APPLICATION OF MOBILE PARKING SYSTEM AND PERFORMANCE OF COUNTY GOVERNMENT OF NAIROBI

BY

EVANS OYARE AKOKO

D61/67545/2013

A RESEARCH PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF BUSINESS ADMINISTRATION

SCHOOL OF BUSINESS

UNIVERSITY OF NAIROBI

DECEMBER, 2018.

DECLARATION

This research project report is my original work and has not been presented for a

degree in any other university

Signature……………………………….……Date……………………………

Evans Oyare Akoko

D61/67545/2013

This research project report has been submitted for examination with my approval as

the university supervisor.

Signature……………………………….........Date…………………………….

Dr. Kate Litondo

Supervisor

DEDICATION

I dedicate this MBA project to my son, Joseph and my wife Jessica. Joseph is such a blessing to my family. Jessica has been so supportive. My God bless us.

ACKNOWLEDGEMENT

I am grateful to the Almighty God for seeing me through this academic achievement in good health. I wish to thank my wife and son, Jessica and Joseph for the support accorded to me during this period. I also want to thanks my friend and mentor Mr. Malonza, for financial assistance accorded during my MBA studies. Finally I would like to thank my supervisor Dr Kate Litondo for her guidance and support during this project.

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ABBREVIATIONS AND ACRONYMS

APM: Alternative Payment Model

ATM: Automated Teller Machine

CGDI: County Government Development Index

CGON: County Government of Nairobi

I.D: Identity Document

ICT: Information Communication Technology

IT: Information Technology

KPIs   Key Performance Indicators

KYC: Know your customer

LSCM: Logistics in Supply Chain Management

SME: Small and Medium Enterprises

TAM: Technology Acceptance Model

UNESCO: United Nation Economic Scientific and Cultural Organization

ABSTRACT

Mobile systems has experienced unprecedented growth following the invention of the internet and increased use of smart phones both locally and across the globe. Indeed, there is no doubt that the internet and mobile applications have made it possible to administered and manage provision of services by the County Government of Nairobi. The mobile parking system launched by the County Government of Nairobi has been found to pose significant benefits to the county government, motorists and even the society in general. This system has led to remarkable increases in parking revenue. While the system is still in the formative stages in Nairobi, motorists are opening up to the idea of mobile parking applications and relatively good number of motorists have already embraced the system. The objective of this study was to establish the relationship between application of mobile parking system and performance of the county government of Nairobi. Further it also sought to establish the drivers of use of mobile parking application in the county. The study targeted 85 county government administrative units within the 17 sub-counties and a cross sectional survey design was adopted. A regression model was used to analyze the data. The study findings revealed that some of the drivers of use of mobile parking applications but to a moderate extent are: increased use of smart-phones by the public, high speed broadband internet connectivity, perceived ease of use of the mobile parking application and high levels of IT literacy among the motorists. Further the findings indicate that they are massive benefits associated with mobile parking systems. The top rated benefits included cost reduction for the county government, convenience to motorists and increased parking revenue collection. The study further revealed that a there is a stronger positive relationship between application of mobile parking system and internet connectivity, perceived ease of use of the system and levels of IT literacy among the users. There was found to be a positive correlation between the application of mobile parking system and parking revenue performance and the performance in terms of daily and monthly revenue targets. The study recommends that in order to encourage increased usage of the mobile parking system, the county government needs to invest in the requisite communication technology and broadband networks to promote usage of the system even in areas with poor network coverage. Most importantly motorists in the county have to be more willingly to migrate from the traditional, manual ticketing to the automated mobile parking system. Finally, the county government has to look into policies and invest in systems that will improve the current internet penetration rates across the county if the mobile parking system is going to thrive.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Information and communication technology (ICT) has specifically brought a total change in outlook on organizations' capacities and on their client service delivery. (Wangwe 2017). In order to get up to speed with worldwide improvement and to improve of administrative services to clients, and decrease exchange cost, organizations have invested heavily in ICT and its related steps to help delivery of a scope of significant goods, products and services as well as in the management process (Koski, 2014). Accordingly, there are more adaptable and easy to use service delivery modes and benefits that organizations have received in return for investments in ICT. Consumer loyalty and services delivery are some of the key parameters that firms aim to gain for the ground and achievement of the successful progress. ICTs are the essential innovation behind the utilization of digital networks, (Roztocki, 2014).

Information and communication technology (ICT) refers to a host of digital innovations and , including telephone and flexible correspondence, radio, TV, video, tele-content, voice information systems and fax, and PC networked devices that systems a PC to the web, (Matambalya, 2010). Deighton, (2016) characterized ICT as a coordinated system that fuses the innovation and foundation required to store, control, convey and transmit data.

The United Nations Education, Scientific and Cultural Organization (2014), characterized ICT as the extent of advancements that are associated with data and information processing, securing, modifying, recuperating and dessemination of information in various systems. ICT enables organizations to integrate organization

functions, flow of operations, improved activity collaborations through such systems as Enterprise Resource Planning systems, Customer Relationship Management systems and Supply Chain Management systems. ICT appropriation in Kenya has seen services and different government divisions making sites that give online services. This is in addition to enabling digital and email communication among employees. ICT has been adopted in various sectors such as: customs clearance, citizen and electoral registration, application processing and finally tax, land, financial and human resource management. Okong'o (2005)

Devolution has seen the services being decentralized to the counties. As a result the uses of mobile applications seem to be common in the counties as witnessed in the recent past. This may be due to the fact the county governments have the good will and financial muscles to improve service delivery to the citizens through mobile platforms. It is majorly the reason why the County Government of Nairobi has been able to be intimately in touch with all the happenings around Nairobi City resulting in its ability to provide impactful and efficient service, (Wangwe, 2017).

1.1.1 Application of Mobile Parking Systems

Mobile application refer to a range of internet based software applications designed to solve a particular problem. They comprise of entire range innovations intended to access, process and transmit data remotely via the internet on mobile devices. They range from web portal applications, mobile applications, e-governance systems, e-commerce applications and interactive web pages, all of which make use of the internet (Wangwe, 2017). Mobile applications have become some of the most common advancements proposed to access, process and transmit information of governance and services (Santhapparaj, Kuppusamy & Vijay, 2015).

It has been noted with great concern that mobile application have become to the modern organizations what steam and machine control were to the traditional industrial period (Hoek, 2011). Mobile systems in Nairobi have turned into a critical enabling agent in dispersing and sharing of information and supporting services for the development of the county. Examples of such systems implemented by the county government of Nairobi include: *e-jiji pay, e-wallet, mobile licensing and mobile parking payment services.* An understanding of the contribution of mobile applications to service delivery in the County Government of Nairobi will provide investors more confidence and direction in the ease of doing business (Prasad 2016).

Infrastructure and computer literacy level are some of the key drivers of increased use of mobile applications in the public sector in Kenya. The government of Kenya through the Communication Authority of Kenya has created an enabling environment that has enabled the use of mobile applications. There has also been increasing levels of computer literacy among the public making it easy for them the use mobile systems.

Web enabled mobile application have become the main pillar of success in each part of economy. Interactive web portals have fundamentally transformed service delivery (Allison, 2010). Governments around the globe are improving their service delivery through e-governance enabled by mobile systems. The development of mobile application has made it easier to share information and to encourage co-operation among stakeholders. In financial performance and growth, mobile systems play a big role in decreasing exchange and transaction costs as well as enhancing profitability through increased revenue, offering prompt availability and enhancing proficiency, straight forwardness, and accuracy. Despite the developments in e-governance, there

have also been challenges. Some of the challenges associated with increased use of mobile applications include; the cost of investments in ICT and the productivity paradox. The other challenge is that despite a steady rise in level of Computer literacy, there exist a greater digital divide among users of mobile systems.

The mobile parking system used by the county government of Nairobi is made up of two modules, integrated together to form a single comprehensive unit for services of parking services within the county. The two modules are: e-wallet and e-jijipay. Before using the system the users must first create a profile account or use their login credentials to access an already existing account. All these can be done through a portal in the internet or via an application installed on a mobile phone, tablet, laptop or even a PC. An e-Wallet, often called an advanced wallet, is a safe place that contains at digital currencies. Mobile customers can finance an e-Wallet in a few diverse ways. When financed, customers can use e-Wallet mobile to purchase products or services. Customers must enroll with the supplier, and may need to complete a full "Know Your Customer" process before using an e-Wallet.

The concept of an e-Wallet is similar to that of card portions; once the account is opened and activated, a confirmation is sent to the accountholder, then the accountholder can be able to access the full features and components of the eWallet account. This record may allow cash changes, top-ups, and access to other features of the e-wallet. Customers may also have the choice to decline an unconfirmed eWallet account during the installation process. There is a danger here that a few customers may be unsuccessful during the process, so it is important that the user is IT Literate, before they can can be able to use the eWallet and enjoy the full benefit.

Customers' information/data is typically encoded and put away safely. Usernames/passwords and email/cell phone check are some of the features used when opening an eWallet account. Photos, IDs numbers and evidence of location are regularly sought and saved for reference amid the KYC process. Some system administrators use exchange cutoff points and speed checks to screen the exchange in a customer's eWallet account. Due their features as a stores of value, APMs and especially eWallets are available to extortion in various route from Credit/Debit Cards and should not be sold as Cards, (CGON ICT Report, 2016).

E-jiji pay is an electronic payment platform used by the county government of Nairobi for collection of revenue. It is a solution for enabling users to make electronic installments for different administrative services including Parking, (CGON, 2016).

1.1.2 Organizational Performance.

Performance is a measure of the level of success of an organization. It is usually gauged in comparison to a set of standards. The level of performance can be established using a number of factors. These factors are referred to as Key Performance Indicators (KPI's). There are two measures of organizational performance: financial measures, non-financial measure

Institutions play a very important part in our economy and therefore, development of counties represent a very important ingredient for public sector. Thus, organizational performance is one over the necessary variables of the services and arguably the most important indicator of economic progress. Non-financial measures of performance assess the organization's capability to exploit its environment because of having access to and the usage of the constrained sources. (Seashore, Yuchtman & Seelman, 2017).

The greatest financial measure of organizational performance is revenue. In this context, revenue is one concerning the many symptoms regarding overall performance. Most organizational theories support the thinking that the ability of a company achieves its overall level of performance is based totally on the constraints imposed by the restrained resources (Adrien, Lusthaus & Anne, 2013). Cost reduction is therefore also considered a financial indicator of performance.

Non-financial indicators of performance include: level of automation, cost reduction, processes or any other non-monitory indicators of development or advancement. Performance can either be positive or negative.

While there is little direct evidence concerning the organization between mobile systems and better organizational performance, available data suggests an organization between higher quality, profitability and cost reduction. Evaluating organization quality and satisfaction for the most part incorporates moving toward customers for theoretical attitudinal appraisals, that is, asking with respect to whether they really felt the organization they derived was pleasant. The brisk headway in mobile systems has influenced the way in which we partner and manage our lives. These systems have transformed into a utility, which ought to be made sense of how to help focus activities of a relationship in achieving the mission and vision of that explicit affiliation. (Deighton, 2016)

1.1.3 County Government of Nairobi

County government is an administrative unit of county management within a county or country. County governments are the second biggest political subdivision inside a state and for the most part capacity to give public services and administer state laws. The Kenyan constitution built 47 Counties, each with its county government. Nairobi

City County is one of the 47 County governments that were built up through the proclamation of the new constitution in the year 2010. Nairobi is County number 47 in the national request of countys and is the capital city of Kenya. The County appeared in March 2013 on similar limits of what was some time ago known as Nairobi county. The county government include the County administrators and the County authorities. The County is additionally made out of 17 parliamentary supporters (sub-Countys) and 85 constituent wards every one of which is spoken to by a chose individual from the County Assembly. Every area get together ward speak to a sub-County (www.nairobi.go.ke)

Concurring the National Census (2009) Nairobi City County has an inexact populace of 3.375 million individuals yet the populace keeps on expanding at a rate of 3% every year Nairobi had a total population of million people. However, this is estimated to have grown rapidly to approximately 4 million since then. This increase in population has led to high demand for local services such as licensing, permitting as well as other mandatory clearances required by individuals and organizations.

Nairobi County has set up the Nairobi Integrated Urban Development Master Plan (NIUPLAN) that tries to incorporate existing and proposed ground breaking strategies to advance coordination among the different partners with orders being developed of different systems inside the City. ICT is one of its core pillars. The preparation of the Integrated Master plan began before September 2013 and it was participative in nature enabling the public to contribute their opinions. The utilization of mobile applications in the provision of basic administrative services was one of the recommendations. The incorporated all-inclusive strategy is aligned to Kenya Vision 2030 that looks to change Kenya into a digital economy by 2030 (www.nairobi.go.ke).

CGON uses the mobile parking application to control vehicle parking services. This is done through the ejijipay a cell phone based installment system – a self-benefit strategy that enables one to use the telephone or a mobile gateway to pay for the services offered by the Nairobi County government. The ejijipay stage was characterized with increased productivity, income, and decrease default. There are three different ways of paying for parking in Nairobi using the ejijipay installment system. One can either use; USSD on any PDA (USSD – Unstructured Supplementary Services Data); ejijipay Android application on a smart phone; Mobile installment stage on Nairobi County government website. Making installment using the ejijipay on a cell phone necessitates that one registers an ejijipay account, stack the cash into the e-wallet lastly pay for parking by following a progression of three basic steps (www.nairobi.go.ke/).

1.2 Research Problem

The effect of mobile systems on service delivery and services success is a vital issue for specialists, county executives and different partners. Mobile systems success and service delivery incorporate profitability, enhanced work relations, competitive advantage and productive utilization of assets at both private and public sector, (Prasad, 2016; Melville, 2016 and Kohli, 2013). In the wake of technology, governments across the globe are now embracing mobile systems giving them an opportunity to interact with their citizens mobile. Empirical studies conducted by various researchers to build up the connection between independent variables and performance of mobile systems delineates different weaknesses. Karunasena (2012) inspected people in general estimation of mobile systems and found a constructive

relationship between ICT foundation and open estimation of mobile systems. He further prescribed for the modified system to be retested and approved as the comprehension of open success differs impressively from one county to the other. In the United Kingdom, Osmani (2014) explored the reasons for the general success of mobile systems and established that citizens who had used e-government services previously will in the long run re-use the services. The study used quantitative measures restricting the ability to carry out a comprehensive investigation of e-government users in relations to what they value. The study also paid attention to systems and service quality ignoring that political and organizational aspects have been identified to influence e-government usage and public value.

In assessing Turkey government sites, Karkin and Janssen (2014), set up that in spite of the fact that the sites performed agreeably on client encounter; customary pointers, for example, supporting solicitation and ease of use, they performed significantly less well on open success measures. Carter & Belanger (2014) finds that the accomplishment of e government is tethered upon citizen's willingness to adapt to innovation. This therefore leads to a need to evaluate G2C e-government systems' success from citizens' perspective. In Kenya, a couple of experts and scientists have surveyed the possibility of e-government in Kenya. Mutinda (2014) looked at the roadmap to e-Government using a case of Kenya. Were (2010) considered systems grasped by the Kenyan government in exhibiting e-governments. The findings revealed that there is an organization between various demographical characteristics and the learning of e-Government and ICT training. Ogutu & Irungu (2013) developed a system to examined mobile applications. The study established that user satisfaction of mobile systems was below forty percent. The study recommended for further study on how mobile technology enhanced mobile service delivery.

Oti (2013) evaluated the intermediate impact of web-based systems, a case study of Huduma Centres in Kenya. The study found that poor ICT infrastructure, inadequate ICT skills, inadequate legal and policy system and lack of citizen participation in e-government processes as key challenges in implementation of mobile systems. Key limitation of the study was that at the Huduma centres the citizens were not connecting specifically with the systems and user experience could not be fully ascertained. Also, the vast majority of the services offered at Huduma centres were still at the initial two phases of e-government models. The study recommended more studies to be conducted at the higher end of e-government models development continuum.

While organizations invest heavily on mobile systems both in developing and developed countries, much consideration has not been given to the comprehension of how mobile systems and online systems makes success, particularly in developing countries (Devaraj, 2013). Considering the huge advantages that are experienced by private division on utilization of mobile systems, local governments have moved to embrace a similar sort of advancements. Nonetheless, they experience a few deterrents or preventions in the compelling and productive utilization of the mobile systems and resources at their disposal.

In many counties in Kenya today, there is developing use procurement, selection and application of mobile systems, to encourage a move towards e-service delivery arrangement. The dimensions of computerization have radically improves particularly over the most recent couple of years.

For that matter, the issue of the growth and improvements in mobile systems is a critical issue that must be investigated. It has been seen that no study is accounted for about the effect of mobile systems on performance of public institutions in Kenya (Roztocki, 2014). Studies that have been done revealed that the use of mobile applications influence public perceptions and drives services delivery. However, studies that link mobile systems to the public sector are few. The mobile parking payment strategy has seen an expansion in income generated by the Nairobi county government while making it advantageous to drivers who don't need to search for the parking attendants. Furthermore, it takes just a couple of minutes and is convenient to use even in office or anywhere else within Nairobi county, This presents the clamping or holding up by the vehicle as the user get the ticket and the same can be confirmed using the vehicle registration number. This study will attempt to fill this knowledge gap by ensuring the following research question: does the usage of mobile systems influence the performance of the County Government of Nairobi?

1.3 Research Objectives

The general objective of this study is to evaluate the usage of mobile systems in the County Government of Nairobi.

Specifically to:

i.   Determine the extent to which the County Government of Nairobi is using mobile applications in service delivery.

ii. Establish the challenges faced by users of the mobile parking system.

iii. Determine the relationship between mobile parking application and performance of the County Government of Nairobi.

1.4 Value of the Study

The study contributes to the scholarly work as it acts as a reference text to researchers and scholars interested in the mobile systems.

The study provides recommendations for areas requiring further studies and in filling the noted gaps in the sector.

It is of huge significance to the services and strategy producers in building up the best methodologies to be executed. It helps the services to make great strategies and favorable condition to support development at various dimensions of services.

This study is of importance to the County Government of Nairobi as it gives the best way forward in formulation, development and implementation of mobile systems. This study is beneficial to the national government understand the importance of automation in achieving growth. The findings in this study are important to the County Government of Nairobi to develop capacity towards improving the implementation of the digital web based systems at the county. The research findings are useful in improving the understanding of the key challenges in the implementation of county government ICT projects.

The study helps donors and other international organizations that support various development proposals in the county to identify ways that they can improve implementation process backed by mobile systems. The findings of the study provide a deeper understanding on the how these ICT projects can be effectively implemented by the various county governments.

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CHAPTER TWO

LITERATURE REVIEW

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2.1 Introduction

This chapter outlines the various theoretical studies and theories formulated that are relevant to the study, the technology aspect in supply delivery and empirical literature review with the summary of the literature and conceptual system.

2.2 Theoretical Foundation

This section presents theories relevant to the study. Theoretical system presents a background basis on which the study is founded on a theoretical basis. This study discussed Technology Acceptance Model (TAM) and systems theory. This study further linked the theories' relevance to this study.

2.2.1 Technology Acceptance Model

In 1986, TAM theory was formulated by Davis aimed at explaining the perception and workability of a new technology by providers and users. This theory asserts that users base their perception on new technologies on the usefulness or ease in using them over a given time period (Davila, Gupta & Palmer, 2013). Davila *et al* (2013) further posit that the user perception towards the new technology increases with time as and when the technology aids in performing a particular task (or activity) to users. Davis, Venkatesh & Patel, (2011) argue that the ease of using a system creates a perception effect on a user (for longer use increases the positive attraction wanting to use available technology).

Mobile systems use a combination of web based and mobile technology applications. These applications and mobile technologies are designed in a way they would enable

users to access CGON services conveniently and easily. The easier it is to use a web based technology the higher the user perception on system effectiveness and efficiency. The TAM model connects with this study in explaining the ease of using the technologies and perception imposition by users of these technologies. Unlike traditional means of accessing local governments' services, these technologies are tailored into virtual contexts of mobile web pages (Oti, 2013).

Technology Acceptance Model is tailored to perceptions held by technology users as this facilitates the design and innovations that could be easily used by the users ((Davis, *et al*, 2011); Oti, 2013). TAM describes various technologies' usage by the users or the perceptions held by the users when they are using the technologies.

The Technology Acceptance Model was applied in the study to determine the perceptions held by the public about mobile county government services as well as payment systems that are facilitated by a combination of technologies. For example, the payment model provided by e-jiji pay

2.2.2 Systems Theory

A system is an operational interconnection of parts reliable in offering a desired service or outcome (Davila, *et all*, 2013). Ludwing & Bertazlanffy forwarded systems theory in 1968 as the general systems theory. With less technology and complex systems available by then, the theory explains why interlinked parts are subjects of efficiency and effective deliveries (Davila *et al*., 2003). Davila *et al* (2003) further argue further that in a complex task that requires different parties and resources involved, there has to exist a clear interconnection to succeed.

Oti (2013) asserts that for a system to exist there has to be subsystems available to facilitate efficiency and effectiveness when delivering a given task. In an

organization, the subsystems would be specific department or sections such as parking, ticketing, and information management that give a rise to a complex major system (Oti, 2013).

The systems theory is a choice for this study as it captures the operations by mobile platforms such as e-wallet and mobile payment through the e-jiji pay platform. The theory helped determine whether there is coordination of different departments in delivering of services to the public through the available mobile platforms, and if there are challenges experiences in the process.

2.3. Mobile Systems in Public Sector

Assumptions regarding the effect of mobile systems on general society segment are certain and high. According to Pokharel, (2015) utilization of online systems is decidedly associated with enhanced authoritative application of the mobile parking system. In regard to service delivery in public services, mobile systems have been employed to facilitate the service provision, despite the fact that it includes considerable segment of investments. The goal of such investments is to make an incentive by offering opportune and dependable services. All together for any investments to positively affect success, extra incomes should be made or in general costs reduced.

Thus, when evaluating impacts of mobile systems investment to the improvement of performance of county governments, the organization of expenses within the different services procedures and exercises should be considered Weistroffer *et all*, (2018). Investment in mobile systems can have far reaching effect on both the internal and external tasks of an organization. Web enabled systems can improve and fortify

authoritative foundation and limit by expanding workers' effectiveness, benefit coordination, and data sharing between offices, budgetary record keeping and following of administrative process.

Mobile systems have also substituted more expensive means of communicating and transacting administrative operations, for instance; physical travels, increasing choice in the business focus and offer access to commonly difficult to reach stock and investements, increasing the geographic degree of potential markets and redirecting learning and information of all sort. According to (Browne, Jagdev and Alex, 2014), mobile systems have given sound learning the board in corporate foundations. With learning and data arranging, data services have the double duty of enhancing approach and system, arranging and dealing with all the corporate assets. Web-based systemss give a productive and adaptable services system, that empower organizations accomplish focused open doors through advancements, sound services of assets and moved forward service delivery.

Today, mobile systems have expedited emotional change methods for conveying services to clients in organizations. This improvement has enabled organizations to work and to re-structure their activities to adjust them to the new innovations for better service delivery (Browne *et al*, 2014). Mobile systems have made possible new business models and even new organization systems. There are many opportunities for management of counties through mobile systems, models, methods, technologies and web based solutions. On the other hand, some problems could arise, when the systems are adopted without taking care of security concerns such as hacking and cybercrime (Chan *et. al* 1997).

2.4 Drivers of Mobile Systems in the Public Sector

There are several drivers of mobile applications in administrative and public institutions. These include: Rapid population growth, IT Literacy, low cost of access to the internet and availability of a reliable ICT network infrastructure enables by fibre optic cable. (Melville, 2016). The population of Nairobi residents has been expanding hugely and thus has prompted increased exchanges. This has brought about the fast radicle changes in the ICT business, and to adapt to the development in populace, there has been need to decide the ideal limit and quality to meet the present moment and eventual service delivery requirements (CGON, 2016).

The fibre optic cable infrastructure that has been laid across the country especially in major cities has greatly contributed to increased use of mobile systems. Fibre optic internets are generally more powerful and faster than other links. This make them more preferable than other forms (Chan, Wan & Xing, 2017). Increased accessibility to ICT resources has greatly contributed to high literacy levels among Kenyans (Deighton, 2016). Mobile systems are currently in use across all the functions of CGON namely in licensing, Parking and ticketing, finance, procurement and other office functions (CGON, 2016).Personal characteristics also contribute to increased use of mobile systems. These attributes include such factors as age, gender and level of education. Nairobi mostly constitutes a young population whose average age is 36 years. These are IT savvy individuals who are mostly computer literate. Majority of people in Nairobi are also fairly learned, making it easy for them to understand and use mobile systems (Nica, 2015). Security is also a major contributing factor to the increased use of mobile systems. Most of the mobile systems in use are considered secure as opposed to cash transactions (Bitner, *et al*, 2017).

2.6 Challenges Associated with use of mobile systems

According to Allison, (2010) there are four main challenges linked to the usage and application of mobile parking system and interactive web based portals: Information system security, computer literacy, lack of ICT infrastructure and public perception (behavioral factors). The greatest challenge faced by organizations that make use of mobile systems is the risk of hacking. Mobile systems, if not well secured can easily be hacked with the intention to defraud the organization. System vulnerability and threats according to Gronroos J., (2014) can take different forms. They include; hacking, cracking and spoofing.

The general public who are the intended users of mobile systems do not have the necessary skills to use the web portals or mobile systems. Computer literacy levels in Kenya are considerably low leading to a digital divide. However, the government is doing a lot through the digital literacy programme to ensure that the upcoming generation of individuals are computer literate. All mobile systems require the availability of a strong reliable internet. In some places, there is weak or no internet at all. This poses a challenge for users of mobile systems. The necessary infrastructure includes a strong network and availability of essential ICT resources such as internet and computers (Bitner, Zeithaml & Naomi, 2017)

Another challenge is the perception of the public towards computerized systems. Some people have a feeling of insecurity and therefore avoid using mobile systems. Some are afraid of using the mobile systems for fear of embarrassments because they are not computer literate. Users also develop perceptions when using mobile systems and at that point contrast their observations and the real services derived. For this situation, earlier recognition and individual judgment influence user's evaluation of

service provided by mobile systems (Davila, *et al*, 2013). Other challenges include productivity paradox.

2.7 Mobile Applications and Performance

According to (Bloemer, 2017) most models used in the evaluations of mobile applications concentrate on the comparison of expectations versus derived benefits. This results in two critical decisions of derives benefit, quality and consumer loyalty. For example, client's adequacy of mobile platforms by comparing their expectations against the actual outcome. Victoria, (2015) studied the use of mobile applications at Kenya Revenue Authority (KRA). The study used descriptive research design and stratified sampling method on 60 managers and established that there was reasonable interconnection in the performances and the adoption of mobile applications. The study further indicated that parastatals that use mobile systems have a significant improvement in services, reduction in transaction cost and the processing time. The study, however, does not provide the technology influence on the revenue performance.

Nica (2015) studied the use of mobile applications within the banking sector in Kenya. The study made use of conceptual and descriptive survey. The research objectively looked into the environmental conduct of the local commercial banks, their sustainable performance and social-economic barriers to the sustainable mobile banking systems. However, the study never looked into the internal controls of the technology's influence on facilitating the mobile banking performance despite looking at the overall environmental conduct.

Tibbs et al (2015) studied mobile applications and adoption of web portal in the Kenya National Examination Council (KNEC). The study used a survey research

design comprising of registered public secondary schools and sampled 47 public secondary schools for observation. The study findings indicated that most public schools at 97.9% were using mobile registration platforms to link with KNEC. However, the study did not provide an in-depth insight into how KNEC enhances academic performance using the mobile applications. Yu et al (2016) undertook a study on mobile systems in government Human Resource Services (GHRIS) as a practice perspective. Using a case study approach, the study explored the mobile systems in the public service in Kenya analyzing data using inferential statistics. The study found out that the use of mobile systems in human resources management largely dependent on system security and the technology applicable. The study recommended infrastructure installation to aid the efficiency in the mobile systems performance. However, there is a need to study more on the technology tools applicable in influencing the efficient mobile system.

2.8 Conceptual Framework.

There were four independent variables whose effect was measured against performance of parking revenue. These are: Availability of parking space, internet/network connectivity, perceived ease of use and IT Literacy level. The dependent variable was performance of parking revenue which was measured using two main indicators: parking revenue collected and service delivery. The figure below illustrates the conceptual framework.

Independent Variable   **Dependent Variable**

| **APPLICATIONS OF MOBILE PARKING SYSTEM**
Availability of parking space
Internet/network connectivity
Perceived Ease of Use
IT Literacy levels | → | **PERFORMANCE**
1. Revenue Collection (Parking)
• Daily
• Monthly
• Budget
2. Service Delivery |
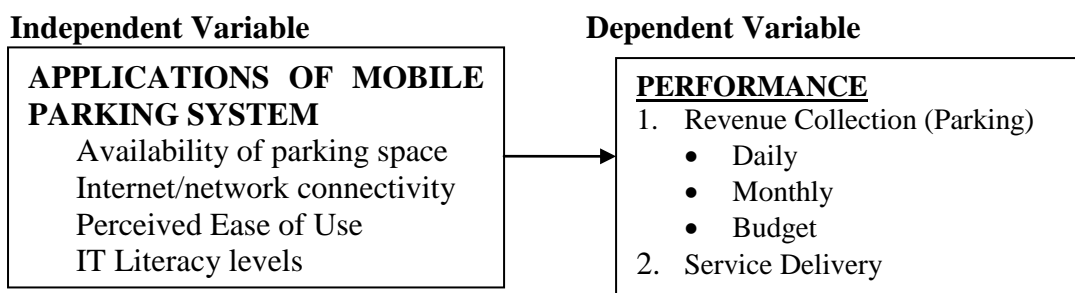
Source: Author 2018
Figure 2.1: Conceptual System

2.9 Summary

This chapter presented a theoretical and empirical literature review that provided a context-based evaluation of mobile systems from a performance value perspective. The literature review was guided by Technology acceptance model theory, system theory and resources based theory of the firm.

Despite the need for thorough evaluation of mobile systems, critical review of literature reveals consistency in evaluation systems and models for mobile systems. This chapter was divided into six sections. Section one reviewed the theories of mobile systems and performance underpinning the study. The second section discussed the concept of mobile systems and performance concentrating on definitions, structure among different aspects.

The third section reviewed the drivers of mobile systems in the county government. The Fourth section presented the benefits of mobile systems in the county government. The fifth section reviewed the benefits of mobile systems in the county government. The sixth section reviewed mobile systems and performance as well as studies relevant to this study and finally formulated research hypotheses. The final section presented the conceptual framework.

CHAPTER THREE

METHODOLOGY

3.1. Introductions

This chapter seeks to outline clearly the appropriate methods to use in conducting the research. It contains the design, target population, the method of data collection and analysis of data.

3.2 Research Design

This study adopted a descriptive research design. Multiple linear regression model was also used to establish the relationship between dependent and independent variables. This is because the study sought to ascertain the manner, phenomena, elements and knowledge in the demographic settings. According to Orodjo (2015), a descriptive research design is appropriate when studying phenomena. The study therefore used a descriptive research design to explain in depth the attitudes, beliefs and available knowledge about the mobile systems and parking revenue performance at CGON.

3.4 Data Collection

The investigation used both primary and secondary data. Primary data was gathered using an organized survey questionnaire while secondary data was collected from literature relevant to the study. This study used Likert scale based questions in the questionnaire to measure the extent of magnitude for various elements or items. The questionnaire (see appendix II) had four sections: Section A had demographic information; Section B contained questions about the extent of implementation of mobile parking systems.

Section C was on the challenges facing the implementation of the mobile systems while Section D contained questions on overall performance of the mobile parking system. There are 17 sub counties in Nairobi, namely Embakasi West, Embakasi East, Embakasi North, Embakasi South, Embakasi Central, Kamukunji, Kasarani, Kibra, Langata, Makadara, Mathare, Roysambu, Ruaraka, Starehe Westlands, Dagoretti North and Dagoretti South. Each sub county has five wards each with its own autonomous administrative unit and a total of 5 staff members.

The study respondents were all the members of staff in the 17 sub counties and in the head office at City Hall. The total number of respondents was 85 one from each administrative unit. This study used "drop-and-pick later" method in the questionnaire distribution. Demographic data on the gender of the respondents, their age bracket, academic/professional background and the length of service in the county was also sought in the study.

3.5 Data Analysis

This study made use of regression analysis to address the impact of mobile systems on performance of CGON. This is in line with the first objective. The study also used descriptive statistics to determine whether overall performance can be attributed to increased automation and use of mobile systems in the County

Descriptive statistics that were used incorporate frequencies, rates, means and standard deviations. The investigation utilized a multiple linear regression equation to measure the interrelation between the dependent and independent variables. This was done objectively in multiple linear regression models is as follows: Objectives 1 and 2 were descriptive and challenges respectively

Objective 3: $Y = a_0 + a_1X_1 + a_2X_2 + a_3X_3 + a_3X_3 + \varepsilon$

Objective 4: $Y = b_0 + b_1 Z_1 + \varepsilon$

Where Y is the performance of CGON,

a_0 and b_0 represent the autonomous function,

a_1, a_2, a_3 and b_1, represent the slope of the function of each function attribute,

Z_1 is the Mobile parking system

X_1 is availability of parking space

X_2 is internet/network connectivity

X_3 is Perceived Ease of use

X_4 is IT Literacy levels

CHAPTER FOUR

DATA ANALYSIS RESULTS AND DISCUSSION OF FINDINGS

4.1 Introduction

This section shows an investigation of information, data analysis and results of the study. Introductions of the results are on tables and figures where necessary. The chapter has been organized into response rate, demographic characteristics of the respondents, descriptive results on application of mobile parking system, inferential statistics on the performance of CGON in relation to mobile parking system, challenges faced by users of mobile parking system and the discussions of the results. Regression and correlation analyses were used. The study relied on primary data.

4.2 General Information/Demographic Characteristics of the Respondents

The segment gives the examination discoveries on the statistic qualities of the respondents. The attributes incorporate the sex of the respondents, their age bracket, academic/professional background and the duration/length of service at the county. The section gives information about the respondents regarding their response rate, gender, age category, level of education attained, and work experience at CGON (Years).

4.2.1 Response Rate

The segment displays the results on the response rate. This is an outline of the response rate from the respondents who were inspected as an agent of the target population as introduced in Table 4.2.1;

Table 4.2.1 Response Rate

	Frequency	Percentage
Returned Questionnaires	78	92%
Unreturned Questionnaires	7	8%
Total	85	100%

Source: Research data (2018)

The researcher targeted a sample of 85 managers from each of the 85 county government administrative units in the 17 sub-counties in Nairobi. Out of the 85 reactions focused on, 78 gave sufficient data. Be that as it may, 7 respondents did not offer response to the examination making a non-response of 8%. Subsequently, the survey achieved a response rate of 92% as appeared in Table 4.2.1. As indicated by Mugenda and Mugenda (2003) a response rate of 50 % is sufficient, 60 % is great or more 70% is great. The response rate derived in the examination was great.

4.2.2 Gender of Respondents

The study sought to determine the gender of the respondents who participated in the study.

Table 4.2.2 Gender of Respondents

	Frequency	Percentage
Male	50	64%
Female	28	36%
Total	78	100%

Source: Research data (2018)

The findings obtained in the study indicate that 64% of the respondents were male while 36% were female as shown in Table 4.2.2. Therefore, CGON has employed more male in the management level than women, The findings imply that most of the managers at CGON are male.

4.2.3 Age of Respondents

The study sought to determine the age of the respondents who participated in the study. The findings are shown in Table 4.2.3.

Table 4.2.3 Age of Respondents

	Frequency	Percentage
20-25 Years	1	2%
26-35 Years	3	2%
36-45 Years	26	33%
46 years or more	49	63%
Total	78	100%

Source: Research data (2018)

The findings on the age of the respondents indicate that 63% of the respondents were aged 46 years and above, 33% were aged 36-45 years, 2% were aged 26-35 years while 2% were aged 20-25 years. The findings are shown in Table 4.2.3. These findings imply that most managers at CGON have more than 46 years, which suggest that CGON might consider employing younger people in future so as to involve the youth more in the leadership positions. This is mainly because the youth are tech savvy and up to date with the current trend in technology, hence they will be able to drive the agenda of mobile parking system across all sub-counties.

4.2.4 Academic/Professional Background of Respondents

The study sought to determine the academic/professional background of the respondents who participated in the study. The findings are shown in Table 4.2.4.

Table 4.2.4 Respondent Academic/Professional Background

	Frequency	Percentage
College level	7	8.9%
University level	28	35.9%
Professional level	43	55.1%
Total	78	100%

Source: Research data (2018)

The findings on the academic/professional background indicate that 55.1% of the respondents were on professional level, 35.9% had attained university education and 8.9% had college education as shown in Table 4.2.4. None of the respondents had only technical or secondary education. The findings indicate that majority of the CGON staff are graduate degree holders thus most of them do have basic IT knowledge that is crucial in the mobile parking application and service delivery. The findings imply that the managers were mainly professionals at CGON, hence reliable information was obtained in the study

4.2.5 Length of Service of Respondents

The study sought to determine the length of time the respondents had worked at CGON. The respondents were requested to provide how many years of experience they have as CGON staff. .The findings are shown in Table 4.2.5.

Table 4.2.5 Length of Service at the County Government

	Frequency	Percentage
Less than 1 Year	12	16%
2-5 Years	33	42%
6-10 Years	18	23%
Above 15 Years	15	19%
Total	78	100%

Source: Research data (2018)

The findings obtained indicate that 42% of the respondents had served at CGON for 2- 5 years, 23% had worked for 6-10 years, 19% had worked for more than 15 years while 16% had worked for less than 1 year. The findings imply that the managers had considerable experience at CGON, shown by the years they have worked for the county government and therefore the information collected could be relied upon.

4.3 Statistical Analysis. Descriptive Statistics

4.3.1 Availability of Public Parking Space

The study sought to determine the number of administrative units that had public parking space under their jurisdiction. The respondents were requested to state whether they have public parking space. .The findings are shown in Table 4.3.1.

Table 4.3.1 Availability of Public Parking Space

	Frequency	Percentage
Yes	78	100%
No	0	0%
Total	78	100%

Source: Research data (2018)

The findings obtained indicate that 100% of the respondents had public parking space. The findings imply that all administrative units have the capacity to generate revenue from parking.

4.3.2 Availability of Mobile Parking System

The study sought to establish the number of administrative units that were actively using the mobile system within the sub-counties. The results are shown in table 4.3.2.

Table 4.3.2: Availability of Mobile Parking System

Availability of Mobile Parking System

		Frequency	Percent	Valid Percent	Cumulative Percent
	YES	10	12.8	12.8	12.8
Valid	NO	68	87.2	87.2	100.0
	Total	78	100.0	100.0	

Source: Research Data (2018)

Results in table 4.2 show that only ten (10) out of the 78 administrative units were actively using the mobile parking system. The other 68 still use manual ticketing system. This implies that a lot needs to be done to address the challenges.

4.3.3 Internet/Network Connectivity

The study sought to determine the number of administrative units that had good internet/network connectivity. The respondents were requested to state whether they have reliable broadband network connectivity at all times. .The findings are shown in Table 4.3.2.

Table 4.3.2 Internet/Network Connectivity

	Frequency	Percentage
Yes	55	70%
No	23	30%
Total	78	100%

Source: Research data (2018)

The findings obtained indicate that 70% of the respondents had reliable broadband network. Only 30% had problems with internet connectivity. The findings imply that most administrative units have the necessary infrastructure to use the mobile parking system.

4.4 Challenges of Application of Mobile Parking System

The section gives information about the respondents regarding the challenges that they face while trying to use the mobile parking system. Table 4.4 and 4.5 below shows the statistics summary.

Table 4.4.1: Summary Statistics

Statistics

		Poor Internet Connectivity	Perceived Complexity	Low Literacy Levels	Low Commercial Activities
N	Valid	78	78	78	78
	Missing	0	0	0	0
Mean		3.88	3.90	4.04	3.74
Median		4.00	4.00	4.00	4.00
Mode		4	4	4	4
Std. Deviation		.664	.695	.568	.591
Variance		.441	.483	.323	.349
Minimum		3	3	3	3
Maximum		5	5	5	5

Source: Research Data (2018)

Table 4.4.2: Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Poor Internet Connectivity	78	3	5	3.88	.664
Perceived Complexity	78	3	5	3.90	.695
Low Literacy Levels	78	3	5	4.04	.568
Low Commercial Activities	78	3	5	3.74	.591
Valid N (listwise)	78				

Source: Research Data (2018)

The results in the tow tables above shows that poor Internet/Network connectivity (M=3.88: SD=0.664), perceived complexity (M=3.90: SD=0.695) and low IT Literacy levels (M=4.04: SD=0.568) are some of the most common challenges cited by the respondents. The greatest challenge mentioned by county administrators who were not using the system was lack of economic activities especially in the peripheral sub-counties of Nairobi (M=3.74: SD=0.591). These areas had only suburban residential homes with adequate compound and private parking space. Consequently there were also very few vehicles in the area. However parking attendants would do rounds to try and make manual revenue collections.

4.5 Correlation Analysis

The discoveries of this investigation were exposed to a connection examination to decide if any relationship existed between the reliant variable (application of mobile parking system) and the independent variables (Availability of parking space, Internet/Network connectivity, perceived ease of use and IT Literacy levels). Correlation findings are indicated in Table 4.4.1.

Table 4.5.1: Correlation Matrix

Statements		1	2	3	4	5	6
Application of Mobile parking system	Pearson's Correlation	1					
	Sig (2 tailed)	0.001					
Availability of parking space	Pearson's Correlation	.636**	.391	1			
	Sig (2 tailed)	.001	.056				
Internet/network connectivity	Pearson's Correlation	.575*	.432**	.338*	1		
	Sig (2 tailed)	.002	.020	.040			
Perceived Ease of use	Pearson's Correlation	.702**	.462**	.330	.314	1	
IT Literacy levels	Pearson's Correlation	.482**	.406*	.396	.347	.133	1
	Sig (2 tailed)	.000	.040	.050	.102	.122	

**.

Correlation is significant at the 0.01 level (2-tailed).

 *. Correlation is significant at the 0.05 level (2-tailed).
Source: Research Data (2018)

According to the study findings, the relationship between application of mobile parking system and availability of parking space was strong, positive and significant; r (0.636); p ≤ 0.05. This was followed by a strong positive relationship between availability of internet/network connectivity; r (0.575); p ≤ 0.05. This was followed by a strong positive relationship between application of mobile parking system and perceived ease of use of the parking system; r (0.702); p ≤ 0.05. The relationship between application of mobile parking system and IT literacy levels was equally positive; r (0.482); p ≤ 0.05, therefore significant.

4.6 Multiple Regression Analysis

Multiple regression analysis was conducted on the study variables with the aim of determining the level of significance in relation to application of mobile parking systems. The results are presented in Table 4.6, 4.7, and 4.8 below. The regression equation that was used: **Y= β_0 + $\beta_1 X_1$ + $\beta_2 X_2$ +$\beta_3 X_3$+$\beta_4 X_4$+e;** Where X_1 = Availability of parking space; X_2 = Internet/Network connectivity; X_3 = perceived ease of use, X_4 = IT Literacy levels.

Table 4.6.1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.929[a]	.864	.824	.301

a. Predictors: (Constant), Availability of parking space, Internet/Network connectivity, perceived ease of use, IT Literacy levels.

According to the findings in Table 4.4.2, multiple regressions indicated an adjusted R squared of 0.824 implying that 82.4% of variation in application of mobile parking system was attributed to Availability of parking space, Internet/Network connectivity, perceived ease of use and levels of IT Literacy. 17.6% of variation in application of mobile parking system was covered with other factors not considered in this study.

Table 4.6.2: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.798	5	1.533	16.873	.000[b]
	Residual	3.544	119	.091		
	Total	14.342	124			

a. Dependent Variable: application of mobile parking system

b. Availability of parking space, Internet/Network connectivity, perceived ease of use, IT Literacy levels

As indicated by Table 4.4.3, the variety between the mean aggregate of squares was 14.798; with degrees of freedom df (4); $F (5, 119) = 16.873$; $P<0.00 <0.05$; in this manner there was huge correlation between use of mobile parking system and Availability of parking spot, Internet/Network availability, ease of use and IT Literacy levels.

4.7 Factors Related to Mobile Parking Application and Regression Coefficients

The study asked the respondents to state the extent to which they agreed with the some statements regarding factors related to the mobile parking system as a strategy to collect parking revenue. The responses were rated on a five point Likert scale where: 5 -Strongly Agree, 4 - Agree, 3 -Undecided, 2 - Disagree, 1- Strongly Disagree. The mean and standard deviations were bred from SPSS and are indicated in the table 4.5

Table 4.7: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.700	3.273		-.390	.000
Availability of parking space	.966	.333	.671	3.570	.018
Internet/Network connectivity	.774	.399	.457	1.654	.027
Perceived ease of use	.155	.115	.280	-1.791	.073
IT Literacy levels	.319	.230	.218	1.606	.000

Source: Research Data (2018)

The findings in Table 4.8 shows a beta coefficient ß (0.671); P<0.05, between utilization of mobile parking system and accessibility of open parking spot. The connection between utilization of mobile parking system and Internet/Network availability had a beta coefficient ß (0. 457); P≤0.05, in this manner critical. The connection between use of mobile parking system and saw usability had a beta coefficient ß (0.280); P≤0.05, in this manner noteworthy. The connection between utilization of mobile parking system and IT education levels had a beta coefficient ß (0. 218); P≤0.05, along these lines noteworthy. The equation used to process the relationship was;

Application of mobile parking $=1.700 + 0.966X_1 + 0.774X_2 + 0.319X_4$

Where X_1 = Availability of parking space

X_2 = Internet/Network connectivity

X_3 = Perceived ease of use

X_4 = IT Literacy levels

4.8 Factors Related to Mobile Parking Application and Performance

The study asked the respondents to state the extent to which they agreed with the some statements regarding factors related to the mobile parking system and performance. The responses were rated on a five point Likert scale where: 5 -Strongly Agree, 4 - Agree, 3 -Undecided, 2 - Disagree, 1- Strongly Disagree. The mean and standard deviations were bred from SPSS and are indicated in the table 4.6.

Table 4.8: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.800	3.372	.669	-.399	.000
Availability of parking space	.989	.361	.669	4.780	.021
Application of Mobile Parking system	.072	.219	.331	-.458	.000

Source: Research Data (2018)

The findings in Table 4.6 indicates a regression coefficient ß (0.669); P<0.05, for the constant. The relationship between application of mobile parking system and

performance had a regression coefficient ß (0. 341); P≤0.05, therefore significant. The formula used to compute the relationship was;

Performance of CGON= 1.800 + 0.72Z_1

Where Z_1 = Application of mobile parking system

4.9 Discussion of the Research Findings

In the study, the first objective was to establish the extent of use of mobile parking system by the county government of Nairobi. It was established that all the sub county administrative units have public parking space from which they can generate revenues form parking revenues. However not all were using the system. This is mainly due to the challenges such as lack of broadband internet, low levels of IT literacy, perceived complexities of the system and low levels of commercial activities especially in the remote outskirts of the county. It was also found that the absence of internet networks in certain parts of the county had led to its slow adoption in some sub-counties.

The findings further show that only ten out of 78 sub counties actively use the mobile parking system. The rest have manual ticketing procedures. It was also found that all sub-counties have public parking space where motorists can pack and pay. However, a number of issues were identified as affecting the application of mobile parking system in the county. Key issues affecting the application of mobile parking system by the public were identified as lack of internet connectivity, perceived ease of use and levels of IT literacy.

The second objective of the study was to evaluate the significance of each of the factors affecting the application of mobile parking system in the county. The study found that availability of public parking space, availability of broadband internet connectivity, perceived ease of use and levels of IT literacy all affect the application of mobile parking system. All these factors were found to be highly significant.

Even though the all administrative units have some public parking space, the study found that there was insufficient information, public awareness and low level of ICT literacy among most motorists who use public parking space.

On the System for quality assessment of mobile services in Kenya, Christine Muthama (2014) contents that there has to be strong customer support, coherent communication infrastructure and increased possession of telecommunication devices. The systems reviewed in the literature of this study were either for assessment of mobile applications or general roadmaps and master plans for government ICT. Most of the existing models and systems were found either to be for evaluation of the impact of mobile portals or assessment of the success of mobile systems. (Otieno & Omwenga, 2014)

The third objective of this study, which forms the core of this research, was to establish the relationship between application of mobile parking system and parking revenue performance of the county government of Nairobi. The regression analysis shows a significant positive correlation between mobile parking system and performance of the county government of Nairobi. This road map was to address issues identified to be impairing the parking revenue performance of the county government. From the analysis of the results of the study, it is evident that use of the system leads to increased performance of parking revenue.

This implies that the system reduces loss of revenue, fraud and other corrupt practices that were traditionally carried out by parking attendants. From this study, the resultant model is proposed as a Road map for application of mobile parking system and performance of County Government of Nairobi.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the research findings, conclusions and recommendations as observed by the researcher. It also highlights an overview of the limitations, recommendations and conclusive remarks of the project as matched to the general and specific objectives of the study and provides suggestions for further research as well as implication of the study on policy and practice. This project aimed at establishing the relationship between application of mobile parking system and performance of the county government of Nairobi

5.2 Summary

Traffic flow, allocation and availability of parking space within the streets of Nairobi, is a major concern to for every motorist. Parking is managed by the County Government of Nairobi (CGON) and this exercise has for a long time been a nightmare for the county officials. For the CGON the concern is the allocation of parking space and an efficient way of services of parking services thereof, while for the motorist, the concern is the need to park his/her vehicle as well as get fairly charged and mobile way of paying for parking services.

Since the advent of the mobile parking system in 2014, parking revenues have grown in leaps and bounds also leading to creation of fully automated system for services of parking services within the county. Efficiency of services and convenience to motorists can be achieved if the mobile parking system could be fully implemented in all administrative units. It is from this view that this study was carried to establish the relationship between mobile parking system and performance.

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The findings that of the 78 administrative units of the county government of Nairobi that responded 100% of the units had public parking space under their jusridiction, some of the units had rolled out and were using the mobile parking system. It was also emergent that some units were not using the system mainly because of communication challenges.

The study established three challenges that considered to be affecting the application of mobile parking system at the county government of Nairobi. These were: Poor broadband internet connectivity, low levels of IT literacy and perceived parking system complexities.

The study indicates that they are massive benefits associated with application of mobile parking system. The respondents concurred that they had experienced increase in parking revenue since the inception of the system. There was also cost reduction as less attendants were deployed to the parking lots to enforce the payment for parking services. The study further revealed that a of the three performance metrics evaluated two of them that is daily and monthly parking revenue targets were found to have a positive correlation with the application of mobile parking system and thus good predictors of performance for county government of Nairobi.

5.3 Conclusion

Mobile parking systems are still in the formative stages in Kenya, the study reveals that the benefits of mobile parking systems outweigh the challenges. Indeed the county government of Nairobi still has to invest in various marketing tools and advertising channels to raise awareness and promote the innovative mobile parking application to the general public.

The study also established that problems with internet/network connectivity features strongly as one of the key challenges especially in remote outskirts of the county. This issue points to the need for proactive investment in network services and communication boosters by telecommunication companies in conjunction with the county government. There is also need for public training and awareness campaigns to inform the general public of the convenience of using the mobile parking application. On the upside availability of public parking space, perceived ease of use and IT Literacy levels were not considered to be significant challenges.

Mobile phones and related applications have made IT and telecommunications benefits a reality to Kenyans and developing countries at large, mobile parking system has been an outstanding development on this front. This application has applied the power of mobile phone and web to deliver this application and systems to the motorist.

Lastly fusing these two tools produces a first in parking management systems since all urban development challenges are spatial problems and Mobile parking system comes in handy. The accessibility of the cell phone and its expanded reasonableness has prompted its selection as the principle contraption and innovation for in most developing countries. Moreover, the system offers great convenience to users. This was reported in the responses from the questionnaires. It was also reported that it is less costly and therefore preferred by those who use it. This has made the collection of parking revenues easy in the county and drastically reduced fraud and under reporting of daily collection as was previously done by corrupt cess collection officials. By utilization of mobile application as observed in other countries, for example, Sweden, Singapore and Germany have encountered expanded productivity parking fees collection. In some cases, this technology is based on a specific software or hardware.

The complexities involve even the service providers of the mobile communication services and banking organizations. In terms of performance, parking revenue collection seems to be doing better in sub-counties where the mobile parking system is in use. This is was seen across all the performance metrics evaluated which included daily and monthly targets as well as annual budget estimations. In order for the public to fully embrace mobile parking system, improved internet/network penetration across the county, low fixed and mobile broadband costs, ample public parking space and user training and awareness are some of the factors that need to be addressed. Motorists also have to be more willing to purchase smart phones that can easily access the internet/network.

5.4 Recommendations for Policy and Practice

The study findings reinforce previous assertion by other researchers that mobile systems pose enormous benefits to public institutions in Kenya. One of this benefit is cost reduction, efficiency and convenience to the general public. One of the most cited barrier to application of mobile parking systems has been poor broadband internet connectivity. To create public awareness and sensitization, the county government can invest in campaign programs to familiarize the general public with the use of mobile parking system. Regression results indicate that there is a positive relationship between application of mobile parking system and performance of parking revenues and CGON. The study recommends that the county government should invest in training and awareness for users of public parking space in Nairobi. This would ensure that the users find the parking application easy to use. In addition, the county government together with telecommunication companies should invest in support infrastructure such as investing in fast internet connections. The county government should also provide ample parking space for public parking.

Most motorists cannot use mobile parking systems mainly due to poor broadband internet connectivity and in some cases lack of the required ICT/technology skills to use the system. This issue cannot be solely addressed by the county government, on one hand they need to team up with telecommunication companies to invest in the requisite technology and systems to ensure strong networks infrastructure as well as create awareness to negate this poor perception with regards to ease of use. On the other hand, the county government needs to invest in the enactment of laws and regulatory infrastructure that supports the use of the mobile parking system. Additionally the government has to look into policies that invest in systems that will improve the current internet penetration rates in the county if the mobile parking system is going to thrive.

5.5 Limitations of the Study

The study results may have the some limitations inherent to the sensitivity of the county government in which the research was carried out. There is great tendency by staff in the county government to be reluctant in divulging sensitive information especially on performance metrics which they felt may expose them for the wrong reasons. Most of the staff in the administrative units are keen to retain and protect any sensitive information. This of course made it difficult to obtain the required data. Some questionnaires had unanswered questions which made it difficult to analyze data in some parts. This can cause non response biased which can affect the validity and reliability of the results though not to a great extent. Due to the scope and limitation of resources for this study it was not possible to investigate the factors influencing performance and also to monitor performance over a considerable duration of time and thus the recommendations for further research.

5.6 Suggestions for Further Research

One of the study objectives was to determine the relationship between application of mobile parking system and parking revenue performance of the county government of Nairobi. The findings indicate that there is a strong positive relationship between the two. In contrast cost implications were cited, the most parking question is why then are motorists reluctant to embrace the innovative technology? Are there more factors at play which were not captured in this study which require further investigations? Further research also needs to be done on the factors influencing the adoption of mobile parking application. The performance metrics used in this study revealed that there was remarkable achievement of revenue targets. It would be interesting to evaluate the parking revenue performance of the county government over time (longitudinal study) to establish growth rate and changes in parking revenue performance.

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APPENDICES

APPENDIX 1: QUESTIONAIRE

PART A: Demographic

Age

      1-5 years [ ] 6-10 years [ ] 11-15 years [ ] Over 15years [ ]

Gender

      Male [ ]   Female [ ]

Level of Education ………………………………

Sub-County Name……………………………

Tittle of respondent …………………………………………………………………………

For how long have you been working with the County Government of Nairobi?

      1-5 years [ ] 6-10 years [ ] 11-15 years [ ] Over 15years [ ]

Do you have a mobile parking system?

      Yes [ ]   No [ ]

      If YES, when did you start using it?.......................................

Do you have public parking space in your sub county where you collect parking fees?

      Yes [ ]   No [ ]

Do you have a problem with parking device connectivity in your sub-county?

      Never [ ]   Sometimes [ ]

      Often [ ]   Every time [ ]

How many times in a month is the mobile parking system down?

      Once [ ]   Twice [ ]

      Thrice [ ]   More than Three times [ ]

How many times in a month is the parking system network unavailable?.....................

      Once [ ]   Twice [ ]   Thrice [ ]   More than thrice [ ]

PART B: Challenges. Please respond by ticking one answer in each line across as to your view about the application of mobile parking. *(1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree)*

To what extent is the following a challenge to the usage of the mobile parking system?

	1	2	3	4	5
1. Availability of public parking space					
2. Broadband internet connectivity					
3. Perceived ease of use					
4. Levels of IT literacy					
5. Complexity of the system i.e. The system is complicated					
6. Security issues					
7. Power/ Battery Charge/Electricity					
8. Motorists do not know how to use the system					

PART C: Financial Performance. Please respond by ticking one answer as appropriate

1. What was your daily revenue collection target for last month?...........................
   Did you meet the target?

   Yes [ ]   No [ ]

2. What was your revenue collection target for last month?...........................
   Did you meet the target?

   Yes [ ]   No [ ]

3. What was your budget for parking activities/operations in the last financial year?...........................

PART D: Non-financial Performance (Service Delivery). Please respond by ticking one answer as appropriate.

What is the state of parking space in your area of jurisdiction?

Well maintained [ ]   Fairly Maintained [ ]   Maintained [ ] Pathetic [ ]

What are the operating hours of your parking space attendants?

8.00 to 5.00 pm [ ]   9.00 to 5.00 pm [ ]   8.00 to 4.00 pm [ ]   9.00 to 4.00 pm [ ]

Please respond by ticking one answer in each line across as to your view about the quality of service you provide with regards to parking services. *(1=excellent, 2=good, 3=fair, 4=bad.* **To what extent is the quality of service offered with regards to the following activities?**

	1	2	3	4
1. Parking space availability				
2. Response of parking attendants				
3. Security of parked vehicles				
4. Parking system customer care				
5. Packing dispute handling				

THANK YOU FOR YOUR CO-OPERATION AND TIME