# UNIVERSITY OF NAIROBI

## SCHOOL OF COMPUTING AND INFORMATICS

## AN EVALUATION OF E-GOVERNMENT PORTAL: CASE OF NAIROBI CITY COUNTY SELF SERVICE PORTAL

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Submitted in partial fulfillment of the requirements for the Degree of Master of Science in

Information Technology Management of the University of Nairobi

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# DECLARATION

This project report is my original work and has not been presented for a degree in another University

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This project report has been submitted in partial fulfillment of the requirements of the Master of Science Degree in Information Technology Management of the University of Nairobi with my approval as the University Supervisor

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# ABSTRACT

Governments across the globe are embracing technology to improve their processes and service offering to the citizens. This government to citizen (G2C) service offering has reduced the bottlenecks that arise from slow and bureaucratic services. There is need however to measure the success of e-government from a citizen's perspective. The aim of this study therefore was to evaluate the level of success of using the Nairobi City County Self Service portal from citizens' perspective. The updated DeLone and McLean (2003) model was applied as a suitable model for evaluating the NCC Self Service portal. The research used structured questionnaires to gather data about the citizens' perceptions of the information, system and service quality of the portal, as well as the perceived benefits, use and user satisfaction levels arising from using the portal. The findings revealed that the e-portal was successful from the citizens' perspective, however since its usage was not mandatory, users could choose not to use it unless the need arose. It was recommended that the decision makers within the county government enforce mandatory usage to improve e-government service consumption, as well as to improve awareness of the e-government services.


**Keywords:** e-Government Portal; DeLone and McLean IS success model (2003), Nairobi City County Self Service Portal.

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# ABBREVIATIONS

**G2B** - Government to Business

**G2B** - Government to Business

**G2C** - Government to Citizen

**G2C** - Government to Citizen

**G2E** - Government to Employees

**G2G** - Government to Government

**G2G** - Government to Government

**ICT** - Information and Communication Technology

**IFMIS** - Integrated Financial Management Information System

**iN** - intelligent Nation

**IPPD** - Integrated Personnel and Payroll Database

**IQ** - Information Quality

**IS** - Information Systems

**IT** - Information Technology

**NB** - Net Benefits

**NCC** - Nairobi City County

**SQ** - System Quality

**SV** - Service Quality

**U** - Use

**US** - User Satisfaction

# CHAPTER 1: INTRODUCTION

## 1.1 Background

Information and Communication Technology (ICT) is and continues to act as an enabler of development of any society. Huge investments have been made by many governments towards services related to electronic government services that enable them to link networks within government aimed at improving productivity and efficiency (Hung et al., 2006). Tan et al. (2005) felt that there was need to boost the tie amongst the communities and public officials thus enabling transparency and accountability of the government to its citizens. Wang and Liao (2007) proposed that e-Government systems and services can generally be categorized into three general types namely: government to citizen (G2C), government to government (G2G) as well as government to business (G2B). Larsen & Rainie (2002) further added that the typical G2C services include: research information, license registration as well as renewal, public policy information, forms and services for government, opportunities for business and employment, voting, filing of taxes, payments of fines, and feedback submitted to governmental officials.

The Kenyan Constitution, passed in 2010, saw the devolution of a centralized system into a national government and 47 county governments with the aim of transferring powers, functions and responsibilities into the counties, thus making it easier for citizens to access governmental services. The county governments have made enormous effort to keep up with technology by launching web portals where citizens have access to various government departments for quick and easy services. The Nairobi City County ICT Transformation programme was launched in September 2013 in partnership with ICT Authority aiming at speeding up the service delivery to citizens and to automate back-office operations. The NCC Self Service Portal offers a digitized platform where Nairobi residents can pay for services such as parking, single business permits and land rates. Payment of these services can be done using mobile money, debit cards and online banking from local banks.

Magoutas et al. (2007) suggested that it was essential to individually gauge the satisfaction citizens derive from using public e-services by using quality ontology.

## 1.2 Problem Statement

In the wake of technology, governments across the globe are now embracing technology giving them an opportunity to interact with their citizens online. However, Akman et al. (2005) argues that e-government systems success, specifically in a G2C context, is not dependent on technology but on the citizens. This therefore leads to a need to evaluate G2C e-government systems' success from citizens' perspective. According to Gupta & Jana (2003), evaluation studies of G2C systems enable government bodies to determine their capability of performing the required tasks as well as delivering services as per the expectations.

## 1.3 Research Objectives

This research therefore aims at identifying the following objectives:

1. To evaluate level of success of the NCC Self Service portal from citizens' perspective
2. To identify a model that can be used to evaluate the NCC Self Service portal
3. To apply the DeLone and McLean (2003) model to evaluate the NCC Self Service portal

## 1.4 Research Questions

1. What is the level of success of the NCC Self Service portal from citizens' perspective?
2. What model can be used to evaluate the NCC Self Service portal?
3. How can the DeLone and Mclean (2003) model be applied to evaluate the NCC Self Service portal?

## 1.5 Significance and Purpose of the Research

It was expected that the county governments and their stakeholders would realize benefits and achieve varied goals as a result of this study. These stakeholders could use the results of this study to prepare for long-term planning and successful rollout and uptake of e-government portals. Policies and guidelines may be developed to enhance the rollout of e-government portals. Also, it was felt this study could be used by key decision-makers as well as those who design services to enhance services provided by e-government as well as their access levels to citizens. It was also envisioned that citizens would access and make use of e-government services with better ease and speed, thus enjoying better service delivery. This study also contributes to the body of knowledge regarding e-government portal service uptake in Kenya

that could be beneficial to the African region as well as to the world.

## 1.6 Scope of the Research

The e-government portal to be studied is county based and hence Nairobi County was selected as it is a metropolitan city that has a good representation of citizens from the different counties.

## 1.7 Assumptions and Limitations

The study was conducted with the assumptions that by basing the research on the citizens in Nairobi County using the NCC Self Service Portal, most of the counties would have similar feedback as the services offered by the e-portals are somewhat standard. It was also assumed that the respondents would answer the questionnaires truthfully. Limitations of this study were anticipated to be that not many users have accepted the use of e-government portals owing to demographics such as age and internet experience.

# CHAPTER 2: LITERATURE REVIEW

**2.0 e-Government Overview**

Technology advancement has pushed the public sector towards the use of Information and Communication Technology (ICT) that provides support of its functions and processes. Chan et al. (2008) argue that no longer is Information and Communication Technology (ICT) useful in supporting back-end operations; rather it has also facilitated the front facing processes with citizens and businesses. Increasingly, Information and Communication Technology (ICT) usage is deeply influencing the way in which people work and live (Berce et al., 2008). Krishnaiah (2008) and Curtin et al. (2003) further explained that there is a remarkable role of Information and Communication Technology (ICT) use in e-Government initiatives thus helping the establishment of efficient and effective communication while providing services to other users, specifically its citizens. The term e-Government, as defined by UN/ASPA (2002), refers to the way in which the Internet and the World-Wide-Web (WWW) can be used to deliver government related information as well as services to its citizens. e-Government transforms government to be more citizen-centered as effective partnerships amongst the citizens, government and private sector affect its success (Farelo and Morris, 2006).

Howard (2001) argues that the four major e-Government development stages include:

*Information Publishing;* which refers the way in which the government posts information regarding public services that are available as well as government related contracts and services on their official websites.

*Two-way Communication;* that refers to citizens being able to communicate via Internet with the government through requests. The requested information may not be addressed online immediately but is sent via email to the requester.

*Transaction;* Citizens, in this more sophisticated stage, are able to carry out transactions online, such as renewal of driving licenses.

*Integration;* At this sophisticated level, services from various agencies and departments are provided by government and are accessible via one website also known as an e-government portal.

E-government services can be extended to different sectors depending on who participates, such as Government to Government (G2G) that emphasizes on all the undertakings amongst government bodies, Government to Business (G2B) offering to people in private companies or institutions and the government, the Government to Citizen (G2C) model that looks at the interactions amongst citizens and their government (DeBenedictis et al., 2002). Ndou (2004) also identified a fourth sector called Government to Employees (G2E) which is another relationship influencing effective cooperation between entities within government.

**2.1 e-Government in Developed Countries**

According to a survey conducted by UN (2014), developed countries still top e-government adoption, innovation and use, with the Republic of Korea leading the pack while Australia and Singapore followed closely at the second and third position respectively. France, Netherlands, Japan, United States of America, United Kingdom, New Zealand and Finland follow in that order respectively. Generally, according to the UN (2014) report, six of the top 10 world e-Government leaders are from Western Asia, while two are from Eastern Asia and the other two from South-Eastern Asia and Central Asia.

The vision of Korea's e-government is to work towards becoming the 'World's best', and 'open e-government'. Yoon et al. (2014) stated that the fundamental aim of the Korean e-Government is to ensure that all its citizens and businesses can enjoy 'seamless' public services through a single channel accessible through different mediums like the Internet, mobile phone, personal visits to government entities, or via fax or mail. Lee et. al (2005) add that the ICT infrastructure growth in Korea has developed rapidly with the broadband penetration services broadly evolving due to its high degree of diffusion that have positively affected e-government and e-commerce. South Korea, having ranked first in the UN 2010 Survey, topped again in 2014 taking the lead in the developed nations' e-Government readiness. Implementation of Advancement of the e-Government Strategy in 2007 helped the government digitize public administration as well as offer G2B and G2C services plus communication and transactions that can be conducted in various channels. By having a necessary and adequate infrastructure for IT development and maintaining its vanguard position, South Korea is feted to have transparent and efficient e-mobile and online presence of world class standards. This helped the country develop more projects in e-governance as well as citizen-centric strategies for the future, thus taking the lead

globally in e-government (UN, 2014).

Singapore was ranked second in Asia and third in the world as a leading e-Government leader. (UN, 2014). It is one of the countries in South East Asia consisting of 63 islands. The Singapore government launched an information communication plan, dubbed Infocomm, in the early 1980s which was aimed at achieving citizens' confidence through service provision and connection. To actualize this, the government of Singapore started a master plan that was to run for 10 years commencing in 2005 till 2015 known as intelligent Nation (iN2015) that would establish Infocomm's promises, by reassuring the realization of intelligent Nation's vision by supporting a globalized city in addition to innovation as well as internationalizing Infocomm. IT's applied use within Singapore's government of Singapore initially refers to the early 1980s when it utilized a programme called civil service computerization (Chan et al., 2008). The PSi is the main infrastructure in Singapore's e-Government that is an integrated e-Government center supporting deployment, evolvement and different e-services processes from different institutions in the government. In the eventuality this centre's operations fail, Chan et al. (2008) believed that different governmental institutions' e-services would fail. Singapore's e-Government uses a private cloud that enables them provide ICT infrastructure, application as well as services. Business analytics are used by Singapore's e-government to assist institutions within the public sector to improve their public service effectiveness and efficiency. Coursey et al. (2007) and Norris & Moon (2005) felt that despite the infrastructure in ICT as well as organizational structure development, little reference is made to the human capacity building capacity that would have a direct influence on the system progress of e-Government. Commendable progress has been made by the Singapore government despite some limitations, and further advancement shall be made in provision of better delivery of services to its citizens. This is evident from the commendable improvement over the last two years where Singapore e-Government jumped to 3$^{rd}$ place globally from 10$^{th}$ position, with a commendable index value of 0.9076. This has created a good learning platform for other governmental authorities to adopt strategies hinged on strengths accomplished.

The UN (2014) report illustrated that the United States of America and Canada were the highest ranking countries from the Americas region. USA has taken important steps, since 2012, in

driving technology towards quality jobs and sustainable growth by developing policies that can support education and innovation. The United States of America has enhanced their digital offering to incorporate its citizens' emerging needs as well as tendencies like mobile phones and tablets that are smart as well as high speed network and cloud computing. In the South, Uruguay has illustrated great progress by increasing to 55% the services offered plus increasing infrastructure on telecommunication by 27%.

In Europe, out of the highest ten e-Government world leaders, four European countries are in the list as compared to the previous rating in 2012 where seven out of ten countries were in the top ten. Europe faced by challenges relating to finances, lack of employment, a population that is aging and reduced growth, resulted in innovative solutions being sought so as to remain competitive, ensure continued public service offering to its citizens and to restore growth. Majority of the governments, however, claim not to have been affected by the crisis as e-Government implementation backing acts as a critical strategy in achieving widespread governance public governance supporting citizen servitude and recovery of the economy.

## 2.2 e-Government in Developing Countries

Developing countries tend to have little or no legacy in infrastructure and online processes as they tend to be very expensive to implement. This is due to the fact that amongst governmental policies, regulatory as well as telecommunication policies have not yet resulted into a competitive telecommunication market therefore bringing forth diffusion issues related to broadband. In Europe, for instance, 68 out of 100 citizens enjoy active mobile broadband compared to only 22 out of a possible 100 people in the Pacific as well as Asia, while 19 out 100 account for those in the states of Arabia. Other than lack of infrastructure, other characteristics such as institutional access are characterized by individual access availability via spaces in the group like schools, cyber cafes, centers built for the community due to low level of income or high costs. Africa in particularly is minimally wired compared to other regions due to a shortage of devices as well as connectivity at work or home. Countries like Tunisia and Mauritius however are making commendable strides in embracing e-Government services and are leading the African turf. Kenya was also recognized in the East African region as having taken significant steps in using e-Government services.

Of the developing countries feted for successfully implementing e-Government since May 2007 is Bahrain (Meftah et al., 2015). Sahraoui (2005) stated that the e-Government of Bahrain came into the spotlight when it was used to carry out the parliamentarian as well as the municipal elections in 2002. The e-Government project was carried out in two main phases consisting of infrastructure and application, each which lasted 2 years and concentrated on five architectural areas namely: information, security, management and applications (Mohammed, 2009). Bahrain e-Government's main strategy is to guarantee efficient and effective service delivery to its citizens, businesses, government and visitors alike. The strategy also aims at enhancing the lives of citizens by offering comprehensive, timely and accurate information through adoption of technology. e-Government success can be attributed to Central Informatics Organization, a central authority in Bahrain. Citizen participation reassures e-Government's usage and satisfaction by creating an accountable and transparent environment. In Bahrain, the success of e-Government related projects may be affected by inadequate democracy in the political system arising from rifts between the Shia protesters and Sunni royal family.

Botswana, through the Information and Communication Technology (ICT) policy, targeted service oriented government by offering vertically integrated online transactions and access to information by its citizens in 2010. It also aims at transforming itself into a seamless government that provides horizontal service delivery by 2016. (UNPAN, 2009; Botswana E-readiness Report, 2004; National ICT Policy 2007; UN E-government Survey, 2008). Botswana still experiences low levels of ICT usage and penetration on mobile phones, despite the ambitious efforts and targets. According to Kereteletswe (2009) and Pheko (2009), broadband penetration stands at 1 per cent, Internet users at 6 per cent while PC penetrations stand at 3 per cent of the population. Zulu et al. (2012) argues that Botswana lags behind due to its citizens experiencing inadequate access and usage of up-to-date ICT resources, as well as the slow integration of ICT usage into its economic and social mainstream regardless of its robust infrastructure. E-Government deployment has also faced budgetary issues in Botswana (UNDP, 2006; Nkwe, 2012) thus highlighting the needs for regulators, policy makers, operators and related industries that would help encourage policy and strategy adaption to help promote ICT to the citizens of Botswana, especially those living in the rural areas.

ICT adoption in Kenya has seen ministries and various government departments creating websites that provide online services and public information. This is in addition to the creation of email accounts for senior officers. ICT has been adopted in various sectors such as: customs clearance, citizen and electoral registration, business application processing and finally tax, land, financial and human resource management. Okong'o (2005) stated that Kenya's e-Government strategy has been in the centre of ICT introduction in central government. Since the inception of the e-Government strategy in 2004, some of its milestones are: A baseline statement of the capabilities and capacities of the Government has been taken to give an indication of the inventory of all ICT assets and capacities; that will aid in developing ICT infrastructure that is robust in nature. Secondly, there was email address creation of all civil servants. Thirdly, IFMIS (Integrated Financial Management Information System) as well as IPPD (Integrated Personnel and Payroll Database) are being piloted and tested in various ministries in the government. Fourth, government buildings are having their cabling done with the intention of providing infrastructure and connectivity within and between governmental buildings. Fifth, there was development of training programmes and staff training within ministries with a aim of operating within an e-Government environment. And lastly, there has been development of ICT security guidelines stipulating how ICT related services as well as equipment should be purchased and employed in the governmental offices. Some challenges facing the e-Government strategy implementation is that it's a top-down implementation that's taking a phased approach starting at the ministries (central government level) to provincial level then district levels, with no indication on how local authorities can be brought on board. The strategy has a bias towards the G2G (Government to Government) offering rather than the G2C (Government to Citizen) offering. Local authorities seem not be mentioned in the e-Government strategy, yet they tend to interact with citizens. The devolution of the national government has seen the services being centralized to the counties. However, the strategy does not seem to touch on the county government offering. This may be due to the fact the government officers developed the strategy independently without giving other stakeholders a chance to participate in its formulation, yet there are expectations of their participation in the success of the strategy implementation. It is majorly the reason why the City Council of Nairobi has been unable to be intimately in touch with all the happenings around Nairobi City resulting in its inability to provide impactful and

efficient service.

## 2.3 Comparative Observations of e-Government in Developed and Developing Countries

Developed countries reveal more success stories as compared to developing countries. This is because e-Government initiatives within developing countries are characteristic of alarming failure challenges as e-Government has not yet developed beyond conceptualization phase while developed countries on the other hand have advanced to the transformation phase that is citizen centric with other countries. The Republic of Korea, Singapore, Sweden, Canada and Malaysia are examples of countries that have made significant strides in total transition and transformation phase of e-Government by offering complete one stop public services and various full online transactions capabilities.

Developed countries exhibit higher levels of advancement and efficiency in e-participation, e-citizens and e-democracy while developing countries exhibit opposite trends. There are significant differences in e-government development capabilities, e-readiness and citizen-user centricity. Disparities in the e-Government implementation and failure levels are clear when comparing developed and developing countries' experiences.

## 2.4 e-Government Channel Service Delivery

UN (2014) defines multichannel service delivery as the public service provision through various means in a harmonized and integrated manner. Channels can be traditional such as voice and over-the-counter services or online like Internet access through computers, mobile devices and through emerging technological media such as social media and mobile applications. Other types of channels include: emails, web portals, SMS and other messaging services, mobile portals (such as mobile websites) as well as public kiosks and Intermediaries through public-private partnerships. Various media is used in different settings, whereby digital channels have been embraced by almost every country while some consumers still use the traditional media like over-the-counter and voice (telephone), thereby providing ubiquitous 24/7 services to various groups.

Nairobi's City Council opted for an online web portal, Self Service Portal, where users upon registration can login to access the various services offered by the local authority.

## 2.5 Evaluation of Information Systems

Doherty & King (2004) and Willocks (1992) define information systems (IS) evaluation as the process of finding the worth and importance of these systems using quantitative and qualitative methods. This process is usually performed after implementing new information systems so as to analyze the system's outcome. Davis & Jackson (2005) argue that it is paramount for organizations to analyze the IS' effectiveness thereby suggesting further system improvements that will enable the actualization of objectives and targets of organizations. Two commonly used types of evaluation are formative and summative formations (Sharp et al., 2007). Formative evaluation is conducted at various stages of system development and also at different points in time. This evaluation involves time ranging from prototype creation to final version of the product. Summative evaluation on the other hand is conducted when the system is fully developed and is being used by its intended users. This evaluation considers the system's efficiency, whether it meets the users' needs as well as the impact of the system on the organization (Rhee & Rao 2008, Sharp et al., 2007).

## 2.6 Evaluation and Challenges of E-Government

Alshawi & Alalwany (2009) argued that governments globally spend a lot of money on e-government development projects. This has led to an increase in demand from citizens for their governments to deliver public services just as they would get them from the private sector services (Edmiston, 2003). Many researchers such as Gupta & Jana (2003), Torres et al. (2005) believe that the effectiveness of web-based systems as well as better service delivery to citizens needs to be justified by evaluating these public systems. E-government evaluation is however not an easy process like it is with other information systems evaluation. Wang & Liao (2007) emphasize and argue that measuring e-government systems success can result into being multidimensional because the concept is in itself complex. Alshawi & Alalwany (2009) further explain that not only will such evaluation require meeting general citizens' demands, rather, it will also need to address specific target group requirements utilizing a particular e-government service such as students, unemployed, lawyers, pensioners etc. Beynon-Davis (2005) stated that finding out the exact advantages associated with e-government initiatives tends to be an uphill task as these initiatives differ in goals, targets and benefits due to differing viewpoints of stakeholders. Additionally, Mingers & Stowell (1997) argued that for an evaluation to be

excellent, an uneasy task of social and technical use context is needed to ensure the evaluation is excellent. Alshawi & Alalwany (2009) argued that traditional approaches were the most commonly used in e-government evaluation that included cost/benefits, present worth, return on investment and payback period. These approaches were criticized due to having a limited definition of stakeholders and targeted only direct tangible costs and benefits. However, Wang & Liao (2007) had a different take where they felt that for better measurement of e-government success, dependable ways needed to be created as well as factors developed to measure better this concept. Theorists however have still not found the best constructs to measure information systems success (Rai et al., 2002).

DeLone and McLean (1992) dealt with these issues by carrying out a review of published research between 1981 to 1987 and classified IS success into six components namely: system quality, information quality, use, user satisfaction, individual impact and organizational impact. Petter et al. (2008) added that these six components are not independent, rather are interdependent. DeLone and McLean (2003), after noting that many researchers have used the framework to develop their own variables as well as performing empirical measurement by citing and testing it, later revised their model to enable it measure shortcomings of the emerging e-commerce world. DeLone and McLean (2003) gave an open call for researchers to empirically test this model in various IS contexts and also felt that the model could be applied using any unit of analysis, such as organization, individual, nation, industry, society etc. Petter et al. (2008) performed a qualitative review, five years since the open call, using 90 empirical studies to summarize the relationship outcomes among the six constructs of the revised framework at both an organizational and individual level. Since this study is interested in the individual context, the results applied well at both levels where sufficient data was provided. The review also considered various types of IS in different conditions finding considerable backing of most relationships in the model.

This model, DeLone and McLean (2003) was therefore chosen as the suitable model due to the good recognition gained regarding evaluation of IS success. Further to the open call to test and validate the model, this study shall test the model in the e-government context and especially in the NCC Self Service portal.

## 2.7 Theoretical Frameworks

### 2.7.1 IS Success Model (1992)

DeLone and McLean (1992) developed an information systems' success model grounded on the synthesis of previous research involving IS success. The more integrated and comprehensive IS model shows that success depends on several factors that are interrelated to each other. Six constructs are typical of this model and consist of: system quality, information quality, use, user satisfaction, individual impact and organizational impact.

Most of IS are characterized by system quality and information quality. The impact of a system can be felt if it's used by the users who can either be satisfied by it or not as well as during its use. The impact would then bring about the organizational impact. System quality in this model therefore quantifes technical success, while information quality calculates semantic success. The other four constructs, use, user satisfaction, individual impacts and organizational impacts measure success related to effectiveness (DeLone and McLean, 1992).

Further, the process model suggested that both information quality and system quality can have an impact on use and user satisfaction. Additionally, use and user satisfaction can influence each other either positively or negatively and both can therefore lead to an individual impact that would then lead to an organizational impact. DeLone and McLean further added that items for all the six constructs need to be carefully chosen to ascertain the overall IS success.

Figure 2.1 below shows the IS Success Model developed in 1992:
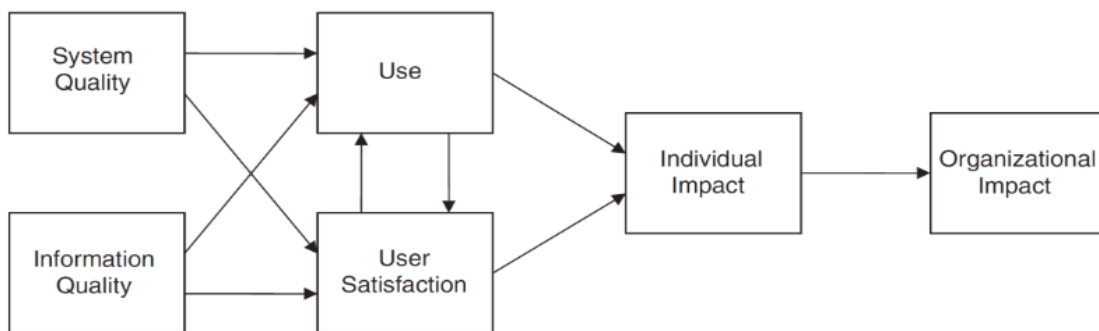


*Figure 2.1: DeLone and McLean IS Success Model ( 1992)*

### 2.7.2 IS Success Model (2003)

After DeLone and McLean developed an information systems' success model in 1992, they

welcomed criticism and suggestions for modifications to the model. Following this, they performed empirical tests and revised the model (DeLone and McLean, 2003). Following the recommendation of Pitt et al. (1995), the construct of service quality was added in the updated version. The net benefits variable replaced the individual and organizational impact constructs thus enabling multiple levels of analysis of benefits. One other modification made to the model involved the use construct, where DeLone and McLean (2003) explained that this variable must occur before user satisfaction in procedure logic whereby positive experience with use would result in a higher level of user satisfaction in a causal sense. This would therefore translate to an increased user satisfaction resulting in higher intention to use together with an effect on use. Figure 2.2 below shows the modified version of the IS success model (Delone and McLean, 2003)
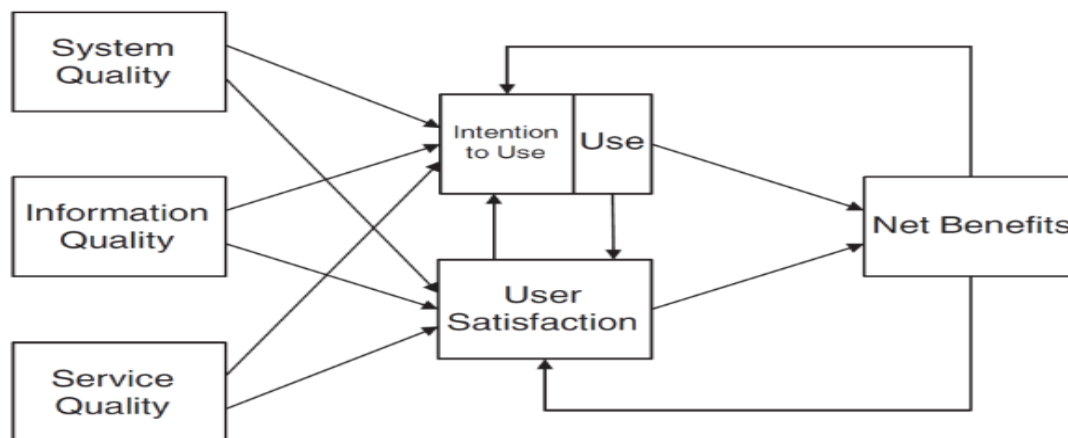


*Figure 2.2 Updated DeLone and McLean IS Success model (2003)*

The six constructs can be defined as below:

1. **System Quality** – Evaluates the desired features of an electronic system in an internet environment or e-commerce system.
2. **Information Quality** – Measures attributes of relevance, completeness, ease  of understanding, personalization and security.
3. **Service Quality** – Refers to the inclusive support that can be supplied by a service provider notwithstanding whether the backing is provided by an internal IS department, a novel unit in an organization or outsourced to an ISP (internet service provider). It's also

considered an important measure because users in an e-commerce context are customers while poor user support will lead to losing customers as well as sales. Additionally, SERVQUAL is an instrument that can be used to evaluate IS service quality while WEBQUAL measures user perceptions on quality of e-commerce websites.

4. **Use** – From an electronic system context, the term refers to the measure of everything from visiting a website, to navigating within a site, to obtaining information, to performing a transaction.

5. **User Satisfaction** – This makes reference to the overall level of user satisfaction and may also be an important way of measuring opinions of users.

6. **Net Benefits** – It refers to the balance between the positive and negative effects that e-commerce has on employees, organizations, markets, customers, industries, markets, suppliers, societies and economies.

## 2.8 Conceptual Framework

Kombo & Tromp (2009) defined a concept as a general or abstract idea derived from specific instances. Mugenda & Mugenda (2003) further defined a conceptual framework as a hypothesized model that identifies the model under study by mapping relationships among them. According to Creswell (2005), the aim of a conceptual framework is to mainly classify and outline relevant concepts that would map the research terrain or conceptual scope, identify gaps in literature and systematize relations among concepts.

This study chose to apply and test the updated DeLone and McLean model (2003) of information systems' success in the e-government success context, specifically the NCC Self Service portal. Hu (2002) argued that consolidated previous research findings suggested that IS success may vary noticeably based on vital organization or system characteristics and thus modification of the model should be made in accordance with the target context. DeLone and McLean (2003) further emphasized that the framework has arrows to illustrate suggested associations amongst success dimension from a process perspective, however no positive or negative signs for causal relationships are shown. The causal nature of these associations will be hypothesized in the context of the research in question. Figure 2.3 below illustrates the conceptual framework for this study:
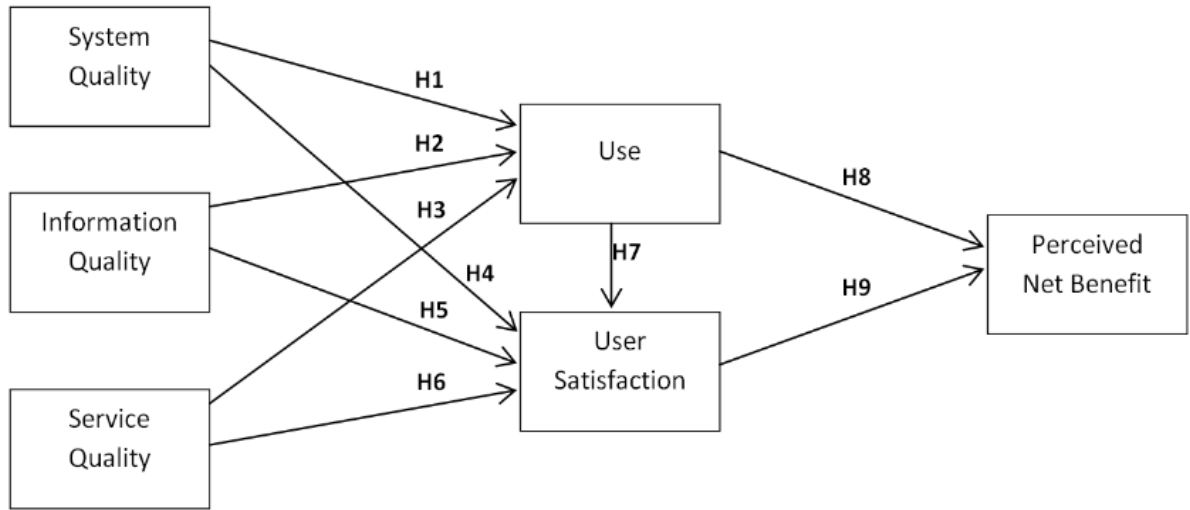
*Figure 2.3 Conceptual Framework*

Research Hypotheses Development

The hypothesized relationships between variables, in the context of the NCC Self Service portal, shall be as follows:

H1: System quality will positively affect use of the NCC Self Service portal

H2: Information quality will positively affect use of the NCC Self Service portal

H3: Service quality will positively affect use of the NCC Self Service portal

H4: System quality will positively affect user satisfaction of the NCC Self Service portal

H5: Information quality will positively affect user satisfaction of the NCC Self Service portal

H6: Service quality will positively affect user satisfaction of the NCC Self Service portal

H7: Use will positively affect user satisfaction of the NCC Self Service portal

H8: Use will positively affect perceived net benefit of the NCC Self Service portal

H9: User satisfaction will positively affect perceived net benefit of the NCC Self Service portal

According to the conceptual model above, the use construct has been used instead of the intention to use variable and this is due to the fact that usage of the system under study was considered not mandatory for any individual. As further defined by DeLone and McLean, intention to use can be referred to as an attitude while user may refer to behavior. Also, the two

constructs, use and intention to use, can be used interchangeably while intention to use is more applicable in a context requiring mandatory usage. Use of the NCC Self Service portal is optional and not mandatory, hence the use construct shall be used to demonstrate actual behavior. This study shall therefore adopt the use construct instead of the intention to use construct as a measure of success. Additionally, perceived net benefit shall be used as the construct instead of net benefits because the study makes reference to the evaluation of citizen-perceived net benefits meaning it shall measure success from the citizens' perspective.

# CHAPTER THREE: RESEARCH METHODOLOGY

## 3.0 Research Design

The term research design was defined by Orodho (2003) as the outline, scheme or plan used to provide answers to research problems. It is also referred to as a set of conditions for data collection and analysis in a way aiming to correlate relevance to the purpose of research. This research study used quantitative research methods, specifically survey based questionnaires were used to get the citizens' responses regarding the overall system use. Data that was collected was used to validate the model using statistical analysis.

## 3.1 Population

Population is a term referring to an entire group of individuals or objects that a researcher has interest in and can therefore generalize the results of the study and have observable same characteristics (Mugenda & Mugenda, 2003). The population comprised of the Kenyan citizens residing in Nairobi County, who consume services from the Nairobi City Council. According to Kenya National Bureau of Statistics (KNBS), the Nairobi County population stood at 3,138,369 as at the 2009 census and this is the population that is under study.

## 3.2 Sample Frame

For purposes of this study, the sampling frame was constructed from the list of constituencies within Nairobi County.

## 3.3 Sampling Design

Nairobi County has seventeen parliamentary constituencies and so the researcher opted to use simple random sampling. Each constituency was assigned a number then sampled so as to be able to obtain a representative sample.

## 3.4 Sample size

Samples are small parts of the total number (subsets) that could be studied (Orodho & Kombo, 2002). It can also be defined as part of the population that is observed for the purposes of making scientific statements about the population. They are usually chosen from the population being studied, especially when the population size is too big to be studied as a whole. The researcher

therefore adopted a statistical model by Yamani & Keyton (2001). The formula that was used to calculate this study's sample size is:

$$= n/1 + N (e) 2$$

Where:

n = Sample size

N = Population size

e = Degree of tolerable error

1 = Constant

Therefore, allowing 5% error margin, we can apply the formula to get this study's sample size as follows:

N = 3,138,369/1 + 3,138,369 (0.05)2

n = 3,138,369 /1 + 3,138,369 (0.0025)

n = 3,138,369 /1 + 7845.9225

n = 3,138,369/7846.9225

n = 399.95

n = 400

## 3.5 Data Collection Methods

Data collection, as defined by Sekaram (2000), is the process of gathering information about a phenomenon using data collection instruments. Kothari (2004) further stated that descriptive studies involve the use of structured interviews as this is viewed as a safe basis for generalization. The study shall use primary data, whereby the instrument that was used was survey based questionnaires. The questionnaire contained seven parts of which six were aimed at measuring the six constructs of the IS success model, while the first section contained questions associated with demographics. The questionnaire started with a preliminary check point question asking whether the citizen has used the NCC Self Service portal or not. If not, the respondent was advised not to proceed further with the survey. Afterwards, there were questions regarding demographics such as age, gender and frequency of computer use. These results were not to be

analyzed using demographics, rather were included to improve the transparency of the research study and also to know how many respondents were male and female, as well as their ages. This helped in obtaining a general understanding of the target population. Multi-item scales were used in the questionnaire to measure the six constructs. The respondents were requested to select on a 5 point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree) how much they agreed or disagreed with a statement outlining an issue.

### 3.6 Validity and Reliability of Instrument

The study carried out a pre-testing of the research instrument prior to administering it, in an effort to test the reliability and validity of the research tool. The exercise enabled the study to identify possible problems, provide clarity on the instrument and language appropriateness during the main study. The pilot also assessed the relevance of the research objectives, tested the understanding of the respondents and research tool and any potential problems. It was also established how long it took to complete the questionnaires. The aim of pre-testing was to determine the reliability of the research tools by checking the structure, wording and sequence of questions as well as the validity of the research instrument. The pre-test was conducted to detect flaws and weakness in instrumentation and design as well as to provide data for probability sample selection.

### 3.6.1 Validity

Validity, which is the extent to which results from data analysis actually represent the phenomenon being studied, was carried out to test the tool for accuracy and meaningfulness using the content validity test. This calculated the degree to which data that is collected using a particular tool represents the specific domain of indicators/content of efficiency of e-government portal use. The assessment of content validity was carried out by an expert who assessed the tools that established what concept the instrument was trying to measure. The expert commented on the suitability and representativeness of questions thus giving recommendations on the structure of the tools. As a result, this improved the content validity of the data collected.

Convergent and discriminant validity were also scrutinized. Average variance extracted (AVE) is suggested as the suitable criteria for calculating convergent validity whereby an AVE value of at least 0.5 shows sufficient convergent validity, meaning that a latent construct is able to give an

indication of more than half of the variance on average of its indicators (Fornell et al., 1981) Discriminant validity on the other hand examines the extent to which the constructs diverge from each other and this happens when the square root of the AVE of each construct tends to be considerably higher than its correlation with other constructs indicating they measure different concepts (Chin, 1998). The second criterion of discriminant validity expects the loading of each indicator to be higher than all its cross loadings (Chin, 1998).

Construct validity test was also conducted. The questionnaire was categorized into various parts to ensure that each part assessed information pertaining to a particular objective. This also helped ensure that this was also closely related to the study framework.

### 3.6.2 Reliability

Reliability refers to the level of degree to which research instruments yield consistent results (Mugenda & Mugenda, 2003; Cooper & Schindler, 2008). The questionnaire, which was the data collection instrument, was tested on 5% of the sample population. Reliability testing was done on randomly selected respondents who were not part of the final study sample size. The data collected was then coded into SPSS to conduct Cronbach reliability testing so as to assess the internal consistency measure. A high internal consistency reliability resulted from Cronbach's alpha coefficient value being closer to 1. Another reliability measure, called composite reliability, was calculated so as to indicate how well each construct in the measurement model is explained by the indicators. Chin (1998) recommended the threshold to be 0.70.

### 3.7 Validation of Model

The updated DeLone and McLean model (2003) was evaluated using Partial Least Squares (PLS) which, according to Chin (1998), is a structural modelling technique whose aim is to analyze a set of latent constructs or dependent variables from a set of independent variables or indicators. The structural model (inner model) illustrates the relationships among observed variables (in this case, the six constructs) while the measurement model (outer model) shows the relationships between an unobserved or latent construct and its indicators or observed variables (questionnaire items for a latent construct). Composite reliability, Cronbach's alpha, AVE, correlations among constructs and cross loadings were calculated for the assessment of the

measurement model used for this research. The structural model was also subjected to testing by estimating the path coefficients as well as the $R^2$ values. SmartPLS version 2.0 M3 was used to perform calculations for all the measures that were required for the measurement assessment as well as the structural model used in this research. PLS Graph 3.0 was also used to confirm the results obtained from the SmartPLS.

## 3.8 Data Analysis

Quantitative research methodology was adopted in this research for analyzing the data. The collected data was thoroughly examined by checking for errors, tabulated accordingly and analyzed. The data was then keyed into excel spreadsheets and exported to SPSS for analysis. Initial analysis of data collected included a descriptive statistics analysis of demographic variables with frequencies and percentage. Structural equation modeling (SEM) using Partial Least Squares (PLS) was used for testing the hypotheses.

# CHAPTER FOUR: RESULTS AND DISCUSSION

**4.0 Data Collection and Analysis**

In this research study, questionnaires were used to get the overall use experience of the NCC Self Service portal. The same data was used to validate the DeLone and McLean model. Questions were included so as to enhance the quality of data collected by requiring the respondents respond to the different variables that were selected for this study. Out of the target sample of 400, 165 responses were received. Of the survey responses submitted, 119 were fully answered and were thus usable, while 8 survey responses were incomplete. It was important to also point out that a number of people approached declined to participate in the survey claiming that they were not even aware of the system.

**4.1 Response Rate and Demographics**

Respondents were requested to specify whether they have ever had the chance of using the NCC Self Service portal or not. Out of the 165 responses, 127 respondents (77 %) had interacted with the system while 38 (23 %) had not used the system.

In terms of demographics, the gender distribution among the respondents accounted for 78 male respondents (66%) while 41 (34%) were female. Majority of those who responded fell into the age group of 30-39 totaling 42%, followed by 26% of the respondents were below 29 years. 23% accounted for the 40-49 age group, while 7% were between 50-59 years and 2% were 60 years and above. In response to the question about how often one uses the internet, 95% of the respondents used the internet almost every day, while 3% used internet at least once a week while 2% used the internet less than once a month.

**4.2 System Evaluation**

The evaluation of the system was done through various constructs whose findings and discussions shall be discussed below:

### 4.2.1 System Quality

*Table 4.1: Descriptive statistics of system quality items*

| Questionnaire Item | Mean | Standard Deviation |
|---|---|---|
| SQ1: NCC Self Service portal is user friendly | 3.66 | 0.915 |
| SQ2: NCC Self Service portal is easy to use | 3.57 | 0.879 |
| SQ3: I get the desired information in time while using NCC Self Service portal | 3.55 | 0.972 |
| **System Quality (SQ)** | **3.5938** | **0.82585** |

As per table 4.1 above, the mean and standard deviation for the questionnaire items as well as the summed values of mean and standard deviation of the system quality construct are illustrated. All three items had values showing that the mean was above 3, meaning that there was a high level of agreement related to construct items. Additionally, the values had a sum mean score of 3.59 with the standard deviation of 0.82 indicating an overall affirmative response to the system quality variable items.

*Table 4.2 Percentage of responses for three items of system quality*

| Questionnaire Item | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| SQ1: NCC Self Service portal is user friendly | 2.5 | 9.2 | 21.8 | 52.9 | 13.4 |
| SQ2: NCC Self Service portal is easy to use | 1.7 | 11.8 | 23.5 | 53.8 | 9.2 |
| SQ3: I get the desired information in time while using NCC Self Service portal | 4.2 | 10.9 | 21.0 | 52.9 | 10.9 |

Table 4.2 above shows the percentage responses that were spread on the 5 point Likert scale in the system quality construct. Generally, the respondents seemed contented with the overall system quality as the number of respondents who were either satisfied or highly satisfied fell above 60%. User friendliness of the system was identified where 66.3% were either satisfied or

highly satisfied while 11.75% fell into the category of either dissatisfied or highly dissatisfied. 63% of the respondents were either satisfied or highly dissatisfied regarding ease of use, while those who were either dissatisfied or highly dissatisfied fell into the 13.5% category. Those who felt they got the desired time while using the portal accounted for 63.8% thus falling into the satisfied or highly satisfied category while 15.1% felt either dissatisfied or highly dissatisfied. The respondents who remained neutral fell within a range of 21-23.5% varying differently for each construct item.

### 4.2.2 Information Quality

*Table 4.3: Descriptive statistics of information quality items*

| Questionnaire Item | Mean | Standard Deviation |
|---|---|---|
| IQ1: NCC Self Service portal provides the precise information that I need | 3.42 | 0.925 |
| IQ2: NCC Self Service portal provides sufficient information | 3.45 | 0.909 |
| IQ3: NCC Self Service portal provides up to date information | 3.62 | 0.863 |
| **Information Quality (IQ)** | **3.4958** | **0.78097** |

The standard deviation as well as the mean values for each questionnaire item of the information quality construct was listed in table 4.3 above. In all three construct items, mean values were higher than 3 indicating the tendency of the respondents to agree with the construct items and therefore illustrating no arising issues related to the portal's quality of information. The summed mean value was 3.49 while the standard deviation was 0.78 thus confirming that the overall respondents agreed with the items.

*Table 4.4 Percentage of responses for three items of information quality*

| Questionnaire Item | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| IQ1: NCC Self Service portal provides the precise | 2.5 | 14.3 | 30.3 | 44.5 | 8.4 |

| | | | | | |
|---|---|---|---|---|---|
| information that I need | | | | | |
| IQ2: NCC Self Service portal provides sufficient information | 1.7 | 16.8 | 23.5 | 51.3 | 6.7 |
| IQ3: NCC Self Service portal provides up to date information | 0.8 | 10.1 | 27.7 | 48.7 | 12.6 |

As per table 4.4 above based on the responses based on the information quality construct and spread through the 5 point Likert scale, nearly 60% of the respondents were either satisfied or highly satisfied with information presented by the portal. Regarding the information precision item, 52.9% of the respondents were satisfied or highly satisfied while 16.8% were either dissatisfied or highly dissatisfied. Regarding the item on sufficient information, 58% were either satisfied or highly satisfied while 18.5% were dissatisfied or highly dissatisfied. Concerning the item about provision of up to date information, 61.3% felt satisfied while 10.9% felt dissatisfied. The respondents that gave neutral responses ranged between 23.5-30.3%, varying within each item.

### 4.2.3 Service Quality

*Table 4.5: Descriptive statistics of items on service quality construct*

| Questionnaire Item | Mean | Standard Deviation |
|---|---|---|
| SV1: I feel safe completing transactions while using NCC Self Service portal | 3.97 | 0.952 |
| SV2: In the NCC Self Service portal, my personal information is treated confidentially | 3.87 | 0.869 |
| SV3: The NCC Self Service portal is available all the time | 3.56 | 0.971 |
| **Service Quality (SV)** | **3.8039** | **0.77193** |

The mean for two items was close to 4 while the last item was also well above 3. Additionally, the sum mean and standard deviation was 3.80 and 0.77 respectively confirming the respondents' agreements to items in the service quality construct.

*Table 4.6 Percentage of responses for three items of service quality*

| Questionnaire Item | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| SV1: I feel safe completing transactions while using NCC Self Service portal | 1.7 | 8.4 | 10.9 | 48.7 | 30.3 |
| SV2: In the NCC Self Service portal, my personal information is treated confidentially | 1.7 | 3.4 | 24.4 | 47.1 | 23.6 |
| SV3: The NCC Self Service portal is available all the time | 2.5 | 13.4 | 22.7 | 47.9 | 13.4 |

Table 4.6 above shows the results related to the service quality construct whereby, the item referring to safety while completing transactions recorded 79% of the respondents who felt satisfied and highly satisfied while 10.1% felt dissatisfied. The item on confidentiality of personal information felt they were highly satisfied accounting for 70.6% while 5.1% felt dissatisfied. Availability of the system was another item which had 61% of the respondents feeling highly satisfied or generally satisfied while 10.9% felt dissatisfied. Those who remained neutral based on these construct items ranged between 23.5 – 30.3%.

### 4.2.4 Use

*Table 4.7 Descriptive statistics of items in system use*

| Questionnaire Item | Mean | Standard Deviation |
|---|---|---|
| U1: NCC Self Service portal provides the precise information that I need | 2.52 | 1.024 |
| U2: NCC Self Service portal provides sufficient information | 2.27 | 1.006 |
| **Use (U)** | **2.3950** | **0.87060** |

The results of the use construct as illustrated in table 4.7 above had different results compared with other variables. Values of mean values for the questionnaire items plus the construct's summed values of mean were below 3 indicating that generally there was some level of disagreement related to the items in the questionnaire. The summed average score also confirmed this with the 2.39 value as well as the 0.87 standard deviation value.

*Table 4.8 Percentage of responses for two items of use*

| Questionnaire Item | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| U1: NCC Self Service portal provides the precise information that I need | 13.4 | 43.7 | 23.5 | 16.0 | 3.4 |
| U2: NCC Self Service portal provides sufficient information | 24.4 | 39.5 | 21.8 | 13.4 | 0.8 |

Table 4.8 above illustrates how to measure the system use, responses were gathered based on the two items in the use construct. 57.1% of the respondents felt that they use the system very rarely while 63.9% felt that they were not dependent on the portal. Simply put, more than half the respondents used the system infrequently and did not feel dependent on the system.

4.2.5 User Satisfaction

*Table 4.9: Descriptive statistics of user satisfaction items*

| Questionnaire Item | Mean | Standard Deviation |
|---|---|---|
| US1: I am satisfied with NCC Self Service portal | 3.55 | 0.841 |
| US2: The NCC Self Service portal has met my expectations | 3.55 | 0.946 |
| US3: The NCC Self Service portal provided services that are exactly what I need | 3.36 | 0.841 |
| **User Satisfaction (US)** | **3.4874** | **0.78569** |

As per table 4.9 above, the mean values of the individual items as well as the sum mean values of the user satisfaction construct were well above 3 thus most respondents seemed to agree with the construct. The summed mean value of 3.48 as well as the standard deviation of 0.78 also supported the fact that most of the respondents agreed with the user satisfaction construct items.

*Table 4.10: Percentage responses for the three items of user satisfaction*

| Questionnaire Item | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| US1: I am satisfied with NCC Self Service portal | 1.7 | 8.4 | 31.9 | 48.7 | 9.2 |
| US2: The NCC Self Service portal has met my expectations | 1.7 | 15.1 | 21.8 | 49.6 | 11.8 |
| US3: The NCC Self Service portal provided services that are exactly what I need | 1.7 | 12.6 | 39.5 | 40.3 | 5.9 |

As per table 4.10 above, the variable on user satisfaction revealed that a larger part of the respondents were generally satisfied with the NCC Self Service portal, based on the responses received for the three construct items. 57.9% responded with either satisfied or highly satisfied based on the construct item probing on user satisfaction, while 10.1% were dissatisfied. The construct on meeting user expectations resulted in 61.4% feeling they were either satisfied or highly satisfied, while 16.8% felt they were dissatisfied or highly dissatisfied. The last construct item was on desired service provision that resulted in 46.2% responding they were satisfied or highly satisfied while 14.3% felt they were either dissatisfied or highly dissatisfied. The respondents who had neutral responses ranged from 21-39%.

### 4.2.6 Perceived Net Benefits

*Table 4.11: Descriptive statistics of perceived net benefits items*

| Questionnaire Item | Mean | Standard Deviation |
|---|---|---|
| NB1: NCC Self Service portal makes my tasks easier | 3.93 | 0.767 |
| NB2: The NCC Self Service portal saves my time | 4.03 | 0.742 |
| NB3: I think I made the right choice when I started using the NCC Self Service portal | 3.92 | 0.835 |
| **Net Benefits (NB)** | **3.9608** | **0.68914** |

The table 4.11 above indicated that the mean values for individual items as well as the mummed mean were higher in the perceived net benefit construct than in any other constructs, which was 3.96. This meant that the respondents largely agreed with the construct items whereby, for one

item, the mean was above 4 while for the other two items, the mean was very close to 4.

*Table 4.12: Percentage responses for the three items of perceived net benefits*

| Questionnaire Item | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| NB1: NCC Self Service portal makes my tasks easier | 0.8 | 4.2 | 15.1 | 60.5 | 19.3 |
| NB2: The NCC Self Service portal saves my time | 0.0 | 4.2 | 13.4 | 58.0 | 24.4 |
| NB3: I think I made the right choice when I started using the NCC Self Service portal | 1.7 | 2.5 | 21.0 | 51.3 | 23.5 |

Table 4.12 above shows that majority of the respondents felt that using the NCC Self Service portal was beneficial for them. Based on the first item regarding making tasks easier, 79.8% of the respondents felt they either agreed or strongly agreed, while 15.9% felt they disagreed or strongly disagreed. 82.4% felt that the portal saves time while 4.2% of the respondents either disagreed or strongly disagreed. 19-24% of the respondents felt that they made the right choice to use the portal while 13-21% gave neutral responses as they felt that the system was neither useful not useless. A low number of respondents accounting for 2% felt that the system was not useful at all.

## 4.3 Validation of the Model

The model was validated using the measurement model validation as well as the structural validation.

### 4.3.1 Distribution Analysis

The statistical measures that are usually used to validate the model require the knowledge of the input data distribution and hence this analysis was performed prior to applying any statistical measures to collected data. This meant that the answers to survey questions were analyzed so as to find out if they were normally distributed. Skewness and kurtosis values for responses of the questionnaire items were calculated in order to get the normal distribution analysis values. A summed scale for each construct was also created to check whether the data constituting the

responses was normally distributed. Skewness and kurtosis values for the summed scale were also calculated. Hair et al. (2007) stated that the normal distribution acceptable range of skewness is between -1 to 1, while the Kurtosis value range is from -1.5 to 1.5. The table 4.13 below illustrates how each construct meets the normal distribution criteria.

Table 4.13: Measure of Skewness and Kurtosis for each questionnaire item

| Item/Construct | Skewness | Kurtosis |
|---|---|---|
| SQ1 | -0.808 | 0.602 |
| SQ2 | -0.717 | 0.267 |
| SQ3 | -0.861 | 0.429 |
| **System Quality (SQ)** | **-0.867** | **0.927** |
| IQ1 | -0.480 | -0.138 |
| IQ2 | -0.594 | -0.298 |
| IQ3 | -0.465 | -0.022 |
| **Information Quality (IQ)** | **-0.392** | **-0.184** |
| SV1 | -1.028 | 0.834 |
| SV2 | -0.697 | 0.795 |
| SV3 | -0.604 | -0.090 |
| **Service Quality (SV)** | **-0.698** | **0.406** |
| U1 | 0.497 | -0.376 |
| U2 | 0.452 | -0.620 |
| **Use (U)** | **0.447** | **-0.243** |
| US1 | -0.567 | 0.448 |
| US2 | -0.564 | -0.241 |
| US3 | -0.335 | 0.005 |
| **User Satisfaction (US)** | **-0.396** | **-0.121** |
| NB1 | -0.915 | 1.740 |
| NB2 | -0.674 | 0.691 |
| NB3 | -0.832 | 1.377 |
| **Perceived Net Benefits (NB)** | **-0.571** | **0.815** |

The histograms represented in Figures 4.1 below show the summed scale for each construct as

well as their skewness and kurtosis values, thus representing normally distributed data which means that the desired statistical measures can be applied to test the measurement and structural model of the updated DeLone and McLean.
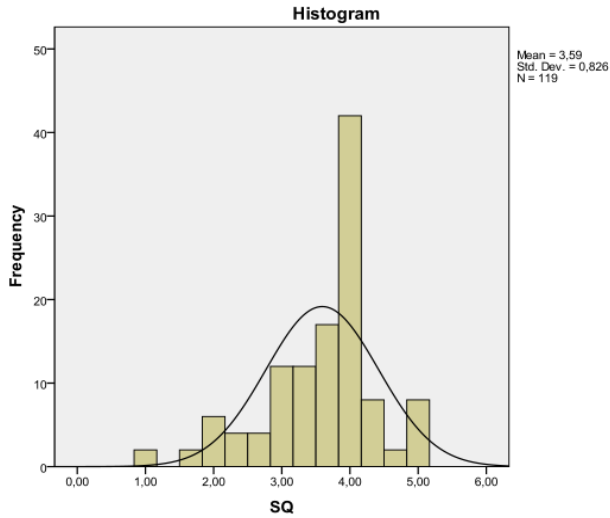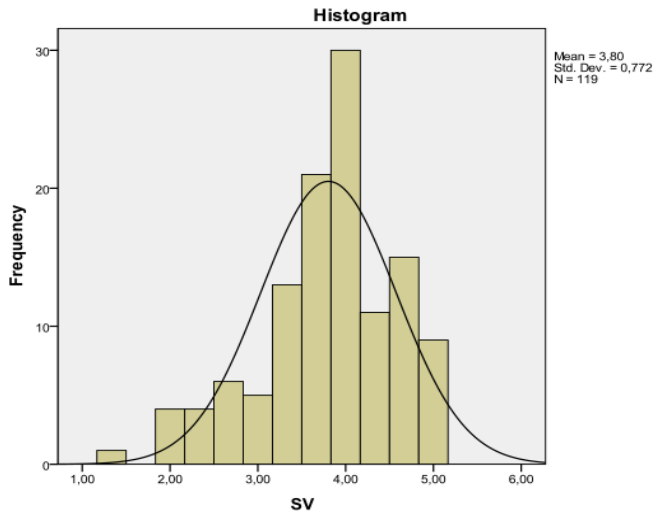


System Quality (SQ)
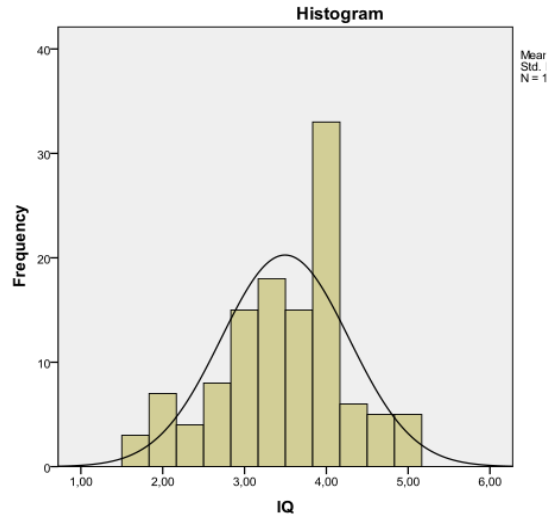


Information Quality (IQ)



Service Quality (SV)
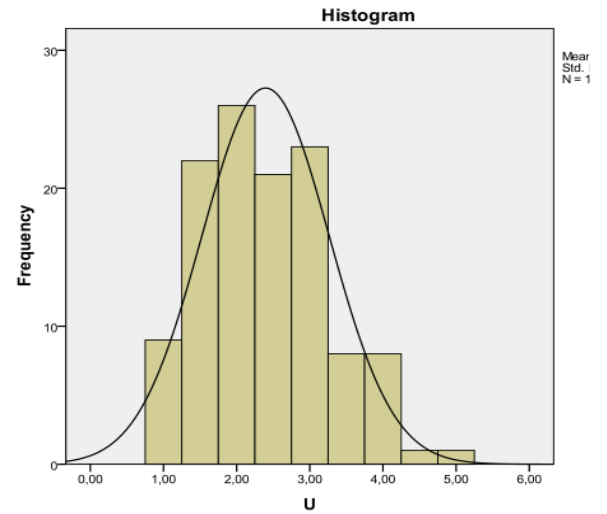


Use (U)
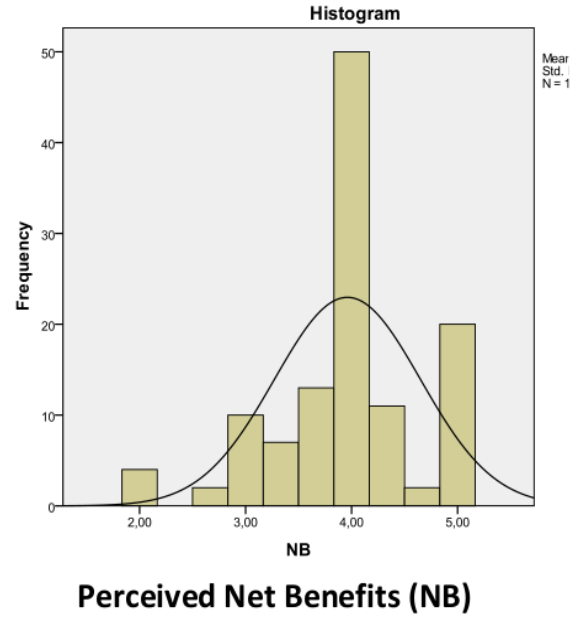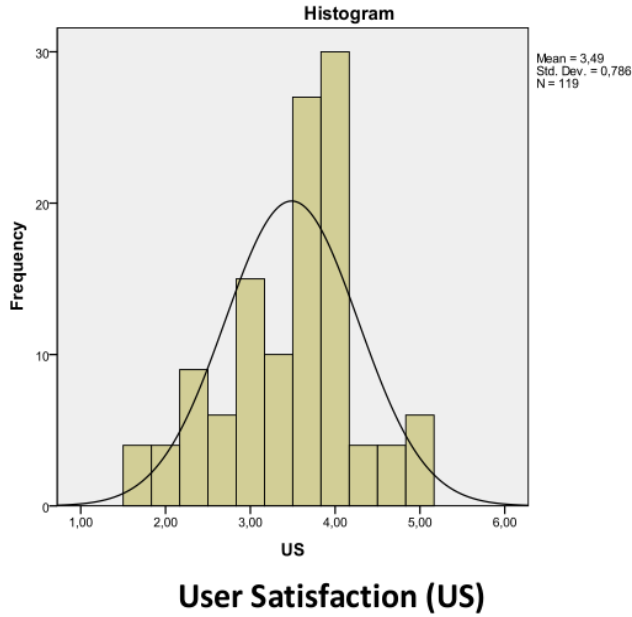
Figures 4.1: Responses distribution analysis of each construct of IS success model

### 4.3.2 Measurement Model

This determines the extent to which indicators explain their respective construct and consequently tests the reliability and internal consistency of the model.

#### 4.3.2.1 Reliability Analysis

The measurement model's reliability is evaluated by computing the composite reliability and Cronbach's alpha. Table 4.16 below shows results of the composite reliability and cronbach's alpha for each variable:

Table 4.14 Results of Coefficients for Assessing the Measurement Model's Reliability

| Construct | Composite Reliability | Cronbach's Alpha |
|---|---|---|
| System Quality | 0.924500 | 0.877339 |
| Information Quality | 0.901794 | 0.836694 |
| Service Quality | 0.868788 | 0.773333 |
| Use | 0.709888 | 0.641053 |
| User Satisfaction | 0.924225 | 0.877248 |
| Perceived Net Benefits | 0.912663 | 0.856358 |

The above results illustrate that the scores just met or were above the thresholds. Composite reliability's recommended threshold value was 0.60, while the results ranged between 0.70 and 0.92. For Cronbach's alpha recommended score of 0.6 to 0.70, the results revealed a range from 0.64 to 0.97. It was also noted that the use construct met an acceptable cut off alpha value and this may be due to the fact that this construct consists of fewer number of variable items. Generally, since the latent constructs are well explained by their items, the measurement model for this study indicates robustness and reliability of this model.

### 4.3.2.2 Validity Analysis

The measurement model was tested for validity by analyzing the convergent and discriminant validity. Convergent validity indicates that a set of indicators usually represents one and the same underlying construct and tends to be adequate when the average variance extracted (AVE) value is at least 0.5. As per table 4.15 below suggests, the AVE values range from 0.58 to 0.80, which is above the threshold value of 0.50, meaning that the measurement model passes the convergent validity test.

*Table 4.15 Average Variance Extracted (AVE) for Each Construct of DeLone and Mclean Model*

|  | Average Variance Extracted (AVE) |
|---|---|
| **System Quality** | 0.803280 |
| **Information Quality** | 0.753901 |
| **Service Quality** | 0.688246 |
| **Use** | 0.587591 |
| **User Satisfaction** | 0.802713 |
| **Perceived Net Benefits** | 0.777079 |

*Table 4.16: Inter-Correlation of Latent Constructs With Their AVE Listed Diagonally*

|  | System Quality | Information Quality | Service Quality | Use | User Satisfaction | Perceived Net Benefits |
|---|---|---|---|---|---|---|
| **System Quality** | **0.896258** | 0.686293 | 0.512634 | 0.323004 | 0.758340 | 0.551762 |

| Information Quality | | **0.868275** | 0.555800 | 0.276821 | 0.734196 | 0.541098 |
|---|---|---|---|---|---|---|
| **Service Quality** | | | **0.829606** | 0.231098 | 0.555097 | 0.526791 |
| **Use** | | | | **0.766545** | 0.371582 | 0.349058 |
| **User Satisfaction** | | | | | **0.895943** | 0.643575 |
| **Perceived Net Benefits** | | | | | | **0.881521** |

Table 4.16 above shows the correlation matrix, with correlations between constructs and the square root of AVE listed diagonally. The square roots of the AVEs listed in bold in a diagonal manner have greater values than their correlation with other constructs thus showing validity of the measurement model.

Discriminant validity can be tested using cross loadings, whereby the appropriateness of the model is determined if an indicator has a higher correlation value with another latent construct than with its respective latent variable.

*Table 4.17: Factor Loadings and Cross Loadings for Each Latent Construct and Its Items*

| | System Quality | Information Quality | Service Quality | Use | User Satisfaction | Perceived Net Benefits |
|---|---|---|---|---|---|---|
| **SQ1** | **0.915896** | 0.607993 | 0.482259 | 0.271728 | 0.671988 | 0.517028 |
| **SQ2** | **0.900667** | 0.571669 | 0.427166 | 0.306410 | 0.700562 | 0.514269 |
| **SQ3** | **0.871649** | 0.667747 | 0.470528 | 0.289308 | 0.665060 | 0.451026 |
| **IQ1** | 0.694375 | **0.878208** | 0.471592 | 0.209013 | 0.710027 | 0.496235 |
| **IQ2** | 0.522986 | **0.891997** | 0.386352 | 0.229729 | 0.616400 | 0.437960 |
| **IQ3** | 0.558021 | **0.833544** | 0.594638 | 0.287666 | 0.576347 | 0.472681 |
| **SV1** | 0.482305 | 0.469883 | **0.842961** | 0.201252 | 0.454035 | 0.577744 |
| **SV2** | 0.364591 | 0.434805 | **0.834075** | 0.233185 | 0.442269 | 0.438218 |
| **SV3** | 0.428837 | 0.478215 | **0.811463** | 0.141024 | 0.484752 | 0.296337 |
| **U1** | 0.306109 | 0.266782 | 0.224965 | **0.998467** | 0.363248 | 0.339681 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **U2** | -0.132193 | -0.040561 | 0.002928 | 0.422194 | 0.029727 | 0.002582 |
| **US1** | 0.771251 | 0.648250 | 0.564220 | 0.387551 | **0.907880** | 0.673274 |
| **US2** | 0.682123 | 0.660826 | 0.488030 | 0.246149 | **0.917952** | 0.507287 |
| **US3** | 0.567109 | 0.667778 | 0.427106 | 0.356754 | **0.860963** | 0.532205 |
| **NB1** | 0.496538 | 0.416232 | 0.523789 | 0.190997 | 0.596843 | **0.849138** |
| **NB2** | 0.422066 | 0.470278 | 0.313817 | 0.369844 | 0.500098 | **0.887664** |
| **NB3** | 0.531962 | 0.540110 | 0.537405 | 0.364607 | 0.597085 | **0.906783** |

The above table 4.17 demonstrates that for each question, the load value is higher on its own latent constructs than on the others, therefore ethers is good correlation between the indicator and its construct.

**4.4 Hypothesis Testing**

The structural model is tested by calculating the estimates of the path coefficients and coefficients of determination; that is $R^2$ values. Path coefficients illustrates the strengths of the dependent and independent variables' relationships whereby the $R^2$ values show the amount of variance expounded by the independent variable. SmartPLS version 2.0.M3 was used to compute the $R^2$ values for the dependent variables as well as the path coefficients between the independent variables (System Quality, Information Quality and Service Quality) and dependent variables (Use, User Satisfaction and Perceived Net Benefits). To be able to ascertain the significance of paths within the structural model, the bootstrap resampling method was used, by generating 1000 samples. The sample size of 119 survey responses was higher than minimum recommended and thus adequate for model testing. The structural analysis of the model results was as illustrated below:
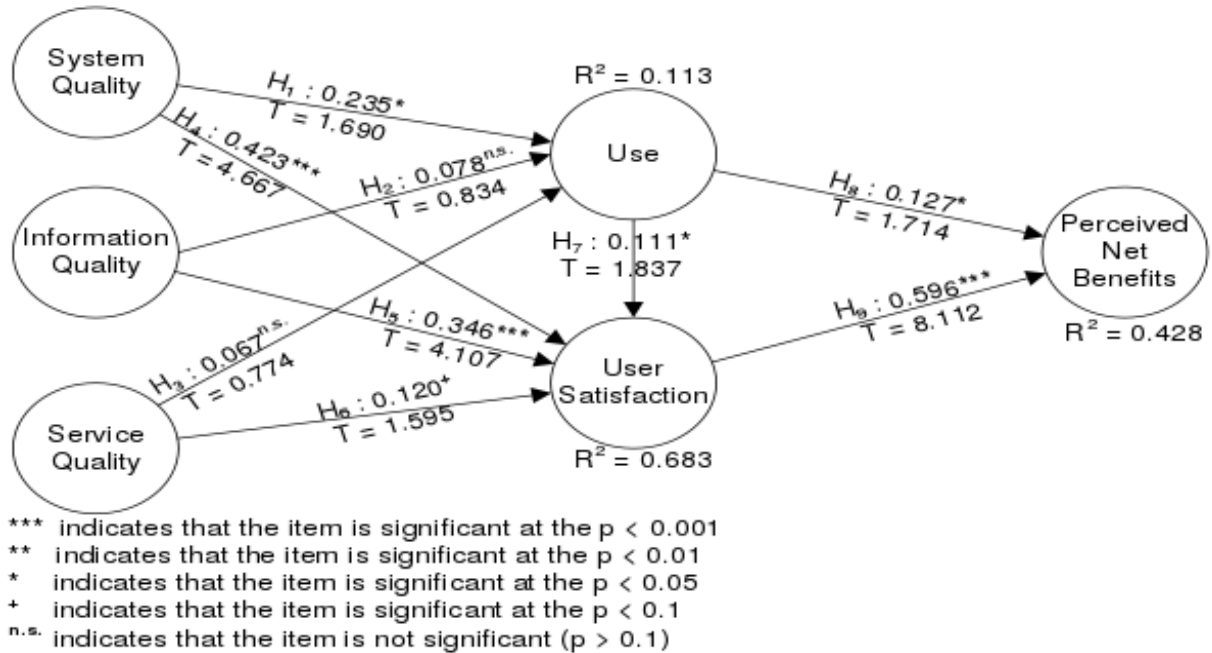
*Figure 4.2 Structural Model Test Results, with $R^2$ and Path Coefficients*

The system quality variable had positive effects on the use and user satisfaction constructs, with a significant influence shown by the corresponding path coefficients of $\beta_1=0.235$ and $\beta_4=0.423$, respectively. This therefore means that $H_1$ and $H_4$ were supported. The information quality construct, on the other hand, has positive but non-significant effect on the use construct as illustrated by the path coefficient $\beta_2=0.078$ as per figure 4.17 above and hence $H_2$ was not supported. However, information quality had positive as well as significant effect, $\beta_5=0.346$, on the user satisfaction construct thus implying that $H_5$ was supported. Service quality construct did not have any effect on use, $\beta_3=0.067$, hence $H_3$ was not supported. The influence of service quality on user satisfaction was not significant at $p<0.05$, rather was significant at $p<0.1$ and thus $H_6$ was marginally supported with $\beta_6=0.120$. Use construct had a significant influence on use satisfaction as well as perceived net benefits constructs and thus $H_7$ ($\beta_7=0.111$) and $H_8$ ($\beta_8=0.127$) were both supported. User satisfaction construct had a significant influence on perceived net benefits and thus $H_9$ was supported ($\beta_9=0.596$). This has been summarized in the table 4.20 below:

*Table 4.18: Hypotheses Test Results*

| H1: System quality will positively affect use of NCC Self Service portal | Supported |
|---|---|
| H2: Information quality will positively affect use of NCC Self Service portal | Not Supported |
| H3: Service quality will positively affect use of NCC Self Service portal | Not Supported |
| H4: System quality will positively affect user satisfaction of NCC Self Service portal | Supported |
| H5: Information quality will positively affect user satisfaction of NCC Self Service portal | Supported |
| H6: Service quality will positively affect user satisfaction of NCC Self Service portal | Marginally Supported |
| H7: Use will positively affect user satisfaction of the NCC Self Service portal | Supported |
| H8: Use will positively affect perceived net benefit of NCC Self Service portal | Supported |
| H9: User satisfaction will positively affect perceived net benefit of NCC Self Service portal | Supported |

Of the three independent variables of the updated DeLone and McLean model, system quality demonstrated a greater effect than information quality and service quality on both the use and user satisfaction constructs. However, these independent constructs only showed 11% of the variance of the use construct. Additionally, 68% of the variance in user satisfaction was illustrated by information quality, system quality, service quality and use. This model accounted for 43% variance of perceived net benefits whereby user satisfaction had a stronger direct effect on perceived net benefits than use.

*Table 4.19: Direct, Indirect and Total Effect of the Dominants on Perceived Net Benefits*

| | Direct Effect | | | Indirect Effect | | | Total Effect | | |
|---|---|---|---|---|---|---|---|---|---|
| | U | US | NB | U | US | NB | U | US | NB |
| SQ | 0.235 | 0.423 | | | 0.0261 | 0.2975 | 0.235 | 0.4491 | 0.2975 |
| IQ | 0.078 | 0.346 | | | 0.0087 | 0.2213 | 0.078 | 0.3547 | 0.2213 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **SV** | 0.067 | 0.120 | | | 0.0074 | 0.0845 | 0.067 | 0.1274 | 0.0845 |
| **U** | | 0.111 | 0.127 | | | 0.0662 | | 0.111 | 0.1932 |
| **US** | | | 0.596 | | | | | | 0.596 |

The direct as well as the total effect of the user satisfaction construct on perceived net benefit was 0.596, while the direct and total effects of use variable on perceived net benefits were 0.127 and 0.1932. This therefore means that user satisfaction demonstrated a stronger effect of direct and total effects on perceived net benefits than use. System quality, one of the three quality related constructs, had the highest total effect on the perceived net benefits.

# CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

## 5.0 Achievements and Conclusions of the study

*Objective 1: To evaluate level of success of the NCC Self Service portal from citizens' perspective*

The analysis of the results reveal that the NCC Self Service portal is successful from the citizens' perspective as most Nairobi citizens feel moderately satisfied with the overall use of the system. Results were different from authors who had expected a certain level of dissatisfaction with the NCC Self Service portal due to various factors such as e-government as a new phenomenon, increasing citizen demands due to security and privacy concerns. The findings contradict study results of Moon & Welch (2005), whereby majority of the respondents had no concerns related to privacy and safety while interacting with the NCC Self Service portal.

*Objective 2: To identify constructs that can be used to evaluate the NCC Self Service portal;*

Majority of the respondents generally agreed with all the six constructs of the model with the exception of the use variable. It was felt that this arose because the system is not mandatory to use and hence the citizens only use the system to access information related to payment of city county services such as business permits, licenses etc. when the need arises.

*Objective 3: To apply a model for evaluating the NCC Self Service portal.*

This model was empirically tested and the results were similar to the expectations of other authors who felt that the model was fairly fit to represent the interrelationships of the model's components. All the links between the six constructs of the updated DeLone and McLean (2003) model were supported except for 2, that is the hypothesized relationships between information quality and use constructs (H2) as well as the relationship between the service quality and use construct (H3) were not supported. As for the seven supported hypothesized relationships, one relationship between service quality and user satisfaction was marginally supported while all the others were significantly supported.

The empirical testing of the DeLone and McLean (2003) model within an e-government context indicated that the model performed as expected, meaning the model could be applied to various contexts. To support this, Petter et al. (2008) illustrated that the model could be applied to any type of information system and hence the conclusion was not contradictory to their findings.

**5.1 Recommendations**

This research contributes to the efforts of empirically validating the model in a developing country context. Of most significance, the study proposes better insights into how the county government can provide online services that can be consumed by its citizens. The study could also benefit the county governments in better policy making decisions that would positively impact its citizens in their service offering, thus providing better technology acceptance of their services by the users in the public sector. This may be achieved through mandatory usage policy on how technology is used thereby significantly enhancing adoption. It also gives an insight as to how Kenya can improve its public service offering using technology by benchmarking itself with other developed countries. There is also need for the county government to create awareness about their products.

**5.2 Limitations of the study**

Since this research study focused on the e-portal Nairobi County, which is in an urban region, it may not be possible to generalize for all other counties hence the need to conduct researches in the other rural areas. Additionally, collecting data proved to be difficult as majority of people preferred not to respond due to the lack of knowledge of the existence of the portal.

**5.3 Further study**

Further research may need to be conducted in other counties to ascertain whether the results shall be similar considering Nairobi is an urban town, while the other counties may have rural settings.

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# APPENDICES

**Appendix I: Introductory Letter**

Dear Respondent,

**RE: RESEARCH DATA COLLECTION**

I am a postgraduate student at the University of Nairobi pursuing a Master of Science degree in Information Technology Management (Msc. ITM). I am currently collecting data for my research project titled: An Evaluation of E-Government Portal: Case of Nairobi City County Self Service Portal.

In view of the above, I humbly request you to create time and answer the questions in the questionnaire attached.

Kindly read the accompanying instructions and respond to the questions as provided for. You may provide any documentation on the same at your discretion. Your positive and objective response will help achieve the objectives of the study.

The information provided will be treated with strict confidentiality for the purpose of achieving the objectives of this research and not for any other purpose whatsoever. Your response and cooperation in this matter will be highly appreciated.

Thank you in advance,
Yours Faithfully,


**Njoroge, Irene Wambui**
**P54/722884/2014**

**Appendix II: Questionnaire**

**SURVEY QUESTIONNAIRE ABOUT NAIROBI CITY COUNTY (NCC) SELF SERVICE PORTAL SERVICES**

This aim of this Questionnaire is to collect information An Evaluation of E-Government Portal: Case of Nairobi City County Self Service Portal.

Please answer the questions freely. The information is required for academic purposes only and will be treated as confidential.

Do not indicate your name as the information given is confidential.

**PRELIMINARY QUESTION**

**Have you ever used the NCC Self Service portal? (Select suitable answer using a tick [√ ])**

[   ] Yes              [   ] No

(If Yes, proceed to answer the questions below.
If No, do not proceed. Thank you for your time)

**DEMOGRAPHIC INFORMATION**

Please provide information about yourself

**1.  What is your age? (Select suitable answer using a tick [√ ])**

[   ] Below 29

[   ] 30 -39

[   ] 40 -49

[   ] 50 - 59

[   ] 60 and above

**2. What is your gender? (Select suitable answer using a tick [√ ])**

[   ] Male

[   ] Female

**3. How frequently do you use the Internet? (Select suitable answer using a tick [√ ])**

[   ] Almost every day

[   ] At least once a week

[   ] At least once a month

[   ] Less than once a month

**NAIROBI CITY COUNTY SELF SERVICE PORTAL – SYSTEM EVALUATION**

The sections below require you to indicate to what extent you agree or disagree with the statements asking about the overall use of the portal, based on your experience. There is no right or wrong answer, just pick an answer that reflects your opinion.

| |
|---|
| **Please select the number that best describes your opinion**<br><br>*(1 – Strongly disagree, 2 –Disagree, 3 – Neutral, 4 –Agree, 5 – Strongly Agree)* |
| **SYSTEM QUALITY**<br><br>1. NCC Self Service portal is user friendly ____<br>2. NCC Self Service portal is easy to use ____<br>3. I get the desired information in time while using NCC Self Service portal ____ |
| **INFORMATION QUALITY**<br><br>1. NCC Self Service portal provides the precise information that I need ____<br>2. NCC Self Service portal provided sufficient information ____<br>3. NCC Self Service portal provides up to date information ____ |

**SERVICE QUALITY**

1. I feel safe completing transactions while using NCC Self Service portal ____
2. In the NCC Self Service portal, my personal information is treated confidentially ____
3. NCC Self Service portal is available all the time ____

**USE**

1. I frequently use the NCC Self Service portal ____
2. I am dependent on NCC Self Service portal ____

**USER SATISFACTION**

1. I am satisfied with the NCC Self Service portal ____
2. NCC Self Service portal has met my expectations ____
3. NCC Self Service portal provides services that are exactly what I need ____

**PERCEIVED NET BENEFITS**

1. NCC Self Service portal makes my tasks easier ____
2. NCC Self Service portal saves my time ____
3. I think I made the right choice when I started using NCC Self Service portal ____

**Thank you for your time and support. God bless!!!**