EFFECT OF TECHNOLOGICAL APPLICATIONS ON SERVICE DELIVERY AMONG CONSUMERS OF NAIROBI CITY WATER AND SEWERAGE COMPANY

BY

TIMOTHY IRIMU MURIGU

MASTER OF BUSINESS ADMNISTRATION (CORPORATE MANAGEMENT)

KCA UNIVERSITY

2020

EFFECT OF TECHNOLOGICAL APPLICATIONS ON SERVICE DELIVERY AMONG CONSUMERS OF NAIROBI CITY WATER AND SEWERAGE COMPANY

BY

TIMOTHY IRIMU MURIGU

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF BUSINESS ADMNISTRATION (CORPORATE MANAGEMENT) IN THE SCHOOL OFBUSINESS AND PUBLIC MANAGEMENT AT KCA UNIVERSITY

OCTOBER 2020

DECLARATION

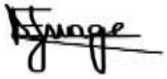
I declare that the work in this research project has not been previously submitted in any institution for award of any degree.

Sign: _____ Date: _____

Timothy Irimu Murigu

18/02512

I do hereby confirm that I have examined the research project of Timothy M. Irimu

Sign: __  _____Date: __27th September, 2020_____

Dr. Nafula Waswa

DEDICATION

This research project is dedicated to my family.

ACKNOWLEDGEMENT

I appreciate my supervisor Dr. Nafula Waswa for her guidance. I acknowledge my family for their support. I also appreciate my colleagues and lecturers for supporting me.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

In the highly competitive service industry, the use of technology has been advanced as a source of competitive advantage by its ability to increase productivity, reduce costs of operation through the use of alternative delivery systems like self-service options. The water service provision in Kenya has incorporated technological application and systems to its service delivery in an effort to satisfy the market and its consumers. This study explored some of the technological applications that NCWSC had adopted in an effort to offer excellent and quality service delivery to its customers. The main objective of this research was to determine the effect of technological applications on service delivery among consumers of Nairobi City Water and Sewerage Company. The specific objectives covered the technological applications of Maji Voice application, customer management system and Per Pay system and the effect they had on service delivery among the consumers of NCWSC. The study was anchored on the institutional theory, the actor network theory and the SERVQUAL model. The researcher specifically targeted senior management level staff from the following departments IT, Human Resources and Customer care and census was adopted since the 77 members could be access to respond to the research questions. Organized questionnaires were used by the researcher to gather primary data from the sources using a drop-and-pick later procedure. The reliability and validity were measured by examining the used devices for the reliability and effectiveness of the Alpha values. The data was summarized and coded to enhance easy classification, tabulation and interpretation. The data was entered into SPSS version 23.0 for further analysis, descriptive analysis were computed like the measures of central tendencies of mean, standard deviation, percentages and frequencies. Inferential statistics were also conducted through multiple regression to test the strength of the correlation between the variables. The analyzed data was illustrated in charts, figures, and tables so as to enhance easier translation, understanding and explanations. The study established that 47.2% variation in service delivery among consumers of NCWSC is explained by technological applications that are in place, MajiVoice applications had significant effect on the service delivery among consumers of Nairobi City Water and Sewerage Company while customer management system and Per Pay system had great but insignificant effect. The study concluded that MajiVoice applications had significant effect on the service delivery among consumers of Nairobi City Water and Sewerage Company while customer management system and Per Pay system had insignificant effect. The recommends that the management of Nairobi City Water and Sewerage Company should upgrade on the technological applications so as to improve on service delivery among consumers. The management team of Nairobi City Water and Sewerage Company should invest a lot of resources in MajiVoice applications so as to improve service delivery among consumers. The customer care managers of Nairobi City Water and Sewerage Company should work together with IT managers to improve on customer management system so as significantly contribute towards service delivery among the customers. The ICT managers of Nairobi City Water and Sewerage Company overhaul that Per Pay system to ensure that it significantly enhances service delivery among the customers. The study was limited by a small sample size.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

In customer oriented service industry, the quality of service delivery is key in survival and success of the industry players and such a market. The success of organizations in this sector is fully dependent on effectiveness and efficiency in service delivery to the customers, which will lead to customer satisfaction (Monstadt & Schramm, 2017). Once the customers are satisfied with the quality of service they get from an organization and as such that their needs are met, then they become loyal to the firm which ensures continuous business in the future. Rono (2018) stated that effective and efficient service is one that satisfies the customer needs and the market wants consistently over time. Ultimately, the quality of service will enable the creation and sustaining worthy relationships between the firm/business unit and customers by delivering service as per their ever changing needs. According to Turman-Bryant, Nagel, Stover, Muragijimana and Thomas (2019) service delivery is the processes and structure set within the organization on how services will be provided to the market and its customers. In the current business environment, in order to provide high quality services that yield competitive advantage, organizations have integrated their service delivery protocols with information technology capabilities and modern technological applications.

The water industry is facing changes due to effects of severe climatic changes, urbanization, rise in the number of knowledgeable and demanding customers and emergence of digital technologies (Rodell, Famiglietti, Wiese, Reager, Beaudoing, Landerer & Lo, 2018). The survival and thriving of the water industry relies on its response and reaction to the changes, as they can be turned into opportunities that can benefit the business entities, the environment and customers. Tilahun (2015) shares that there is water scarcity from the effects of urbanization, changing lifestyles and dietary demands, and the quality of the available water is poor due the effects of water pollution like domestic wastage and agricultural produce run-off and water loss through leakage is a major concern for many economies. These trends, have led to different responses, like in England-the Wales water utility has embarked on replacement of water mains system for 109 kilometers that is 150+ years old to prevent water loss (Sousa, Ribeiro, Barbosa, Pereira & Silva, 2018).

On water scarcity, the people are encouraged to recycle water and harvesting rain water to supplement the scarce water sources. Water scarcity is also addressed by educating the water pollution and measures to handle it, community governance and protecting the water sources as well as partnering with government bodies and non-governmental agencies to manage water sources, usage and safety. Other common trends are adoption and usage of water modeling technologies to protect the people from effects of flooding using dikes; use of efficient irrigation techniques and management schemes that will reduce water pollution and help the agricultural sector; re-use of wastewater by shifting from linear model to circular model and the use of smart and intelligent network technologies through the use of Internet of Things (IoT) devices that can analyze water data, inform the sector players on the best infrastructure systems and improve its productivity (Furlong, De Silva, Guthrie & Considine, 2016). The use of technology has been praised to solve the problem of data and information on the status of the sector and be a response to the demanding nature of the customers and consumers of water. In the quest to improve service delivery to the market, customers and consumers, use of modern technology has been recognized as an adequate answer (Rodell, *et al.,* 2018).

Service industries have incorporated technological applications in all their organizational operations including customer care desk, customer service centers, feedback desk for either compliments or complaints. The information technology service portals have helped in promoting high quality service delivery, productivity and improved the general customer satisfaction with the service and the organization (Giri & Shakya, 2018). When considering the water provision and distribution sector, use of information technology has enabled the customers to raise any issues with water supply, shortages, quality of the water and sewerage and compliments on good service delivery. The firms have an automated self-service customer care desk, where the consumers can report any issues and gain answers to their questions, they may also fill a form to give feedback on water service delivery either to their homes or work places. Some of the common ICT enabled service delivery channels include automated water quality sensors, automated water consumption meters, geographical information system (GIS) and communication infrastructure with the use of mobile phone linkage (Giri & Shakya, 2018).

The use of technology and modern applications in an organization is beneficial as it leads to reduction in overhead costs like those for monitoring and inventory of operational materials and

activities. It also improves efficiency in service provision and increases revenue collection as all service provider have their customers' information and data on a software that can easily be retrieved and invoices sent, once the payments are made, it is also easier to check and cross-reference the material (Strzelecka, Ulanicki, Koop, Koetsier, Van Leeuwenb & Elelman, 2017). Water provision companies have adopted the use of information technological applications in their operations with the aim of gaining benefits like effective monitoring since technological application and systems allow easy data transfer, reduces cases of manual data error and it is cost effective. Another benefit of using ICT is it reduces response time, production costs and maintenance costs while optimizing operations at the firm. There are other benefits accrued by water firms in using technological applications and systems like improved water collection rates through the use of mobile money platforms like MPESA and strengthening the feedback mechanism from the consumers. The current study explored the effect of technological applications on service delivery among consumers.

1.1.1 Technological Applications

Organizations across the globe in search of competitive edge and its ability to survive in the ever-changing business environment have shifted their attention and adopted technology. Many of these organizations are using technological applications and systems in their operational processes, as an input in the final product they sell to the market and in its ability for its safety and security features. Dai and Lee (2018) mentions that technology is all the elements that are related to computing technology with aspects like hardware, software, networking, internet and specialist people who use these technologies. These technologies are used in telecommunications, data management, and information processing and high-end data analysis. Baumüller (2016) reveal that in today's world, many organizations are using technology to invent and innovate products that solve business problems, help the firms' in making every day decision making process that affect the end result, enhance quality of outputs and production levels which enables the firms to compete in the different market places.

Technological applications are used by the management of organizations to control, guide and manage the business functions and activities, the organizational resources and all its personnel. It also ensures that all systems within the firm are functioning at top speed to ensure that they can satisfy the market needs, through effective and efficient product and service delivery. According

to Giri and Shakya (2018) technology is a functioning unit that has been compulsory for all organizations that are seeking to make a presence in the market by the goods and services. In the service industry, technologies are used to ensure safety and security of the clientele, efficient and quick service and ease in communication, where requests and responses are handled effectively. Technology comes in handy, since the service industry is largely based on human touch and the only way to succeed is based on customer service. The use of technology involves streamlining processes, enhancing customer experience, improving efficiency and increases revenue earnings from the delivered services (Monstadt & Schramm, 2017).

According to Muchai and Kimuyu (2017) the achievement of vision 2030 is also only possible through advanced technologies. With good technologies in place, there is likelihood of an improved water resource management technique as well as creation of more accountable leadership when it comes to management of water as a resource. In addition, technology like customer care numbers as well as social network sites may be used to communicate to customers and hence help them air their views on how they would wish to be served better. According to Dai and Lee (2018) such networks also work towards improving the knowledge sharing and hence dissemination of good practices as well as fostering multi-stakeholder partnerships among others.

1.1.2 Concept of Service Delivery

Service delivery is the concept of provision of services to the public, market or consumers that meet their needs and are of high quality. At the end of the day, shifting the public to become loyal customers is dependent upon creating value to the users with each of the purchases that they make (Kratz, 2019). The services are intangible products offered by an organization to the market in response to a need, taste or preference, and its quality standard is measured by feelings the consumers get after consumption of the service product. According to Ajibade, Ibietan and Ayelabola (2017) service companies can be rated as successful only if they deliver services that answer the needs of the public, in the quantity, quality and price that reflects the value of the product to the consumers and the market.

The management of an organization can determine the success or failure of the firm, based by the service delivered to the market and customers. Agarwal (2017) mentions that poor service is when the services are of poor quality, ineffective to the customer needs and preferences and late

delivery such that customers are left waiting for a long time to be served. To rectify such, the management of an organization can improve their service delivery by properly training its staff in efficiency service delivery, hiring highly qualified and experienced staff, build a strong organizational culture that is service oriented and developing organization structure by formulation of service charters that guide the operations of the firm.

Turman-Bryant, *et al.* (2019) mentions that other than working on the skills and attitudes of the staff, the organizational structure and culture, many service companies are investing and employing advanced technological systems and applications to improve their service delivery. Technological applications and system make it easier for the public to inform them of their needs and preferences, get feedback on their suggestions and complaints and rate the service they got from the facility. It now common practice for many firms to give their customers feedback forms to be filled in an effort to improve their service provision. At the same time, marketers have recognised that new customers will often check the ratings, reviews and feedbacks by previous customers, before making their final purchase decision. As such, service companies have learnt from what reviews are given on their social media platforms like Twitter, Facebook and Webpages to improve their service provision and delivery. The Nairobi water and sewerage company has adopted the same medium, such that they have a robust social media presence and pursue communication with the public on the services and delivery protocols. They also work to allay any fears on their product quality, respond to inquiries and pass communique to the public in an effort to satisfy the customers' needs.

1.1.3 Effect of Technology Applications on Service Delivery

Customer service is the glue that will stick together all the operations of the organization, and the quality of the service will either enhance or decrease customer loyalty to the organization and its products and the brand (Laudon & Laudon, 2016). In the highly competitive service industry, the use of technology has been advanced as a source of competitive advantage by its ability to increase productivity, reduce costs of operation through the use of alternative delivery systems like self-service options. At the same time, technology is the force behind service innovation, like ATMs, mobile money transfer services, automated voice mail, fax machine usage, interactive voice response systems and security and safety features like passwords and other protection services.

Technology has enabled marketing companies easily advertise their products through internet marketing channels and systems, the manufacturing companies have also benefited by use of technology to automate their systems so as to provide, accurate, high quality products to meet the market needs, while the service industry has gained by opening up millions of communication channels through the use of technological applications and systems to quickly reach the masses (Giri & Shakya, 2018). For the water service provision companies, the use of technology has made them offer high quality of products since the testing and monitoring of the water quality is automated and once the standards are set, a signal is sent when the water is of poor quality and then remedial work is done. This ensures that the firms do not abuse the trust placed on them to deliver high quality service to its customers and the public (Tilahun, 2015).

The use of technology, Strzelecka, *et al.* (2017 shares has increased the scope and reach of business people as they can share information on their products to people across the globe using the internet. The internet has made the market for products one bid service area without boundaries, such that information, transactions and services can move across countries and regions, since service providers can reach anybody who accesses the web. Technologies also allow prompt service delivery like automatic car wash, automatic cash dispensers and motion sensors, which allows the public get services promptly which increases their satisfaction. According to Ndirangu and Schaer (2017) the water service provision in Kenya has incorporated technological application and systems to its service delivery in an effort to satisfy the market and its consumers. Some of the technologies adopted included, settling monthly water bills using M-PESA money services option, adoption of MajiVoice platform for communication with the public and customer management systems for catering to the customers and billing management by sending notifications and reminders. Rono (2018) shared that use of websites to disperse information, and e-mails that customer can ask questions and gain quick responses and other communication tools have led to increase in customer satisfaction. The water firms are also using software to improve the relationship with the customers by gathering data, communicating any changes to dispel fears, store and share information (Otieno, 2019).

1.1.4 Nairobi City Water and Sewerage Company (NCWSC)

The Nairobi City Water and Sewerage Company (NCWSC) was established by companies act and integrated in 2003 and owned by Nairobi County. The main agenda of establishing this

company was to provide clean water to the citizens and efficient sewerage services. It has rules and regulations that guide all its activities, which is currently managed by the Nairobi City County Government. NCWSC management is divided into six (6) administrative units referred to as regions namely Eastern, Northern, North Eastern, Central, Southern and Western and together there are twenty five (25) zones that work to ensure the mandate of the firm is achieved.

In supply of clean water to the Nairobi residents, the NCWSC is guide by the 2016 Water Act, which mandates that the company set up regional water boards and assign them duties and responsibilities. Some of which include monitoring and reporting on matters to do with sanitation, piping, water related utilities and water provision or lack of it in their areas. These boards often oversee any major development in water provision and sewerage services. The main duty of NCWSC is to provide regular and clean water to the 4.3 plus million people currently residing within Nairobi County and perform sewerage services.

NCWSC has had cases of mismanagement where billions of shillings have been lost, some customers are under-billed while others are over-billed and some are not even billed for water consumption. Another issue was lack of adequate data on the water system, customers had to queue for long hours in banks to pay for their water bills, coupled with occasional machine breakdown and insufficient staffs who left their desks unattended for long hours. Service provision was poor such as getting water meter one followed lengthy procedures. These complaints led to the firm to develop an Integrated Customer Management System to capture customer details and data in 2006-2009 which came under the customer service charter of NCWSC of 2010. The strategic plan for 2009/10 advocated for Information Communication Technology (ICT) to enhance customer service delivery, which brought along Oracle Financials for the Financial and Accounting Control and Management, Stores and Procurement Management System (SPMS) and Customer Management System (CMS). These systems have brought order to the billing of customers, procurement of materials, equipment and resources and handling of customer queries and resolving of customer complaints.

1.2 Problem Statement

Urbanization has increased the population of residents of Nairobi County to about 4.3 Million people, who demand services like effective sewerage service, water and water sanitation levels. The residents are well-informed using social media platforms hence they demand regular and

sufficient clean water supply for their use. The Nairobi Water and Sewerage Company has been unable to deliver that to many residents, with some estates having no water in their taps, some access water once or twice a week; there is have been many complaints on double billing and wrong billings and the issue takes very long to be resolved. The company has also been unable to roll-out wastewater recycling measures and other technologies that will improve the quality of water and customer service management by resolving and responding to their issues (Ndirangu & Schaer, 2017). In many parts like Singapore and England, the use of technology has been able to improve the quality of water, help in managing water pollution and managing customers and consumers' expectations through communication and educating them. This makes it necessary to explore the impact that technological applications will have in service delivery to consumers of NCSWC.

The NCWSC report of 2016, shows that many residents are affected by flooding during the rainy season due to climate change impact, the pipes have never been rehabilitated since their installation in the 1970s and they are near the sewerage system which causes contamination and water loss due to spillage and fifty percent (50%) of the inhabitants have a direct connection to piped water, and about forty percent (40%) receive their share of water on a 24-hour basis, such that a lot of the residents do not receive regular and sufficient water supply. The customer complaints are not resolved in time hence calling for adoption and use of technological applications to resolve complaints, communication, billing and making payments.

Studies by Mwania (2015) investigated on customer service charter and service delivery revealing that continuous improvement culture leads to improved delivery of services. The study creates a conceptual gap as it does not link technology and service delivery. Ndaw (2015) investigate on ICT potential in improving water and sanitation by resolving and tracking customer complaints. The study creates a conceptual gap since it fails to look at specific water technologies but looks at ICT in general. Otieno (2019) covered the influence of technology adoption and water service delivery, the study was based on Lake Victoria South Region, whose population and challenges as faced by the Nairobi City County, hence creating a contextual gap. According to Finlay's and Adera (2012) there has been a disconnect between technological applications implementation at the local communities and the water service providers in spite of

the fact that all the effects of climate affect the inconsistencies thereof on all the water resources have been recorded.

The situation problem within residents of Nairobi City and challenges faced by the NCWSC make a case for the investigation. The studies have also created knowledge gaps in terms of context and concept creating a need to fill the gap. As such the study will assess the effect of technological applications on service delivery among consumers of Nairobi City Water and Sewerage Company.

1.3 Objective of the study

1.3.1 General Objective

The main objective of this research is to determine the effect of technological applications on service delivery among consumers of Nairobi City Water and Sewerage Company.

1.3.2 Specific Objectives

1) To analyze the effect of MajiVoice applications on the service delivery among consumers of Nairobi City Water and Sewerage Company
2) To determine the effect of customer management system on service delivery among consumers of Nairobi City Water and Sewerage Company
3) To establish the effect of Per Pay system on service delivery among consumers of Nairobi City Water and Sewerage Company

1.4 Research Questions

1) How does MajiVoice application affect service delivery among consumers of Nairobi City Water and Sewerage Company?
2) What is the effect of customer management systems on service delivery among consumers of Nairobi City Water and Sewerage Company?
3) How does Per Pay system affect the service delivery among consumers of Nairobi City Water and Sewerage Company?

1.5 Significance of the Study

The study would be beneficial to a number of stakeholders as discussed in the upcoming sections:

1.5.1 The Nairobi City Water and Sewerage Company

This research study would review the level of application of technology in water management as well as explore how technological applications can help to enhance water-use discipline at the local levels; the Nairobi City Water and Sewerage Company. Data obtained from the study would be used to establish a guideline in technology use in Water Management in Kenya. Value of the study is perceived as twice as great.

The study contains a conceptual weight that makes it effective enough for measurement and examination of methods at the interchange of adaptation to climate variation, technologies, and water reservoir. In addition, it contains useful and significant importance for project controllers and managers since it enables them to interpret better on tangible decision actions as well as the factors that are relevant in implementing their projects.

1.5.2 The Government of Kenya and Researchers

When it comes to singling out of key thematic areas for effective use of technology is that the study would help to see how technology could be used to strengthen monitoring and inventory of infrastructure. It would also help the government of Kenya and Research Institutions in determining how sustaining technology-based planning and programming initiatives can help in the sustainable use of technology and how technology can be used to strengthen the consumer voice as well as governance and financial area in the Water and Sanitation capacity. The study would also be used to identify various barriers that are faced when a company wants to invest in technology and how to overcome such barriers.

1.5.3 Benefit to Engineering and Water Technology Scholars

The study would also help in the advancement of literature on the use of technology applications in Water and Sewerage Companies. This would be helpful in helping to fill the gap in this area. As a result, academics in climate change research and water technologieswould benefit. Besides, the research work would also play a role as being a basis for future research, by being reference materials and suggesting areas where future studies can be conducted.

With respect to scholars in science technologies and some in politics, there has been an ongoing notion that climate is a manufactured hoax. This means that the reality of climate change is not accepted while its impact continues to be detrimental to human life and life support systems. This research, however, would endeavor to expose that climate change is a reality and there is a need to curb its impacts through the use of technology in water and sewerage companies which have one of its many roles as ensuring the availability of clean and adequate water resources to the people they serve. In essence, this research would be informative to climate change researchers on the truth of the fact that climate change is real and its impacts harmful to people, and that technology can be useful in alleviating its effects through bodies such as sewerage and water sanitation Companies.

1.6 Scope of the Study

The study concentrated on technological applications and its effect on service delivery among the consumers of Nairobi City Water and Sewerage Company (NCWSC). The study explored the different technological applications that are used in NCWSC in an effort to improve their service delivery to its customers. The respondents of the study were drawn from the customer service department, the information technology department and finance and HR departments at the NCWSC. The study was conducted in the months of July and August 2020 at the NCWSC head offices.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter explores into the various publications on the influence of technology on effective service delivery. It commences with a theoretical framework that features institutional theory actor network theory. There is also a general overview on the effect of technology application on service delivery followed by the other literature and ending on the conceptual framework section.

2.2 Theoretical Framework

The section covers the philosophical basis for undertaking the research by drawing a link between the theoretical aspects and practical components being investigated. The section will discuss the three theories that anchor the study, namely the institutional theory, the actor network theory and the SERVQUAL model.

2.2.1 Institutional Theory

This theory was advanced by Meyer and Rowan (1977) and DiMaggio and Powell (1983), who considered the institutional processes including the systems and structures that are established within the functioning aspect of the organization and guides its daily operations and workings. The organization is comprised of the social structures, cognitive aspects and technical aspect. This study concentrates on the technical aspect of the institution as it discovers the systems and applications that once adopted into the institutional structure will improve its performance in terms of quality service delivery.

The institutions are symbols of stability, but Shoib, Nandhakumar and Currie (2009) shares that there is need for the leadership to consider the changing times and shifts in market needs and preferences and respond accordingly. At the times the change could be gradual increments or discontinuous, but it should be easily noted by the research and development department within the institution. As the market becomes more and more competitive, customers are knowledgeable and demanding; the organizations are adjusting their strategic plans to accommodate this, and one of the ways is adopting of technological systems and applications. This will affect the product and service delivery as it is incorporated into the internal operations of the organization.

This study applies the institutional theory which is one of the many frameworks that explain the rationales behind the utility of innovation of a technology in a given institution. As explained in the conceptual framework, there are a number of technologies used in the NCWSC including but not limited to MajiVoice, CMS, SPMS, Per Pay and MFA. While the study works towards establishing the impact of technology on the effectiveness of service delivery, the institutional theory comes in handy in elucidating the reasoning behind the use of given technologies. According to the theory, Scott (1987) explains that organizations are likely to use technologies that other institutions or competitors are using particularly if the technologies are beneficial or can give them an edge in the industry.

The theory as a basis of social structure, cognitive aspect and technical aspect, Puffer and McCarthy (2011) mention that even when considering adoption and utilization of different technological applications and systems; the cognitive aspect and social structure comes into play. At Nairobi Water and Sewerage Company, adoption and usage of different technologies as the technical aspect of the firm, will depend on the cognitive aspect of the staff, in terms of their know-how on use of systems and applications. There must be a training program to teach staff on the effective use of the technologies and at the same time there might be need of hiring IT experts. The social structure must be accommodative to allow the new system into use, so as to improve service delivery to the customers. The organizational social structure will include the culture, value system and management structure, which must be planned to allow better adoption and higher results in form of the service delivery to its consumers.

With respect to this study, institutional theory was informative on the justification for the use of various water technologies on the part of the NCWSC. Apart from the competitive aspect that may cause an institution to adopt technologies in a bid to have an edge over their competitors, it bears stating that this theory advocates for adopting technologies that can advance the performance of an organization. In this sense, it can be argued that theory relates to this study in that it explains the reasoning for using better water technologies in the company in an effort to enhance the effectiveness of service delivery.

2.2.2 The Actor Network Theory (ANT)

The theory was created by Latour (1987) and Callon (1984), as they attempted to understand and process knowledge creation and innovation both in science and technology. The theory focuses on connections or networks that bring about innovations and inventions, since it is not possible for one element to act alone and bear the expected results. The networks and connections can be human or non-human and work in such a manner to bring about the expected results. The Actor-Network shares that the environment, technical and non-technical elements are the ones that lead to the success of the actor.

The Actor-Network Theory (ANT) has become quire influential especially in the current modern world that depends a lot on usage of different technologies in handling their every-day activities. But the ANT theory faces a lot of contestations since the unclear understanding of how humans interact with inanimate objects. Couldry (2008) stated that the theory shifts from the concept that technology impacts the humans from an external force, but rather the technology emerges from the social interests and social interactions of humans, such as their economic and professional interactions. Since ANT is based on social interactions, it then shapes the social interactions due to the fact that an actor cannot act alone and acts in combination with other actors to realize a specific goal. According to Cresswell, Worth and Sheikh (2010), the ANT is based on the central idea and theorizes on how the networks come into being by tracing their associations and the movement of actors across the network. The theory assumes that entry or exit of one actor affects the entire network. The emergence of technology affects the entire network and the quality of interconnectivity of all actors in the network, and at the same time the exit of technology will affect the whole network system.

The NCWSC cannot succeed in its quest to solve its problem of efficient and effective quality service delivery alone, but working with other connections and networks either internal or external, the firm is able to reach its goals. The entry of different actors namely, the technologies, expertise staff, service charter and mission statement, all impact the network and its associations or connectivity within the NCWSC and it will affect its ability to meet its goals and objectives. Furthermore, in its quest for high service delivery, the management at NCWSC has adopted the service charter, which uses different technologies with the main being customer management systems to offer quality service delivery to its water and sewerage consumers. As such, this

theory highlights that when adoption and usage of a technology is successful, it is usually because of networks of both non-human and human actors (Law, 1987). The theory treats all these actors in an equal manner.

The main principle in Actor-Network Theory is the generalized symmetry by integrating the human and non-human elements into the organizational framework and each is given the same level of agency (Douglas, 2012). This study assumes that to successfully determine the influence of various technologies on effectiveness of service delivery (non-human actors) both employees in the Nairobi Water and Sewerage Company and their customers (human actors) are involved in the process. The theory explains that the usefulness of a technology in enhancing effectiveness of tasks execution provides the basis for its use, and in this case, the assumption is made that the usefulness of various technologies used by NCWSC have provided the rationale for their use in the company involving both human and non-human actors.

2.2.3 The SERVQUAL Model

The model was derived from the study by Zeithaml, Parasuraman and Berry (1985) by looking at the service quality as perceived by the consumers and the market. The service quality was as a basis of 10 dimensions namely, competence, access, courtesy, communication, reliability, credibility, responsiveness, security, knowledge of the customer and tangibility. But many organizations have four distinct gaps that affect the consumers' perception of quality of service they have been given. These gaps cover differences in consumer expectations and organizational management perceptions of what the consumer expects, versus service quality specifications, the differences in service quality specifications and the actual service delivered; the service delivered and what is communicated about the service to the consumers. The differences between the service expectations and the perceived service quality, and these gaps as shared by Vashishth and Chakraborty (2018) are what determine the effectiveness and ratings of service delivery and its quality.

As the business world and its environment keeps growing in terms of competitiveness, many firms have to ensure that the quality of the products and services is high before it reaches their markets. The demand for high quality services is especially needed in the case of service industries and according to Ravichandran, Prabhakaran and Kumar (2010), the firms that supply only services like airlines, have nothing to offer their customers if the quality is poor. As such

the use of SERVQUAL model shows the valuation of products and services by tracking the trends of the quality of service based on the service quality measurement tool. The trends are tracked per industry, market and consumers to understand their changing needs and preferences and what aspects are deemed to lead to quality service. At the same time, the SERVQUAL is able to evaluate the quality of the organization and overall measure of service quality by obtaining an average score of the five dimensions of service quality. The model also determines the relative importance of the five dimensions which will affect the overall quality perception of the customers on different products and services on offer by an organization (Haming, Murdifin, Syaiful & Putra, 2019).

The perceived service quality looks at the differences between consumer expectations and perceptions and in the same light, the NCWSC has in the past suffered bad reviews and poor perception of their service quality delivered to its customers. As such the management can look at the tangible aspect of service delivery by looking at its physical facilities and quality of staff, by being reliable it builds trust of the public to its products and brand names and using systems and technologies that lead to high quality products and services as per the market needs. Mauri, Minazzi and Muccio (2013) noted that the Servqual model measure is based on the attitudes since it measures the perception and not necessarily the actual service received. The NCWSC performance on its delivery of services in adopting this model will be measured by perception of the service delivery and quality as opposed to the actual services delivered and its quality, making it necessary to improve its perception through effective customer care. That is the reason for the service charter that advocates for Maji Voice system that attends to all complaints, compliments and suggestions under the organizations' feedback mechanism.

Servqual model establishes quality service which is an effective tool in measuring customer satisfaction. When the service quality increases, the chances of higher customer satisfaction also increases (Vashishth & Chakraborty, 2018). In our case use of Maji Voice, Per Pay and customer management system to improve on service delivered by NCWSC leads to high customer satisfaction, which ultimately will positively affect the perception of the public to the brand and the company brand name. Quality service delivery raises the perception of the firm and its products or services building the confidence of the public towards the firm. These further raises

credibility and knowledge on the customer which improves the services offered and hence the satisfaction of the customers.

2.3. Empirical Review

The empirical review section will cover research studies by other researchers on the objectives and variables. The section is divided into parts as per the study independent variables of the technological applications adopted to improve service delivery, the study will focus on MajiVoice application, customer management system and Per pay system.

2.3.1 Maji Voice Application and Service Delivery

The MajiVoice application an initiative of Water Services Regulatory Board (WASREB) has enhanced water services provision through utilizing advanced technologies increase interaction between the consumers and the water provision body. The water consumers use the platform for two-way communication, such that the consumers use their mobile phones, computers of laptops to share their concerns, comments, feedback and complaints on the quality of service delivered to them. Adhikari, Zuo, Maharjan and Yadav (2018) did a study on the use of big data within the WASH sector, and shares that using technological platform, the water consumers are able to share their concerns and feedback and also get feedback on their issues, while at the same time they are able to track the progress of their issues before it can safely be resolved. WASH (Water, Sanitation, and Hygiene) plays a key part in human lifestyle and it is effective by collecting and analyzing data from sources like Water Point Mapping (WPM) and Flow Monitoring and Leak Detection (FMLD). The WASH program advocates for use of information and data in improving the public health and use of technological like mWater and mWASH to lead to accountability and execution that improve the water and sanitation services sector. When looking at adoption of technological applications in the water industry, it will be possible through data and information collection that lead to better service delivery. Such technological applications allow sending of data and messages through SMSs, email and receive instant feedback that improves service delivery. In the case of MajiVoice application allows for timely responds and feedback, which works to achieve its target of improving efficiency, responsiveness, accountability and transparency. The study looks at big data and creates a conceptual gap as it does not concentrate on technological applications that are used in the water industry.

Ndaw (2015) in the study on unlocking the potential that ICT has on improving the water and sanitation services a Kenya case; and noting that the main objective in the use of the technology is to help in resolving and tracking of the customer complaints raised. The advantage in the use of the technology is that the system is simple to use, partly because of consistency in the interface and its current situation is suited for all kind of users. It also facilitates easy tracking of customer complaint using ticket numbers. The study creates a methodological gap, since it used a case study format and its findings can be applied on ICT and water and sanitation services in Kenya alone and not in specific sectors or regions.

Peixoto and Fox (2016) in the study on government responsiveness as prompted by ICT-enabled citizen voice; by exploring the degree to which the public service responds to the citizen voice and demands. The study looks at the effectiveness of ICT enabled citizen voice to inform the top management and demand for services and accountability while at the same time, accountability is reached by the masses by either individual user feedback or a collective civic action. Use of technologies, applications and systems has made demand for services, giving feedback and rating services provided easier and faster. Findings show that looking at the 23 information and communication technological platforms that have adopted project 'citizen voice' has led to improve service delivery. The ICT platforms have increased public sector responsiveness as advocated for by the masses and the general public. The study creates a contextual gap as covers ICT-enabled citizen voice system which is not linked to service delivery, hence needing to investigate on the link of technological applications and service delivery.

Kinuthia (2019) did a study on M-Bus based smart water meter model at NCWSC, sharing that water is critical to human survival, but the Kenyan water supply and service provision has a lot of challenges in meter reading, and the firm employed many staff to sort out that issue which led to blotted work force, increased operational costs. As more of the staffs went to the customers' premises, it raised security and privacy concerns and still complaints of wrong billings, erroneous meter reading and misstated bills are still persistent. The study shows that adopting to technological systems and applications can help reduce some of these challenges like use of wireless meter-bus smart water meter reader to enable remote meter reading. The advantage of using technologies is that it is accurate, fast, reliable and efficient in resolving the customers' issues; furthermore, it becomes economic in the long run since it cuts operational costs. The

study looked at only one technology for meter reading and does not mention other systems and technologies, needing to investigate other technologies and how they influence delivery of services.

2.3.2 Customer Management System and Service Delivery

The customer is king in any business operation and will easily determine the success or failure of the venture. Therefore, it becomes prudent for the management in any venture to find ways of properly managing the needs of the customers and deliver high quality service, which will make them loyal and guarantee future business operations. According to Mwania (2015), who investigated on the customer service charter and its influence on service delivery at the Nairobi City Water and Sewerage County (NCWSC). The study reveals that for the firm to improve service delivery, they developed and incorporated a service charter within its operations. The service charter makes the staff of the firm aware of the customers' expectations and hence made a commitment to deliver the same. In the initial stages, the staff lacked awareness of the charter and what was expected of them such that they did not adhere to its mandate, but when the management committed to refresher training for all staff on the particulars of the service charter and what is expected of them, the service delivery has been improved. The findings further show that, the management of the firm having adopted a continuous improvement culture, which has realized huge gains in terms of service delivery. There has also been a continuous improvement of the management information system to aide in implementation of the service charter and hence higher quality service delivery. The study looks at the regulatory aspect of the customer service charter and does not mention adoption of technological applications and systems and service delivery.

Njuguna and Mirugi (2017) did a study on the relationship management and quality of service and its effectiveness on service delivery. The study reveals that modern organizations that are seeking competitive advantage through attracting and retaining customers have to maintain the relationship and guard it as prized assets. Growth and success of any organization is based on efficiently managing the relationship and having excellent quality of service delivered to the market. The study findings show that effective service quality positively affects service delivery and at the same time relationship management enhances service delivery. As such the study shares practical skills that other business units can adopt including improving their service

processing, use of modern technology to enhance the relationship between the market, customers and consumers and the organization that is providing the different services. Modern technological applications and systems are able to enhance service quality which will positively improve the relationship between the two aspects.

Ijoema (2018) on the value of management information system and service delivery noted that proper training and orientation of staff on the new system helped to reduce paper work at the university while also improving the quality standard of services offered. Use of technology by the management of the universities led to safety of data, ease in storing, retrieving and re-use of data. At the same time, proper data management led to better service delivery as it enabled the planning, control and efficient operational function of the institution leading to better results. The information system once properly managed can share useful historical data that help in preparation of costs, forecasts and analysis the guide the decision making process leading to better service quality. The study was done in Nigeria in the education sector thus creating a contextual gap hence the need to look at the Kenyan case and in the water services sector.

In many instances, Buttle and Maklan (2019) on customer service management share that use of technologies in customer management leads to better relationship between the customer and the organization, due to the fact that the technological systems and applications store information about the customer which the entrepreneur can use to offer better services and products and increase sales. Similarly, the system keeps records of purchases and services offered and help in the billing times. Its accuracy means that both the relationship between the customer and the business venture is not negatively affected. The study does not link customer management and service delivery, creating a need for the current study.

2.3.3 Per Pay System and Service Delivery

Technology has impacted all aspects of the organization, and the pay system and human resource management has not been left behind. The deployment of technological systems and applications is vital in having an effective functioning firm and it also improves productivity and service delivery. Debroux (2017) on human resources management in Japan, noted that the adopting of different HRM systems is to be able to manage and control organizational decisions about pay, promotion, work and tasks and responsibilities and the well-being of the people within the organization. The main functions of human resource management are wide and varied but use of

technology has assisted in position classification, hiring and staffing, administration, advance administration, employee relations, work force development, time discipline, attendance processing, and payment processing. The study was done in Japan, which is a different context to the Kenyan human resource sector and it fails to mention anything on service delivery.

According to Ahmed and Ogalo (2019) on the developments from HRM to e-HRM, sharing that the HRM sector faces a lot of challenges in change management, effective and efficient organizational and individual performance measurement, data management and record keeping, staffing issues that deal with recruitment, placement, promotion and retention. The study revealed that some of these challenges can get their solution in adopting electronic and technological applications. The adoption of online recruitment and selection process and data base management will solve the questions that employees have on accuracy and authenticity of the process, hence creating an efficient and timely management process that will improve delivery of service and production process. At the same time, the study elaborates that it is becoming increasing necessary and inevitable for businesses to shift from the traditional way of handling HRM practices and accept E-HRM. The study was based on use of electronic means in handling HR management practices but it does not link e-HRM to service delivery.

Thite (2018) in the study on E-HRM, its digital approaches, directions and applications, stating that adopting the electronic manner of handling HR management comes with unique features that are beneficial to the organizations. Some of the unique features and benefits include labor management in an efficient manner by reducing operational costs and paper-work, it streamlines workflow by sharing pertinent information from the top leadership to each person at the workplace, meaning that there is improved work output. Electronic human resource management eases redundant and repetitive HRM tasks which improve its efficiency especially with the use of self-service HRM delivery system and self-service portals which speeds up response timelines and also enforce informed decision making. Other than mentioning the benefits an organization gains in adopting e-HRM, the study does not look at the service delivery aspect to its market and customers.

Agrawal (2018) examined the use of e-HRM system and noted that this is the new way that organizations are operating. Furthermore, the E-HRM is divided into three types, the first being operational E-HRM which concentrates on all administrative HR functions including payroll and data management of personal information of the employees. The relational E-HRM works to support the processes of the organization like the recruitment, training, placement, promotion and performance management. The third aspect is transformational E-HRM that looks at strategic activities such knowledge management to enhance innovation and invention, strategic orientation and re-orientation as per the changing business environment. The study focuses on only one technological system, the e-HRM and creates a conceptual gap as it does not link it to service delivery on the consumers' side.

According to Karanja, Sang and Ndirangu (2018) in ICT integration and HRM management study and shared that the adoption of payroll management information system which maintains employee database covering the number of working hours/days, payments, deductions and bonuses which is integrated into biometric devices and once it is coded in, the other times it will be automatically updated. The system also integrates functionality of the system which will enable HR and payroll departments to access, process, operate and manage all aspects of the organization's hire-to-retire cycle and payroll functions. The per pay system also works by linking to ERP solutions to share real time reports and data, this is ideal for the business people who can quickly make informed decisions. This is an ICT and HRM management and does not look at technological applications and the impact on service delivery of the organization to its consumers.

Macharia and Dominic (2019) in the study on the effectiveness of integrated financial management information system (IFMIS) and noted that the prepay technology as a computerized Human Resource Management Information System has been implemented in government ministries and agencies to handle HR related functions. The same has been implemented in the NCWSC and has been in use in the last 4 years, so as to minimize or do away with errors in the payroll procedures. It also seeks to reduce the amount of effort and energy applied in the calculation of employee working hours, salaries and wages, as well as their tax-related payments. Also, it is simple to use and sometimes very affordable for all sizes of businesses. In most instances, small business organizations can save funds by using the payroll

software instead of going for other alternatives. Besides, using this software enables these businesses to combine business reports at the pace that they desire. Business owners and stakeholders are also able to introduce certain reforms quickly if the need to do so comes up. The study is a theoretical review creating a methodological gap, since it is theoretically based on government ministries and use of IFMIS which is not correlated to service delivery.

2.4. The Conceptual Framework

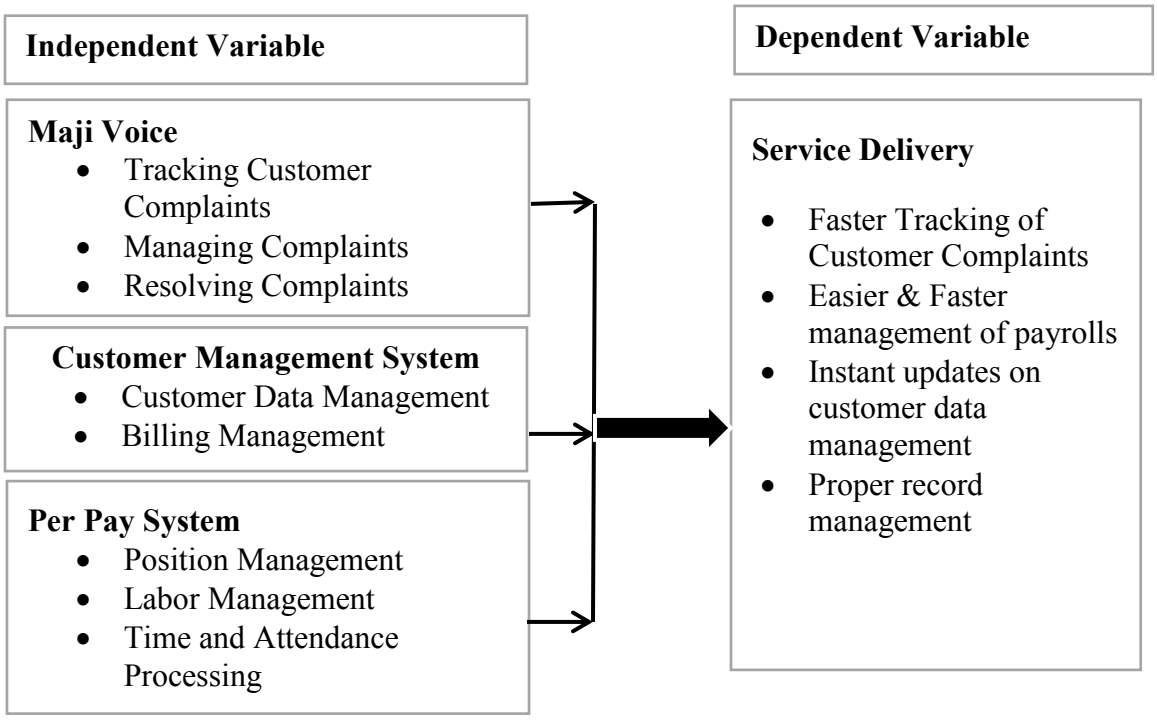


Figure 2.1: Conceptual Framework
Source: Author (2020)

2.5 Operationalization of Variables

Table 2.1 indicates the way the variables of the study are operationalized

Table 2.1: Operationalization of Variables

Variable	Type	Indicator	Measurement
MajiVoice application	Independent Variable	Tracking Customer Complaints Managing Complaints Raised Resolving Complaints Raised	Descriptive Regression
Customer management system	Independent Variable	Customer Care data management Billing Management	Descriptive Regression
Per Pay system	Independent Variable	Position management and Classification Labor Management Time and Attendance Processing	Descriptive Regression
Service Delivery	Dependent Variable	Faster Tracking of Customer Complaints Easier & Faster management of payrolls Instant updates on customer data management Proper record management	Descriptive Regression

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology that was adopted in undertaking the study. Some of the areas included are the target population, the sampling procedure that was adopted to get the sample size. It also discusses the instruments that were used in the data collection and its procedure. The chapter discusses the pilot tests to ensure the instrument is valid and reliable, the data analysis procedure and diagnostic tests.

3.2 Research Design

A research design is the scheme, outline or plan that is used to generate answers to research problems (Creswell, & Poth, 2016). It offers a systematic order of occurrences and activities in which to conclude the research. Descriptive research design was adopted by the study. The aim of descriptive research was to determine and report how things are without manipulation that helps to determine the current state of the study population. Descriptive design allowed for more data to be tested (Leavy, 2017). Descriptive research design was chosen because it determines and reports how things are and is suitable because with definite goals it is concerned with obviously defined issues. Therefore, the study design involved a description of what the researcher does when formulating research questions and their consequences for the final analysis of information. The description design helped the researcher to describe the various technological applications and service delivery at Nairobi City Water and Sewerage Company.

3.3 Target Population

A study population according to Sekaran and Bougie (2016) is the general large collection of elements either human or non-living that are at the core of scientific query. For any individual, whether male of female to be considered as part of the company population, they must be permanent employees and salaried. This criterion is used because only permanent employees are conversant with company systems and therefore well placed to provide critical information needed for the study. For this study, the population was staff of NCWSC and the researcher specifically targeted senior management level staff from the following departments IT, Human

Resources, Customer care and Field Managers. These departments and persons were chosen since they interacted closely with organizational technological systems and the customers and have valued information that can respond to the research questions.

From the records held at the HR department, these are the number of staff from the four departments and the organization leadership. The target population is as shown in Table 3.1

Table 3.1: Target Population

Department	Population
Senior Managers	7
IT Managers	19
HR Managers	11
Customer Care Managers	14
Field Managers	26
Total	**77**

Source: HR Department at NCWSC (2020)

3.4 Sample Size and Sampling Procedure

Sampling procedure is whereby the units which cover both the living and non-living elements are carefully chosen from the entire population and included in the study for one reason or another such as being knowledgeable or easily accessible (Veal, 2017). For this study, census sampling was adopted since the population was small and could be accessed to take part in the study. Lune and Berg (2016) indicate that whenever the population is small of less than 200 members who are unique and having unique characteristics then applying a census where all members are picked for the study is ideal. As such all the 77 respondents were included in the study.

3.5 Instrumentation and Data Collection Procedure

Organized questionnaires were used by the researcher to gather primary data and relevant information from all the selected respondents at the NCWSC. The questionnaires consisted of both closed and open-ended questions. The advantage of using questionnaires is that it is cheaper and quicker to administer (Bell, Bryman & Harley, 2018). The instrument is also deemed to enhance high convenience to the respondents hence its use which also increases the response rate. The questionnaire used a five-point Likert scale to rate the extent to which the respondents agree with the statements on the study variables.

The researcher collected primary data from the sources using a drop-and-pick later procedure. The researcher droped the questionnaire at the NCWSC offices where all the respondents worked and allowed them five-days to fill, before going back to collect them. Using this method in data collection increased the response rate and quality of information as respondents are not hurried to fill it and their work responsibilities is not interfered with.

3.6 Validity and Reliability

The reliability and validity are measured by examining the used devices for the reliability and effectiveness of the Alpha values as it is recommended by Cronbach (1946) and further recommending that an examination and measurement for these values for all the variables under study. According Bernard (2017) the values for all the variables should not be less than 0.6 for the statements in the instruments to be considered reliable for research. As a result, the total statements underlying every data variable is put under this test and also be proven and recorded to be above 0.6. Evidence shows that a measure is reliable or effective when it is free of errors. It should also be consistent at all times and across different data items present in the used device.

The validity of instruments used in data collection was conducted with an assistance of an expert who will correct the questionnaire. At the same time, the researcher presented a closed ended questionnaire to the top manager who was a veteran and skillful in the particular field covered by that particular research. The presentation was done for the purposes of proofreading, editing and reviewing.

3.7 Data Analysis and Presentation

The filled in questionnaires were reviewed to eliminate inconsistencies and then the data was summarized and coded to enhance easy classification, tabulation and interpretation. The data was entered into SPSS version 23.0 for further analysis, and as such the package of statistics for social sciences (SPSS) was adopted for general data measurement and analysis. Descriptive analysis was computed like the measures of central tendencies of mean, standard deviation, percentages and frequencies.

Inferential statistics were also conducted through multiple regressions to test the strength of the correlation between the independent variables of (MajiVoice Application, Customer

Management System and Per Pay System) and the dependent variable of (Service Delivery among Consumers of NCWSC).

The Regression Model is:

$$\mathbf{Y= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon}$$

Where Y= Service Delivery among Consumers of NCWSC

β_0 = Constant

β_1, β_2 and β_3 are Coefficients of the effect of technological applications at the Nairobi City Water and Sewerage Company

ε = error term

X_1= MajiVoice Application

X_2= Customer Management System

X_3= Per Pay System

The analyzed data was illustrated in charts, figures, and tables so as to enhance easier translation, understanding and explanations.

3.8 Diagnostic Tests

As multilinear model of regression was applied in this research, the table illustrated below summarizes the various tests to be conducted to determine the fitness of the model.

Table 3.2: Diagnostic Tests

Test	Measure	Result
Heteroskedasticity test	This was to determine if data is homogeneous. Heteroskedasticity problem will exist if the analysis will show high dispersion. The researcher used scatter plots	The observations that are widely spread with no clearly established pattern signify absence of Heteroskedasticity
Normality Test	The measure indicated whether residual data is either normally distributed or not.	Data points falling along the normal QQ line would be an indication of normally distributed data
Multicollinearity Test	This measure helped to determine the existence of a correlation of independent variables in the regression model. A good model usually has no correlation between these variables. VIF/Collin test was used.	In a VIF that is less than 4.0, multicollinearity is usually not a major problem. On the other hand, when, VIF is greater than 4.0, there is usually presence of multicollinearity and a VIF that is greater than 10, severe multicollinearity of the independent variables is present

CHAPTER FOUR
DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the analysis based on the primary data that was gathered from the field. The collected data was analyzed using SPSS tool by beginning with the response rate, reliability results and the analysis of the general information. The findings of the descriptive statistics, diagnostic tests and regression analysis are also presented.

4.2 Response Rate

From the 77 questionnaires that were administered to the respondents, 53 of them were dully filled and returned giving a response rate of 68.8%. This response rate is illustrated in Table 4.1.

Table 4.1: Response Rate

	Frequency	Percentage
Response	53	68.8
Non Response	24	31.2
Total	**77**	**100.0**

Source: Field Data (2020)

The response in Table 4.1 was relatively low than it was expected. One key factor that could have resulted into this low response rate could have been the challenges posed by Covid-19 pandemic which meant social distancing which affected the collection of data from the respondents.

4.3 Reliability Results

The instrument of the study was pilot tested to determine their reliability. According to Mugenda and Mugenda (2003), a pilot study can comprise of 1-10% of the sample size. In this study, a pilot study was conducted among 7 respondents (being 10% of the sample size) who were staff of NCWSC. The respondents who took part in the pilot study were excluded in the final study so as to avoid possible biasness. In order to determine reliability, the study adopted an internal measure of consistency called Cronbach Alpha Coefficient. In this regard, the dully filled questionnaires from this pilot study were coded into SPSS and the values of Cronbach Alpha coefficients were generated on each of the variable. Table 4.2 gives the findings of reliability analysis of the instrument of the study.

Table 4.2: Reliability Results

Variable	No. of Items	Cronbach Alpha Coefficient
Majivoice Applications	4	.753
Customer Management System	6	.876
Per Pay System	7	.883
Service Delivery	6	.779

Source: Field Data (2020)

As indicated in Table 4.2, Majivoice applications had Cronbach Alpha Coefficient of 0.753, customer management system had 0.876, per pay system had .883 and service delivery had .779. Thus, all the variables had Cronbach Alpha Coefficient values of above 0.7; which infer that the scale used in the study was reliable. The finding is echoed by Cronbach (1951) who argued that values of Cronbach Alpha coefficient above 0.7 indicate that the study instrument is reliable.

4.4 General Information

The study sought to establish the general information of the respondents. These included their gender, departments, and levels of education and the years of experience. The findings are as indicated in sub sequent sections.

4.4.1 Gender of Respondents

The findings on gender distribution of the respondents are indicated in Figure 4.1.

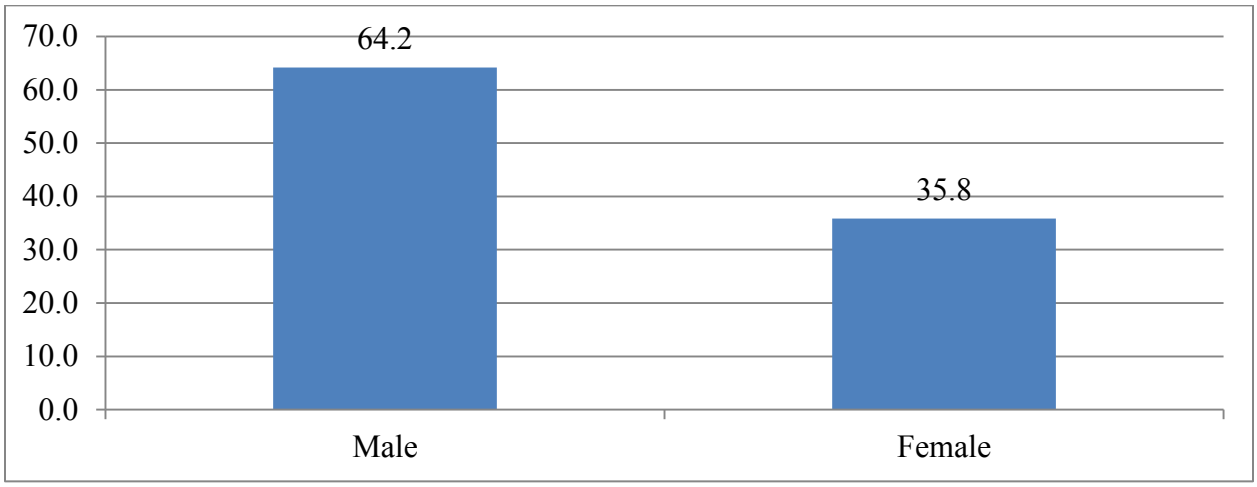


Figure 4.1: Gender of Respondents
Source: Field Data (2020)

Figure 4.2 indicate that 64.2% of the respondents were male while 35.8% were female. This means that there was gender diversity in the views of the respondents on technological applications as this was sought from both male and female respondents.

4.4.2 Department of the Respondents

Respondents were asked to indicate the department which they worked in and the findings were presented as shown in Table 4.3.

Table 4.3: Department of the Respondents

	Frequency	Percent
IT Department	10	18.9
HR Department	9	17.0
Customer Care	12	22.6
Senior Management	4	7.5
Field Managers	18	34.0
Total	**53**	**100.0**

Source: Field Data (2020)

Table 4.3 indicates that 34.0% of the respondents were field managers, 22.6% worked in customer care department, 18.9%v were in IT department, 17.0% in HR department and 7.5% were senior managers. This means that respondents were drawn from diverse functions within the organization, which means that representative findings were sought ontechnological applications and service delivery.

4.4.3 Level of Education

The findings on the level of education of the respondents were sought and presented in Figure 4.3.

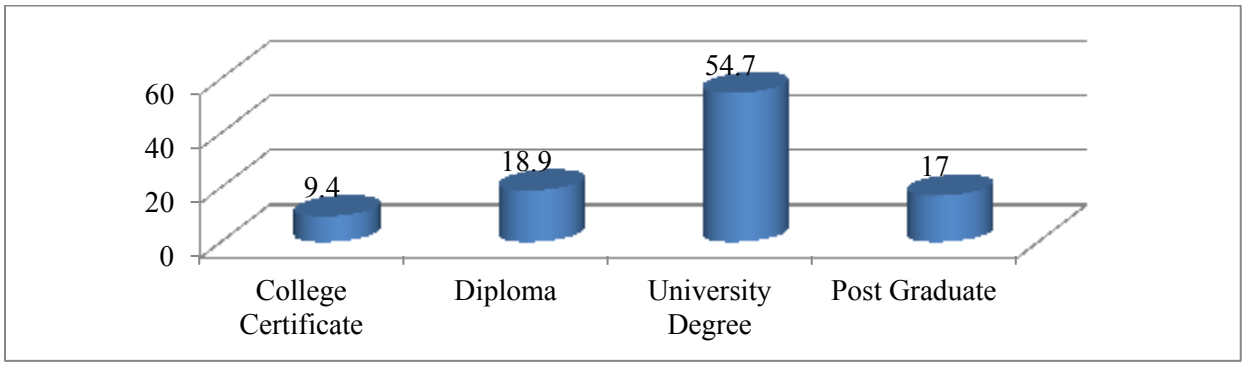


Figure 4.2: Level of Education
Source: Field Data (2020)

From Figure 4.3, while 54.7% of the respondents had university degrees, 18.9% had diplomas, 17% had post graduate degrees and 9.4% had college certificates. This implies that respondents of the study were learned and thus probably able to read and interpret the items on the questionnaire.

4.4.4 Years of Experience

The study sought to establish the number of years that respondents had worked in their organization as reported in Figure 4.4.

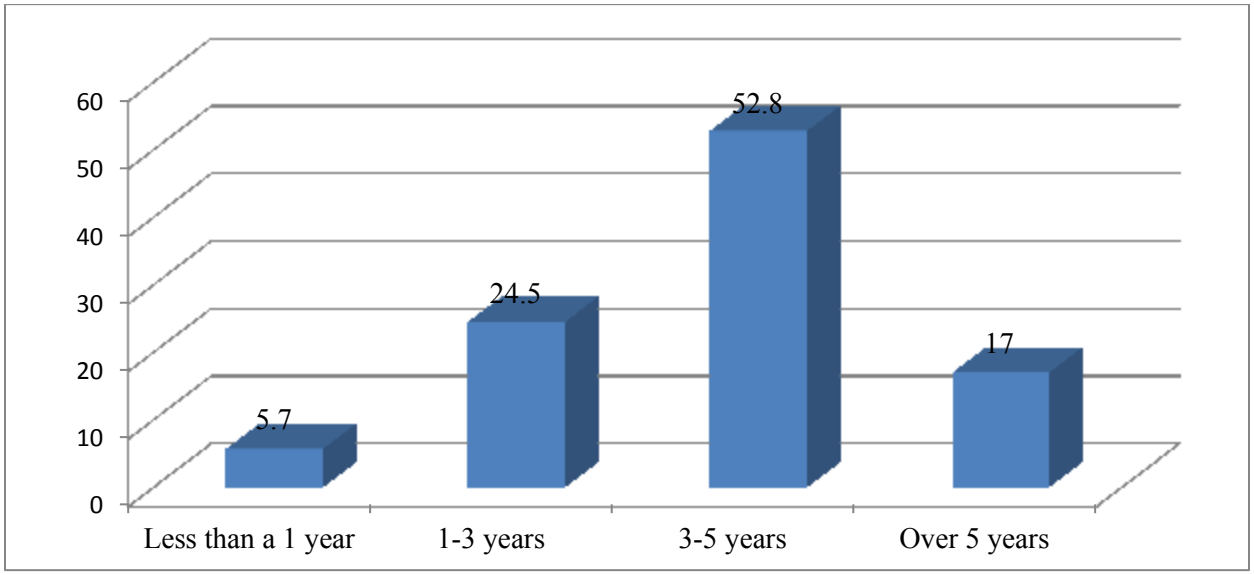


Figure 4.3: Years of Experience
Source: Field Data (2020)

As indicated in Figure 4.4, while 52.8 of the respondents had worked in their institutions for 3-5 years, 24.5% had worked for 1-3 years, 17% for over 5 years and 5.7% for less than a year. This means that respondents who participated in the study had worked in their organization for a longer period of time and thus probably gained more information on technology application and service delivery mechanisms which were ley themes in the present study.

4.5 Descriptive Statistics

This section is a summary of the descriptive statistics on the Likert based questions established on each of the variables of the study. The interpretation of the Likert based questions was done using the values of mean and standard deviations.

4.5.1 Service Delivery

The dependent variable of the study was service delivery. The variable had some Likert based questions that were interpreted as supported by means and standard deviations. The Likert scale used in formulation of the statements was such that 1=no extent and 5=very great extent. The results are summarized in Table 4.4.

Table 4.4: Service Delivery

	Mean	Std. Dev
Faster tracking of customer complaints	3.83	.726
Ease in payroll management	3.43	.990
Faster management of payrolls	3.88	.669
Instant updates on customer data management	3.71	.948
Proper record management	3.62	.985

Source: Field Data (2020)

From Table 4.4, majority of the respondents agreed to a great extent that that there isfaster management of payrolls (M=3.71), faster tracking of customer complaints (M=3.83), instant updates on customer data management (M=3.71) and proper record management (M=3.62). On the contrary, respondents noted that there was ease in payroll management to a moderate extent in their organization (M=3.43). This means that service delivery in the studied organization aimed at enhancing the management of payroll, customer complaints and record management. This result is empirically supported by Ajibade, Ibietan and Ayelabola (2017) who noted that service companies can be rated as successful only if they deliver services that answer the needs of the public, in the quantity, quality and price that reflects the value of the product to the consumers and the market. At the same time, Agarwal (2017) mentions that poor service is when the services are of poor quality, ineffective to the customer needs and preferences and late delivery such that customers are left waiting for a long time to be served.

4.5.2 Majivoice Applications and Service Delivery

The first independent specific objective variable of the study was Majivoice applications and a summary of the means and standard deviations used to interpret the Likert scale are as indicated in Table 4.5.

Table 4.5: Majivoice Applications and Service Delivery

	Mean	Std. Dev
Tracking Customer Complaints	3.67	.753
Managing Complaints Raised	3.73	1.002
Resolving Complaints Raised	3.88	.776

Source: Field Data (2020)

From Table 4.5, majority of the respondents noted that Majivoice applications helped in resolving complaints that had been raised to a great extent (M=3.88). This implies that Majivoice applications had complaint management capability. The finding is echoed by Turman-Bryant, *et al.* (2019) who noted that technological applications and systems make it easier for the public to inform them of their needs and preferences, get feedback on their suggestions and complaints and rate the service they got from the facility.

Respondents indicated that Majivoice applications helped in management of the complaints raised probably by the customers to a great extent (M=3.73).The study further established that Majivoice applications helped in tracking customer complaints in the organization to a great extent (M=3.67). According to the Water Services Regulatory Board (WASREB), the water consumers use the Majivoice applications for two-way communication, such that the consumers use their mobile phones, computers or laptops to share their concerns, comments, feedback and complaints on the quality of service delivered to them.

Respondents were asked to indicate their general views on the extent to which MajiVoiceapplication affected service delivery among consumers of NCWSC. The findings are as summarized in Table 4.6.

Table 4.6: Overall Perceptions of Respondents on Majivoice Applications

	Frequency	Percent
Little extent	2	3.8
Moderate extent	12	22.6
Great extent	30	56.6
Very Great extent	9	17.0
Total	**53**	**100.0**

Source: Field Data (2020)

Table 4.6 shows that 56.6% of the respondents shared thatMajivoice applications affected delivery among consumers of NCWSC to a great extent, 22.6% indicated moderate extent, and

17.0% said very great extent and 3.8% noted little extent. This means that Majivoice applications greatly affected delivery among consumers of NCWSC. This finding is consistent with Adhikari, Zuo, Maharjan and Yadav (2018) who shared that using technological platforms, the water consumers are able to share their concerns and feedback and also get feedback on their issues, while at the same time they are able to track the progress of their issues before it can safely be resolved.

4.5.3 Customer Management System and Service Delivery

The second independent objective variable of the study was customer management system and a summary of the descriptive statistics are as shown in Table 4.7.

Table 4.7: Customer Management System

	Mean	Std. Dev
Providing instant updates/notifications to customers	3.77	.697
Sending reminders to customers	3.75	1.036
Instant invoicing	3.62	1.095
Accessibility to the water service provider systems	3.90	.966
Faster Billing	3.66	.979

Source: Field Data (2020)

The results in Table 4.7 indicate that respondents shared that there was accessibility to the water service provider systems to a great extent (M=3.90). It was noted that there was provision of instant updates/notifications to customers to a great extent in the organization (M=3.77). This means that the CMS helped in giving notifications and updates while allowing accessibility to water services at the convenience of the customers. As shared by Njuguna and Mirugi (2017), modern organizations that are seeking competitive advantage through attracting and retaining customers have to maintain the relationship and guard it as prized assets.

Respondents noted that the CMS helped in sending reminders to customers to a great extent in the organization (M=3.75), faster billing (M=3.66) and instant invoicing (M=3.62) to a great extent. This implies that the CMS was faster and properly convenient especially in regard to customer related issues. Buttle and Maklan (2019) on customer service management share that use of technologies in customer management leads to better relationship between the customer and the organization, due to the fact that the system keeps records of purchases and services

offered and help in the billing times. Its accuracy means that both the relationship between the customer and the business venture is not negatively affected.

Respondents of the study were asked to indicate in general terms the extent which customer management system affected service delivery among consumers of NCWSC. Table 4.8 gives a summary of the results.

Table 4.8: Overall Perceptions of Respondents on Customer Management System

	Frequency	Percent
Little extent	3	5.7
Moderate extent	11	20.8
Great extent	29	54.7
Very Great extent	10	18.9
Total	**53**	**100.0**

Source: Field Data (2020)

Table 4.8 shows that 54.7% of the respondents were of the view that customer management system affected service delivery among consumers of NCWSC to a great extent, 20.8% said moderate extent, and 18.9% indicated very great extent and 5.7% said little extent. This means that customer management system greatly affects service delivery in an organization. The result is supported by Buttle and Maklan (2019) who on customer service management share that use of technologies in customer management leads to better relationship between the customer and the organization, due to the fact that the technological systems and applications store information about the customer which the entrepreneur can use to offer better services and products and increase sales.

4.5.4 Per Pay System and Service Delivery

The last specific objective variable of the study was per pay system and the findings of descriptive statistics on this variable are summarized in Table 4.9.

Table 4.9: Per Pay System

	Mean	Std. Dev
Mitigating errors in the payroll process	3.81	.735
Calculating employee wages	3.75	.958
Calculating employee work hours	3.56	.888
Calculating Tax withholding which reduces work hours for people	3.86	.809
Compiling reports for various staff	3.64	1.001
Making amendments on reports when need arises	3.84	.968

Source: Field Data (2020)

From Table 4.9, majority of the respondents said that per pay system in making amendments on reports when need arose to a great extent (M=3.84) and that it helped in calculating tax withholding which reduced work hours for peopleto a great extent (M=3.86). It was shown that per pay system helped in mitigating errors in the payroll processto a great extent (M=3.81), it greatly helped in calculating employee wages(M=3.75). Respondents further shared that the per pay system helped in compiling reports for various staffto a great extent (M=3.64) besides calculating employee work hours(M=3.56). These findings are consistent with Karanja, Sang and Ndirangu (2018) who in ICT integration and HRM management study and shared that the adoption of payroll management information system which maintains employee database covering the number of working hours/days, payments, deductions and bonuses which is integrated into biometric devices and once it is coded in, the other times it will be automatically updated.

The study sought to establish the extent which per pay system affected service delivery among consumers of NCWSC. The findings are as indicated in Table 4.10.

Table 4.10: General Perceptions of the Respondents on Per Pay System

	Frequency	Percent
Little extent	10	18.9
Moderate extent	4	7.5
Great extent	30	56.6
Very Great extent	9	17.0
Total	**53**	**100.0**

Source: Field Data (2020)

The results in Table 4.10 indicate that while 56.6% of the respondents shared thatper pay system affected service delivery among consumers of NCWSC to a great extent, 18.9% indicated little extent, 17.0% said very great extent and 7.5% noted moderate extent. This implies that per pay system greatly affects service delivery in an organization. Karanja, Sang and Ndirangu (2018) noted that the per pay system works by linking to ERP solutions to share real time reports and data, this is ideal for the business people who can quickly make informed decisions.

4.6 Diagnostic Tests

Diagnostic tests were conducted before regression analysis to test the associated assumptions. The specific diagnostic tests that were conducted in this study include test for multicollinearity, normality test and test for presence ofHeteroskedasticity.

4.6.1 Multicollinearity Test

Multicollineairty is said to be present in the data set whenever one of the study independent variables have high correlation with each other (Katrutsa & Strijov, 2017). In ascertaining for multicollinearity in the data set, the study relied on Variance of Inflation Factor (VIF) values. To infer the absence of multicollinearity in the data set, the VIF values should be within the range of 1 all through to 10 (Vatcheva, Lee, McCormick & Rahbar, 2016). The study used the values of the Variance of Inflation Factor (VIF) to test for the presence of multicollinearity in the data. Table 4.1 reports the findings.

Table 4.11: Multicollinearity Test

	Collinearity Statistics	
	Tolerance	**VIF**
MajiVoice Application	.996	1.004
Customer Management System	.976	1.025
Per Pay System	.980	1.021

a. Dependent Variable: Service Delivery

Source: Field Data (2020)

The results in Table 4.11 indicate thatMajiVoice application had VIF of 1.004, customer management system had 1.025 and per pay system had 1.021. These findings concur with Vatcheva *et al*. (2016) who indicated that if a VIF that is less than 4.0, multicollinearity is usually not a major problem. Similarly, Katrutsa and Strijov (2017) noted that when VIF is greater than 4.0, there is usually presence of multicollinearity and a VIF that is greater than 10, severe multicollinearity of the independent variables is present. Hebnce, in light of the results in Table 4.11, all the established VIF values for majivoice application, customer management system and per pay system were all less than 4. The implication of this finding is that there was no serious multicollinearity in the data set and thus it was suitable for conducting regression analysis.

4.6.2 Normality Test

The need for conducting normality test was to check and ascertain if the observations in the data set obey a normal distribution. Usually, in a normal distribution, there is a mean value of 0 as well as standard deviation of 1 (Xie, Hong, Laing & Kang, 2017). According to Srivastava (1984), regression analysis can only proceed is one of apart from other diagnostic test, normality test had been conducted and established that the data is normally distributed.Normality test was established using the normal PP plot as presented in Figure 4.5. In case the data points are seen falling along the normal PP line, the inference drawn would be that the data is normally distributed.

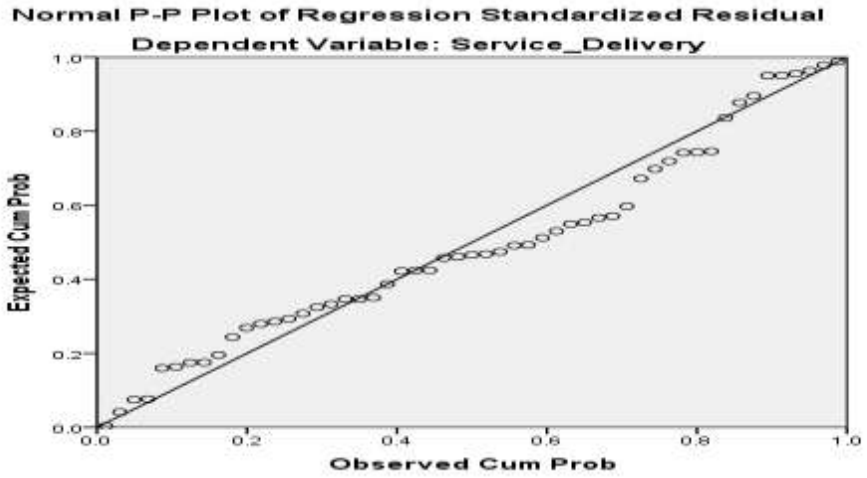


Figure 4.4: Normal PP Plot
Source: Field Data (2020)

The study used the normal PP plot to test for the presence of normality as indicated in Figure 4.4. From the results in Figure 4.5, majority observations between expected probability and observed probability are aligned along the normal PP line. This could be an indication that the data is normally distributed and thus probably relevant for regression modeling. This finding is consistent with Nasrum (2020) who argued that whenever the data points between expected and observed probabilities are found to fall along the PP line, the relevant inference to be drawn is that the data is normally distributed. The implication of the findings in Figure 4.5 was that the data did not violate normality assumption of regression analysis and thus its suitability in regressing between technological applications and service delivery with the results detailed in subsequent sections.

4.6.3 Heteroskedasticity Test

Heteroscedasticity is where the spread of the residual or the error term of the model varies within a range of different measured values (Baum & Lewbel, 2018). Scatter plots were useful in establishing this phenomenon. The interpretation of these scatter plots is such that where the observations are spread without absence of a clearly observed trend or pattern could signify absence of heteroscedasticity condition (Chasco, Le-Gallo & López, 2018). The study used the scatter plots to predict the presence of heteroskedasticity and the findings are as presented in Figure 4.6. Whenever the data points are observed to be spread all over with no clearly established pattern, it would signify absence of heteroskedasticity and thus homoscedasticity would be assumed.

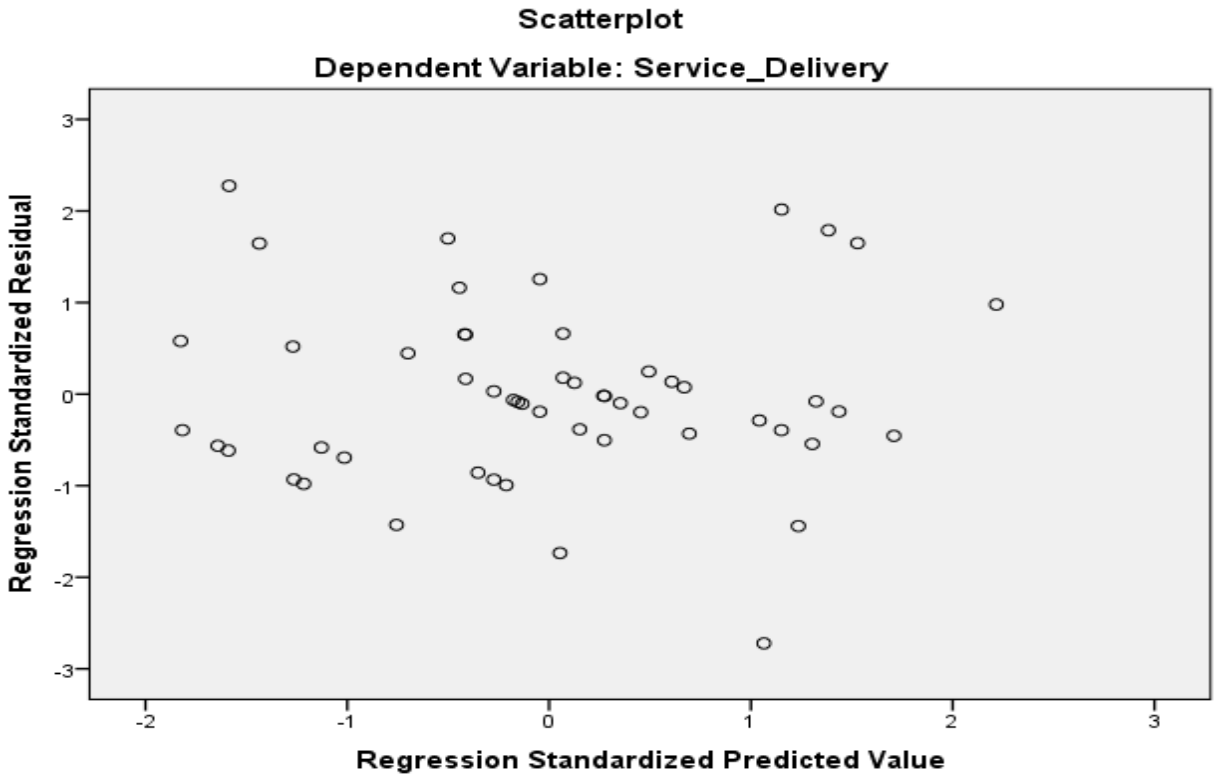


Figure 4.5: Scatter Plot
Source: Field Data (2020)

From the way the observations have been distributed in Figure 4.6, no pattern can be identified from this spread. The implication of this finding is that there was no heteroskedasticity in the data and thus it was suitable for regression analysis with the results presented in the subsequent

sections. This assertion is consistent withChasco, Le-Gallo and López, (2018) who noted thathe interpretation of the scatter plots is such that where the observations are spread without absence of a clearly observed trend or pattern could signify absence of heteroscedasticity condition.

4.7 Regression Results

In order to establish the effect of technology application on service delivery, the researcher performed regression analysis. The findings are as presented in subsequent sections.

4.7.1 Regression Model Summary

The results of the model summary as an output of regression analysis are presented in Table 4.12.

Table 4.12: Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.709[a]	.502	.472	2.07354

a. Predictors: (Constant), Per Pay System, MajiVoice Application, and Customer Management System

Source: Field Data (2020)

As indicated in Table 4.12, the coefficient of correlation R is taken as 0.709; this could be an indication that the technology applications strongly impacts on service delivery of an organization. Ndaw (2015) in the study on unlocking the potential that ICT has on improving the water and sanitation services a Kenya case noted that the main objective in the use of the technology is to help in resolving and tracking of the customer complaints raised. The coefficient of determination R square is0.502; this means that the overall regression model of the study was a good fit. The value of adjusted R square was 0.472; this means that 47.2% variation in service delivery among consumers of NCWSC is explained by technological applications that are in place.

4.7.2 Analysis of Variance

Table 4.13 gives the results of the Analysis of Variance (ANOVA) of the regression model used in the study.

Table 4.13: Analysis of Variance

	Sum of Squares	df	Mean Square	F	Sig.
Regression	212.567	3	70.856	16.480	.000[b]
Residual	210.679	49	4.300		
Total	**423.245**	**52**			

a. Dependent Variable: Service Delivery
b. Predictors: (Constant), Per Pay System, MajiVoice Application, and Customer Management System
Source: Field Data (2020)

Based on the findings in Table 4.13, the value of F calculated was 16.480; which infer that the overall regression model of the study was significant. The p-value is given as 16.480; which imply that technological applications have significant effect on service delivery and thus the general objective of the study had been attained. Consistent with these findings, Baumüller (2016) reveal that in today's world, many organizations are using technology to invent and innovate products that solve business problems, help the firms' in making every day decision making process that affect the end result, enhance quality of outputs and production levels which enables the firms to compete in the different market places.According to Giri and Shakya (2018) technology is a functioning unit that has been compulsory for all organizations that are seeking to make a presence in the market by the goods and services. In the service industry, technologies are used to ensure safety and security of the clientele, efficient and quick service and ease in communication, where requests and responses are handled effectively

4.7.3 Regression Coefficients and Significance

Regression beta coefficients covering the unstandardized and the standardized values were established. This study used the standardized regression beta coefficients in interpretation of the magnitude of the effect of the variables. Table 4.14 gives a breakdown of the analysis.

Table 4.14: Regression Coefficients and Significance

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	-1.366	4.258		-.321	.750
MajiVoice Application	1.153	.169	.689	6.820	.000
Customer Management System	-.115	.076	-.154	-1.510	.137
Per Pay System	.177	.124	.146	1.432	.159

a. Dependent Variable: Service Delivery
Source: Field Data (2020)

From Table 4.14, the following regression equation is predicted between technological application and service delivery:

Y=-1.366+.689MajiVoice Application

The study had three specific objectives. The first objective sought to establish the effect of MajiVoice applications on the service delivery among consumers of Nairobi City Water and Sewerage Company. From the findings, the study established that when all other constructs of technological applications are held constant, a unit change in MajiVoirce application would lead to 0.689unit increase in service deliveryamong consumers of Nairobi City Water and Sewerage Company. At 5%, it was shown that the p-value ($p<0.05$), which means that MajiVoice applications had significant effect on the service delivery among consumers of Nairobi City Water and Sewerage Company. Consistent with these findings, Adhikari, Zuo, Maharjan and Yadav (2018) noted that MajiVoice application allows for timely responds and feedback, which works to achieve its target of improving efficiency, responsiveness, accountability and transparency. Peixoto and Fox (2016) shared that use of technologies, applications and systems has made demand for services, giving feedback and rating services provided easier and faster. Kinuthia (2019) shows that adopting to technological systems and applications can help reduce some of these challenges like use of wireless meter-bus smart water meter reader to enable remote meter reading.

The second objective sought to determine how customer management system affects service delivery among consumers of Nairobi City Water and Sewerage Company. It was shown that when all the elements of technological application are held constant, a unit change in customer management system would lead to 0.154unit decreases in service delivery among consumers of Nairobi City Water and Sewerage Company. However, p-value was less than 0.05, which inferredthat customer management system has no significant effect on service delivery among consumers of Nairobi City Water and Sewerage Company.These findings contradicts with Njuguna and Mirugi (2017) who showed that effective service quality positively affects service delivery and at the same time relationship management enhances service delivery. The results further contradict with Buttle and Maklan (2019) who shared that use of technologies in customer management leads to better relationship between the customer and the organization,

due to the fact that the technological systems and applications store information about the customer which the entrepreneur can use to offer better services and products and increase sales.

The third objective sought to assess the effect of Per Pay system on service delivery among consumers of Nairobi City Water and Sewerage Company. It was shown when all other constructs are held constant; a unit change inPer Pay system would lead to 0.146unit increase in service delivery among consumers of Nairobi City Water and Sewerage Company. The study further noted that the p-value was greater than 0.05, which infer that thatPer Pay system has no significant effect on service delivery among consumers of Nairobi City Water and Sewerage Company. The results are inconsistent with Debroux (2017) on human resources management in Japan, noting that the adopting of different HRM systems is to be able to manage and control organizational decisions about pay, promotion, work and tasks and responsibilities and the well-being of the people within the organization.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter is set out to provide a summary of the findings from the analysis of the data that was sought from the field. The conclusions drawn from the key findings and the recommendations are also presented in this chapter. The limitations and suggestions requiring further research are also pointed out in this study.

5.2 Summary of the Findings

This section provides a summary of the findings from the analysis of the findings. The summary is provided beginning by the descriptive statistics followed by the inferential statistics of the study. The summary of the findings is guided by the specific objectives that the study sought to achieve.

5.2.1 Technological Applications and Service Delivery

The main objective of this research was to determine the effect of technological applications on service delivery among consumers of Nairobi City Water and Sewerage Company. From the findings, the study noted that the coefficient of correlation R was 0.709, which inferred that technological applications are strong correlated of service delivery among consumers of Nairobi City Water and Sewerage Company. This finding is consistent with Ndaw (2015) who noted that the main objective in the use of the technology is to help in resolving and tracking of the customer complaints raised. The value of adjusted R square was 0.472; this means that 47.2% variation in service delivery among consumers of NCWSC is explained by technological applications that are in place.

From the ANOVA findings, the value of F calculated was 16.480 with p-value of 0.000 which is less than 0.05. This infersthat technological applications have significant effect on service delivery and thus the general objective of the study had been attained. Consistent with these findings, Baumüller (2016) reveal that in today's world, many organizations are using technology to invent and innovate products that solve business problems, help the firms' in making every day decision making process that affect the end result, enhance quality of outputs

and production levels which enables the firms to compete in the different market places. According to Giri and Shakya (2018) technology is a functioning unit that has been compulsory for all organizations that are seeking to make a presence in the market by the goods and services. In the service industry, technologies are used to ensure safety and security of the clientele, efficient and quick service and ease in communication, where requests and responses are handled effectively.

5.2.2 MajiVoice Applications and Service Delivery among Consumers

The study sought to establish the effect of MajiVoice applications on the service delivery among consumers of Nairobi City Water and Sewerage Company. The findings of descriptive statistics indicated 56.6% of the respondents shared that Majivoice applications affected delivery among consumers of NCWSC to a great extent. This means that Majivoice applications greatly affected delivery among consumers of NCWSC. This finding is consistent with Adhikari, Zuo, Maharjan and Yadav (2018) who shared that using technological platform, the water consumers are able to share their concerns and feedback and also get feedback on their issues, while at the same time they are able to track the progress of their issues before it can safely be resolved.

From the regression results, the study established that when all other constructs of technological applications are held constant, a unit change in MajiVoirce application would lead to 1.153 unit increase in service delivery among consumers of Nairobi City Water and Sewerage Company. At 5%, it was shown that the p-value ($p<0.05$), which means that MajiVoice applications had significant effect on the service delivery among consumers of Nairobi City Water and Sewerage Company. Consistent with these findings, Adhikari, Zuo, Maharjan and Yadav (2018) noted that MajiVoice application allows for timely responds and feedback, which works to achieve its target of improving efficiency, responsiveness, accountability and transparency. Peixoto and Fox (2016) shared that use of technologies, applications and systems has made demand for services, giving feedback and rating services provided easier and faster. Kinuthia (2019) shows that adopting to technological systems and applications can help reduce some of these challenges like use of wireless meter-bus smart water meter reader to enable remote meter reading.

5.2.3 Customer Management System and Service Delivery among Consumers

The study sought to determine how customer management system affects service delivery among consumers of Nairobi City Water and Sewerage Company.From the descriptive statistics, 54.7% of the respondents were of the view that customer management system affected service delivery among consumers of NCWSC to a great extent. This means that customer management system greatly affects service delivery in an organization. The result is supported by Buttle and Maklan (2019) who on customer service management share that use of technologies in customer management leads to better relationship between the customer and the organization, due to the fact that the technological systems and applications store information about the customer which the entrepreneur can use to offer better services and products and increase sales.

Regression results were that when all the elements of technological application are held constant, a unit change in customer management system would lead to 0.115 unit decreases in service delivery among consumers of Nairobi City Water and Sewerage Company. However, p-value was less than 0.05, which inferred that customer management system has no significant effect on service delivery among consumers of Nairobi City Water and Sewerage Company. These findings contradicts with Njuguna and Mirugi (2017) who showed that effective service quality positively affects service delivery and at the same time relationship management enhances service delivery. The results further contradict with Buttle and Maklan (2019) who shared that use of technologies in customer management leads to better relationship between the customer and the organization, due to the fact that the technological systems and applications store information about the customer which the entrepreneur can use to offer better services and products and increase sales.

5.2.4 Per Pay System and Service Delivery Among Consumers

The third objective was to assess the effect of Per Pay system on service delivery among consumers of Nairobi City Water and Sewerage Company.Descriptive statistics indicate that while 56.6% of the respondents shared that per pay system affected service delivery among consumers of NCWSC to a great extent. This implies that per pay system greatly affects service delivery in an organization. Karanja, Sang and Ndirangu (2018) noted that the per pay system

works by linking to ERP solutions to share real time reports and data, this is ideal for the business people who can quickly make informed decisions.

From regression results, when all other constructs are held constant; a unit change in Per Pay system would lead to 0.177 unit increase in service delivery among consumers of Nairobi City Water and Sewerage Company. The study further noted that the p-value was greater than 0.05, which infer that that Per Pay system has no significant effect on service delivery among consumers of Nairobi City Water and Sewerage Company. The results are inconsistent with Debroux (2017) on human resources management in Japan, noting that the adopting of different HRM systems is to be able to manage and control organizational decisions about pay, promotion, work and tasks and responsibilities and the well-being of the people within the organization.

5.3 Conclusion

The main objective of this research was to determine the effect of technological applications on service delivery among consumers of Nairobi City Water and Sewerage Company. From the ANOVA findings, the p-value was 0.000. Based on this finding, the study concludes that technological applications have significant effect on service delivery among consumers of Nairobi City Water and Sewerage Company.

The first specific objective of the study was to establish the effect of MajiVoice applications on the service delivery among consumers of Nairobi City Water and Sewerage Company. From regression analysis, MajiVoice applications had a postive beta coefficient that had p-value less than 0.05. Based on this finding, the study concludesthat MajiVoice applications have postive and significant effect on the service delivery among consumers of Nairobi City Water and Sewerage Company. The study concludes that Majivoice applications affected delivery among consumers of NCWSC to a great extent.

.The second specific objective of the study was to determine how customer management system affects service delivery among consumers of Nairobi City Water and Sewerage Company.The findings of regression analysis indicated a negative bate coefficient that had p-value greater than 0.05. Based on this finding, the study concludes that customer management system has no significant effect service delivery among consumers of Nairobi City Water and Sewerage

Company. Most of the respondents were of the view that customer management system affected service delivery among consumers of NCWSC to a great extent.

The third objective was to assess the effect of Per Pay system on service delivery among consumers of Nairobi City Water and Sewerage Company.From regression results, Per Pay system had a postive beta coefficient with p-value greater than 0.05. Based on this finding, the study concludes that Per Pay system has no significant effect on service delivery among consumers of Nairobi City Water and Sewerage Company. Majority of the respondents noted that per pay system affected service delivery among consumers of NCWSC to a great extent.

5.4 Recommendations of the Study

The findings indicatedtechnological applications had a p-value of 0.000 which was less than 0.05. Based on this finding, the study recommends that the management of Nairobi City Water and Sewerage Company should upgrade on the technological applications so as to improve on service delivery among consumers.

From regression analysis, MajiVoice applications had a postive beta coefficient that had p-value less than 0.05. Based on this finding, the study recommends that the management team of Nairobi City Water and Sewerage Company should invest a lot of resources in MajiVoice applications so as to improve service delivery among consumers.

The study established that customer management system had a negative beta coefficient that had p-value greater than 0.05. Based on this finding, the study recommends that customer care managers ofNairobi City Water and Sewerage Company should work together with IT managers to improve oncustomer management system so as significantly contribute towards service delivery among the customers.

It was shown that Per Pay system had a postive beta coefficient with p-value greater than 0.05 hence it was not significant. Therefore, the study recommends that ICT managers of Nairobi City Water and Sewerage Company overhaul that Per Pay system to ensure that it significantly enhances service delivery among the customers.

5.5 Limitations of the Study

Conceptually, the study was limited on technological applications as the independent variable that was examined in relation to service delivery as the dependent variable. The sub-variables under technological applications included Maji-Voice Application, customer management system and per pay system.

Contextually, the study was limited to one organization which was Nairobi City Water and Sewerage Company. Therefore, this was a case study that only covered a single firm. The sample size of the study was 77 respondents which were relatively small and thus a limitation to the study since it limited generalization of the finding s to other firms in other sectors away from the Nairobi City Water and Sewerage Company.

Methodologically, the study was limited to primary data that was gathered with the aid of the questionnaire. The limitation faced during collection of this primary data was that there was Corvid-19 pandemic during data collection. This was a challenge as some of the respondents were working from home and this required online administration of the questionnaires to such respondents. These challenges posed by Ciorvid-19 pandemic resulted into a low response rate that was recorded in this study.

5.6 Suggestions for Further Research

From regression results, it was shown that technological applications only account for 47.2% variation in service delivery in an organization. This means that apart from technological innovation, there are still other factors that influence service delivery in the firm that future studies should seek to cover. Thus, apart fromMaji-Voice Application, customer management system and per pay system, future studies should be conducted to establish other factors that influence service delivery among customers of the organization.

A case study design was adopted in the present study with focus on Nairobi City Water and Sewerage Company. Although a case study gives one an opportunity to dig deeper into an organization and get more relevant information required, it limits generalization of the findings to other organizations. Thus, the study recommends further studies to be conducted covering for

instance the state corporations in Kenya or others firms operating in different sectors of the economy. This will give room for comparison of the findings.

Future similar studies adopting case study designs should consider using different sources of data collection including the interviews, focus group discussions and observations aside from the questionnaire. Secondary data should be given due consideration in future similar studies.

REFERENCES

Xie, J., Hong, T., Laing, T. & Kang, C. (2017).On normality assumption in residual simulation for probabilistic load forecasting. *IEEE Transactions on Smart Grid*, *8*(3), 1046-1053.

Katrutsa, A. & Strijov, V. (2017). Comprehensive study of feature selection methods to solve multicollinearity problem according to evaluation criteria. *Expert Systems with Applications*, *76*, 1-11.

Vatcheva, K. P., Lee, M., McCormick, J. B., &Rahbar, M. H. (2016).Multicollinearity in regression analyses conducted in epidemiologic studies. *Epidemiology (Sunnyvale, Calif.)*, *6*(2).

Giles, D. E. & Beattie, M. (2018).Autocorrelation pre-test estimation in models with a lagged dependent variable.In *Specification analysis in the linear model* (pp. 99-116).Routledge.

Baum, C. F. &Lewbel, A. (2018). *Advice on using heteroscedasticity based identification* (No. 975). Boston College Department of Economics.

Chasco, C. Le Gallo, J. & Lopez, F. A. (2018). A scan test for spatial group wise heteroscedasticity in cross-sectional models with an application on houses prices in Madrid. *Regional Science and Urban Economics*, *68*, 226-238.

Adhikari, B. K., Zuo, W. L., Maharjan, R., & Yadav, R. K. (2018). Use of Big Data Analytics in WASH Sector. In*2018 Second International Conference on Intelligent Computing and Control Systems (ICICCS)* (pp. 1185-1190). IEEE.

Agarwal, V. (2017). Implementing quality healthcare strategies for improving service delivery at private hospitals in India. *Journal of Health Management*, *19*(1), 159-169.

Agrawal, A. (2018). To examine the relationship between the use of the e-HRM system and HRM effectiveness. *Research Review International Journal of Multidisciplinary*, *3*(7), 478-483.

Ahmed, A., & Ogalo, H. S. (2019). From hrm to e-hrm: Contemporary developments from scholarly work. *Annals of Contemporary Developments in Management & HR (ACDMHR)', Print ISSN*, 2632-7686.

Ajibade, O., Ibietan, J., & Ayelabola, O. (2017). E-Governance Implementation and Public Service Delivery in Nigeria: The Technology Acceptance Model (TAM) Application. *world*, *7*(4).

Baumüller, H. (2016). Agricultural service delivery through mobile phones: local innovation and technological opportunities in Kenya. In *Technological and institutional innovations for marginalized smallholders in agricultural development* (pp. 143-162). Springer, Cham.

Bell, E., Bryman, A., & Harley, B. (2018). *Business research methods*. Oxford university press.

Bernard, H. R. (2017). *Research methods in anthropology: Qualitative and quantitative approaches*. Rowman & Littlefield.

Buttle, F., & Maklan, S. (2019). *Customer relationship management: concepts and technologies*. Routledge.

Callon, M. (1984). Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. *The sociological review*, *32*(1_suppl), 196-233.

Couldry, N. (2008). Actor network theory and media: Do they connect and on what terms?.

Cresswell, K. M., Worth, A., & Sheikh, A. (2010). Actor-Network Theory and its role in understanding the implementation of information technology developments in healthcare. *BMC medical informatics and decision making*, *10*(1), 67.

Dai, W., & Lee, J. H. (2018). Effects of website characteristics and delivery service quality on repurchase intention. *The International Journal of Industrial Distribution & Business*, *9*(5), 17-24.

Debroux, P. (2017). *Human Resource Management in Japan: Changes and Uncertainties-A New Human Resource Management System Fitting to the Global Economy: Changes and Uncertainties-A New Human Resource Management System Fitting to the Global Economy*. Routledge.

Douglas, D. G. (2012). *The social construction of technological systems: New directions in the sociology and history of technology*. MIT press.

Furlong, C., De Silva, S., Guthrie, L., & Considine, R. (2016). Developing a water infrastructure planning framework for the complex modern planning environment. *Utilities Policy*, *38*, 1-10.

Giri, S., & Shakya, S. (2018). ICT and service delivery mechanisms in civil service of Nepal. *International Journal of Computer Science and Mobile Computing*, *7*(4), 47-52.

Haming, M., Murdifin, I., Syaiful, A. Z., & Putra, A. H. P. K. (2019). The Application of SERVQUAL Distribution In Measuring Customer Satisfaction of Retails Company. *The Journal of Distribution Science*, *17*(2), 25-34.

Ijoema, M. M. (2018). Importance of Management Information System in service Delivery and Paper Work in Nigeria University. *IOSR Journal of Business and Management*, *20*(9), 30-38.

Karanja, D., Sang, A. K. A., & Ndirangu, M. (2018). Influence of Integration of ICT on human resource management in Kenyan public universities. *International Journal of Sustainability Management and Information Technologies*, *3*(6), 73.

Kinuthia, E. M. (2019). *A Wireless M-Bus based smart water meter model: a case of Nairobi City Water & Sewerage Company* (Doctoral dissertation, Strathmore University).

Kratz, C. (2019). New Realities, New Relationships: Transforming the delivery of service: The joint-use library and information commons. *College & Research Libraries News*, *64*(2), 100-101.

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Harvard university press.

Laudon, K. C., & Laudon, J. P. (2016). *Management information system*. Pearson Education India.

Law, J. (1987). Technology and heterogeneous engineering: The case of Portuguese expansion. *The social construction of technological systems: New directions in the sociology and history of technology*, *1*, 1-134.

Lune, H., & Berg, B. L. (2016). *Qualitative research methods for the social sciences*. Pearson Higher Ed.

Macharia, W. S., & Dominic, N. (2019). The Effectiveness of Integrated Financial Management Information System in Selected Government Ministries in Kenya: A Theoretical Review. *International Journal of Current Aspects*, *3*(V), 1-11.

Mauri, A. G., Minazzi, R., & Muccio, S. (2013). A review of literature on the gaps model on service quality: A 3-decades period: 1985-2013. *International Business Research*, *6*(12), 134.

Monstadt, J., & Schramm, S. (2017). Toward the networked city? Translating technological ideals and planning models in water and sanitation systems in Dar es Salaam. *International Journal of Urban and Regional Research*, *41*(1), 104-125.

Muchai, D. N., & Kimuyu, P. (2017). Prospects for information and communications technology-enabled services in Kenya. *The case of the mobile money transfer industry*.

Mwania, K. N. (2015). Influence of Customer Service Charter on Service Delivery: A Case of Nairobi City Water and Sewage Company in Kenya. *An MA Thesis Presented to the Department of Project Planning and Management, University of Nairobi*.

Nairobi City Water and Sewerage Company. (2016). Strategic Business Plan 2016/17 - 2019/20

NCWSC (2019) Nairobi Water and Sewerage Company, History. http://www.nairobiwater.co.ke/about.htm

Ndaw, M. F. (2015). Unlocking the potential of information communications technology to improve water and sanitation services.

Ndirangu, W., & Schaer, C. (2017). Catalysing low cost green technologies for sustainable water service delivery in Kenya: Feasibility Study Report.

Njuguna, R. K., & Mirugi, S. (2017). The effectiveness of relationship management and service quality on service delivery. *International Journal of Sales, Retailing & marketing*, *2*(6).

Otieno, O. G. (2019). Influence Of Technology Adoption On Water Service Delivery In Lake Victoria South Region, Kenya.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). Servqual: A multiple-item scale for measuring consumer perc. *Journal of retailing*, *64*(1), 12.

Peixoto, T., & Fox, J. (2016). When does ICT-enabled citizen voice lead to government responsiveness?

Puffer, S. M., & McCarthy, D. J. (2011). Two decades of Russian business and management research: An institutional theory perspective. *Academy of Management Perspectives*, *25*(2), 21-36.

Ravichandran, K., Prabhakaran, S., & Kumar, S. A. (2010). Application of Servqual model on measuring service quality: A Bayesian approach. *Enterprise Risk Management*, *2*(1), 145.

Rodell, M., Famiglietti, J. S., Wiese, D. N., Reager, J. T., Beaudoing, H. K., Landerer, F. W., & Lo, M. H. (2018). Emerging trends in global freshwater availability. *Nature*, *557*(7707), 651-659.

Rono, N. C. (2018). *Management Perception Of The Influence Of Mobile Technology-Based Strategy On Service Delivery At Kenya Revenue Authority* (Doctoral Dissertation, School Of Business, University Of Nairobi).

Scott, W. R. (1987). The adolescence of institutional theory. *Administrative science quarterly*, 493-511.

Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.

Shoib, G., Nandhakumar, J., & Currie, W. (2009). Contextualising the IT artefact: towards a wider research agenda for IS using institutional theory. *Information Technology & People*.

Sousa, J. C., Ribeiro, A. R., Barbosa, M. O., Pereira, M. F. R., & Silva, A. M. (2018). A review on environmental monitoring of water organic pollutants identified by EU guidelines. *Journal of hazardous materials*, *344*, 146-162.

Strzelecka, A., Ulanicki, B., Koop, S., Koetsier, L., Van Leeuwen, K., & Elelman, R. (2017). Integrating water, waste, energy, transport and ICT aspects into the smart city concept. *Procedia Engineering*, *186*, 609-616.

Thite, M. (Ed.). (2018). *E-HRM: Digital approaches, directions & applications*. Routledge.

Tilahun, Z. (2015). *Assessment of practices and challenges of strategy planning process in the case of construction & business bank* (Doctoral dissertation, ST. Mary's University).

Turman-Bryant, N., Nagel, C., Stover, L., Muragijimana, C., & Thomas, E. A. (2019). Improved Drought Resilience through Continuous Water Service Monitoring and Specialized Institutions—A Longitudinal Analysis of Water Service Delivery Across Motorized Boreholes in Northern Kenya. *Sustainability*, *11*(11), 3046.

Vashishth, A., & Chakraborty, A. (2018). Measuring the Service Quality of Services: TRADONIC SERVQUAL Model. In *E-Manufacturing and E-Service Strategies in Contemporary Organizations* (pp. 219-241). IGI Global.

Veal, A. J. (2017). *Research methods for leisure and tourism*. Pearson UK.

Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1985). Problems and strategies in services marketing. *Journal of marketing*, *49*(2), 33-46.

APPENDICES

Appendix I: Introduction Letter

Dear Respondent,

I am a postgraduate student at the KCA University pursuing MBA – Corporate Management. As part of this course, I am carrying out a research on the impact of technology on effective service delivery at Nairobi City Water and Sewerage Company (NCWSC) specifically looking at various technologies and how they contribute to effectiveness in service delivery.

This is to request you to kindly fill in this questionnaire by responding to the questions concerning the use of technologies and their impacts on effectiveness of service delivery at NCWSC. 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

Timothy Irimu

Appendix II: Questionnaire

Bio Data

Kindly Circle/Tick the most appropriate answer

1. Your gender
   Male [ ]
   Female [ ]
2. Which department do you work in?
   IT Department [ ]
   HR Department [ ]
   Customer Care [ ]
   Senior Management [ ]

3. What is your highest level of education?
   College Certificate [ ]
   Diploma [ ]
   University Degree [ ]
   Post Graduate [ ]
   Others (Specify) [ ]

4. How long have you worked in this company
   Less than a 1 year [ ]
   1-3 years [ ]
   3-5 years [ ]
   Over 5 years [ ]

MajiVoice Application and Service Delivery

5. Please indicate the degree to which you agree with the following statements with regard to the extent of the usage of MajiVoice application in enhancing service delivery among consumers of NCWSC. Use the Likert Scale of 1-5, where 1 –No extent, 2-little extent, 3-Moderate extent, 4 –Great extent and 5 Very Great extent

FACTORS	**No Extent 1)**	**Little Extent (2)**	**Moderate Extent (3)**	**Great Extent (4)**	**Very Great Extent (5)**
Tracking Customer Complaints					
Managing Complaints Raised					
Resolving Complaints Raised					

6. In general terms, to what extent does MajiVoice application affects service delivery among consumers of NCWSC?

   No Extent [ ]
   Little Extent [ ]
   Moderate Extent [ ]
   Great Extent [ ]
   Very Great Extent [ ]

Customer Management System and Service Delivery

7. Please indicate the degree to which you agree with the following statements with regard to the extent of the usage of Customer management system in enhancing service delivery among consumers of NCWSC. Use the Likert Scale of 1-5, where 1 –No extent, 2-little extent, 3-Moderate extent, 4 –Great extent and 5 Very Great extent

FACTORS	**No Extent 1)**	**Little Extent (2)**	**Moderate Extent (3)**	**Great Extent (4)**	**Greatest Extent (5)**
Providing instant updates/notifications to customers					
Sending reminders to customers					
Instant invoicing					
Accessibility to the water service provider systems					
Faster Billing					

8. In general terms, to what extent does customer management system affect service delivery among consumers of NCWSC?

   No Extent [ ]
   Little Extent [ ]
   Moderate Extent [ ]
   Great Extent [ ]
   Very Great Extent [ ]

Per Pay System and Service Delivery

9. Please indicate the degree to which you agree with the following statements with regard to the extent of the usage of Per Pay system in enhancing service delivery among consumers of NCWSC. Use the Likert Scale of 1-5, where 1 –No extent, 2-little extent, 3-Moderate extent, 4 –Great extent and 5 Very Great extent

FACTORS	**No Extent 1)**	**Little Extent (2)**	**Moderate Extent (3)**	**Great Extent (4)**	**Very Great Extent (5)**
Mitigating errors in the payroll process					
Calculating employee wages					
Calculating employee work hours					
Calculating Tax withholding which reduces work hours for people					
Compiling reports for various staff					
Making amendments on reports when need arises					

10. In general terms, to what extent does Per Pay system affect service delivery among consumers of NCWSC?

No Extent [ ]
Little Extent [ ]
Moderate Extent [ ]
Great Extent [ ]
Very Great Extent [ ]

Service Delivery among Consumers of NCWSC

11. Please indicate the degree to which you agree with the following statements with service delivery among consumers of NCWSC. Use the Likert Scale of 1-5, where 1 –No extent, 2-little extent, 3-Moderate extent, 4 –Great extent and 5 Very Great extent

FACTORS	**No Extent 1)**	**Little Extent (2)**	**Moderate Extent (3)**	**Great Extent (4)**	**Very Great Extent (5)**
Faster tracking of customer complaints					
Ease in payroll management					
Faster management of payrolls					
Instant updates on customer data management					
Proper record management					