THE EFFECT OF INVENTORY MANAGEMENT ON CUSTOMER SATISFACTION

CASE STUDY OF NATIONAL WATER AND SEWERAGE CORPORATION (NW&SC)

BY

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DECLARATION

I Arinda Ronah, hereby declare that this research report is my original work and has not been published and/or submitted to any institution of higher learning for any award

Signed ..... **Date** 09/07/08.....

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APPROVAL

The following research by **Arinda Ronah** which has been carried out under the topic **The Effect of Inventory Management on Customer Satisfaction** has been under my supervision and is now ready for submission with my approval

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Special thanks to my dear parents Mr & Mrs J. Kayondo who work tirelessly to see that I succeed in my academic struggles, I thank them for the financial assistance and courage they provide me in all my endeavors in academic progress and also the care and state of parent hood they show me. May the lord bless you abundantly.

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DEDICATION

This research work is a special dedication to my dear parents Mr & Mrs J. Kayondo and to my beloved brother Asiimwe Edgar Kayondo.

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LIST OF ACRONYMS

NW&SC; National Water and Sewerage Corporation

M.R.O; Maintenance Repairs and Operations

WIP; Work In Progress

FIFO; First in First Out

LIFO; Last In First Out

COGS; Cost of Goods Sold

Et al; and others

i.e.; that is To Say

ABSTRACT

Inventory management has been a global concern to any organisations whether small or big and the value of holding stock is seen as a waste of resources and should be done away with. To any inventory is realised as the type of goods/supplies that are stored, manufactured for sale of aiding in production, sometimes it includes assemblies and work in progress.

This research study was aimed at making sure that the effect of inventory management on customer satisfaction was explored. All the related literature concerning the various types of inventory was exposed, the role of inventory management was also designed properly in this case study.

The parameters of customer satisfaction derived from the services of National Water and Sewerage Corporation was also tested against some tangible clues. The design and the methodology used tackled all the fields for different data to be analysed. The analysis is by the method of tables and other relevant materials in interviews and general observation of the trends seen in the organisation.

In the conclusion the researcher looked at the major influence of inventory management it has on customer satisfaction and the way forward for other similar organisations that lie in the same industry, it was suggested that customer satisfaction mostly results out of proper holding of stock that is so economical to the organisation; that is economic order quantity or matching demand and supply.

CHAPTER ONE

1.0 INTRODUCTION

This chapter presents the background of the study, the statement of the problem, the purpose of the study and its objectives. The chapter proceeds with the research questions, the significance of the study and ends with the scope of the study plus the organisation of the whole research.

1.1 BACKGROUND

It is logical today to relate organizational satisfaction of customers with the way it handles or controls its inventory especially service firms. This does not rule out the fact that selling and distribution companies (those that deal in selling of finished goods) should take keen concern and interest in managing their inventory. The concept of inventory management has to a greater extent contributed to better performance, profitability and customer satisfaction of any business organization. **(Baily 2002)**

Inventory has been defined by many scholars as the tangible material assets of a company except fixed assets. It comprises of any fixed product or merchandise ready for sale, any parts and materials to be incorporated into production or carrying out the business.

Inventory management calls for human judgment, experience and expertise which aim to meet demand economically. There is a further indication that unless stock is controlled or managed at an acceptable minimum level, that is, economic order quantity, service/production would be disrupted since there would be insufficient inventory to keep production continuous. Customers would be disappointed and lost since their demand would not be fulfilled by the organization.

Inventories are sometimes stocked to meet unforeseen circumstances or uncertainties, which would require an organization to have stocked some kind of inventory for such occurrences, in form of buffer stock. Space must be provided to house it, people employed and equipment to handle this inventory to put in place.

Inventories are subjected to deterioration, theft, shrinkage, loss, damage and may be superseded or become surplus to requirements. The biggest cost element is usually the input cost of money invested in stock.

It should be noted that inventory costs represent 85% of all firm costs. This therefore is obvious that by effective inventory management, a marked reduction in overall costs is possible hence the achievement of the organizations objectives such as customer satisfaction (**Appleby 1994)**

By definition **inventory** is assets that are included for sale, are in process of being produced for sale or are to be used in producing goods. For many public entities, inventory represents a large (if not the largest) portion of assets and, as such, makes up an important part of the balance sheet. It is therefore crucial for inventors who are analyzing stocks to understand how inventory is valued. The following equation expresses how a company's inventory is determined:

Beginning inventory + Net purchases – Cost of Goods sold (COGS) = Ending Inventory. This means that one takes what the company has in the beginning, adds what has been purchased, subtracts what has been sold and the result is what is remaining (**Ballou, 2000**)

To manage inventory there is need for costing it and there are many ways of costing inventory as presented by many scholars. **Ballard (2000)** cites three inventory-costing methods that a company can use to determine the cost of inventory and argues that they impact directly on the balance sheet, income statement and statement of cash flow.

- First-In, First –Out (FIFO)- This method assumes that the first unit making its way into inventory is the one sold:
- Last-In, First-Out (LIFO)-This method assumes that the last unit making its way into inventory is sold first. The older inventory is therefore left over at the end of the accounting period

- Average Cost- This method takes the weighted average of all units available for sale during the accounting period and then uses that average cost to determine the value of cost of goods sold (COGS) and ending inventory.

Chandra (2001) cites the following as advantages of the three methods:

- FIFO gives a better indication of value of ending inventory (on the balance sheet), but it also increases net income because inventory that might be several years old is used to value the cost of goods sold.
- LIFO is not a good indicator of ending inventory value because the left over inventory might be extremely old and perhaps obsolete. This results in a valuation that is much lower than the current prices. LIFO results in lower net income because cost of goods sold is higher.
- Average cost produces results that are some where in the middle between FIFO and LIFO.

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

Inventory Control; This area of inventory management involves receiving of purchased goods, storage, stock movement, cycle counting, order processing and dispatching to customers **(Krejewski and Ritzman, 1999)** it takes care of knowledge of service hours, warehouse study operation, operating procedures, frequent inventory verification; all for cost control and customer service mobilization.

It can be done using the Pareto Rule or ABC Analysis, which involves the categorization of all stock. Close examination of an inventory list often reveals that, for any given inventory, a small number of stock accounts for the majority of inventory costs. The Pareto analysis classifies inventory using the 80-20 rule where 80 percent of the investment of sales value is held in 20 percent of the inventory. ABC analysis stems from theory of Pareto by classifying the inventory into class A,B or C according to the value of annual usage. The ABC analysis is most frequently used for item aggregation because of its simple implementation

procedure. The turnover value of all products is determined and ranked in descending order. Then the cumulative turnover relative to the ranking order and the percentage of calculative turnover are calculated. The percentage range of the product is then calculated by dividing the ranking number of the parts by the total number of products.

To manage inventory calls for one to consider certain factors such as depreciation, rate of scrap, man power, opportunity cost, time, financial implications among others; Thus investigating the effects of inventory management on customer satisfaction using National Water and Sewerage Corporation as a case study.

(NW&SC) was established in 1972 and is a government owned parastatals under decree no. 34 of 1972 and its legislative frame work was strengthened by the NW&SC Act 2000.

The Corporation is responsible for the provision of quality water supply and sewerage services in 25 towns in Uganda, with a population of over 3 million customers.

The service is meant to be provided on a sound commercial and viable basis, which puts the question of revenue performance at the fore front. In pursuit of this, the NW&SC has undertaken several measures to improve the position of connections **(NW&SC Corporate Plans 2003-6/2007-10).**

During the financial year 2004/5 the corporation developed an affordable and simplified water connection policy to spur service demand. The Ministry of Water Lands and Environment enacted the policy to address accelerated coverage and service to the urban poor. The policy's specific aims are to gain accessibility to new customers, reducing on the un-accounted for water, proper maintenance of pipe networks with recurring leaks and bursts and increasing on sales revenue in the long run, (NW&SC plan 2003-6).

The implication of the policy is that the customer pays the normal connection fees while the National Water and Sewerage purchases all the pipes, fittings and carries out trenching and pipe laying up to the customer's meter from the NW&SC services point.

The result of the policy has been a dramatic increase in new connections from an average of 1200-2000 consumers per month in 2006 for domestic, institution, commercial and stand pipe users. The increase has necessitated extra pressure on the inventory and customer management functions. For example, the corporation has had to decentralize functions from the centre for 13 Kampala water zones.

Recently, the corporation was reported to have been one of the highly indebted National Corporations **(The Auditor General's report 2006).** Customer complaints on quality and availability of water have been reported (Monitor, New vision, Bukedde). One local daily reported that Kampala water contains feaces, **(The Monitor, November 2007).**

Prior to the new connection policy, the customers paid a connection fee and were also responsible for supplying all the materials including pipes and fittings necessary for connection between the supply line and the meter. At the time the Corporation Management complained of water losses, poor materials and inaccessibility to new customers.

According to National Water and Sewerage Corporation, corporate plans (2003/6, 2007/8) the corporate objective of increasing sales revenue is to be pursued alongside prudential inventory management as well as customer satisfaction objectives.

According to **Garland et al (2001)** the purpose of prudential inventory Management is to create a satisfied customer. The way the customer and inventory are managed will determine the user service level and therefore the sales

1.2 STATEMENT OF THE PROBLEM.

Inventory in organization faces a number of problems which affects the level of performance as evidenced in the **Sebutinde Report (2000)** that recommended sacking of all officials in the Uganda police procurement unit for mismanagement of inventory and turnover; implying that in many organizations inventory

management/control practices should be adhered to. The NW&SC introduced a new inventory management policy to source and supply materials and gain more customers.

Although customer coverage has been increased, there has been a corresponding increase in customer complaints regarding delayed connections, constant water shortages, burst pipes that are not attended to for long, contaminated water, in accurate billings and unethical conduct by staff towards customers. These complaints may well mean wrong inventory management practices or improper customer handling services by the NW&SC. It is not clear which is which, prompting an investigation on the effect of inventory management on customer satisfaction.

1.3 PURPOSE OF THE STUDY

The purpose of the study was to establish the effect of inventory Management practices on customer satisfaction.

1.4 OBJECTIVES OF THE STUDY

The study was based and guided by the following objectives:

- To examine how inventory monitoring affects service delivery to NW&SC customers.
- To examine how inventory information management affects the key drivers of satisfaction
- To evaluate the influence of inventory monitoring and inventory information management on customer satisfaction at NW&SC:

1.5 RESEARCH QUESTIONS

- What effect does inventory monitoring have on customer service delivery at NW&SC?
- What is the effect of inventory information management on the key drivers of satisfaction of NW&SC customers?
- How does inventory monitoring and inventory information management influence customer satisfaction at NW&SC?

1.6 SIGNIFICANCE OF THE STUDY

There is existing evidence that NW&SC has greatly improved from a loss making to a profit making organisation. The organisation has been recording profits in the last three years 2004-2007. The measures put in place among others included inventory and warehouse management.

A study of this kind was thus warranted to guide management of the organisation with inventory management department to achieve customer satisfaction. This research also highlight inventory management practices that can guarantee customer satisfaction with these in place, researchers, the management of NW&SC and policy workers will be availed with useful data to fill gaps in the relationships between inventory management and customer satisfaction. The study offers an opportunity for the researcher to reconcile classroom theory with practice

1.7 SCOPE OF THE STUDY

1.7.1 Geographical scope.

The study was conducted in Kampala national water and sewerage corporation-city branch located in the industrial area. Which covered the headquarters on 6th street industrial Area and the water zone offices of Natete, Nansana, Mukono; Ntinda, Bwaise, Kitintale, Najjanankumbi, Kansanga, Kanyanya and Kireka. These areas are accessible and have big populations from whom to get representative samples of respondents.

1.7.2 Period Scope

The period that was investigated is from 2003-2007. This was reached and managed using questionnaires and interviewing plus general observation using a cross-sectional survey

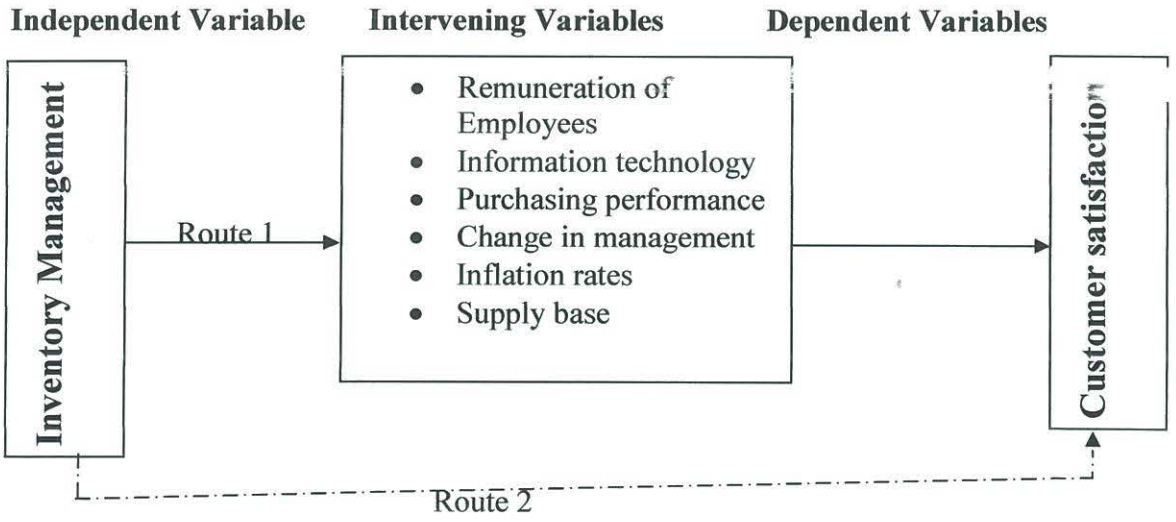
1.8 CONCEPTUAL FRAMEWORK.

Inventory management includes the broad management functions of planning, organization, and leadership, staffing, controlling, and communicating inventory processes and activities across the spectrum of the 'upstream' and 'downstream' supply chain activities of both public and private organizations. A supply chain; is a

network of activities involving the suppliers on one hand and the customers on the other but being linked by an organization. Inventory and its management, is one of the activities of the supply chain. Inventory management both as a concept and function is probably one of the extensively talked about concepts in the procurement literature. It is a function that forms the foundation for the purchasing performance.

In inventory management literature planning is crucial which implies that managers think through their goals and actions in advance and that their actions are based on some method, plan or logic rather than on a hunch **(Stoner, Freeman& Gilbert, 1995)**. The inventory management function encompasses defining inventory, establishing an overall economic quantity, and developing a comprehensive hierarchy of plans to integrate and coordinate the activities of inventory management such as stock control, monitoring, valuation, costing for financial comparison and for manufacturing firms meeting demand and supply on market **(Robbins, 2001).**

Analysis of the Topic Using the Conceptual Model was done as below;



The research on inventory management could take **Route 1** where customer satisfaction was influenced by inventory management amidst the intervening variables other wise known as extraneous such as; remuneration of employees, change in management in inventory department, customer changes in tastes and

preferences, which were found also to be major factors. Sometimes the inventory management can be moved under **Route 2** where directly the inventory management practices affect customer satisfaction. For the purpose of this research inventory management was confined to inventory monitoring and inventory information management on one hand (as the independent variable) and to customer service delivery and other key drivers of customer satisfaction (the dependent variables) on the other.

1.9 OPERATIONAL DEFINITION OF TERMS

Inventory; Refers tangible materials used in organization such as raw materials, finished goods, components and parts.

Buffer stock; Refers to stock for unforeseen circumstances some times called safety stock

Minimum stock; the safety stock below which the organization cannot go through

Economic order quantity; Optimal ordering quantity for any and ministries costs.

Customer satisfaction: Results that can be achieved through given action after the ingrained perception from end users.

Working progress (WIP) Items/ products which are semi-finished therefore need further industrial operation.

Stock Taking: Making clerical records agreed with stock or ground.

Inventory Control: Refers to Measures or technique used by organizations to keep stock that is not maximum or Minimum that is Economic order quantity.

Codification Means allotting symbols numeric or alphabetic numbers for each classified item in accordance with some suitable arrangement.

Classification: Process of dividing, arranging and describing of materials with different groups based on the nature use or technical affinity.

1.10 ORGANISATION OF THE STUDY

This study is organised in five chapters. Chapter one is the introduction and it highlights on the effect of inventory management on customer satisfaction. The chapter further includes the research problem, the objectives of the study, scope of

the study and the significance of the study among others. The related literature review is presented in chapter two. The methodology used in collection of data is presented in chapter three. In chapter four the findings, interpretations and analysis of the study data are given. The conclusions and recommendations are discussed in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the literature reviewed by different scholars on the subject of inventory management practices and customer satisfaction. The variables of inventory Monitoring and inventory information Management are highlighted as well as those of customer service delivery and key drivers to customer satisfaction. The chapter ends with the relationship between inventory management practices and customer satisfaction and a conclusion.

2.1 Inventory Management Practices

According to **Hsu-Hua and Kleiner (2001),** inventory management is comprised of two major activities-inventory planning and control. They explain that the purpose of inventory management is to satisfy customer demand and minimization of handling costs Inventory control involves managing the inventory that is already in the ware house knowing what products are in stock, their quantities, cost and location. Inventory planning involves determining when to order items, how much to order, fore casting demand and stock replenishment, identifying the most effective sources of supply, inventory information management and monitoring.

2.2 Components and Definitions of Inventory Management Practices

While inventory management practices are varied, **Ballard (2000)** stresses that monitoring and inventory information management is core. By definition **inventory** is assets that are included for sale, are in process of being produced for sale or are to be used in producing goods. For many public entities, inventory represents a large (if not the largest) portion of assets and, as such, makes up an important part of the balance sheet. It is therefore crucial for inventors who are analyzing stocks to understand how inventory is valued. The following equation expresses how a company's inventory is determined:

Beginning inventory + Net purchases – Cost of Goods sold (COGS) = Ending Inventory. This means that one takes what the company has in the beginning, adds

what has been purchased, subtracts what has been sold and the result is what is remaining (**Ballou, 2000**)

To manage inventory there is need for costing it and there are many ways of costing inventory as presented by many scholars. **Ballard (2000)** cites three inventory-costing methods that a company can use to determine the cost of inventory and argues that they impact directly on the balance sheet, income statement and statement of cash flow.

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Chandra (2001) cites the following as advantages of the three methods:

- FIFO gives a better indication of value of ending inventory (on the balance sheet), but it also increases net income because inventory that might be several years old is used to value the cost of goods sold.
- LIFO is not a good indicator of ending inventory value because the left over inventory might be extremely old and perhaps obsolete. This results in a valuation that is much lower than the current prices. LIFO results in lower net income because cost of goods sold is higher.
- Average cost produces results that are some where in the middle between FIFO and LIFO.

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

2.2.1 Inventory Control

This area of inventory management involves receiving of purchased goods, storage, stock movement, cycle counting, order processing and dispatching to customers **(Krejewski and Ritzman, 1999)** it takes care of knowledge of service hours, warehouse study operation, operating procedures, frequent inventory verification; all for cost control and customer service mobilization.

It can be done using the Pareto Rule or ABC Analysis, which involves the categorization of all stock. Close examination of an inventory list often reveals that, for any given inventory, a small number of stock accounts for the majority of inventory costs. The Pareto analysis classifies inventory using the 80-20 rule where 80 percent of the investment of sales value is held in 20 percent of the inventory. ABC analysis stems from theory of Pareto by classifying the inventory into class A,B or C according to the value of annual usage. The ABC analysis is most frequently used for item aggregation because of its simple implementation procedure. The turnover value of all products is determined and ranked in descending order. Then the cumulative turnover relative to the ranking order and the percentage of calculative turnover are calculated. The percentage range of the product is then calculated by dividing the ranking number of the parts by the total number of products.

2.2.2 Inventory Monitoring

Both **Ballard (2000)** and **Tersin et al (1994)** observe that monitoring involves the day to day follow up and evaluation of the key performance indicators of inventory control costs and customer service level.

An effective inventory monitoring system empowers management with the right information to reduce inventory in times of specific decline and increase it in times of high demand **(Neville, Rush and Sadd; 1998).**

Monitoring of inventory is about knowing, at all times, everything that needs to be known about the stock to ensure the effective management of the warehouse and the

reliable feedback of data for the management of business. It means knowing about the progress of goods and materials as they are processed through the warehouse.

Naylor (1996) observes that the best inventory systems monitoring the process rather than just the stock. According to him, monitoring takes place after every action, thus highlighting errors immediately using methods coupled with their documents such as stock cards, bin cards, materials requisition forms among others.

The importance of monitoring is further stated by **Watts, Hahn and Sohn, (1999).** The authors point out that it should focus on the environmental variables, decision rules and performance measures. Environmental variables include demand, cost, lead time, classification of customer requirements and management policies. They argue that decision rules should be made about order quantity, reorder point, economic order quantity and safety stock level. Performance measures, on the other hand, should include turn over rate, stock out frequency inventory to sales ratios, total inventory investment and customer service level.

A carefully designed monitoring system is required as the system may not be capable of detecting and reacting to changes in its operating environment. The proponents of this view, **Watts et al, (1999)** add that performance deviations should be noted from two sources; performance deviations due to system fitness and deviations due to operational causes.

It is noted, according to **Ritzman (1999),** that efficient inventory monitoring system assure accurate economic order quantities for stock; making the demand forecast more reliable. The author explains that the better the monitoring system, the easier it is to detect items running out of stock and stock obsolescence, which in turn promotes Just-In-Time ordering and delivery. Efficient stock monitoring helps to detect stock items not normally available on a company's stock list, which eventually improves customer service level and therefore customer satisfaction

2.2.2 Inventory Information Management.

The variable includes the systematic processing, analysis and feedback of information that determines the accuracy and timely decision on the key data of inventory planning.

The key ingredients according to **Everett and Ebert (1994)** include accurate outputs ensuring actual representation of system data.

Information must be benchmarked, captured consistently and measured correctly.

Raz and Tam (2003) note that the indicators of good inventory information management include timely and accurate outputs reports on inventory turnover and customer service level among others and should provide warnings for stock outs and overstocking, which are evidence of poor information management.

According to **Narasimhan (2000)** inventory management can be threatened when the physical inventory management quantities do not match what is displayed by the information system.

This is because the information system must be able to display accurate quantities for each item to avoid wrong sales promises to customers leaving items un sold yet they are in system or wrong procurement decision due to wrong physical stock data.

Closs et al (1997) present three-life cycle stages pertinent to inventory information management as collection, storage and retrieval of information. They add that the purpose of such an information system should be to establish what information is held or should be held, by an organization to support inventory management activities.

In their view, an information system should analyze gaps in order for it to understand what information it holds and where it needs to improve in order to meet business needs. Information rationalization should be supported on basis of content to identify redundancies, under –utilized stock and conflicting information.

2.3 CUSTOMER SATISFACTION

2.3.1 Customer service level

One of the tenets of customer satisfaction is customer service level. Customer service refers to not only to the benefit, but also an act performed in a beneficial manner. This includes what is provided and how it is provided, **(Troobolf et al 1995)** customer's care about both the services offered and how it is delivered. **Reily (1996)** argues that customer service is a practice in which all employees feel and act accountable for creating satisfied customers.

According to **Singh (2001)** customer service level indicates how often items must be in stock when customers require them. It is calculated by dividing the number of line items for stocked items shipped by the promised date with the total number of line items for stocked products ordered.

Singh (2001) further reveals that customer service level takes into account only dispatches of stocked inventory and excludes non-stock items. It should be monitored frequently in order to maintain customer satisfaction.

2.3.2 Service reliability

It is the ability to deliver the promised service dependably and accurately. It is about keeping promises on delivery, pricing, complaint handling and others

Parasuraman et al (1998) argue that reliability is the most important dimension in creating customer satisfaction, but that, the strategies for keeping customers involves delivering value.

According to **Monroe (1990)** customers will not mind waiting if they know that things will be done right the first time, promises will be kept and materials will be delivered on time. This would ensure avoidance of customer complaints and creation of customer loyalty and finally satisfied customers.

2.3.3 Assurance

It is a customer service quality dimension that focuses on the ability to inspire trust and confidence **(Mudie and Cottam 1999).** The customers expect to deal with knowledgeable and qualified staff during service delivery process. Customers are

particularly intolerant of the incompetence of staff whose quality of service is vulnerable to compromise. The ability to inspire confidence is influenced by the willingness of a customer to maintain the relationship with a service provider.

2.3.4 Tangible clues

This is a customer service dimension that focuses on the elements of services physically. These include the appearance of physical facilities, equipment, personal and communication materials. They make the nature of the service more easily understood and act as key motivators for purchase.

Gale, (2001) have analyzed the relationship between inventory management and service level and concluded that it is beneficial to increase stock level and to attain service level of up to 80% beyond which the negative side of idea of stock holding sets in service level, the higher the sales of volume and the better the inventory management practices; monitoring and information management inclusive.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

This chapter presents the methods and procedures that were used by the researcher in the study. It involved the introduction, research design, population of the study, sample of the study and sample selection technique, source of data, data collection instruments, data quality control, measurement of variables, data analysis, procedures of the study and the limitations of the study.

3.1 RESEARCH DESIGN

The study was conducted using quantitative research method. The descriptive method was used to establish distribution of variables in the study.

3.2 POPULATION OF THE STUDY

The study was conducted in National Water and Sewerage Corporation and a total of 60 respondents were selected from the population. This comprised of the employees in inventory management department like stores and procurement plus other departments that are engaged in the running of the organization's activities because they have the general knowledge on how materials are handled and managed plus the satisfaction they derive when inventory is managed.

3.3 SAMPLE SIZE AND SAMPLE SELECTION TECHNIQUES

The study used random sampling techniques especially simple random sampling where by individuals or sample sizes were identified, defined and individual selected at random. The sample size was aimed at 60 respondents, but all in all 47 returned as seen below;

Type	Number sent	Returned
Employees	40	32
Customers	20	15
Total	60	47

3.4 SOURCE OF DATA

These comprised of primary and secondary data. Under primary data the researcher expected to obtain data from the company's respondents that was selected as sample size.

Under secondary data sources the researcher collected data from written documents like textbooks, journals, Newspapers and other publications.

3.5 DATA COLLECTION INSTRUMENTS

These involved use of self administered questionnaires. Some of those were pre-tested outside the selected sample size for clarity and to reduce ambiguity of the questionnaire. On pre-testing 10 staff members were selected randomly and requested to answer it, then it will be checked for clarity and approval.

3.6 DATA QUALITY CONTROL

The quality of data is necessary and vital to its reliability, so it was carried out through pilot test of instruments by giving a well designed questionnaire to one of the employers to fill. Data control was also be done by consulting research experts and supervisors for proper and more guidance.

3.7 MEASUREMENT OF VARIABLES

The study was about the effect of inventory management on customer satisfaction. Inventory management is an independent variable while satisfaction is a dependant variable. **Inventory Management;** refers to planning, controlling and monitoring the inventory that means all tangible material assets of a company accept fixed assets. It comprises of any fixed product or merchandise ready for sale, any parts and materials to be incorporated into production or carrying out the business. Measurement will take consideration of extent of inventory monitoring and accuracy and timeliness of inventory information management among others. **Customer satisfaction**; satisfaction will be measured by taking consideration of customer service level, affordability and availability, Service reliability, assurance and tangible clues.

3.8 DATA ANALYSIS TECHNIQUE

The findings of data were analyzed by use of tables, by arranging and describing data in relation to the objectives of the study. This was to enable the researcher to attach meaning of the figures used in the tables. Editing was done to ensure completeness of data and discover any misrepresentation. Coding as a measure of analyzing what was done and not done was used to assign numbers and letters to avoid ambiguity in the presentation of data.

3.9 PROCEDURE OF THE STUDY

After getting an authorization letter from the University Authorities, the researcher begun by designing the questionnaire to be used in collecting primary and other data. This step was followed by data quality control measurement of variables, data analysis techniques such as tables, frequencies, interpreting the data, making necessary recommendations and submitting in the report.

3.10 LIMITATIONS

Research is a lengthy exercise which involves procedures to be undertaken. The researcher mostly encountered the following limitations.

- Problem of limited funds, related to transport, stationery, binding, typing, lunch, and photocopying relevant documents. Arrangements were made to acquire a loan for this purpose was done to make the study effective.
- Some employees of the organization were not able to fill the questionnaire in time and others refused to give information due to fear of being victimized. The researcher had to embark on a socialization program targeting some respondents.
- Language barrier- some employees and clients were not able to express them to give detailed information about the study problem. Probing techniques were applied. Mostly some people had little knowledge about the study topic which led to time consumption in interpreting the questions.

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF FINDINGS

4.0 Introduction

The results from the field were extracted from the questionnaire, interview guide and inventory management reports for the period under study. Data extracted from inventory management was analysed using descriptive statistics followed by interpretation of the tables, pie charts, and the diagrams used. Data from the questionnaire was also used to support descriptive statistics, resulting in information monitoring, effects of the key drivers of satisfaction and the influence of inventory management on customer satisfaction.

4.1 General Information of the Respondents

This section represents the general characteristics of the respondents, which will be of better background for the reliability of the findings.

Table 4.1.1 distribution by departments

Departments	Frequency	Percentage
Marketing	4	8.5
Accounts	7	14.9
Production	5	10.6
Stores	14	29.8
Customer relations	2	4.3
Others (customers)	15	31.9
Total	**47**	**100%**

Source; primary data

The table above shows the number of respondents by various departments, where 29.8% were from stores, 8.5% from marketing, 10.6% from production, 4.3% from customer relations, and 31.9% from customers that were interviewed.

The stores department is said to be the one with the necessary data about the study and turn up being good, conforms the reliability of the data.

Table 4.1.2 Distributions by Sex

Sex type	Frequency	Percentage
Male	32	68.1
Female	15	31.9
Total	**47**	**100%**

Source; primary data

Males constituted bigger percentage that is 68.1% and the female had 31.9%. this was attributed to the fact that most of the inventory management work is energy oriented and men do it better, as well as males are the ones that pay bill of water in families interviewed, thus the bigger percentage compared to females.

Table 4.1.3 Distribution by Age

Age bracket	Frequency	Percentage
18-26	12	25.5
28-37	16	34.1
38-49	14	29.8
50+	5	10.6
Total	**47**	**100%**

Source; primary data

The above table shows distribution by age, where 25.5% were between 18-26 years, 34.1% between 28-37 years, 29.8% were in the bracket of 38-49 years and 10.6% were in 50 years and above.

The young staff is believed to be vigilant and swift compared to the old. And it is these age groups that are dominant in employment, urban places and more chances of being selected in the sample than other age groups.

Table 4.1.4 Distribution by Level of Education

Education	Frequency	Percentage
Certificate	2	4.3
Diploma	14	29.8
Degree	26	55.3
Masters	4	8.5
PhD	1	2.1
Total	**47**	**100%**

Source; primary data

Education being a measure of performance in organisations was analysed and 4.3% had certificate, 29.8% were diploma holders, 55.3% had degrees, masters were 8.5% and other qualifications like PhD constituted 2.1%.

Being a big public firm education level in the organisation and the customers was majorly degree holders which eased the work of the researcher.

4.2 Inventory Management

The data collected here majorly was concerned with how inventory is managed and the key drivers of the controlling systems. Many respondents agreed that truly inventory management contributes to any firm's profitability and enhances customer satisfaction in the long run. However the respondents were 40 selected among the employees using a cross sectional survey of all departments and only 32 responded. So the data presented is based on the 32 employees. Further analysis is presented below.

Table 4.2.1 Type of Inventory Kept/Stored

Type	Frequency	Percentage
Raw materials	10	31.2
Semi-finished products	2	6.3
Finished products	4	12.5
Components and parts	16	50
Total	**32**	**100%**

Source; primary data

From the table above majority of stock in NW&SC are components and parts that consist of 50% while raw materials take 31.2%, finished products cover 12.5% while semi-finished products cover 6.3%.

The statistics got from the primary data and views got through interviewing indicate that most stock is comprised of components and parts because of the nature of the enterprise. That is NW&SC is a public body that deals in installation and connecting water to its clients.

Table 4.2.2 Distribution of Respondents According To the Methods Used In Inventory Control

Methods used	**Frequency**	**Percentage**
Establishment of inventory levels	12	37.5
ABC Analysis	6	18.7
Just-in-Time	4	12.5
Economic order quantity	10	31.3
Total	**32**	**100%**

Source; primary data

Inventory management is influenced by the methods employed to manage it, from table 4.2.2 respondents responded on the methods used as; the establishment of inventory levels had 37.5%, ABC analysis that was developed by Pareto 18.7%, Just-In-Time method 12.5% and use of economic order quantity 31.3%. In the interview conducted other methods like fixed reorder levels and stocks take crediting method are also known but not applied due to less commitment of top management on inventory. But according to the information got from the accounts, inventory is responsible for over 70% of NW&SC expenditure.

Inventory management is a tacit task by every organisation and needs regular checking otherwise problems may arise. Respondents had their views on the problems that result as proper inventory management is to be achieved.

Table 4.2.3 Distribution of Respondents on Problems Met In Inventory Management

Problems met	Frequency	Percentage
High costs of holding stock	11	34.4
Deterioration of inventory	5	15.6
High scrap/obsolescence	6	18.7
Poor storage facilities	10	31.3
Total	**32**	**100%**

Source: primary data

From the table above it is said that high costs of holding stock/inventory cover 34.4%, deterioration of inventory 15.6%, obsolescence 18.7%, and poor storage 31.3%. These problems can either be occurring co-currently or independently.

Obsolescence are items that are worthless to the organisation holding it, this when asked on the causes, poor storage and planning was mentioned. The above problems need to be averted and the solutions sighted are in table 4.2.4 and are true representative of the primary data.

Table 4.2.4 Distribution of Respondents on the Solutions of Problems Faced In Inventory Management

Solutions	Frequency	Percentage
Holding quantities that matches demand	5	15.6
Providing enough space and facilities	9	28.1
Matching demand and supply	11	34.4
Employing enough skilled personnel	7	21.9
Total	**32**	**100%**

Source; primary data

Matching demand and supply being major solutions to the many problems faced during inventory management according to the respondents with a percentage of 34.4, while providing enough space and facilities covered 28.1%, employing enough skilled personnel with 21.9% and holding quantities that matches demand covered

15.6%. These solutions depend on the firm's commitment to realise the role played by inventory by department and devote more time and resources.

Table 4.2.5 Opinion of Respondents on Questions 1& 2

Statement	Very accurate	Moderately	Inconsistent	Inaccurate
How do you assess the minimum, maximum and reorder levels of stock	6	16	8	2
How accurate is the past sales compared to demand	11	19	2	0
Total	**17**	**35**	**10**	**2**

Source: primary data

The primary purpose of questions 1 & 2 was to get information from respondents on how monitoring and information is done, to keep inventory in the modest figure to enhance daily activities of the organisation. The scores were made using parameters and moderately accurate scored 35 on two statements that is; how are minimum, maximum, and reorder levels of stock are assessed, how accurate is the past demand compared to sales. Very accurate scored 17, while inconsistent 10 plus inaccurate 2. The opinions got are based on how inventory is managed presently and according to the interview made many told the researcher that computerizing inventory management by going e-business or go global would ease the system.

Table 4.2.6 Opinions of Respondents on Questions 3 & 4

Statement	Daily	Weekly	Monthly	Yearly
How often is ABC analysis done	0	2	6	24
How often are cycle counts done based on ABC report	0	2	6	24
Total score	0	4	12	68

Source: primary data

Reporting in inventory management is a vital factor in all organisations both small and large, because it helps in decision making and informing management on the status of stock. From the table 4.2.6 it was observed that most stock count or check based on the parameters set are done yearly with an attached score of 68 while on monthly basis is 30 and weekly basis was 4, no respondent agreed on the daily basis.

The major factor given on the distribution of data like that is that stock counts based on ABC reports and analyzing it becomes a dangerous and expensive exercise.

Respondents where asked to comment on the adequacy of stock outs and stock obsolescence system used in National Water and Sewerage Corporation. It was revealed that only one system was used that is manual where stock is checked at every end of a week to thorough confirm the available stock/inventory. It was noted that proper stock checking system is the use of computers in this modern age.

Among the improvements sighted by respondents on inventory monitoring and proper information keeping were

- Computerizing the inventory management operations such that stock levels are checked at a very time there is a stock out, obsolescence and overproduction.
- Regular checks of stock-commonly known as stock taking
- Employing enough skilled personnel to handle all the activities of inventory management and keep updates as required.

4.3 Customer Satisfaction

This section represents data collected from customers only, who were chosen from the suburbs of Kawempe, Kansanga, Kireka, Bwaise, Kanyanya, and Mukono areas that are served by the city branch located on 7th street industrial area. Customers being scattered all over only 15 responded and their information was analysed below, according to the score given against the statements that were tested

Table 4.3.1 Opinions of Respondents on How They Are Satisfied With NW &SC Services

Statement	Delighted	Satisfied	Moderately satisfied	Dissatisfied	Score
Process of application for water connection	3	4	6	2	38
Competitiveness of processing fees charged	2	4	2	7	31
Ease of completion of application forms	6	3	2	4	41
Time taken to approve application	0	3	7	5	28
Follow up between application and approval	0	4	3	8	26
Ease of application process on whole	4	7	3	1	44
Variety of payment methods offered	2	6	0	7	33
Convenience in methods of payment	1	2	4	8	26
Time taken between approval and connection	2	4	3	6	32
Availability of water	6	4	2	3	43
The quality of water	5	6	1	3	43
Promptness in delivery of bills	4	2	3	6	34
Accuracy of bills	0	4	5	6	28
Interpersonal care by water staff	0	5	2	8	27
Quality of after sale services	4	3	2	6	35
Keeping promises by water staff	2	6	3	4	36
Follow up on requests/complaints	1	4	6	4	32
Ease of contact of staff	3	6	4	2	40
Quality of connection of materials	7	3	4	1	46
Maintenance of connection equipment	3	4	2	6	34
Total score					**697**

Source: Primary data

Weights: delighted =4, satisfied =3, moderately satisfied =2, dissatisfied =1

Total maximum expected score = 4x20x15 = 1,200

Total minimum expected score =1x20x15 = 300

Total average expected score =2.5x20x15 = 750

Table 4.3.1 is a result of responses to a battery of figures statements to which 15 respondents indicated they satisfaction and dissatisfied with the statements basing on the given options that include;
Delighted, satisfied, moderately satisfied, dissatisfied

For analysis, the researcher attached a score scale ranging from 1-4, the highest score being 4 assigned for strong agreement with the statement(s) and lowest score 1 assigned to dissatisfaction. Then various frequencies where multiplied by the relevant scales and summed up to get the resultant score as shown in the table above.

This is a simple model that was adopted from Likert scale (Moster and Kalton 1989) to assess the opinions of respondents on the subject mater.

From the table therefore, it can be seen that total score of 15 respondents is 697. This can be understood when we relate it to the total maximum expected score, which is 1,200, the total minimum expected score, which is 300 and the average expected score, which is 750

The maximum score 1,200 represents favourable opinions and the minimum score 300 represent unfavorable opinion and the average 750 represents the neutral opinion of the respondents who are either uncertain or do not want to take any stand

According to this analysis, it shows that the total score is slightly lower than the neutral position, which implies that respondents had moderate opinion towards the

role of inventory management on customer satisfaction as employed by the organisation.

In conclusion, therefore with evidence from the respondents it is clearly seen that inventory management and the way NW&SC operates affects customer satisfaction in the following ways;

The processes of acquiring services of water and payment terms are quite notorious because clients are dissatisfied

- Quality of water and the enhancement of bills plus interpersonal care were revealed to be core factors in customer satisfaction and the better results come from proper inventory management
- Materials and other equipments plus their maintenance that are used in connecting customers perceived to be moderately satisfied.

Inventory management is a crucial factor in achieving the organisation's objectives, so its management should be the one strategic decision.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 INTRODUCTION

This chapter builds on the presentation, analysis and discussion of the research findings using the research objectives and research questions as basis. It further represents summary of findings, conclusions and recommendations made. As earlier stated the study is on effect of inventory management on customer satisfaction, the areas for further research related to this study were also reached.

5.1 SUMMARY OF FINDINGS

Findings reveal that (table 4.2.1) the type of inventory kept in NW&SC is majorly components and parts that include pipes, nuts, water in tanks, containers and other items used in connection of water; these constituted 50% while raw materials had 31.2% and other items were consumables like office ware.

Inventory management was seen as a key issue in an organizational performance table 4.2.2 reveal the establishment of inventory levels that match with the organizational activities, was sighted with 37.5% while the use of economic order quantity followed with 31.3%. These two methods were seen to be preferred because they are economical.

Problems faced in inventory management table 4.2.3 was revealed that high costs in holding stock was a major cause with 34.4%, poor storage facilities with 31.3% while other problems were there but insignificant.

Table 4.2.4 reveal the solutions by respondents to the problems met during inventory management and matching demand and supply with 34.4% was seen to be effective, providing enough storage space constituted 28.1% . These two solutions that were revealed seem to work effectively to such big organisations.

Table 4.2.5 and table 4.2.6 reveal the information monitoring and how stock taking, stock checks, periodic reviews was done. The assessing of minimum, maximum and reorder levels plus comparing past sales to demand were moderately done with 35 scores, the accuracy is to a degree of 17 scores. Stock taking majorly was done yearly.

Table 4.3.1 reveals how customers are treated and serviced in terms of their needs as a result of proper inventory management. The results show that many clients are dissatisfied with the quality of connection, maintenance of connection equipments.

5.2 CONCLUSIONS

The study was carried out to investigate whether inventory management meets the objective of customer satisfaction and thus playing and important role in the organizational performance.

Both secondary and primary data were used. The analysis of data using table and frequencies shows no doubt that inventory management is a key driver of customer satisfaction and therefore should be frequently monitored, checked and regular reports made to management to take action.

5.3 RECOMMENDATIONS

In the light of the research findings and conclusions made in this chapter, the researcher recommends the following measures to be taken by the management of organisations faced with inventory management problems as to improve customer satisfaction and general performance.

Organisations should make sure that stores records are properly maintained and updated regularly

- Organisations should always employ establishment of inventory levels that are best used or match with the organisations operations as a method of controlling stock, aimed at customer satisfaction because their demands will always be fulfilled at any time.

- Organisations should be devise mechanism of future demand and supply of daily demand items so as to minimize disparities between available inventory and actual demand.
- That inventory should be reviewed periodically and orders placed at the time inventory is needed by use of Just-In-Time purchasing to avoid problems of holding stock in form of costs.
- Firms dealing in public service delivery should employ methods that reduce on the bureaucracy faced by clients during, acquisition, installation and requesting for maintenance, since most of the respondents are dissatisfied with such red tape.

5.4 AREAS FOR FURTHER RESEARCH

From the study it is observed that the scope of study was limited to only one organisation and small coverage of customers. Further more, time was limited and only used quantitative statistics. Therefore, it is recommended that further studies should be extended to include wider scope and using different methodologies like ANOVA (F-Statistic), Chi-Square, E-Views.

Further studies should be carried out to compare alternative approaches to inventory management such as stocktaking, stock evaluation and stock control techniques

The effect of teamwork on inventory management, forecasting inventory levels appropriately should also be studied

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APPENDICES

Appendix 1.

Questionnaire

QUESTIONNAIRE FOR THE MANAGEMENT OF NW&SC

Dear respondents,

I am a student of **Kampala International University** pursuing a Bachelors Degree in **Supplies and Procurement Management**, conducting a research on the **Effect of Inventory Management on Customer Satisfaction** as a requirement for the award of a degree.

Your responses will be treated with confidentiality, please read and answer questions by putting a tick against the alternative of your choice or filling in your opinion.

SECTION A

1. What is your department?

   Marketing, ☐ Accounts, ☐ Production, ☐ Stores, ☐ Customer relations ☐ others (specify).....

2. Sex

   Male ☐ Female ☐

3. In what age bracket are you?

   18-26 ☐ 28-37 ☐ 38-49 ☐ 50+ ☐

4. Educational Level

   Certificate ☐ Diploma ☐ Degree ☐

   Masters ☐ Others (specify).....

SECTION B- INVENTORY MANAGEMENT (for employees only)

a) What major type of inventory do you have in your organization?

Raw materials ☐ finished products ☐

Semi-finished products ☐ Components and parts ☐

b) If you have methods of managing inventory, mention them.

Establishment of inventory levels ☐

ABC analysis ☐

Just in time ☐

Economic order quantity ☐

Others (specify) .....

c) If agree that there are problems in inventory management, what are these problems?

High costs of holding stock ☐

Deterioration of inventory ☐

High scrap/Obsolescence ☐

Poor storage facilities and lack of space ☐

d) What measures are put in place to solve these problems?

Holding the quantity that matches with the organizations activities ☐

Providing enough space and facilities ☐

Matching demand and supply ☐

Employing enough skilled personnel in inventory/stock department ☐

For questions 1 and 2; tick the number corresponding to your choice using

4 for very accurate, 3 for moderately accurate

2 for inconsistent, 1 for inaccurate

1. How do you assess the minimum, maximum and reorder levels of stock items?

4 3 2 1

2. How accurate is the past demand compared to sales?

4 3 2 1

For questions 3 and 4; tick the number corresponding to your choice using.

4 for daily, 3 for weekly

2 for monthly, 1 for quarterly

3. How often is an ABC analysis done on stock?

4 3 2 1

4. How often are cycle counts done based on ABC report?

4 3 2 1

5. Comment on the adequacy of the stock out and stock obsolescence warning system in use at NW&SC.

.....

.....

.....

6. What improvements, in your opinion, need to be done in the inventory monitoring system?

Please explain

.....

.....

.....

.....

SECTION C: CUSTOMER SATISFACTION (for customers only)

For this section use

4= for delighted, 3= for satisfied

2= for moderately satisfied, 1= for dissatisfied

How satisfied are you with the following?

i.	Process of Application for Water connection	4	3	2	1
ii.	Competitiveness of processing fees charged	4	3	2	1
iii.	Ease of completion of application form	4	3	2	1
iv.	Time taken to approve application	4	3	2	1
v.	Follow up between application and approval	4	3	2	1
vi.	Ease of application process, on the whole	4	3	2	1
vii.	Variety of payment methods offered	4	3	2	1
viii.	Convenience in methods of payment	4	3	2	1
ix.	Time taken between approval and connection	4	3	2	1
x.	Availability and affordability of water	4	3	2	1
xi.	The quality of water	4	3	2	1
xii.	Promptness in delivery of bills	4	3	2	1
xiii.	Accuracy of bills	4	3	2	1
xiv.	Interpersonal care by water staff	4	3	2	1
xv.	Quality of after sale service	4	3	2	1
xvi.	Keeping promises by water staff	4	3	2	1
xvii.	Follow up on requests/Complaints	4	3	2	1
xviii.	Ease of contact with staff	4	3	2	1
xix.	Quality of connection materials	4	3	2	1
xx.	Maintenance of connection equipment	4	3	2	1

I thank you very much for your response and time you have sacrificed to answer this questionnaire, your response will be helpful in achievement of the study and all this is highly appreciated.

God bless you.

Appendix 2.

Curriculum Vitae

BIO DATA

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