

**INFORMATION AND COMMUNICATION TECHNOLOGY AND
CUSTOMER SERVICE DELIVERY AT NAIROBI CITY WATER AND
SEWERAGE COMPANY**

BY

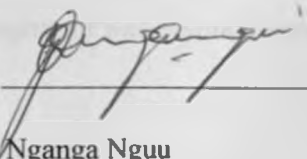
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**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT
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DECLARATION

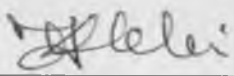
This research project is my original work and has not been presented to any University for award of degree.

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This research project has been submitted for examination with my approval as the university supervisor.

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DEDICATION

Dedicated to my dear wife Veronicah Mwikali and my children Christine, Janet and Deogracious whose enduring tolerance, forbearance and support have made my academic dream come true. Not forgetting my parents, brothers, sisters and college mates whose encouragement has seen me through, and my Supervisor Mr. Joel Lelei whose support and encouragement was beyond measure.

ACKNOWLEDGEMENT

I am greatly thankful to God the Almighty for his grace that has brought me this far. I am also indebted to my workmates and college mates who gave me the inspiration to pursue the course to the end even when things didn't seem to work out. Special thanks to my wife Veronicah and my children Christine, Janet and Deogracious who provided the encouragement and understanding during those many years that I took to complete the course. Indeed you were the wind beneath my wings. Thanks to my late mother Esther and my father Sammy for their prayers and support all through my years of schooling. Lastly, I cannot forget to sincerely thank my supervisor Mr Joel Lelei for the constructive advice, professional guidance and support offered during this project.

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ABBREVIATION

ANOVA	–	Analysis of Variance
AWSB	–	Athi Water Services Board
BPR	–	Business Process Re-Engineering
CISA	–	Certified Information Systems Auditor
CMS	–	Customer Management System
CRM	–	Customer Relations Management
DSS	–	Decision Support Systems
EIS	–	Executive Information Systems
GIS	–	Geographical Information System
HRMS	–	Human Resource Management System
ICT	–	Information and Communication Technology
IS	–	Information Systems
IT	–	Information Technology
KSF	–	Key Success Factor
MIS	–	Management Information Systems / Marketing Information System
NCC	–	Nairobi City Council
NCWSC	–	Nairobi City Water And Sewerage Company
SMS	–	Short Message Service
SPA	–	Service Provision Agreement
SPMS	–	Stores & Procurement Management System
SPSS	–	Statistical Package for Social Scientists

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ABSTRACT

Many organisations have adopted the use of information and communication technology (ICT) in order to improve the products and services they offer to their customers. While some of these organisations have reaped great benefits from ICT, some have not been able to establish whether indeed the investment in ICT was worthwhile while others have suffered noticeable losses arising from the investment in ICT. Although the Nairobi City Water and Sewerage Company has invested heavily in ICT since its inception, no study has been undertaken to find out the extent to which the technology has been adopted and its influence on customer service. This study sought to establish the extent of the usage of ICT for service delivery in the company, the effect of ICT on the work of the customer service staff and the effect of ICT on customer service delivery as a whole.

The research project was a survey during which eighty (80) members of staff of the Nairobi City Water and Sewerage Company were sampled. These members of staff belonged to various levels in the organization but were all involved in the different areas of service delivery in the company. Self-administered questionnaires were distributed to the respondents. The data collected was checked for completeness and edited for correctness. Descriptive statistics were used to analyze the data with the Statistical Package for Social scientists (SPSS) as the main tool. Statistical measures such as frequencies, percentages and the measures of central tendency such as mean and mode were used. An analysis of Variances (ANOVA) and regression analysis were also carried out.

The study established that in the NCWSC, ICT is used to the greatest extent in communicating to customers, resolving customer queries, meter reading, billing and in processing of applications for new water connections. The study also established that ICT is used to the least extent in the refund of customer deposits and in the exhaustor and water tanker services. The study further established that the use of ICT has led to an improvement in the speed in Customer Enrolment, increased efficiency in Billing, accuracy in Meter Reading, improved speed in cash receipting, increased efficiency in query handling and increased efficiency in complaint handling which all ultimately lead to an improvement in service delivery. The work of customer care staff has also been made easier by the use of ICT according to the findings of the study.

From the study, it is clear that although ICT is used in customer service delivery at NCWSC, it is used more in some areas than others. ICT usage in the company has made the work of the staff engaged in customer service easier and has led to an improvement in the delivery of services to customers.

CHAPTER ONE

INTRODUCTION

1.1 Background

Many organisations have adopted the use of information and communication technology (ICT) in order to improve the products and services they offer to their customers. Owuor (2004) defines Information and Communication Technology (ICT) as the technology which supports activities involving the creation, storage, manipulation and communication of information, together with their related methods. According to this definition, ICT represents the technical perspective of an information system (IS) and includes computing, telecommunications and automation activities. Lucas (1987) defines an information system as a set of organised procedures which, when executed, provides information to support decision making. According to Olson and Gordon (1998), an information system is an integrated user-machine system for providing information to support operations, management, analysis and decision making functions in an organisation. From these three definitions, ICT can be viewed as the enabling mechanism that facilitates the processing and flow of information as well as the technologies used in the actual processing that goes on to produce a product or to provide a service to customers.

According to Owuor (2004), in the past, companies used information technology simply to mechanise the way they did their business. The existing processes were kept intact and computers were used simply to speed up the same old processes. However, the mere automation of ineffective processes cannot eliminate their fundamental performance deficiencies. Many organisations have since realised that business-as-usual is a path to disaster. In many organisations of today, there is a strong change in focus on activities of productivity from the traditional cost cutting to radical changes aimed at improving organisational performance and effectiveness. Different functions of the same organisation are now able to share information by use of integrated information systems. In this way, these organisations are able to serve their customers better.

Integrated information systems have played a major role in changing organisations. Today, IS are found in many organisational activities including production, marketing, communication, logistics, leisure and personal entertainment. They have greatly influenced modern living. It is now difficult to imagine life without computers, the Internet, e-mail, e-business, e-learning, mobile phones and much more. Businesses of today are largely dependent on ICT for collection and sharing of data and information. Other organizations and individuals are using ICT to transfer funds from one party to another. In his study, Kitur (2006), found out that to many organisations like banks, insurance firms, and utility companies, ICT is considered a key success factor (KSF) because it has become the driving force that is crucial in the production and delivery of goods and services in those industries.

Mbote (2003) states that the tremendous changes that have taken place in the banking industry would not have been possible without IT. ICT has made banking services easily available to customers via automatic teller machines (ATMs) and e-business. Kimani (2006) attributes the tremendous growth in Savings and Loans (Kenya) Ltd. to the company's adoption of ICT and asserts that even the company's top management has applauded the role played by ICT in establishing competitive interest rates.

1.1.2 ICT and Service Delivery

To those organizations which are committed to improving service delivery, ICT is perhaps the best tool. Abwao (2002) states that IT is the key enabler for business process re-engineering (BPR) citing rehabilitation and competitive advantage as some of its business benefits. Owuor (2004) identifies eight opportunities for IT in process re-engineering. These opportunities as listed down include the elimination of human labour from a process by automation, capturing process information for the purpose of understanding, changing process sequence or enabling parallelism, tracking and monitoring process status and objectives, coordinating processes across geographical locations, integrating and coordinating tasks and processes, capturing and distributing intellectual facts and finally eliminating intermediaries from a process.

For companies engaged in the provision of water and sewerage services, ICT has the potential of greatly influencing their service delivery. ICT can be used to monitor and manage the water

levels in the dams and reservoirs as well as the transmission and distribution network and water flows. Geographic Information Systems (GIS) can be used to identify and trace different types of assets such as gate valves, pressure valves, water meters, pumps and even movable assets such as motor vehicles, machinery and materials. From the commercial perspective, ICT can be used by water service providers in metering, the computation and delivery of water bills, the management of customer accounts and in the handling of customer queries and complaints. ICT can further be used to improve the processing of applications for new water connections, servicing orders for water delivery by water tankers and in improving the process of cash collection. ICT can also be used in performance measurement. In all these ways, ICT has the potential of improving service delivery.

However, although ICT can be applied in all these areas with the aim of improving service delivery, there are many other factors that affect service delivery which may neutralize the effect of the technology. These include organizational culture, management commitment to service delivery, level of education of staff and the integrity of both staff and customers. Furthermore, according to Brynjolfsson (1992), one major question related to the application of ICT is whether it actually delivers the positive impact expected. In his study, Brynjolfsson (1992) found out that the relationship between ICT and productivity is not always positive. According to the researcher, although this topic is widely discussed, usually, it is not well understood. He found out that while major success stories exist, so do equally impressive failures especially in the service industry. According to him, the lack of good quantitative measures for the output and value created by IT has led to a productivity paradox that has made it difficult for MIS managers to justify the heavy investments made in IT. Factors such as mismeasurement of outputs and inputs, lags due to learning and adjustment, redistribution and dissipation of profits and the mismanagement of information and technology may lead to a productivity paradox in which case the costs would be seen to outweigh the benefits.

1.2 Nairobi City Water And Sewerage Company

NCWSC was incorporated in December 2003 under the Companies Act Cap 486 and was officially launched on August 19th 2004. It is a wholly owned subsidiary of the Nairobi City Council (NCC) and has its headquarters along Kampala Road, Industrial Area, Nairobi with regional offices at Parklands, Kayole Estate, Woodley Estate near Nairobi Dam, Eastleigh Estate, Kariobangi Estate, Enterprise Road in Industrial Area and Pangani. To serve customers better, other business centers have been set up at Comcraft House in the City Centre, Buruburu Shopping Centre, and at The Mall in West lands.

The company has been licensed by the Athi Water Services Board (AWSB) to provide water and sewerage services to the people of Nairobi and its environs. The licence is based on an agreed framework specified in the Service Provision Agreement (SPA) that ensures adequate and quality supply of water, affordable tariffs, and maintenance and improvement of water and sewerage infrastructure.

Before the Water Act (2002) came into force, water and sewerage services in Nairobi were provided by the Water and Sewerage Department (WSD) of the Nairobi City Council (NCC). According to the official records, minutes of meetings and reports inherited by the company from the WSD and collaborated by the NCWSC Customer Perception Survey (2007), service levels fell below customer expectations. The customer data inherited was to a large extent inaccurate and highly unreliable. Customers' details were erroneous, data on the water systems infrastructure was inadequate and some important financial records were either missing or incomplete. Under such circumstances, it was not possible for the company to effectively meet its customers' expectations. Customers took long periods queuing for services at the various service points which were few and far from their reach. There were many complaints of erroneous bills and applications for new water connections took unnecessarily too long to be processed and effected. The company therefore was faced with an urgent task of cleaning up customers' data and its re-organization. To address these issues and improve customer service, the company initiated a project for the implementation of an integrated CMS. The system which was implemented in phases from 2006 became fully operational in 2009.

On 27th August 2010, the NCWSC launched its customer service charter. The service charter, which is an expression of the company's commitment to improving its services to the customers and creating good relations with them, tabulates the various services it offers, the requirements for the provision of these services, their related charges, and the timelines for the delivery of these services. Among the main services offered by the company are effecting new water and sewerage connections, supplying water by water bowsers, licensing private water tankers, repairing water leaks and providing customers with the necessary service information and water bills.

In order to deliver these services to the satisfaction of the customers, the company in its three year strategic plan 2007/8 – 2009/10, recognised the tremendous role that ICT has to play. The company therefore undertook the implementation of several integrated systems. These included Oracle Financials for Accounting and Financial Management, Stores and Procurement Management System (SPMS) for the supply chain, Human Resource Management System (HRMS), Customer Management System (CMS) for customer care and billing and a fleet management system for vehicle tracking & management. Although several other ICT related projects have been initiated, it is the CMS project that has so far received the greatest level of investment among all the systems.

The CMS is the main system used by the management and supervisory staff who are engaged in customer service on a full time basis. To these staff, CMS is the primary tool of work in meter reading and billing. The system is used in the computation and generation of water bills, the enrolment of new customers and the de-enrolment of those customers whose contracts have been terminated as well as in the reimbursement of their cash deposits. The system is also used for the management of water delivery by tankers, delivery of sewer services, handling of customer queries and the resolution of customer complaints.

1.3 The Problem Statement

Over the years there has been an increase in demand for better services and communication worldwide. To meet this demand, many organizations have tried to improve on their technology of production and service delivery by investing in information systems and often incurring heavy

expenditure. According to Kamau (2006), customer service involves answering the phones, channeling potential buyers to sales people, answering questions, handling complaints, documenting complaints, calming agitated customers, compensating them, follow up on issues, remedies and offering before and after sales support. ICT if well applied in these areas can go a long way in influencing customer service. As Mbote (2003) established, ICT can be utilised to improve customer service by extending services to customers over the Internet, facilitating account queries via short message services (SMS), facilitating on-line payments and adopting e-business. Wambugu (2010) concurs with Mbote (2003) that ICT facilitates the introduction of new delivery channels ATMs, Mobile Banking and the like thereby reducing congestion in banking halls. Waithaka (2006) also found out that there was a positive co-relation between the utilization of ICT and enhanced customer satisfaction.

Although in many cases, the utilization of ICT has led to improved business results this is not always the case. Lelei (2007) found out that the ICT goals could not always be realized as expected. This she attributed to the high cost of ICT projects' implementation, high cost of ICT staff, struggles of change management, high expectations from ICT and other vested interests. Brynjolfsson (1992) attributes the lack of realization of the benefits expected from ICT to factors such as mismeasurement of outputs and inputs, lags due to learning and adjustment, redistribution and dissipation of profits and the mismanagement of information and technology. From the studies of both Brynjolfsson (1992) and Lelei (2007), it emerges that the use ICT in an organization does not always lead to improvement in efficiency, productivity or service delivery.

There are however many studies that the researcher has encountered that link the use of ICT to improvement in organizational performance and service delivery. Wambugu (2010) found out that with the commercial banks, ICT was a crucial tool in service delivery and one which has reduced congestion in banking halls to a great extent. It has facilitated the introduction of new delivery channels in the form of ATMs, Mobile Banking, Electronic Cash Transfers and the like. Muchiru (2003) also found out that at the Kenya Commercial Bank, ICT has been used to develop new processes and new products for the customers with great success. With regard to public procurement in Kenya, Nyandimo (2011) established that the extent of ICT adoption in

public procurement in Kenya has a positive impact on procurement management. She found out that due to the adoption of ICT, the procurement staff's services are timely, more ethical, and that there is enhanced client satisfaction and a reduction on transaction costs. Owuor (2004) and Muchiru (2003) concur that ICT has played a major role in changing the way of work. The old procedures that were used in the production and distribution of goods and services have been drastically replaced with new and more efficient ones in line with customer requirements with the help of ICT. The researcher did not find any study similar to these that was undertaken for a water service provider.

According to the NCWSC Customer Perception Survey (2007), the major issues raised by the customers of the company and which were given priority by the management were; poor coverage of water and sewer services in Nairobi, inadequate provision of water and consumption of untreated water, inaccurate meter reading, delayed delivery of water bills and poor employee attitude towards quality customer service. The company embarked on several ICT projects with a view to improving customer services by addressing these issues. Since these ICT projects were commissioned, no study has been undertaken to establish the productivity of ICT in service delivery at the NCWSC. Besides productivity, the extent to which ICT is used across the various areas related to customer service and its influence in these areas has also not been studied. Consequently there exists a knowledge gap which leads to the need to undertake this study with the aim of answering three questions: To what extent has ICT been applied in service delivery at NCWSC, how has the use of ICT affected the work of the staff involved in delivering services to the customers of NCWSC and how has it influenced customer service delivery at NCWSC?

1.4 Objectives of the Study

The objectives of the study are to determine

- a) The extent of the usage of ICT for service delivery at the NCWSC
- b) The effect of ICT on the work of the customer service staff at the NCWSC
- c) The effect of ICT on customer service delivery at the NCWSC

1.5 Value of The Study

This study will be of use to the management of Nairobi City Water And Sewerage Company in helping them to know the extent of usage and the influence of ICT on the company's customer service delivery. If the heavy investment made in ICT and CMS in particular has had no positive influence on customer service, then NCWSC may need to change strategy and identify an alternative system since CMS was primarily targeted at enhancing customer service.

The study will also be of use to the government and other donors who have been financing the implementation of the ICT projects in the company in assessing the effect of the funding they have directed to these projects. Using the findings of this study, they will be able to come up with better strategies and plans as they fund other water service providers across the country. The study will also be of use to the NCC which is the principal shareholder of the company in assessing the justification of the investment they have made in ICT. From the findings of the study, they will be able to take the necessary measures to ensure better practices for ICT governance.

Other WSPs will also benefit from the study as they engage in the implementation of ICT projects of a similar nature. They will be able to identify those areas where the use of ICT can be of benefits in service delivery. Researchers will also find the study useful as they seek to identify areas of further research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Information and Communication Technology

Data processing is a major societal activity. Olson and Gordon (1998) assert that a significant part of an individual's working and personal time is spent recording, searching for, and absorbing information. According to them, man collects data, records it and manipulates it in various ways to produce meaningful information. According to Lucas (1987), quality information is the most vital tool for decision making. For this quality information to be availed, an information system is necessary.

Lucas (1987) states that an information system is a set of organised procedures which, when executed, provides information to support decision making. According to Olson and Gordon (1998), an information system is an integrated user-machine system for providing information to support operations, management, analysis and decision making functions in an organisation. Information technology (IT) forms the backbone of information systems today. Different information systems influence organisations in different ways.

Cole (1995) quoting the Department of Trade and Industry in Britain defines IT as the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numeric information by a microelectronics based combination of computing and telecommunications. Although there is no express definition of ICT in the quote, the element of communication appears in the definition of IT. It is due to this inseparable relationship between information and telecommunication, that the term Information and Communication Technology (ICT) has found its way in many aspects of our lives. ICT has had a big impact in the world today.

According to Kitur (2006), ICT has found a strategic position in many organisations globally. Although simply speaking ICT involves computers, software, communication systems and services, good ICT synthesizes these elements with a concentration on how an organization can best meet its goals. Kitur (2006) claims that where as an ICT strategy gives technological direction and purpose, organises and deploys IT resources in the most effective manner, and

coordinates the stream of decisions being made by different members of the organisation, it is corporate strategy which influences ICT through business strategies, dictating the need for new information systems or other ICT capabilities. An organisation therefore needs to align its IT strategy to business strategy in order to reap maximum benefit from ICT.

There appears to be an opportunity for ICT in every activity in the value chain of any organisation. Kotler (2002) says that every firm is a collection of activities that are performed to design, produce, market, deliver, and support its products and lists down the five primary activities in the value chain as inbound logistics, operations, outbound logistics, marketing and sales, and service. There are also support activities that include procurement, technology development, human resource management and firm infrastructure. According to Owuor (2004), ICT can be applied in any of these activities to enhance customer value. For example, with regard to infrastructure, since the bulk of the work in the accounting function is made up of daily transactions, an ICT based transaction processing system (TPS) can be used to improve accuracy and speed up the processing of transactions. According to Knod and Richard (1991), in quality management, the major task is concerned with process control, inspection and early warnings and process improvement. Without adequate and timely information, it would be impossible to ensure quality of goods or services. In such a case therefore, a good information system is a vital tool for the quality management function. And this is the case in all the other functions.

In the auditing function, ISACA (2010) asserts that auditors use Computer Aided Auditing Techniques (CAATs) to gather and analyse audit information. According to Rittenberg et al. (1994), these tools assist the auditor in testing the effectiveness of control procedures, especially the control procedures that are embedded within computer programs; testing the processing leading to the recorded accounting balances; reading computer files and performing manipulations on those files to assist in evaluating the year end account balances; and assisting in planning, administering, documenting and conducting an audit. According to ISACA (2011), one system that has had a positive impact in the internal audits of many organisations is the Audit Command Language (ACL).

Kotler (2002) asserts that armed with laptop computers, sales representatives can now access information about prospects and customers and provide immediate feedback and sales reports. In this way, sales and marketing managers are able to use ICT based reports on orders, sales, prices, costs, inventory levels, receivables, payables, and so on to achieve their objectives, hence the importance of ICT in the sales and marketing function. Organisations nowadays store such logistical information on centralised databases accessible throughout the organisation and activities previously separated within organisations have been integrated into a total logistics construct. Moreover, this information is shared with suppliers and customers and using ICT, further external integration has resulted in organisations focusing on the total supply chain as a new frontier in their quest to find a competitive advantage. ICT's role in logistics can therefore not be ignored. By the implementation of the Nairobi City Water And Sewerage Company's strategic business plan 2007/8 – 2009/10, the company implemented the SPMS and a Fleet Management System (FMS) to improve its logistics.

ICT also plays a crucial role in the field of research and development. According to Gillett (1976) the concurrent development of the digital computer is credited with the rapid growth of operational research. An example this author gives is that “the simplex method of linear programming was developed in 1947 by George B. Dantzig, but it lay dormant with respect to realistic problems until the mid to late 1950s when the computer, with its high speed and large storage capacity, became common place in many universities and businesses, as well as in government agencies”.

There are many other areas, support functions, careers and professions in which ICT if well applied would be of great value. One such opportunity is provided by the use of the internet. Moody (1996) describes the internet as a global network of computer networks, linking together millions of machines from the mightiest mainframe to the humblest home computer. Any two computers connected to this network can exchange information as easily as if they were linked together directly. Data, information, knowledge and expertise can now easily be shared for the benefit of the individual employees and the organisation as a whole irrespective of the

geographical dispersion of the people. Using the Internet, organisations can communicate to their customer's easily availing information that would hitherto have been difficult to communicate.

There are many areas in which ICT can be applied in a water service provider such as NCWSC. According to Kamau (2006), customer service involves answering the phones, channeling potential buyers to sales people, answering questions, handling complaints, documenting complaints, calming agitated customers, compensating them, follow up on issues, remedies and offering before and after sales support. In all these areas, ICT if well applied would be of great value to NCWSC in influencing customer service. As Mbote (2003) established, ICT can be utilised to improve customer service by extending services to customers over the Internet. In these way, water companies can provide services such as online application for water and sewer services as well as bill presentation.

According to Mbote (2003), other services that ICT can facilitate and which water service providers can offer to their customers those of account querying via short message services (SMS), facilitating on-line payments and adopting e-business. Wambugu (2010) concurs with Mbote (2003) that ICT facilitates the introduction of new delivery channels ATMs, Mobile Banking and the like thereby reducing congestion in banking halls. These too would find ready use in the provision of better services to customers of water companies.

As Gillett (1976) asserts, ICT also plays a crucial role in the field of research and development. For companies engaged in the provision of water and sewerage services, ICT can be used to research on new and better methods of monitoring and managing the water levels in the dams and reservoirs as well as in the transmission and distribution networks and water flows. Geographic Information Systems (GIS) can be used to identify and trace different types of assets such as gate valves, pressure valves, water meters and water pumps.

2.2 Influence of ICT on Different Organisations

Many studies have been made regarding the role played by ICT in various organisations. In all the studies that the researcher encountered, the main aim of investing in ICT has been the need to improve efficiency, ultimately leading to improved service delivery. Kitur (2006) studied the

strategic role of ICT among insurance companies in Kenya. According to the study, over the past few decades, a number of business developments have taken place in business management. They include the transformation of the value chain, influences of the global competition into the way business is done, and the effects of liberalisation of the economy. Arising from these, changing patterns of employment, and changes in the organisation structure due to developments in IT are among the salient developments in business management. Each of these has led to the need to strategically position IT in an organisation. In this way, Kitur (2006) states that, ICT is permeating the value chain at every point transforming the way value activities are performed and the nature of the linkages among them.

ICT is also shaping the way products meet buyer needs. Wambugu (2010) sought to determine the impact of ICT on commercial banks and found out that it was a crucial tool in service delivery and one which has reduced congestion in banking halls to a great extent. ICT facilitates the introduction of new delivery channels in the form of ATMs, Mobile Banking, Electronic Cash Transfers and the like. The researcher concludes that the efficiency brought about by ICT in banks can be realised in any other areas of easy access to customers and staff records, data on assets of the organisation as well as in the front office operations. Muchiru (2003) studied the enabling role of ICT in BPR. The case study which focused on the Kenya Commercial bank established that at the bank, ICT has been used to develop new processes and new products for the customers. The author asserts that today, ICT is a lever for designing processes and therefore instead of it being constrained to satisfy the requirements of the old procedures and products, it challenges those old procedures and replaces them with new ones and new products to meet the customers ever changing needs.

Nyandimo (2011) studied the extent of ICT adoption in public procurement in Kenya and its impact on procurement management. She further sought to establish the relationship between the level of ICT adoption and the quality of service delivery in public procurement and found out that due to the adoption of ICT, the procurement staff's services are timely, more ethical, and that there is enhanced client satisfaction and a reduction on transaction costs. Owuor (2004) studied the use of ICT as a facilitator of BPR at Bidco Oil Refineries. Like in the case of

Muchiru (2003), the study established that ICT has played a major role in changing the way of work. The old procedures that were used in the production and distribution of goods and services have been drastically replaced with new and more efficient ones in line with customer requirements.

Waithaka (2006) studied the levels of customer satisfaction with educational services offered by The Kenya Polytechnic. The researcher established that service firms have been able to leverage the power of IT to enhance time and place utility in their customer offerings. The study establishes a positive co-relation between the utilization of ICT and enhanced customer satisfaction at the Kenya Polytechnic. Njogu (2003) studied the extent of ICT adoption in state corporations in Kenya. The study concludes that since ICT applications are tools of productivity and efficiency leading to a better transparency and accountability in the functioning of government and organizations, then it can provide a weapon against corruption, minimize inefficiencies and improve productivity and service delivery in state corporations.

Ougo (2010) studied ICT as a strategic orientation for service delivery in the Office of the Vice President and Ministry of Home affairs and found out that majority of the respondents believe that the use of ICT has improved service delivery in the ministry and that service delivery to the internal customers is much better now than it was during the days of the manual processes. Lelei (2007) carried out a study on ICT as a strategic tool in Micro Finance Institutions in Kenya. The study sought to establish the extent to which ICT is used as a strategic tool in MFIs in order to compete effectively and survive in a dynamic and turbulent environment. From the study, it was established that in a majority of the studied organisations, technology has re-written business rules and transformed a standalone environment into entities. The researcher found out that IT in MFIs enabled the businesses to address and accommodate global customers, vendors, suppliers, and local customers on a common ground. In this way, access to customers is simplified and service delivery hastened.

Mbote (2003) studied the influence of IT on marketing. The study which was a case of commercial banks in Kenya established that revolutionary advances in IT in Kenya had reinforced economic and social changes in the banking industry. From the study, it emerged that

industries were using IT to create solid relationships with their customers. The study further established that IT has brought numerous changes in the consumer behaviour due to the readily available information and as a result, businesses are increasingly serving many of their customers and prospective customers on the internet. This makes business-customer interaction faster, easier and cheaper.

Kimani (2006) carried out a survey on the application of Marketing Information Systems (MIS) by Savings & Loan (Kenya) Ltd. The study sought to find out how the company uses the information from the MIS to create a sustainable competitive advantage. From the study, it emerged that the information from the system is very useful when formulating interest rates. By the time of the interview, Savings and Loans (K) Ltd had the lowest interest rates on mortgage financing in Kenya a factor that gave the company a superior competitive position and which was attributed to the MIS. The information from this system is also used in gauging the satisfaction level of the customers for the improvement of services.

Since ICT has had a lot of influence in many organizations, different functions in an organization adopt and apply ICT in different paces and to different extents. According to Lelei (2007), the process of embracing ICT is gradual and may take many years for all functions to experience the same level of its utilization. Different organizations were found to use different systems for different functions and to varying extents. The researcher also found out that not all of these organizations achieved their ICT goals due to high cost of implementation, high cost of ICT staff, struggles of change management, high expectations from ICT and other vested interests.

2.3 Customer Service

Kotler (2002) defines customer service as all the activities involved in making it easy for customers to reach the right parties within the company and receive quick and satisfactory service, answers, and resolutions to problems. Customer service is one of the core business processes of any business just like new-product realization, inventory management, customer acquisition and retention, and order-to-remittance activities. Even those organizations that are not in the service industries have to provide product support services to their customers. According to Kotler (2002), firms that provide high quality service out-perform their less

service-oriented competitors. Customers have three service support worries; they worry about reliability and failure frequency, they worry about down time duration and they worry about out-of-pocket costs of maintenance and repair. Many companies operate customer service departments whose quality varies greatly. At one extreme are departments that simply transfer customer calls to the appropriate person or department for action, with little follow-up. At the other extreme are departments eager to receive customer requests, suggestions, and even complaints and handle them expeditiously.

Organisations employ ICT with the intention of improving on the quality of products and services to customers. Quality has been defined in various ways by different authors. Some definitions of quality are “Value”, Feigenbaum (1991), “Fitness for use”, Juran and Gryana (1998), “Conformance to requirement”, Crosby and Stephens (1987), “Meeting and/or exceeding customer expectations”, Panasuraman (1985) and in many other ways.

Panasuraman (1985) presents some criterion for judging service quality. The first characteristic of quality is reliability. Reliability is the consistency of performance and dependability of the product or service. This is followed by responsiveness or the willingness and readiness of the employees to provide the service. The third characteristic of quality is on the competence of the employee and his possession of the required skills and knowledge to perform the service. Accessibility of the customer or the approachability and ease of contact with the service provider is also an important characteristic of quality. Other characteristics of quality are: courtesy; which is described as the politeness, respect, consideration and friendliness of contact personnel; Communicating with the customers or keeping them informed and listening to them; Credibility which is described as trustworthiness, believability and honesty; and security or freedom from danger, risk and doubt. Above all these, understanding the customer is regarded as the foundation of customer service. This involves the effort to understand customers’ needs and requirements. To conclude, Panasuraman (1985) adds tangibility or the physical evidence of the service such as physical facilities, tools or equipment used to provide the service and appearance of contact personnel as the last characteristic of determining quality. The availability of these characteristics determines the level of the quality of the service.

According to Fitzsimmons and Fitzsimmons (2011), for services, the assessment of quality is made during the service delivery process. During this process, customers use five principal dimensions namely reliability, responsiveness, assurance, empathy and tangibles to judge service quality. In concurrence, Mugambi (2006) established that the quality of services is considered to be a critical success factor for contemporary service companies and gives reliability as one of the most important characteristics of quality. According to Gachengo (2004), consumers employ many tangible cues to judge quality of goods. However, when purchasing services, there are fewer tangible cues. In most cases therefore, tangible evidence is limited to the service providers' physical facilities, equipment and personnel.

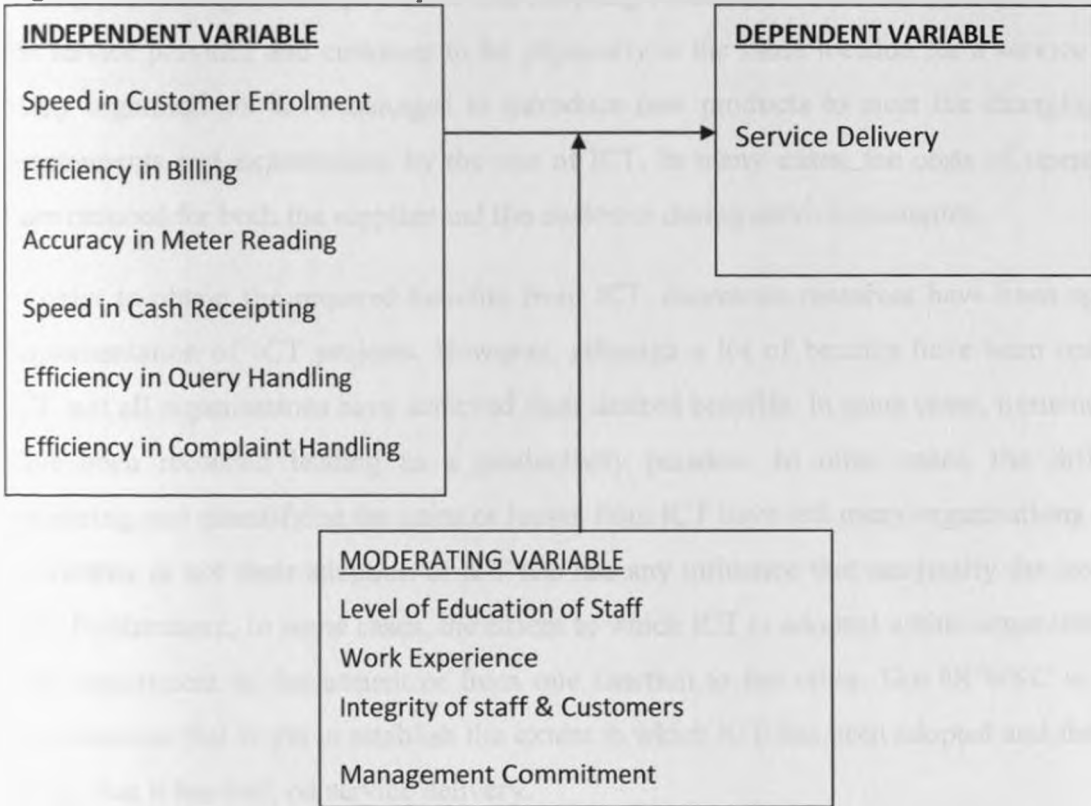
Fitzsimmons and Fitzsimmons (2011) say that technology can play diverse roles and to varying extents in service delivery. The authors give five different modes of service encounter described as A to E. In mode A, the services are offered free of technology and there is direct encounter between the service provider and the customer as is the case with hair dressing services. In mode B, the services are technology assisted and only the service provider has access to the technology to facilitate the service as is the case with an X-Ray operation. Mode C is technologically facilitated and both the customer and the service provider have the same technology. In all these three modes, both the customer and the service provider need to be in the same location. However in mode D, the service is technologically mediated and the customer and the service provider do not need to be in the same locality. There is no face to face contact between the two parties. In mode E, the service is technologically generated and the human service provider is replaced by technology as is the case with ATM services.

Wambugu (2010) established ICT has helped commercial banks in Kenya to introduce new delivery channels in the form of ATMs, Mobile Banking and Electronic Cash Transfers. Nyandimo (2011) found that the adoption of ICT in the procurement process by government ministries has led to the timely delivery of services, enhanced use of ethical standards, enhanced client satisfaction and a more reliable supply of goods.

2.4 Conceptual Model

The Main focus of the study is on the influence on customer service by the application of ICT. This influence may either be experienced by the staff as they carry out their duties in the ICT environment or by the customers as they receive services provided with the use of ICT. The variable relationship is as shown in Figure 2.1.

Figure 2.1: Variable Relationship



Source : Author

From Figure 2.1, the independent variable represents the various factors derived from the ICT based Customer Management System (CMS). Each of these factors is required to have some positive influence on the dependent variable “service delivery”. However, even without the CMS, the depended variable can still be influenced by the level of education of staff, their work experience, their integrity and the commitment of the management towards service delivery.

2.5 Summary of Literature Review

From the various studies cited above, ICT is adopted by organisations with the aim of improving efficiency, profitability and consequently service delivery. ICT has played a significant role in the way organisations do business. It has been utilised to improve customer service by extending services to customers over the internet, facilitating account queries via short message services (SMS), facilitating on-line payments and adopting e-business. It has also minimised the need for the service provider and customer to be physically at the same location for a service encounter. Many organisations have managed to introduce new products to meet the changing customer requirements and expectations by the use of ICT. In many cases, the costs of operations have been reduced for both the supplier and the customer during service encounter.

In order to obtain the required benefits from ICT, enormous resources have been spent on the implementation of ICT projects. However, although a lot of benefits have been realised from ICT, not all organisations have achieved their desired benefits. In some cases, tremendous losses have been recorded leading to a productivity paradox. In other cases, the difficulties in measuring and quantifying the gains or losses from ICT have left many organisations at a loss as to whether or not their adoption of ICT has had any influence that can justify the investment in ICT. Furthermore, in some cases, the extent to which ICT is adopted within organisations varies from department to department or from one function to the other. The NCWSC is one of the organisations that is yet to establish the extent to which ICT has been adopted and the influence, if any, that it has had, on service delivery.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methods and procedures that were followed in conducting the research. It describes the research design, the population of interest and the sampling method. It goes on to explain the data collection procedure, the data collection instruments and the data analysis techniques.

3.2 Research Design

The study was a descriptive survey in design. A descriptive survey is best suited to enable the researcher to describe the characteristics of the entire population and can be used for both quantitative and qualitative data.

3.3 Population

According to Cooper and Schindler (2003), the population of a survey is the subject such as a person, Organization or amount of quantitative data on which measurement is being taken. The population of this study was made up of all the staff of the NCWSC who were in charge of staff that use ICT based systems in their services to the customer. These members of staff included the supervisors, officers, coordinators, managers and the functional directors. According to the company's payroll for the month of July 2012, the total number of staff in these grades totaled to 405.

3.4 Sampling

Judgmental sampling was used. In judgmental sampling, the researcher or some other "expert" uses his/her judgment in selecting the units from the population for study based on the population's parameters. According to Black (2004), Judgmental sampling design is usually used when a limited number of individuals possess the trait of interest. It was the most appropriate sampling technique for this study since the information required could best be obtained from a specific group of staff in the company.

According to Yamane (1967), the following formula can be used for the determination of the sample size of a small population:

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the sample size, N is the population size, and e is the level of precision. When this formula is applied to the populations of 405, with a $\pm 10\%$ precision, a sample size of 80 is obtained. This is how the sample size of eighty (80) members of staff was arrived at.

$$\text{Sample size } n = 405 / (1 + (405 (0.1 \times 0.1))) = 80$$

3.5 Data Collection

The study made use of primary data collected from the 80 respondents. Self-administered questionnaires were distributed to them using the “drop and pick later” method.

Each questionnaire was divided in to three sections. Section A contained questions relating to the bio data of the respondent. Section B contained questions that sought information relating to the extent of ICT usage in the company. Section C contained questions relating to the effect of ICT on the work of staff involved in customer service and the influence of ICT on service delivery at NCWSC.

3.6 Data Analysis

According to Marshall and Rossman (1999), data analysis is the process of bringing order, structure and interpretation to the mass of collected data. It involves the coding, editing and cleaning of data in preparation for processing. Once the completed questionnaires were received, they were checked for completeness and edited for correctness. Descriptive statistics were used to analyze the data in this study with SPSS as the main tool for data analysis and presentation.

For the data collected in Section A of the questionnaire, statistical measures such as frequencies, percentage and the measures of central tendency such as mean and mode were used. Also, for the data collected in Section B of the questionnaire, measures of central tendency such as mean,

standard deviation and frequency distribution were used. The objective was to determine how each variable describes the extent to which ICT is used. For the data collected in section C of the questionnaire, multiple regression was used to explain the influence of the use of the ICT on customer service.

The regression model may be expressed as:

$$y = \alpha + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \beta_4\chi_4 + \beta_5\chi_5 + \beta_6\chi_6 + \varepsilon$$

Where

y = Service Delivery

α = a constant amount (Service Delivery without ICT);

β = the effect of application of ICT, hypothesized to be positive (Regression coefficient) and

χ_1 = Speed in Customer Enrolment

χ_2 = Efficiency in Billing

χ_3 = Accuracy in Meter Reading

χ_4 = Speed in Cash Receipting

χ_5 = Efficiency in Query Handling

χ_6 = Efficiency in Complaint Handling

ε = the “noise” reflecting other factors that influence Customer Service).

The results were discussed and then presented in tables.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter deals with the analysis of data and presentation and discussion of the results. The research was conducted on a sample of 80 employees of the company whose work mainly involves attending to customers and providing them with the various services offered by the company. Eighty self-administered questionnaires were distributed by hand and through e-mail. However, only 56 questionnaires were returned duly filled, making a response rate of 70% which is an adequate response rate for statistical reporting.

4.2 General information

The results on Table 4.1 reveal that a greater proportion of the respondents 21 (37.5%) were supervisors at NCWSC while 12(21.4%) were officers at the company.

Table 4.1: Current job designation

Job designation	Frequency	%
Assistant	9	16.1
Supervisor	21	37.5
Officer	12	21.4
Coordinator	8	14.3
Manager	6	10.7
Director	-	-
Total	56	100.0

The researcher sought to establish the service areas of the respondents, the results on Table 4.2 indicate that 24 (42.9%) of the respondents have been assigned technical duties at the company. These are the people who armed with instructions and reports from the system go to the ground to do the actual work of connecting and disconnecting pipes, meters and other technical jobs which consequently bring them close to the customers. Respondents involved in customer care were 16(28.6%).

Table 4.2: Functional service area

Service Area	Frequency	%
Cash Collection	4	7.1
Customer care	16	28.6
Meter Reading	7	12.5
Technical	24	42.9
Billing	5	8.9
Total	56	100.0

The findings on Table 4.3 reveal that majority of the respondents 26 (46.4%) have worked with the company for a period of six to ten years. This implies that they have good work experience and have been with the company as it undertook the implementation of ICT. However, there is also a large number of respondents who have not worked with the company for more than five years and although they currently use ICT, they may not know how the service delivery at the company was there before the adoption of ICT.

Table 4.3: Years of service

Years	Frequency	%
1 - 5years	16	28.6
6 -10 years	26	46.4
11- 15 years	6	10.7
16 - 20 years	4	7.1
Above 20	2	3.6
Total	56	100.0

The findings on Table 4.4 reveal that majority of the respondents 26 (46.4%) are aged between 26-35 years while 16 (28.6%) are aged between 36-45 years. These findings imply that the respondents had adequate work experience and therefore were well informed on service delivery at NCWSC.

Table 4.4: Ages of the Respondents

Age Group	Frequency	%
18- 25years	2	3.6
26-35 years	26	46.4
36-45 years	16	28.6
46-55 years	6	10.7
Above 56	4	7.1
Total	56	100.0

The results on Table 4.5 indicate that a greater proportion of the respondents were male at 63.3%, female respondents were 36.7%. The findings imply that there was gender representation in the respondents.

Table 4.5: Gender of the Respondents

Age Group	Frequency	%
Males	35	63.3
Females	21	36.7
Total	56	100.0

The researcher sought to establish the education levels of the respondents, the results on table 4.6 indicate that majority of the respondents 34 (60.7%) have university level education while 6 (10.7%) have postgraduate qualifications. Respondents with Diploma/certificate level of education were 16(28.6%). The findings imply that the respondents were qualified and competent staff capable of providing the information sought by the researcher.

Table 4.6: Respondents' Education level

Education level	Frequency	%
Secondary school level	-	-
Diploma/Certificate level	16	28.6
University level	34	60.7
Postgraduate level	6	10.7
Total	56	100.0

The researcher sought to establish whether the respondents had undergone formal training in ICT. The results on table 4.7 indicate that majority of the respondents 45 (80.4%) have formal training in ICT. This implies that they are in a position to give the information sought by the researcher.

Table 4.7: Respondents' training in ICT

Trained?	Frequency	%
Yes	45	80.4
No	11	19.6

The findings on table 4.8 reveal that majority of the respondents 25 (44.6%) use ICT to a great extent in the course of their work while 10 (17.9 %) use ICT to a very great extent. This implies they are well experienced in ICT and well positioned to provide the information sought.

Table 4.8: Extent of work involving ICT devices

Extent	Frequency	%
No Extent	-	-
A Little Extent	3	5.4
Moderate Extent	18	32.1
Great Extent	25	44.6
Very Great Extent	10	17.9
Total	56	100.0

4.3. ICT usage in customer service delivery

Table 4.9: Extent of ICT usage in customer service delivery

Factors	Mean	Standard Deviation	N
ICT is used in the processing of applications for water connections	4.652	0.674	56
ICT is used in the process of contracting new customers	4.870	0.815	56
ICT is used in meter reading	4.542	0.973	56
ICT is used in water billing	4.785	0.972	56
ICT is used in the process of resolving customer complaints	4.945	0.892	56
ICT is used in processing applications for exhauster services	2.584	0.565	56
ICT is used in the process of delivering exhauster services	2.556	0.784	56
ICT is used in the process of licensing private exhausters	3.842	0.784	56
ICT is used in the process of unblocking sewers	2.124	1.234	56
ICT is used in the process of licensing bowzers	4.330	0.745	56
ICT is used in the process of testing water meters	3.945	0.674	56
ICT is used in the Leak Repair process	2.584	1.245	56

Factors	Mean	Standard Deviation	N
ICT is used in delivering water bills	4.756	0.970	56
ICT is used in the process of delivering water to the customer by water tanker.	2.892	0.876	56
ICT is used in responding to customer queries	4.874	0.832	56
ICT is used in the water treatment process	3.430	0.545	56
ICT is used in communicating distribution information to customers	4.945	0.784	56
ICT is used in refund of meter deposits	2.766	0.784	56
ICT is used in the process of testing water quality	3.472	1.200	56
ICT is used in payment of water bills	4.353	0.931	56
ICT is used in the process of pumping water to the customers	3.874	0.564	56
ICT is used in repairing damaged water pipes	3.630	0.734	56

The researcher sought to determine the extent of ICT usage at NCSWSC. The respondents were instructed to respond to the statements on a 5 point Likert scale and indicate the extent they agree with the statements that is: 5-Greatest Extent, 4-Great Extent, 3-Moderate Extent, 2-Little Extent, 1-No Extent. A mean (M) score of 0-1.5 means that the respondents indicated No Extent, between 1.50 to 2.50 -Little Extent, 2.50 to 3.50 -Moderate Extent, 3.50-4.50- Great Extent, and a mean above 4.50 - Greatest Extent. the findings on table 4.6 reveal that ICT is used to greatest extent by the company in: The processing of applications for water connections (M=4.652;SD=0.674), the process of contracting new customers (M=4.870;SD=0.815), meter

reading (M=4.542;SD=0.973), water billing (M=4.785;M=0.972), the process of resolving customer queries (M=4.945; SD=0.892) and communicating and distribution of information to customers (M=4.945; SD=0.7984).

ICT however is used to a little extent at NCWSC in: the process of delivering exhauster services (M=2.556; SD=0.784), the leak repair process (M=2.584; SD=1.245), the process of delivering water to the customer by water tanker (M=2.892; SD=0.876), and refund of meter deposit (M=2.766; SD=0.784).

4.4 Influence of ICT on customer service

Table 4.10: Customer service duties

Factors	Mean	Standard Deviation	N
ICT has made contracting new customers easier	4.902	0.774	56
ICT has made the installation of water meters faster	4.842	0.845	56
ICT has made meter reading easier	4.530	0.793	56
ICT has made meter reading more accurate	4.435	0.982	56
ICT has made water connection easy	3.952	0.790	56
ICT has made delivery by of water by tankers more efficient	2.470	0.761	56
ICT has made itinerary management easier	4.576	0.889	56
ICT has made bill processing faster	4.861	0.685	56
ICT has eased complaint handling	4.874	0.534	56

Factors	Mean	Standard Deviation	N
ICT has eased delivery of exhauster services	2.430	0.645	56
ICT has made the work of unblocking sewers easier	2.445	0.934	56
ICT has made meter testing faster	4.484	0.245	56
ICT has made eased Leak Repair	2.456	0.973	56
ICT has made bill delivery faster	4.873	0.992	56
ICT has eased query resolving	4.845	0.797	56
ICT has eased meter installation	4.430	0.863	56
ICT has made meter removal easier	4.473	0.685	56
ICT has increased the work of customer care staff	4.845	0.804	56

The researcher sought to establish the influence of ICT on customer service at NCWSC, the respondents were instructed to respond to the statements on a 5 point Likert scale and indicate the extent they agree with the statements that is: 5-Strongly agree, 4-Agree, 3-Neutral, 2-Disagree, 1-Strongly disagree. A mean (M) score of 0-1.5 means that the respondents strongly disagreed, between 1.50 to 2.50 means they disagreed, 2.50 to 3.50 means the respondents were neutral, 3.50-4.50 means they agreed, and a mean above 4.50 means the respondents strongly agreed.

From the findings on table 4.8, the respondents strongly agreed that the use of ICT at NCWSC has made: contracting new customers easier (M=4.902; M=0.774), the installation of water meters faster (M=4.842; M=0.845), meter reading easier (M=4.530; SD=0.793), meter reading more accurate (M=4.435; SD=0.982), bill processing faster (M=4.861; SD=0.685), complaint

handling easy (M=4.874; SD=0.534), bill delivery faster (M=4.873; 0.992), and the work of customer care easy (M=4.845; SD=0.804). The respondents however disagreed that: ICT has made delivery by water tankers more efficient (M=2.479; SD=0.761), and that ICT has eased leak repair (M=2.456; SD=0.973).

Table 4.11: Service delivery

Services	Mean	Standard Deviation	N
ICT has reduced the time taken to make new water connections	4.552	0.604	56
The use of ICT has made water bill more accurate	4.870	0.929	56
The use of ICT has led to more efficient water meters	3.642	0.773	56
The use of ICT has reduced the number of customer complaints	3.785	0.872	56
The use of ICT has improved the reliability of water supply	3.945	0.792	56
The use of ICT has made Exhauster services reliable	2.484	0.885	56
The use of ICT has shortened the duration for re-connection of disconnected water meters	2.456	0.984	56
The use of ICT has shortened the time taken to deliver water by tanker	3.802	0.873	56
The use of ICT has improved the quality of water	3.874	0.934	56

Services	Mean	Standard Deviation	N
Management commitment has improved water quality	4.630	1.125	56
The integrity of water treatment staff is main cause of improved water quality	3.934	0.674	56
The use of ICT has increased the amount of water supplied	2.484	1.014	56
The use of ICT has improved Communication with the customer	4.560	0.973	56
The use of ICT has made bill delivery more regular	3.892	1.072	56
The use of ICT has enhanced the quality of water supplied	3.574	0.902	56
The use of ICT has reduced the time taken to pay water bills	4.621	0.965	56
The use of ICT has improved reliability of water supply.	3.945	0.683	56
The use of ICT has made the distribution of water more equitable	3.484	0.980	56
Management commitment has led to an equitable distribution of water supply	2.456	0.750	56
ICT has reduced the time taken to unblock sewers	2.392	0.924	56

Services	Mean	Standard Deviation	N
The integrity of staff has improved service delivery to customers	3.874	1.245	56
Staff training has enhanced customer service delivery	4.630	0.973	56
Staff with a higher level of education provide better service to customers than their counterparts	3.945	1.872	56
Experience in customer service has improved service delivery	4.484	0.892	56
The integrity of customers has helped to improve the services rendered to them	2.456	0.565	56

The researcher further sought to determine the influence of ICT on service delivery at NCWSC. The respondents were instructed to respond to the statements on a 5 point Likert scale and indicate the extent they agree with the statements that is: 5-Strongly agree, 4-Agree, 3-Neutral, 2-Disagree, 1-Strongly disagree. A mean (M) score of 0-1.5 means that the respondents strongly disagreed, between 1.50 to 2.50 means they disagreed, 2.50 to 3.50 means the respondents were neutral, 3.50-4.50 means they agreed, and a mean above 4.50 means the respondents strongly agreed.

Based on the findings on table 4.7, the respondents strongly agreed that: ICT has reduced the time taken to make new water connections (M=4.552; SD=0.604), the use of ICT has made water bill more accurate (M=4.870; SD=0.929), management commitment has improved water quality (M=4.630; SD=1.125), the use of ICT has improved communication with the customer (M=4.560; SD=0.973), and that the use of ICT has reduced the time taken to pay water bills (M=4.621; SD=0.965).

The respondents however disagreed that: The use of ICT has increased the amount of water supplied (M=2.484; SD=1.014), the use of ICT has improved the reliability of water supply (M=2.484; SD=0.792), and that the use of ICT has reduced the time taken to unblock sewers (M=2.392; SD=0.924).

4.5 Regression analysis

Regression analysis is a set of data analytic techniques that examine the interrelationships among a given set of variables. In this study, the independent variables were Speed in Customer Enrolment, Efficiency in Billing, Accuracy in Meter Reading, Speed in Cash Receipting, Efficiency in Query Handling and Efficiency in Complaint Handling. The study sought to establish how these are affected by the use of ICT and on the other hand how they in turn affect the dependent variable which is customer service delivery.

The researcher performed a regression analysis to establish the association between the independent variables with the dependent variable.

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon$$

Where

y = Service Delivery

β_0 = a constant value (Service Delivery without ICT);

X_1 = Speed in Customer Enrolment

X_2 = Efficiency in Billing

X_3 = Accuracy in Meter Reading

X_4 = Speed in Cash Receipting

X_5 = Efficiency in Query Handling

X_6 = Efficiency in Complaint Handling

ε = Std. Error of the Estimate

4.6 Strength of the Model

Analysis in table 4.12 shows that the coefficient of determination (the percentage variation in the dependent variable being explained by the changes in the independent variables) R^2 equals 0.843,



that is, Speed in Customer Enrolment, Efficiency in Billing, Accuracy in Meter Reading, Speed in Cash Receipting, Efficiency in Query Handling and Efficiency in Complaint Handling leaving only 15.7 percent unexplained. The P- value of 0.000 (Less than 0.05) implies that the model of service delivery is significant at the 5 percent level of significance.

Table 4.12: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.896 ^a	.843	.974	2.04756

- a. Predictors: (Constant), Speed in Customer Enrolment, Efficiency in Billing, Accuracy in Meter Reading, Speed in Cash Receipting, Efficiency in Query Handling and Efficiency in Complaint Handling

Table 4.13 ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.144	4	23.286	79.730	.000 ^a
	Residual	53.739	56	.292		
	Total	146.884	60			

- a. Predictors: (Constant), Speed in Customer Enrolment, Efficiency in Billing, Accuracy in Meter Reading, Speed in Cash Receipting, Efficiency in Query Handling and Efficiency in Complaint Handling

- b. Dependent Variable: Service delivery.

Source: Research data 2012

ANOVA findings (P- value of 0.00) in table 4.9 show that there is correlation between the predictor's variables (Customer enrolment, efficiency in billing, accuracy in meter reading, speed in cash receipting, efficiency in query handling and efficiency in complaint handling) and the response variable (Service delivery). An F ratio is calculated which represents the variance between the groups, divided by the variance within the groups. A large F ratio indicates that

there is more variability between the groups (caused by the independent variable) than there is within each group, referred to as the error term.

Table 4.14: Coefficients of regression equation

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	.240	.058		.930	.354
Speed in Customer Enrolment	.896	.077	.297	3.798	.000
Efficiency in Billing	.735	.070	---	---	---
Accuracy in Meter Reading	.913	.062	.013	.215	.001
Speed in Cash Receipting	.851	.077	.406	5.445	.000
Efficiency in Query Handling	.434	.045	.320	.345	.000
Efficiency in Complaint Handling	.596	.083	.245	.976	.002

a. Dependent Variable: Service delivery

Source: Research data 2012

The established multiple linear regression equation becomes:

$$y = 0.240 + 0.896X_1 + 0.735X_2 + 0.913X_3 + 0.851X_4 + 0.434X_5 + 0.596X_6 + 2.04756$$

Where

Constant = 0.240, this implies that without ICT there would be no speed in Customer Enrolment, efficiency in Billing, accuracy in Meter Reading, speed in cash receipting, efficiency in query handling and efficiency in complaint handling, and therefore the level of service delivery would be 0.240. $X_1 = 0.896$, implies that one unit change Speed in Customer Enrolment results in 0.896 units increase in service delivery. $X_2 = 0.735$, implies that one unit change in Efficiency in Billing results in 0.735 units increase in service delivery. $X_3 = 0.913$, implies that one unit change in Accuracy in Meter Reading results in 0.913 units increase in service delivery. $X_4 = 0.851$, implies that one unit change in Speed in Cash Receipting results in 0.851 units increase

in service delivery. $X_5=0.434$, implies that one unit change in Efficiency in Query Handling results in 0.851 units increase in service delivery. $X_6= 0.596$, implies that one unit change in Efficiency in Complaint Handling results in 0.596 units increase in service delivery.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of findings as discussed in chapter four. Based on the objectives of the study, the research findings, conclusions and recommendations are discussed. The study aimed at establishing the extent of the usage of ICT for service delivery at the NCWSC, the effect of ICT on the work of the customer service staff and the effect of ICT on customer service delivery.

5.2 Summary of findings

From the findings, a majority of the respondents were in the middle level in the organisation structure namely officers and supervisors. These are the people whose work mainly entails delivering services to the customer and use ICT in varying extents. The largest number of respondents is engaged in technical work while the other respondents are either cashiers, meter readers, customer care staff or engaged in billing. These employees constantly interact with the customers as they deliver the services are therefore well placed to assess the levels of customer service. They are also best positioned to understand the extent of the usage of ICT for service delivery in the company and its effect on their work.

The findings indicate that most of the respondents were male. This implies that there are more male staff than there are female as is the case in many others organisations in Kenya. The study also reveals that that majority of the respondents 26 (46.4%) have worked with the company for a period of six to ten years. This implies that they have good work experience and have been with the company both during the days that ICT systems had not yet been implemented and after their adoption. However, there are 16 respondents (28.6 %) who have worked with the company for less than five years and although they currently use ICT, they may not be in a position to state objectively whether service delivery has been influenced by ICT since they do not know how it was there before they joined the organization.

The findings further reveal that majority of the respondents 26 (46.4%) are aged between 26-35 years while 16 (28.6%) are aged between 36-45 years. These findings indicate that majority of the employees are in their middle ages and have a clear understanding of customer expectations since most of them are family people who also depend on the company for water and sewerage services for their families. The findings also indicate that majority of the respondents 34 (60.7%) have university level education while 6 (10.7%) have postgraduate qualifications. Respondents with Diploma/certificate level of education were 16(28.6%).

The findings imply that NCWSC has employed qualified and competent staff who are able to use ICT to improve service delivery in the company. Also the study found out that 45 out of the 56 (56.3 %) respondents have undergone formal training in ICT. This implies that they are able to make good use of the ICT facilities provided for their work. The study also found out that majority of the respondents 25 (44.6%) use ICT to a great extent in the course of their work while 10 (17.9 %) use ICT to a very great extent. This implies that their work is highly influenced by ICT. All the respondents use ICT devices in the course of their work although some use them more than others.

The researcher sought to determine the extent of ICT usage at NCSWSC. The respondents were instructed to respond to the statements on a 5 point Likert scale and indicate the extent they agree with the statements that is: 5-Greatest Extent, 4-Great Extent, 3-Moderate Extent, 2-Little Extent, 1-No Extent. The findings on table 4.6 reveal that ICT is used to greatest extent by the company in water billing (M=4.785;M=0.972), resolving customer queries (M=4.945; SD=0.892) and communicating and distribution of information to customers (M=4.945; SD=0.7984). ICT however is used to a little extent at NCWSC in the process of delivering exhauster services (M=2.556; SD=0.784) and in the leak repair process (M=2.584; SD=1.245)

The researcher also sought to establish the influence of ICT on customer service at NCWSC, the respondents were instructed to respond to the statements on a 5 point Likert scale and indicate the extent they agree with the statements that is: 5-Strongly agree, 4-Agree, 3-Not Sure, 2-Disagree, 1-Strongly disagree. From the findings, the respondents strongly agreed that the use of ICT at NCWSC has made: contracting new customers easier, the installation of water meters

faster, meter reading easier and more accurate, bill processing faster and complaint handling easier. Bill delivery has also been made faster with the use of ICT and the work of customer care easier. The respondents however disagreed that: ICT has made delivery by water tankers more efficient and that ICT has eased leak repair.

The researcher further sought to determine the influence of ICT on service delivery at NCWSC. The respondents were instructed to respond to the statements on a 5 point Likert scale and indicate the extent they agree with the statements that is: 5-Strongly agree, 4-Agree, 3-Not Sure, 2-Disagree, 1-Strongly disagree. The study found out that ICT has reduced the time taken to make new water connections, made water bills more accurate, improved communication with the customers reduced the time taken to pay water bills. The study also established that management commitment has also improved water quality. The study however found out that the use of ICT has had no positive influence with regard to the amount of water supplied, reliability of water supply, the unblocking of sewers.

The regression analysis provided a deeper insight in to the relationship between the use of ICT and the independent variables (speed in Customer Enrolment, efficiency in Billing, accuracy in Meter Reading, speed in Cash Receipting, efficiency in Query Handling and efficiency in Complaint Handling) and consequently the level of service delivery. The study established that without ICT, there would be no speedy Customer Enrolment, no efficiency in Billing, no accuracy in Meter Reading, no speedy cash receipting, no efficiency in query handling and no efficiency in complaint handling, and therefore the level of service delivery would be 0.240.

However with the use of ICT, there would be an increase in each of these variables leading to a corresponding, though not equal increase in service delivery. For example, the study established that one unit change Speed in Customer Enrolment results in 0.896 units increase in service delivery while one unit change in Efficiency in Billing results in 0.735 units increase in service delivery. The study further established that one unit change in accuracy in Meter Reading results in 0.913 units increase in service delivery, one unit change in Speed in Cash Receipting results in 0.851 units increase in service delivery, one unit change in Efficiency in Query Handling

results in 0.851 units increase in service delivery and that one unit change in Efficiency in Complaint Handling results in 0.596 units increase in service delivery.

5.3 Conclusions

The study established that without the use of ICT, there would be no speedy Customer Enrolment, no efficiency in Billing, no accuracy in Meter Reading, no speedy Cash Receipting, no efficiency in Query Handling and no efficiency in Complaint Handling. From the findings the study concluded that there is a positive correlation between the speed in customer contracting, efficiency in billing, accuracy in meter reading, speed in cash receipting, efficiency in query handling and efficiency in complaint handling on the one hand and the dependent variable Service delivery on the other hand.

Since these variables have been positively influenced by ICT, it means that ICT has had a positive influence in the delivery of customer services at NCWSC. Furthermore, the employees engaged in delivering services to the customers find their work easier due to the usage of ICT although ICT is used more in some functions than in others.

5.4 Limitations of the study

The study was limited to only those areas that relate to customer service in the front office such as cash collection, meter reading, billing, delivery of water and sewer services but did not dwell on other areas such as water treatment, abstraction from the dams and management of sewage and its treatment. This was due to resource constraints such as money and time. The respondents were members of staff engaged in the delivery of services to the customers and are likely to be biased while giving their responses. Furthermore, the staff are well known to the researcher and this may also have led to biased responses.

In addition to the above, since the questions covered various processes which all lead to the delivery of services, it is possible that some respondents only had information relating to the particular processes that they are involved in and that they may not have had sufficient information about other processes. For example, some respondents involved in the delivery of

water services by tankers may not have had sufficient information on sewer services and vice versa. Lastly, the study relied on primary data only and did not take into account secondary data such as that collected during previous customer perception surveys.

5.5 Recommendations and Suggestions for further Research

The researcher recommends that further research be done on the reasons for the slow pace of adoption of ICT in the non-commercial functions at NCWSC and at the other service providers. Areas such as Water & Sewer treatment, water abstraction and the use of Geographical Information Systems to map water infrastructure need to be studied. Additionally, in a country like Kenya where water is a scarce commodity, research needs to be done on the role that ICT can play in water conservation and the recycling of waste water.

Further research should be done to establish the customers' perception of ICT and service delivery. Studies need to be done on the use of ICT for prepaid metering of water and remote sensing of meters. If adopted, remote meter reading and prepaid metering may ease the work of having to move from meter to meter taking the readings manually. Lastly, research needs to be done to establish ways in which water companies in Kenya can use one single Information System for standard tasks such as meter reading and billing instead of each company investing on its own information system.

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APPENDIX 1 : QUESTIONNAIRE

I am a post graduate student at the University of Nairobi specialising in Management Information Systems. As part of this course, I am carrying out a research on how the use of Information and Communication Technology (ICT) by Nairobi City Water and Sewerage Company has influenced service delivery.

This is to request you kindly to fill in this questionnaire by responding to the questions concerning the application of ICT in the company. All responses will be handled with utmost confidentiality and will not be used for any purpose other than this academic study.

Thank you in advance.

Signed

Date

Gideon N. Nguu

SECTION A:

GENERAL INFORMATION - NCWSC

Kindly fill this questionnaire as accurately as possible by ticking in the appropriate space

1. What is your Current job designation?

Assistant []

Supervisor []

Officer []

Coordinator []

Manager []

Director []

2.. Which is your main functional (service) area

Cash Collection []

Customer Care []

Meter Reading []

Billing []

Technical []

Other (specify) _____

3. What is your gender? Male []

Female []

4. For how many years have you worked for the company (include any served at NCC) _____?

5. What is your Age Group?

18 - 25 Years []

26 - 35 Years []

36 - 45 Years []

46 - 55 Years []

Above 56 []

6. What is your highest level of education?

Secondary School Level []

Diploma/Certificate level []

University Level []

Postgraduate level []

Others (Please Specify) _____

7. Do you have any formal training in ICT? Yes [] No []

8. To what extent does your work involve the use of ICT devices ?

No extent [] A little extent [] Moderate extent []

Great extent [] Very Great extent []

SECTION B: EXTENT OF ICT USAGE IN CUSTOMER SERVICE DELIVERY

Please indicate the degree to which you agree with the following statements with regard to the extent of the usage of ICT on service delivery activities in NCWSC

FACTORS	No Extent (1)	Little Extent (2)	Moderate Extent (3)	Great Extent (4)	Greatest Extent (5)
ICT is used in the processing of applications for water connections					
ICT is used in the process of contracting new customers					
ICT is used in meter reading					
ICT is used in water billing					
ICT is used in the process of resolving customer complaints					
ICT is used in processing applications for exhauster services					

FACTORS	No Extent (1)	Little Extent (2)	Moderate Extent (3)	Great Extent (4)	Greatest Extent (5)
ICT is used in the process of delivering exhauster services					
ICT is used in the process of licensing private exhausters					
ICT is used in the process of unblocking sewers					
ICT is used in the process of licensing bowsers					
ICT is used in the process of testing water meters					
ICT is used in the Leak Repair process					
ICT is used in delivering water bills					
ICT is used in the process of delivering water to the customer by water tanker.					
ICT is used in responding to customer queries					
ICT is used in the water treatment					

FACTORS	No Extent (1)	Little Extent (2)	Moderate Extent (3)	Great Extent (4)	Greatest Extent (5)
ICT is used in communicating distribution information to customers					
ICT is used in refund of meter deposits					
ICT is used in the process of testing water quality					
ICT is used in payment of water bills					
ICT is used in the process of pumping water to the customers					
ICT is used in repairing damaged water pipes					
Others. (Please specify and rate accordingly)					

SECTION C: INFLUENCE OF ICT ON CUSTOMER SERVICE

PART 1: CUSTOMER SERVICE DUTIES

Please indicate the degree to which you agree with the following statements with regard to the effect of the use of ICT on service delivery work in NCWSC

FACTORS	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
ICT has made contracting new customers easier					
ICT has made the installation of water meters faster					
ICT has made meter reading easier					
ICT has made meter reading more accurate					
ICT has made water connection easy					
ICT has made delivery by of water by tankers more efficient					
ICT has made itinerary management easier					
ICT has made bill processing faster					
ICT has eased complaint handling					
ICT has eased delivery of exhaustor services					
ICT has made the work of unblocking sewers easier					
ICT has made meter testing faster					
ICT has made eased Leak Repair					

FACTORS	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
ICT has made bill delivery faster					
ICT has eased query resolving					
ICT has eased meter installation					
ICT has made meter removal easier					
ICT has increased the work of customer care staff					
Others. Please specify and rate accordingly					

PART 2: SERVICE DELIVERY

Please indicate by ticking in the appropriate boxes the degree to which you agree with the following statements with regard to the use of ICT on service delivery in NCWSC

Services	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
ICT has reduced the time taken to make new water connections					
The use of ICT has made water bill more accurate					
The use of ICT has led to more efficient water meters					

Services	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
The use of ICT has reduced the number of customer complaints					
The use of ICT has improved the reliability of water supply					
The use of ICT has made Exhauster services reliable					
The use of ICT has shortened the duration for re-connection of disconnected water meters					
The use of ICT has shortened the time taken to deliver water by tanker					
The use of ICT has improved the quality of water supplied					
Management commitment has improved water quality					
The integrity of water treatment staff is main cause of improved water quality					
The use of ICT has increased the amount of water supplied					

Services	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
The use of ICT has improved Communication with the customer					
The use of ICT has made bill delivery more regular					
The use of ICT has enhanced the quality of water supplied					
The use of ICT has reduced the time taken to pay water bills					
The use of ICT has improved reliability of water supply.					
The use of ICT has made the supply of water more equitable					
Management commitment has led to an equitable distribution of water supply					
The use of ICT has reduced the time taken to unblock sewers					
The integrity of staff has improved service delivery to customers					

Services	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
Staff training has enhanced customer service delivery					
Staff with a higher level of education provide better service to customers than their counterparts					
Experience in customer service has improved service delivery					
The integrity of customers has helped to improve the services rendered to them					
Others. Please specify and rate accordingly					

THANK YOU FOR YOUR COOPERATION.