Technology- Developed in Israel, OPT claims, like JIT to minimize inventory of materials and work in progress and manufacturing lead times particularly with regard to batch or continuous production.
8. Vendor-Managed Inventory -The aim of VMI is to enable manufacturers or distributors to eliminate the need for customers to reorder, reduce or exclude inventory and obviate stock outs. With VMI customers no longer "pull" inventory from suppliers. Rather inventory is automatically "pushed" to customers as suppliers check customers' inventory and respond to previously agreed stock levels. VMI is particularly applicable to retail distribution. VMI can also relieve the customer of much of the expense of ordering and stocking low level maintenance, repair and operating items.

Chemists refer to shops where drugs used for human consumption are traded. They operate within the provisions of the Drugs and Poisons Act (GOK 2002) and the drugs and poisons Board act. The pharmacists operating the chemists are requires to be members of the pharmaceutical society of Kenya. Chemists stock their inventory from a number of supplies based locally in Kenya and some abroad. Their merchandise are many and varied and requires specialized skills to mange. They are manufactured within the provisions of certain standards regarding composition design, content, validity period, among others.

Hence efficient inventory management becomes highly important as a financial management tool. Pandey (1999) asserts that the firm should avoid a situation of overinvestment or underinvestment of inventories. He cites the major dangers of overinvestment as: - Unnecessary tie up of the firm's funds and loss of profit, excessive carrying costs and risk of liquidity. The excessive level of inventories consumes funds of the firm, which cannot be used for any other purpose, and thus it involves opportunity cost. Two basic decisions that can help minimize inventory are how much to order and when to order from the suppliers.

Ordering the minimum amounts at the right time keeps the inventory at low levels. One popular technique is the Economic Order Quantity (EOQ), which is designed to minimize the total ordering costs and holding costs for inventory items. In this case ordering costs are the costs associated with actually placing the order such as postage, receiving and inspection, whereas holding costs are the costs associated with keeping the item on hand such as storage space charges, finance charges and materials handling expenses. With the advent of information technology and its application to retail management the above costs can drastically be minimized.

Lowe and Wrigley(1996) found out that since 1970;s there have been three main ways in which retailers have used IT, namely, 1. Investment in IT combined with organizational charges, improved retail logistics, reducing delivery lead times, resulting in a progressive, reduction in retailer inventory holdings, 2. Better information about consumer demand supported retail policies in own- brand, product development and the refocusing and redefinition of many of the most successful firms and 3. Retails have cut their labour costs by effective staff scheduling and by using more part-time and casual staff. The dispensing of items by chemists requires a lot of accuracy, efficiency, economy and effectiveness. However the use of manual holding systems at the point of sales has manifested itself in a number of cases including, long queue times, transaction speed decreases, less accuracy in sales transactions, higher lead times, less accuracy of stock records, slow response to market conditions among others (Lowe and Wrigley 1996)

To redress the above manifestation the chemists have an option of installation of the EPOS as a way of speeding up the inventory processing. EPOS uses scanning systems to charge accurate prices, enables checkout staff to work faster and eliminate the need to apply price labels to individual items since they capture data through the universal product codes, the bar codes. Nakuru municipality (Town) is the provincial headquarters of Rift valley, the largest province of Kenya. It is the fourth largest town in the country after Nairobi, Mombasa, and Kisumu.Taking advantage of its strategic position in the Kenyan map; it links Nairobi with the other Western areas of Kenya. The population of the residents of Nakuru municipality stands at 219, 366 persons (GOK, MLG, 2003).

This means heavy demand for drugs leading to the establishment of many chemists in the town and the fact that there is cost sharing in place in public health institutions, many patients tend to resort to the chemists in order to obtain the drugs. The drugs are so many hence require efficient monitoring of the inventories so as to stem cases of pilferages. In Nakuru the EPOS has been applied in ten chemists at the time of this research.

1.2 Statement of the Problem

Cole (1993) asserts that an efficient inventory management is one the key components for reducing costs in a profit seeking organization. The efficiency of a system is measured in terms of the ratio of the output to input.

Chemists are operated by medically qualified persons and dispense drugs on the Advice/prescription of doctors. Cases of congestion and long queues have been noted in most of the chemists leading to longer waiting time before the patients/consumers are served. This poor speed of the service could be as a result of manual calculations that have to go with the pricing of drugs i.e. retail pricing including mark-ups and tax computations among others.

There is a worldwide trend towards the application of information technology in all spheres of business transaction of which one such application is the installation of the EPOS.

With the general increase in demand for health services coupled with cost sharing in public health institutions most patients/consumers of drugs resort to chemist to obtain the drugs. This necessitates an efficient inventory management by the chemists.

One surest way of having an efficient inventory management system is to install an EPOS system. However, most chemists in Nakuru town do not have in place the EPOS system. Hence the need to evaluate the factors hindering the application of EPOS systems in inventory management and the relationship between EPOS and EOQ model of inventory management as a way of minimizing both total holding and ordering costs.

1.3 Objectives of the study

The main objective of this study was to investigate the factors that hinder the application of Electronic - point - of -sale systems by chemist operators in Nakuru town in managing inventories. The other objectives are:

1. To determine the extent of use of EPOS
2. To identify the main factors that affect the use of EPOS
3. To determine the relationship between EPOS and EOQ

1.4 Hypothesis of the study.

1. The use of EPOS is equally influenced by human, economic and technical factors.
2. There is no significant relationship between the use of EPOS and the use of EOQ model in chemists.

1.5 Importance of the study.

The outcome of this study is expected to benefit the following:

1. The chemist operators- they will be able to keep track of sales, inventory, staff, sales, and tax returns, i.e. VAT, reorder point, profit margins, and inventory cost. This promotes efficiency in inventory management leading to good cash flow and expansion of their business

2. Members of the public- with the application of the EPOS the expansion of the chemist firms is likely to offer employment opportunities, provide enough drug supplies for the town residents leading to poverty reduction.
3. The government - will enable the government to formulate good policies for the health sector in terms of fiscal policies related to the EPOS machines in order to encourage the chemist operators to install them.
4. The suppliers/ manufacturers- since this study is being undertaken at the consumer side the manufacturers of drugs will automatically get the feedback on the turnover of the medicines i.e. demand especially for those chemist operators who use the electronic data interchange (EDI) to procure supplies.

1.6 Scope and Justification of the study

The study was undertaken in Nakuru town. The reason for this is that the town provided an ideal environment in terms of diversity of population which is made up of various ethnic communities, good infrastructure for business, transport network, communication systems, financial institutions, training institutions, and security. The town is the fourth largest in Kenya after Nairobi, Mombasa and Kisumu and doubles as the provincial headquarters of rift valley province which happens to be the largest province in Kenya. It is also centrally located in terms of transport as one connects to various parts of the country.

1.7 Limitations.

While undertaking this study a number of constraints included suspicion from the chemist operators who did not take this study seriously. This means that the researcher had to take a lot of time explaining the various parts of the questionnaire one by one leading to inadequate time available. The researcher had also financial constraints.

1.8 Definition of terms.

Economic order quantity - That particular quantity which if ordered every time the inventory is replenished will minimize the total annual cost of ordering and carrying the inventory.

Electronic point - of sale (EPOS). An electronic device, which consists of a numerical keypad and a few control or function keys. The item code quantity and the price of the goods purchased by the customer are entered into the EPOS terminal directed by the operator. The terminal produces customer receipts further the details of the sale are entered directly to a baking storage device and the stock level is also automatically decreased.

Lead-time - Time (usually measured in days / weeks) required for inventory to arrive after an order is placed.

Reorder point - The inventory level at which it is appropriate to replenish the stock

Safety stock - Extra inventory held against the possibility of stock - out.

Chapter 2: Literature Review

2.1 Introduction

According to Leenders M.R., Fearon H.L, and England W.B (1989) inventory management is complicated by the rapidly changing environment within which inventory management and purchasing planning is carried out. The purposes for which inventories exist include:

1. To provide and maintain good customer service.
2. To smooth the flows of goods through the productive process.
3. To provide protection against the uncertainties of supply and demand.
4. To obtain a reasonable utilization of people and equipment.

2.2 Historical Literature.

A number of writers have argued that for every item carried in inventory, the cost of having it must be less than the cost of not having it. Inventory exists for this reason mainly. The main types of inventory costs include:

1. Carrying, holding or possession costs - These include handling charges; the cost of storage facilities of warehouse rentals, the cost of equipment to handle inventory, storage , labour, and operating costs, insurance premiums, breakage, pilferage, obsolescence, taxes, and investments or opportunity cost.
2. Ordering or purchasing costs:-These include the managerial, clerical, material, telephone, mailing, accounting, transportation, inspection, and receiving costs associated with a purchase or production order.
3. Set up costs: - These refer to all the costs of setting up a production run. Set up

costs may be substantial. They include such learning related factors as early spoilage and low production output until standard rates are achieved as well as the more common considerations such as set up employees wages and other costs, machine down time, extra tool wear, parts (and equipment) damaged during set up and so on. Both the purchases and vendors set up costs are relevant.

4. Stock out costs: - These are the costs of not having the required parts or materials on hand when and where they are needed. They include lost contribution on lost sales (both present and future), change- over cost necessitated by the shortage, substitution of less suitable or more expensive parts or materials, rescheduling and expediting costs, labour and machine idle time and so on. Often customer and user goodwill may be affected and occasionally penalties must be paid.
5. Price variation costs- Vendors often offer items in larger quantities at price and transportation discounts. Purchase in small quantities may result in higher purchase and transportation costs but buying in larger quantities may result in significantly higher holding costs.

According to Britney R.R (1971), the following classification of inventory function reveals the multi purpose roles played by inventories:

1. Transit or pipeline inventories: - These inventories are used to stock the supply and distribution pipelines, linking an organization to its suppliers and customers as well as internal transportation points. They exist because of the need to move material from one point to another.
2. Cycle inventories: - These stocks arise because of management decisions to

purchase, produce, or sell in lots rather than individual units or continuous. Cycle inventories accumulate at various points in operating systems. The size of the lot is a trade off between the cost of holding inventory and the cost of making more frequent orders and / or setups. This is reflected through Economic Order Quantity.

3. Buffer inventories: - Buffer inventories also called safety stocks, exist as a result of uncertainties in the demand or supply of units at various points in the production system. Raw material buffer stocks give some protection against the uncertainties of supply performance due to shutdowns, strikes, lead time variations, late deliveries to and from the supplier, poor quality units that cannot be accepted, and so on. Work- in - progress buffer inventories protect against machine breakdown, employee illness and so on.
4. Anticipation inventories: - Anticipation stocks are accumulated for a well defined future need. They differ from buffer stocks in that they are committed in the face of more certainty and an excellent example.
5. Decoupling inventories: - The existence of decoupling inventories at major linkage points makes it possible to carry on activities in each side of the point relatively independently to each other. The amounts and locations of raw material, work in progress and finished goods decoupling inventories depend on the costs and increasing operating flexibility benefits of having them.

2.3 Empirical Literature

Uses of inventory model on drugs by the chemists have attracted few writers. Locket (1984) while trying to explain the variance between literature on modeling and implementation suggested that the scenario may be due to the fact that organizations with successful application of inventory control model did not wait to broadcast the fact in order to stay ahead of competitions.

This actually means that what we mostly have in literatures are contributors in the health sector.

Kendall (1985) considered blood inventory control in the United States of America. The model included goal constraints related to inventory levels of availability of blood, blood outdating, the age of blood and the cost of collecting it. He concluded that blood inventory problem is more complex as it involves multiple objectives, multiple inventories and perishability of blood.

Odeny (1987) in a study carried out came up with an inventory model for Kenyatta National hospital. He found that the lead-time and demand size of the majority of the drugs portrayed a unique pattern characterized by remarkable fluctuations. He showed that there was no standing inventory policy at K.N.H.

The pattern of demand, which a particular drug showed, is governed by such factors as:

(i) Disease pattern

(ii) Availability of close substitutes

(iii) Complementary effects.

He noted that uneven demand for drugs at K.N.H and lack of utilization of inventory models contributed to drug stock outs.

Kariuki (1993) has also shown how inventory model can be used in the health sector in university health services. He found that there was minimal drug expiry in Nairobi University health services department but shortage was common phenomena. The shortages were due to lack of enough capital to purchase drugs and non-application of inventory model in managing drug inventory.

Gathumbi (1997) found out that application of inventory models is difficult in that payments to suppliers are irregular and hence they refuse to supply drugs due to non-payments. He concluded that the operation research models as they have been developed in western world cannot be applied as they are in developing countries. He identified the constraining factors to their application as lack of awareness on how best to use the models and also lack of the basic equipments like computers to keep track of the required data, which is a prerequisite in inventory models utilization. He suggested further research on the analysis of inventory management by means of simulation due to the variation of the demand, price and lead-time.

General Electric Company some years back came up with the ABC analysis. ABC stands for Always Better Control. In their study they found out that out of a large range of inventory, 10% or so account for 70% -80% of the annual inventory usage value whereas a relatively small inventory usage value of say, only 5% is contributed by the bulk, say 70% of the items in inventory. In effect we may name - High Usage value items - A items could be that group of items which account for 70% to 75% of the usage value of inventories, medium usage value items 15% to20% of usage value of inventory and low usage value- C Items would be remaining group of items. This analysis is also referred to as Pareto Analysis.

Srivastava, Shenoy and Sharma (1998) assert that ABC analysis gives deeper cost perspective to management and enables them to decide upon priorities in improvement or cost reduction programme. It prevents wasting of time and energy in making improvements where improvement yields marginal benefits (for example type C items). It reinforces the "Management - by - Exception" theory by bringing out the "exception" items on a quantitative rather than to vague explanations.

Satir, A & Cengis, D carried out a research in medicinal inventory control in a health center. They contend that inventory control is also a major concern in the service industries, the health sector being one of them. They argue that adequate control of stock levels of medicines and other medical supplies not only secure smooth functioning of the health service, but also contribute in restoring and preserving the well being of patients.

In another study by Afaf El-Dash (1989) he considered the problem of storing goods with limited life such as oxygen for breathing. In his study the aim was to determine;

1. The optimum rate of supply for limited life items (oxygen bottles in this case), which are stored and /or,
2. The optimum number of bottles from a source to storage, according to priorities, such that the cost of items which expire and the cost revenue is minimum.

Since storage life of an oxygen bottle is 3 months, after which the bottle has to be recharged and hence to the decision maker, the aim was to determine a policy, which minimizes the number of bottles, which has to be recharged, while ensuring that the store has enough bottles for the requirements of the users.

To solve this problem, an inventory of oxygen - bottle problem was formulated as

1. An (M/M/C): (GD/N) queuing model with different serving rates,
2. A probabilistic goal programming model.

The first model was to give an optimum required rate for oxygen bottles to be stored, while the second model was to determine the policy that minimizes the total costs.

Determination of safety stock is a problem as it increases the holding costs and writing in the Harvard Business Review, Consultant John Magee (1956) summarized the situation concisely that, the objective is to arrive at a reasonable balance between the cost of carrying the stock and the protection against inventory exhaustion. Since exhaustion becomes less likely as the safety inventory increases, each additional amount of safety inventory characteristically buys less protection. The return from increasing inventory balances therefore diminishes rapidly.

So the question is: How much additional inventory as safety stock can be economically justified?

In those cases where the decision maker is confronted with decision making under uncertainty two approaches are commonly employed for inventory control and these are:

1. Holding the lot size constant by using the formula while varying the times between the placement order, or
2. Holding the time between the placements of orders constant while varying lot size.

Most chemists have either of the two approaches depending on their annual demand for drugs.

Wild (1986) contends that many companies subject all, purchased or produced, irrespective of their value, usage or quantity, to the same type of stock control procedure. He asserts that such a policy can be a waste of time and effort.

Ghare (1974) developed a simple economic order quantity model with constant rate of decay. This model took into account the impact of already deteriorated items that are received into inventory systems as well as those items which may start deteriorating in the future. This model is highly applicable in developing countries where the drugs inventories are composed of locally manufactured drugs and imported ones (Odeny, 1987). The local manufactured drugs start deteriorating in the future while the imported ones may take time to arrive in these countries and they are received when they have already deteriorated.

An EPOS system is a computerized way to maintain a retail business. The retailer can keep track of the sales, inventory, staff, VAT, etc., using the computerized EPOS system. The computers (or the stations) replace the existing manual tills (or cash registers) where the sales and inventory operations are controlled from a central location (the back- office server).

Each sale station includes a screen (or the monitor) for displaying and modifying the sales details, customer display, barcode scanner, cash drawer, and a keyboard for entering sales details.

Optionally, one can add a weighing scale, credit card terminal, etc.

The back-office server is used for maintaining the EPOS system, for example, for entering product information, maintaining staff and getting sales reports.

The back-office server and the sales stations connected by the network make up a complete EPOS system. A computerized EPOS system is infinitely more flexible than a manual cash register. Maintenance of sales and inventory not only became easier, they will be more accurate as well. The retailer can evaluate the performance of the business (for example, in terms of sales value, sales volume, profits, VAT, etc.) at the touch of a button. Since everything is centralized, maintaining multiple sales stations become much simpler. The shopkeeper does not have to programme each cash station separately as in the case of old cash registers. With EPOS system it is possible to generate professional looking receipts, invoices and reports improving the business' image among customers. Very importantly, EPOS systems improve staff productivity and reduce waste and fraud. With such flexibility and convenience, the retailer can concentrate on the business, rather than on maintaining the cash registers. In a word, "YES". Because of its flexibility (as explained earlier) an EPOS system is much better than a manual cash register. The initial investment might appear to be high (Note: Max POS offers advanced high-quality EPOS systems at very low prices)

However, the investment pays for itself by improving staff productivity and by reducing waste and fraud. It varies by the software offered by different EPOS vendors.

Right from the beginning, Max POS software was designed with feedback from people who have been in the retail business for decades. Max POS was developed with ease of use and reliability as the two most important criteria.

EGERTON UNIVERSITY LIBRAR.

With such design goals, about 30 minutes is enough to train the sales staff on MaxPOS terminal and conduct sales in minutes.
To train the management staff to maintain the MaxPOS system (to enter product information, maintain inventory, control staff and to obtain reports), about 3 hours of training is needed. Ease of use, speed, flexibility, reliability, upgradeability and, of course; price should be the deciding factors.

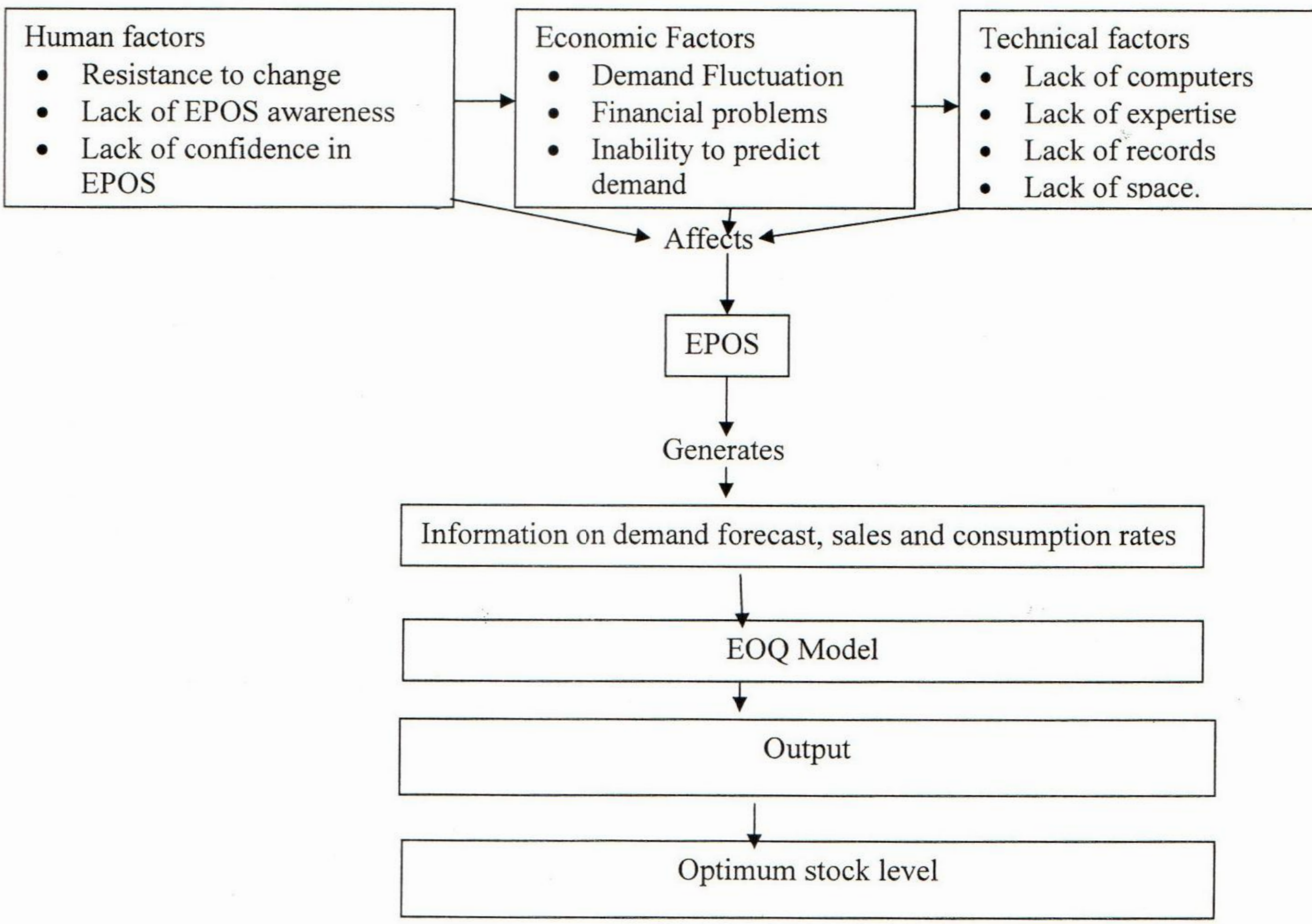
The EPOS system should not slow down the sales process. This is especially important for small convenience stores where many customers purchase only one or two items. MaxPOS is designed to complete sales with the minimum number of keystrokes speeding up the sales process. MaxPOS is very intuitive to use, making it easier for the sales staff to learn.

Flexibility is an important concern as well. The retailer should be able to modify different aspects of the EPOS system (for example, payment methods, returns, voids, etc.). Middleton (2004) links EPOS to XML (extensible mark- up Language, an electronic communications technology) .He says in effect, purchase orders can leave one enterprise resource planning (ERP) system as soon as they are authorized and seamlessly enter another as a sales order. Changes to orders can be sent immediately if an ERP system and EPOS system detects unusual demand and needs the supplier to react immediately.

XML enable files from a finance system, say, to be readily sent from one party to another without any manual intervention or fixed link. Neither system needs to understand the other. These extract are "fully describing", which means they carry descriptions of what they are and what they contain. So the receiver can accept the message without worrying about communicating with it.

2.4 Conceptual/ Theoretical Framework

Figure 2: A framework showing the factors related to EPOS installation.



Source: Own 2003

The framework conceptualizes that human, economic, and technical factors influence application of EPOS. This gives rise to high rate of information generated which reduces information asymmetry, and the adequate information will minimize total cost i.e. total holding costs and total ordering costs leading to maximum profits.

Chapter 3: Research Methodology

3.0. Introduction:

In this chapter the researcher looked at the target population; the sample and sampling design, data Collection method, and the analytical model.

3.1 Research Design

This study was undertaken by a case study. A case study is an in-depth investigation of an individual, group, institution or phenomenon. The case under study was viewed as a typical example of retail outlets, which have failed to install EPOS systems in inventory management.

The case study was chosen because it was believed that it could help in determining the relationship between the use of EOQ model and the installation of EPOS system and would provide more detailed explanation in prioritizing the factors that hinder the installation of EPOS in the chemists.

3.2 The Target population

The study was conducted on the chemists firms operating within Nakuru Municipality. According to the information obtained from the provincial pharmaceutical technologist the chemist operators registered with his office are 56 in number. The expected respondents were managers of those chemist firms in the name of the manager, managing director or shopkeeper. Nakuru town was chosen due to the diversity of the population in the town, convenience in terms of accessibility since it lies on the main highway that links the main ports of Mombasa through Nairobi to the western parts of Kenya.

Also time schedule and financial resources available to the researcher was another important consideration. According to the information obtained from the government of Kenya, the population of Nakuru town stood at 219,399 persons.

3.3 The Sample and Sampling Design

Owing to the geographical distribution and the diversity of chemists it was not possible to study all of them. The researchers therefore took a sample of thirty (30) chemists. This sample was selected using stratified random sampling technique where all chemists were stratified on the basis of the streets and a proportional sample picked in the following manner:

Figure 3: Table showing samples per street

	Name of Street	No. of chemists	No. selected (sample)
1.	Kenyatta Avenue	15	8
2.	Mburu Gichua	12	6
3.	Oginga Odinga	7	4
4.	Gusii Road	4	2
5.	Kanu	9	5
6.	Others	9	5
	Total	56	30

Source: Own 2003

Kenyatta Avenue = $^{15}/_{56} \times 30 = 8$

Mburu Gichua = $^{12}/_{56} \times 30 = 6$

Oginga Odinga = $^{7}/_{56}$ x 30 = 4

Gusii Road = $^{4}/_{56}$ x 30 = 2

Kanu street = $^{9}/_{56}$ x 30 =5

Others = $^{9}/_{56}$ x 30 = 5

3.4 Data Collection Instruments/Method

This study used primary data. A structured questionnaire was designed by the researcher. The questionnaire was then pretested by distributing copies to colleagues in the MBA class of Egerton University with the aim of improving in terms of clarity and flow.
The final copy of the structured questionnaire was administered by the researcher to the operators of the identified chemists in Nakuru town with a view to collect the required data. This was done through self administration coupled with face to face guidance given to the respondents in cases where they required explanations.

3.5 Analytical Model

For hypothesis (1) the classification of factors and their importance was done using factor analysis. In factor analysis we assume that each of the variations we have is made up of linear combinations of common factors (hidden factors that affect the variable and possibly affect other variables) and a specific component unique to the variable.
The total variation in the data in factor analysis is composed of the common factor component, called the communality and the specific part, due to each variable alone.

VARIABLES

i) Human factors.

1. Resistant to change from manual to electronic
2. Lack of EPOS awareness
3. Lack of confidence in EPOS

ii) Economic factors

4. Demand fluctuation
5. Financial problems
6. Inability to predict demand

iii) Technical factors

7. Lack of computers
8. Lack of expertise
9. Lack of proper records
10. Lack of space for installation

Hypothesis 2 was tested using chi- square test of association. The following contigency table was used

Figure 4: Installed EPOS and the use of EOQ model.

Count	The use of EOQ model		Total
	Yes	No	
Installed Yes	X_{II}	X_{I2}	
EPOS No	X_{2I}	X_{22}	
Total			

Source: Own 2003

Where X_{II} stands for those chemists who use both EPOS and EOQ

X_{I2} stands for those chemists who use EPOS and not EOQ

X_{2I} stands for those chemists who use EOQ without EPOS

X_{22} stands for those chemist who do not use both EPOS and EOQ

This can be analyzed as follows:

n_{ij} $\quad$ n_{ij}^2 $\quad$ $n_{io} \times n_{oj}$ $\quad$ $\frac{n_{ij}^2}{n_{io} \times n_{io}}$

i.e. $X^2 = \sum_{1}^{k} \frac{f^2_{io}}{f_{ie}} - n$

Where n is the total expected frequency and $\sum f_{io} = f_{ie} = n$.

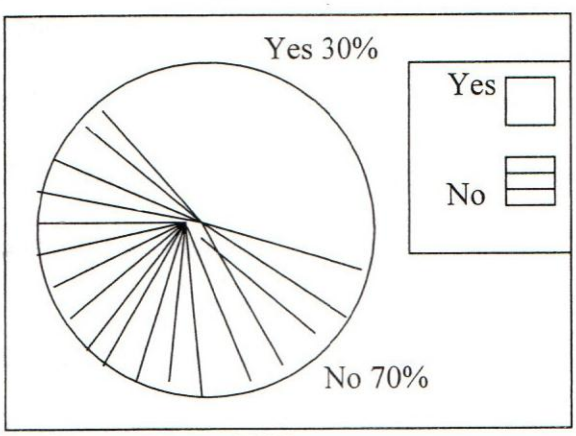
Chapter 4: Data Analysis and Presentation of Research Findings

4.1 Outcome of factors by strength

The research questionnaire was successfully administered and the response rate was 100%. Out of the sample interviewed it was found out that only 30% had installed the EPOS system in their chemists and the rest 70% had not.

This can be explained in the following pie chart:

Figure 5: A pie chart showing Installed EPOS



Source: Own, 2003

Several factors were advanced by the respondents as the main causes of hindrance to the installation of EPOS systems in their chemists of which they were ranked in the order of strength i.e. Strong, moderate or weak.

Among the strongest factors hindering the installation of EPOS system in chemists included lack of computers. The order of strength in this category was strong (46.67%) moderate (10%) and weak (13.3%).

This can be depicted as follows:

Table 1: Lack of computers

Response	Frequency	Percent
Strong	14	46.67
Moderate	3	10.00
Weak	4	13.33
EPOS	9	30.00
Total	30	100.00

Source: own, 2003

Fluctuation in demand for drugs as a hindering factor accounted for strong 6.67% moderate 23.33% and weak 33.33% with EPOS 36.67%.

This can be explained as follows:

Table 2: Fluctuation in demand

Response	Frequency	Percent
Strong	2	6.67
Moderate	7	23.33
Weak	10	33.33
EPOS	11	36.67
Total	30	100.00

Source: own, 2003

To some chemists, financial problems were a key factor hindering the installation of EPOS systems in their drug inventory management. This was found out as strong cases 43.33% moderate 23.33%, and weak 3.33%. The tendency in this case was towards the strong case.

This can be depicted in the following table.

Table 3: Financial problem

Response	Frequency	Percent
Strong	13	43.33
Moderate	7	23.33
Weak	1	3.33
EPOS	9	30.00
Total	30	100.00

Source: own, 2003

Lack of personnel expertise by the operators of some chemists was also observed as a factor hindering the installation of EPOS systems. The findings were that those who were strongly influenced by this factor accounted for 33.33%, while in moderate cases were 30% and weak 3.33%.

This can be reflected in the following table:

Table 4: Lack of personnel expertise

Response	Frequency	Percent
Strong	10.00	33.33
Moderate	9.00	30.00
Weak	1.00	3.33
EPOS	10.00	33.33
Total	30.00	100.00

Source: own, 2003

Operators of some chemists who were used to manual computations were influenced by the resistance to change from manual to electronic as a hindering factor. In the analysis strong cases accounted for 13.33%, moderate 6.67% and weak 50%.

This can be depicted by the following table:

Table 5: Resistance to change from manual to electronic

Response	Frequency	Percent
Strong	4.00	13.33
Moderate	2.00	6.67
Weak	15.00	50.00
EPOS	9.00	30.00
Total	30.00	100.00

Source: own, 2003

In other chemists there was lack of proper records to give the required demand rate. Hence this became a hindrance and the response was that strong cases observed were strong 40%, moderate 10%, and weak 16.67%. This can be depicted as follows:

Table 6: Lack of proper records

Response	Frequency	Percent
Strong	12.00	40.00
Moderate	3.00	10.00
Weak	5.00	16.67
EPOS	10.00	33.33
Total	30.00	100.00

Source: own 2003

In other chemists the operators were not able to predict demand adequately. In the sample studied strong cases accounted for 40%, moderate cases 10%, and weak cases 16.67%. This was reflected in the table below:

Table 7: Inability to predict demand

Response	Frequency	Percent
Strong	3	40.00
Moderate	5	10.00
Weak	13	16.67
EPOS	9	33.33
Total	30	100.00

Source: own 2003

Lack of space for installation of the EPOS system in the chemists also became another reason why some of the chemists had not installed the EPOS systems. In the sample studied strong cases constituted 10%, moderate case 16.67%, and weak cases 43.33%. This would be depicted as follows:

Table 8: Lack of space for installation

Response	Frequency	Percent
Strong	3	10
Moderate	5	16.66667
Weak	13	43.33333
EPOS	9	30
Total	30	100

Source: own.2003

Lack of awareness of the existence of the EPOS systems was seen as yet another reason why the chemist could not install the EPOS systems. Out of the sample studied 36.67% were very strong cases, 16.67 moderate and 16.67 weak cases.

This would be depicted as follows:

Table 9: Lack of awareness of the existence of EPOS

Response	Frequency	Percent
Strong	11.00	36.67
Moderate	5.00	16.67
Weak	5.00	16.67
EPOS	9.00	30.00
Total	30.00	100.00

Source: own, 2003

Some of the chemists studied lacked confidence in the accuracy of the EPOS systems and were not ready to install them. In the sample strong cases were 13.33%, moderate 16.67% and weak 43.33%. This would be depicted as follows:

Table 10: lack of confidence in the accuracy of EPOS

Response	Frequency	Percent
Strong	4.00	13.33
moderate	5.00	16.67
weak	13.00	43.33
EPOS	8.00	26.67
TOTAL	30.00	100.00

Source: Own, 2003

4.2. Analysis of the frequency tables.

The positions of the respondent's studied were classified into three main groups namely: 1. Managing Director (MD) 2. Managers and 3. Others such as superintendents in charge. The response was managing directors accounted for 13.3%, Managers 43.3% and others 43.3% with validity of the same sequence. This was presented in the following frequency table:

Table 11: Position of respondents

	Freque ncy	Percent	Valid Percent	Cumulative Percent
Valid MD	4 13	13.3 43.3	13.3 43.3	13.3 56.7
Manager	13 30	43.3	43.3	100.00
Others		100.00	100.00	
Total				

Source; own 2003

The order size each time an order is placed for drugs in cartons was grouped in the order of 0 to 5 cartons, 6 to 10 cartons and over 10 cartons. The findings were that 36.7% of the sample were in the category of 0 - 5 cartons, 26.7% in the category of 6 - 10 cartons and the rest 36.7% comprised of those ordering over 10 cartons each time the order is placed. This was depicted in the following table.

Table 12: Order size

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0-5	11 8 11	36.7	36.7 26.7	36.7 63.3
6-10	30	26.7	36.7 100.0	100.0
Over 10		36.7		
Total		100.0		

Source; own 2003

On the average duration taken between the time/date the order is placed and the arrival of the consignment in days, it was found out from the sample that 80% took 0 - 14 days while the rest 20% took 15 to 28 days. So the frequency in the 0 to 14 days was higher as compared to the 15 to 28 days. This was depicted in the following table.

Table 13: order duration between placing and arrival

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 0-14	24 6 30	80.0	80.0 20.0	80.0 100.0
15-28		20.0	100.0	
Total		100.0		

Source; own, 2003

Some chemist operators were already using the EOQ model when placing an order for supply of drugs. Out of the sample studied 36.7% were found to have installed EOQ model and were using the same to place the orders for the drugs from the suppliers. The rest 63.3% had not done so. This would be reflected in the table below:

Table 14: The use of EOQ model in placing order

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	11 19 30	36.7	36.7	36.7 100.0
No		63.3	63.3	
Total		100.0	100.0	

Source: own, 2003

In the method of inventory management used by the chemists, it was found out that 6.7% still relied on the use of stock cards, 10% were using EPOS systems while others categories accounted for 20%. The number that had not applied EOQ model amounted to 63.3% of the whole sample studied. This can be depicted as follows:

Table 15: Method of inventory management.

Responses	Frequency	Percent
Stock cards	2.0	6.7
EPOS	3.0	10.0
Others	6.0	20.0
No EOQ	19.0	63.3
Total	30.0	100.0

Source: own2003

While investigating on the average profit margin per drug consignment in percentage terms the findings was that of the sample studied 23.33% were obtaining in the category of 11 to 15 whereas 13.33% was in the category of 16 to 20 and of course this was without EOQ model. This would be depicted in the following table:

Table 16: Profit margin per drug consignment %

Responses	Frequency	Percent
11-15	7.00	23.33
16-20	4.00	13.33
No EOQ	19.00	63.33
Total	30.00	100.00

Source: own, 2003

For the chemists that had installed the EPOS system the mean was found to be 1.7 with a standard deviation of 0.466, whereas the position of the respondent had a mean of 2.3 with the standard deviation of 0.702. Of all the factors listed as causes of hindrance to the installation the EPOS system in the chemists, financial problems had the least mean of 1.429 whereas lack of proper record had the highest mean of 2.762, and the lowest standard deviation. Inability to predict demand as a factor had the highest standard deviation of 0.875. The other variables studied assumed varying levels of mean and standard deviation which all together with the above is depicted in the following table.

Table 17: Table showing the descriptive statistics of variable studied

Variables	N	Minimum	Maximum	Mean	Std. Devi
Position	30	1	3	2.300	0.702
Installed EPOS	30	1	2	1.700	0.466
Demand Fluctuation	19	1	3	2.421	0.692
Lack of computers	21	1	3	1.524	0.814
Financial problems	21	1	3	1.429	0.598
Lack of expertise	20	1	3	1.550	0.605
Resistance to change	21	1	3	2.524	0.814
Lack of proper records	21	1	3	2.762	0.539
Inability to predict demand	20	1	3	1.650	0.875
Lack of space for installation	21	1	3	2.476	0.750
Lack of EPOS awareness	21	1	3	1.714	0.845
Lack of confidence in EPOS	22	1	3	2.409	0.796
Order size	30	1	3	2.000	0.871
Order duration between placing and arrival	30	1	2	1.200	0.407
The use of EQQ model in placing order	30	1	2	1.633	0.490
Annual stock holding	11	1	3	1.909	0.944
Annual ordering cost	11	1	3	1.545	0.688
Quantity of drugs sold in 2002 (cartons)	11	2	3	2.545	0.522
Method of Inventory Management	11	1	3	2.364	0.809
Profit margin per drug (%)	11	2	4	3.364	0.505

Source: own, 2003

The factors for the hindrance to the installation of the EPOS systems were therefore summarized as follows:

Table18: Table showing the factors variation why EPOS is not used

Variables	Strong	Moderate	Weak
Fluctuation in demand	6.7	23.3	33.3
Lack of computers	46.7	10	13.3
Finance	43.3	23.3	3.3
Expertise	33.3	30	3.3
Resistance	13.3	6.7	50
Lack of records	3.3	10	56.7
Unpredicted demand	40	10	16.7
Space	10	16.7	43.3
EPOS awareness	33.7	16.7	16.7
EPOS confidence	13.3	16.7	43.3

Source: own, 2003

4.3. Testing of Hypothesis

The testing of Hypothesis was done by factor analysis for hypothesis 1 and chi-square as a test of association for hypothesis 2.

Hypothesis 1: The use of EPOS is equally influenced by human, economic and technical factors. This was analyzed as follows:

VARIABLES	FACTOR LOADINGS		
ii) Human factors.	1	2	3
4. Resistant to change from manual to electronic	0.1333	0.067	0.5
5. Lack of EPOS awareness	0.367	0.167	0.167
6. Lack of confidence in EPOS	0.133	0.167	0.433
ii) Economic factors			
4. Demand fluctuation	0.667	0.233	0.333
5. Financial problems	0.433	0.233	0.033
6. Inability to predict demand	0.40	0.10	0.167
iii) Technical factors			
11. Lack of computers	0.467	0.10	0.13
12. Lack of expertise	0.333	0.30	0.033
13. Lack of proper records	0.40	0.10	0.167
14. Lack of space for installation	0.10	0.167	0.433

Hence communality of the factors can be compiled as follows:

1. Resistance to change

$= (0.133)^2 + (0.067)^2 + (0.5)^2$

$=0.272$

2. Lack of EPOS awareness

$= (0.367)^2 + (0.167)^2 + (0.167)^2$

$= 0.19$

3. Lack of confidence in EPOS

$= (0.133)^2 + (0.167)^2 + (0.433)^2$

$=0.233$

4. Demand fluctuation

$= (0.667)^2 + (0.233)^2 + (0.333)^2$

$=0.61$

5. Financial problems

$= (0.433)^2 + (0.233)^2 + (0.033)^2$

$=0.242$

6. Inability to predict demand

$= (0.40)^2 + (0.10)^2 + (0.167)^2$

$=0.197$

7. Lack of computers

$= (0.467)^2 + (0.10)^2 + (0.13)^2$

$=0.245$

8. Lack of expertise

$= (0.333)^2 + (0.30)^2 + (0.033)^2$

$=0.2$

9. Lack of proper records

$= (0.40)^2 + (0.10)^2 + (0.167)^2$

$=0.197$

10. Lack of space for installation

$= (0.10)^2 + (0.167)^2 + (0.433)^2$

$= 0.225$

From the above variables it can be interpreted as follows:-

Variable 1- 27.2% of the variation in the values of variables is explained by the three levels of strength.

Variable 2- 19% of the variation in the values of variables is explained by the three levels of strength.

Variable 3- 23.3 % of the variation in the values of variables is explained by the three levels of strength.

Variable 4- 61% of the variation in the values of variables is explained by the three levels of strength.

Variable 5- 24.2 % of the variation in the values of variables is explained by the three levels of strength.

Variable 6- 19.7 % the variation in the values of variables is explained by the three levels of strength.

Variable 7- 24.5% of the variation in the values of variables is explained by the three levels of strength.

Variable 8- 20% of the variation in the values of variables is explained by the three levels of strength.

Variable 9- 19.7 % of the variation in the values of variables is explained by the three levels of strength.

Variable 10 - 22.5 % of the variation in the values of variables is explained by the three levels of strength.

Hypothesis 2: hypothesis 2 was tested using chi-square as follows:

n_{ij}	n_{ij}^2	n_{io} x n_{oj}	$\frac{n_{ij}^2}{n_{io} \times n_{io}}$
6	36	11 x 9 = 99	0.36
5	25	11 x 21 = 231	0.11
3	9	9 x 19 = 171	0.05
16	256	19 x 21 = 399	0.64
			1.16

Therefore chi- square = 30 x 1.16 - 30 = 4.8

The degree of freedom = (2-1) x (2-1) = 1.

At 5% level of significance with I degree of freedom, the value of chi- square is 9.488 and so the null hypothesis is proved as stated.

Coefficient of Contingency

In order to find out the association between the two attributes in this study i.e. EPOS and EOQ, the coefficient of contingency will be computed as follows:

$$C = \sqrt{\frac{X^2}{N + X^2}}$$

$$= \sqrt{\frac{4.8}{34.8}}$$

= 0.371

The upper limit of C for a 2 x 2 contingency table is 0.707. Hence this suggests that there is a moderate association between the two items in this study.

Chapter 5: Conclusions, Recommendations and Suggestions

5.1 Introduction.

Most business enterprises tend to adopt the use of information technology (IT). Information technology is a general expression covering computers, telecommunications and electronics. Much of the expenditure incurred by the organizations on computers and IT is mainly on relatively routine data processing applications, particularly in financial area and in operational control systems such as stock control.

These traditional data processing systems which are often highly sophisticated and complex perform the essential role of processing the day - to -day transactions and provide much of the data from which management information can be prepared. Of particular interest in types of system of using IT is the data processing area which is computer and electronic based systems for recording, processing, and reporting on the day-to -day activities of the organization. Examples here include ledger keeping, payroll. barcodes, EPOS, and automatic teller machines. Since EPOS systems basically relies on the use of computers it enhances rapid and accurate calculations of values.

5.2 Application of the findings.

This study focused on the chemists. They were identified and studied because they handle many and various product lines from different manufacturers of which pricing and stock control with computations of profit margins are highly necessary. Out of the sample studied 70% was found not to have installed the EPOS systems in managing their drug inventory.

Various reasons were identified of which the leading factor was that related to lack of computerized systems in their chemists. This is because computerization is a prerequisite for data processing and hence this validates the reason. Other factors include fluctuations in demand for product, financial problems, lack of personnel expertise by the chemist operators, resistance to change from manual to electronic, lack of proper records to give the required demand, inability to predict demand by the chemists, lack of space for installation, lack of awareness of the existence of EPOS, and lack of confidence in the accuracy of EPOS systems which received the lowest ranking.

On the other hand 30% of the sample studied was found to have installed EPOS systems in their chemists. This category relatively enjoyed higher level of accuracy in managing their drug inventory as reflected in pricing, profit margin calculations and even turnover reports.

5.3 Recommendations

The finding of this study was that 70% of the sample had not installed the EPOS systems in their chemists. The EPOS system has apparent advantages in the form of faster and speedy calculation of values with much accuracy which means enhanced data processing. The management information systems enhances data processing.

The management information systems as a financial management tool require feedback and feed forward readily available to enable informed decision making at all the three levels of organization structure, namely: operational level, tactical level and strategic (top) level. Hence the hindering factors notwithstanding, the researcher highly recommends that the chemists which have yet to install the EPOS systems in their drug stores should do it in order to reap the benefits of the method.

This would translate for them into accurate pricing of the drugs calculations of the profit margins and production of financial and management reports as and when required leading to expansion and growth of their business. This would nationally lead to creation of employment opportunities and reduce waiting time for the customers in chemist shops.

5.4. Suggestions.

This was an exploratory research into EPOS systems in management of drug inventory. The findings above do give some need for further research in the field of the computerized application in financial areas such as Material Requirement Planning (MRP) in production. In particular the researcher would suggest further research in the following areas:

i. Application of EPOS in promoting the Just-in-time (JIT) systems

ii. Application of the EPOS systems in the Material Requirement Planning (MRP) in retail enterprises.

The above is likely to give further insight in the use of EPOS systems in business enterprises.

References.

Afaf el-dash,"Two probabilistic model for solving an oxygen - Bottle inventory problem"JORS Vol. 40 No. 11 pp961 - 969 -1989.

Amoro Yobesh. Inventory Optimization: Determining major inventory parameters into the cases of hops at the KBL. Unpublished MBA project (Nairobi) 1991.

Aseto B.B.O, Marketing Strategies Used by Multinational Pharmaceutical Companies to harmonize the conflict between maximization profits and maintaining social responsibility in the marketing of social related disease Therapies. The case of HIV/Aids drugs in Kenya. Unpublished MBA project (Nairobi) 2002.

Britney R.R "Inventories: their functions, forms, and control", paper presented to the Canadian Association for Production and Inventory Control, May 1971

Cole, G.A Management- Theory and Practice, Fourth Edition1993, DP Publications Ltd.

Daft, Richard L. Management, 1988 edition, The Dryden Press, 1988.

Gathumbi S.N Application of Inventory Models in Drug Inventory Management; the case of Nairobi City Council (NCC) Health Services.Unpublished MBA project (Nairobi). 1997

Ghare and Schrader," A model for exponential Delay inventories, Journal of Industrial Engineering Vol. 14, 1974 pp 238 - 243.

Gilbert, David, Retail Marketing Management, 1999 Edition, Pearson Education Ltd.

Irayah, C.M. Forecasting Demand in Health Services: A case study of University of Nairobi clinics. Unpublished project, 1993

Kariuki, James Thuo.Drug Inventory management, Acase study of University of Nairobi Health Services unpublished MBA project, 1993

Kendall, E.K and Lee, S.M, Formulation of Blood relation policies with multiple objectives. Journal of the Institutes of Management Science, 1982.

Leenders, M.R., Fearon, H.E and England, WB, Purchasing and Materials Management, town publications, 1989.

Lowe, M and Wrigley, N Retailing Consumption and Capital: Towards the new retail geography, 1996 Edition, Harlow, Essex; Longman.

Lucey, Terry, Management Accounting 1994, DP Publications.

Magee, J.F."Guide to inventory policy" Haward Business Review, Jan-Feb 1956.

Middleton, Alastair, "Supply Management Magazine", the chartered Institute of Purchasing and Supply (UK), February 2004.

Mugenda, O.M and Mugenda, AG- Research Methods, Quantitative and Qualitative Approaches 1999.

Pandey, I.M. Financial Management 2002, Vikas Publishing House Pvt Ltd.

Satir, A & Cengis, D "Medicinal Inventory Control in a University Health Center."JORS, Vol.38, No.5 pp 387 -395, 1987.

Srivastava, U.K, Shenoy, GV and Sharma, S.C Quantitative Techniques for Managerial Decision, 1991

Thierauf, R. J. and Klekamp, Decision Making Through Operations Research, 2nd Edition,John Wiley and Son Inc, New York, 1975;

Wild, R, Production and Management Principle and Techniques, Holt, Rinchart and Winston Ltd, 1986.

William, A. Odeny, Drug Inventory Management: Case for Kenyatta National Hospital. Unpublished MBA project (Nbi) 1987.

Questionnaire

Dear respondent,

My name is Fredrick Ndede, an MBA student at Egerton University. I am carrying out a management research project as partial fulfillment of the requirements for the award of A Master of Business Administration (MBA). The topic of this study is AN EVALUATION OF THE USE OF ELECTRONIC - POINT - OF SALE SYSTEM IN INVENTORY MANAGEMENT. A CASE OF CHEMISTS IN NAKURU TOWN.

I kindly request you to provide the required information to the best of your knowledge. The information you provide will be kept confidential and only used for academic purposes.

Background Information

1. Name of the chemist
2. Position of the respondent

   Managing Director ☐ Manager ☐ Others ☐

3. Have you installed EPOS in your chemist?

   Yes ☐ No ☐

   If yes, go to question 12 onwards.

4. If No, from the following factors tick (√) only those that hinder the installation of electronic - point - of -sale system in drug inventory management in your chemist.

Strong = 1

Moderate = 2

Weak = 3

	1	2	3
1. Fluctuation in demand	☐	☐	☐
2. Lack of computer system	☐	☐	☐
3. Financial problem	☐	☐	☐
4. Lack of personal expertise	☐	☐	☐
5. Resistance to change from manual to electronic	☐	☐	☐
6. Lack of proper records to give required demand.	☐	☐	☐
7. Inability to predict demand	☐	☐	☐
8. Lack of space foe installation	☐	☐	☐
9. Lack of awareness of the existence of EPOS.	☐	☐	☐
10. Lack of confidence in the accuracy of EPOS.	☐	☐	☐

11. Others:

Specify ______________________________

____

____

In the following questions please quantify as appropriate.

12. On average what is your order size when you place an order of drugs?

0-5 ☐ 6-10 ☐ over 10 cartons ☐

13. What is the average duration taken between the time/date the order is placed and the

19. On average what is your profit margin per drug in %?

1-5%	6-10%	11-15%	16-20%
☐	☐	☐	☐

The List of Chemists Studied in Nakuru

1. Bell Pharmacy
2. Kiamunyi Pharmacies Ltd
3. Menengai Chemists
4. Kings Pharmacies Ltd
5. Foothill Pharmacy Ltd Menengai Crescent
6. Lifelink Pharmacy Ltd
7. Splash Chemists
8. Munjoka Chemists
9. Nakuru Medical Store
10. Nakuchem Chemists
11. Metropolitan Chemists Ltd
12. Supreme Pharmacy
13. Sako Pharmacy
14. Belmax Medical Centre
15. Bamboo Chemists
16. Sunview Chemists
17. Mid rift Chemists
18. Friends Pharmacy
19. Melan Pharmacy
20. Roseway Pharmacy
21. Pyat Pharmacy
22. Flamingo Chemists

23. Chemists Le Apothelika
24. Care Chemists
25. Swizer Chemists
26. Bark Chemists
27. Valley Chemists
28. Dayslink Chemists
29. Masaba Chemists
30. Med Aid Pharmacy

EGERTON UNIVERSITY LIBRARY

									CODE OF RESPONSES																					
	R1	R1	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30
V1	1	2	3	3	3	2	3	1	3	2	2	3	2	3	2	2	3	3	2	2	3	2	2	3	2	3	1	2	1	3
V2	2	1	3	2	2	2	2	1	2	1	2	1	1	2	2	2	1	2	2	1	2	1	2	2	2	2	1	2	2	2
V3	3	-	3	3	-	3	3	-	2	-	2	-	-	2	2	3	-	-	1	-		-	3			2	-	-	2	
V4	2	-	3	3	3	3	1	-	3	-	1	-	-	1	1	1	-	-		-	1	-	1	2	1		-	-		1
V5	1	-	-	2	3	2	1	-	1	-	1	-	-	1	2	1	-	2	2	-	1	-		1	1	2	-	1	2	1
V6	2	-	2	-	1	2	1	-	2	-	3	-	-	2	-	2	-	-	-	-		-	1	1	-		-	1		-
V7	3	-	3	1	3	1	3	-	1	-	2	-	-	3	-	-	-	-	-	-	3	-		-	-	1	-	-	2	-
V8	2	-	1	3	3	3	2	-	3	-	3	-	-	3	-	-	-	-	-	-	-	-	1	-	-		-	-	-	-
V9	3	-	1	1	3	2		-	3	-	2	-	-	2	1	-	-	2	-	-	-	-	-	1	-		-	1	-	-
V10	3	-	3	3	3	3	3	-	3	-	3	-	-	3		1	-	2	-	-	-	-	-	-	-		-		-	-
V11	2	-	3	2	3	3	3	-	3	-	3	-	-	1		-	-	1	1	-	2	-	-	2	1	1	-	1	1	1
V12	1	-	3	3	3	2	3	-	3	-	2	-	-	2		-	-	1	3	-	2	-	1	-		1	-	2	1	
V13	1	3	3	1	1	1	3	2	2	2	3	2	2	1	3	3	3	2	1	3	2	3	2	3	1	1	2	1	3	3
V14	1	1	1	1	1	1	1	1	1	2	3	1	1	2	1	2	1	2	1	1	1	1	1	2	1	1		1	1	1
V15	2	2	1	2	2	1	2	2	2	2	3	1	1	-	1	1	2	1	2	1	2	1	1	2	2	2	1	2	2	2
V16	-	-	3	-	-	1	2	3	1	2	2	2	1	-	1	3	-	1	-	2	-	1	2	2	-	-	3	-	-	-
V17	-	-	2	-	-	2	1	1	2	3	2	1	2	-	1	2	-	1	-	1	-	2	-	-	-	-	3	-	-	-
V18	-	-	3	-	-	1	3	2	3	3	-	3	3	-	1	3	-	2	-	3	-	3	-	-	-	-	3	-	-	-
V19	2	1	-	-	-	1	2	2	1	1	-	2	2	-	1	2	-	1	-	2	-	2	-	-	-	-	2	-	-	-
V20	-	3	-	-	-	2	3	4	4	3	-	2	2	-	3	2	-	4	-	4	-	4	-	-	-	-	4	-	-	-