

DECLARATION

ADOPTION OF THE PREPAID ELECTRICITY SYSTEM BY
KENYA POWER //

BY

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF
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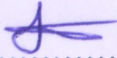
JULY 2012

DECLARATION

I JOSEPH KARUE KIMANI, declare that this is my original work and has never been submitted by anyone to any examination body for grading.

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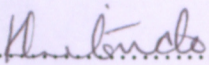
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I dedicate this research project to my family for their support and encouragement through this program.

To my sister Irene Njoki for her insight on issues concerning the research project.

To all my colleagues at work who assisted me in one way or the other.

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Kenya Power has been and has continues to be on the front line in embracing ICT and investing heavily in it to ensure that it meets it goals and objectives.

The latest innovation is the prepaid electricity system which has just started being implemented. This system has been used in other countries although Kenya has its own unique social, economic and political factors that can lead to its success or failure. This system implies that the service is paid for before it is rendered. Kenya power has introduced prepaid meters for domestic use only. This technology has also been used in other utility companies like water services in other countries e.g. South Africa. The main question is how the adoption of this new innovation has impacted Kenya Power's business processes.

The main objective of the study is to examine the benefits of the prepaid system, challenges that have been encounter and the performance implications of the new system in Kenya Power. The study was carried out in Nairobi region, basically dealing with the commercial services division. A descriptive survey was carried out with questionnaire being used to gather information. Staff from this Kenya Power filled in and returned the questionnaires. Qualitative data was received and analyzed using the computer programs and statistical programs.

The finding from the research show that the prepaid electricity system has had a major impact in the company and it continues to influence the business processes in Kenya Power in a positive way, although there are few serious challenges that need addressing.

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ED - ELECTRICITY DISPENSER

CDU - CASH DISPENSING UNIT

SMS - SYSTEM MASTER STATION

CTP - INFORMATION AND BILLING SYSTEM

STS - STANDARD TRANSFER SPECIFICATION

LIST OF ABBREVIATIONS

ICT – INFORMATION COMMUNICATION TECHNOLOGY

GDP – GROSS DOMESTIC PRODUCT

EAP&L - EAST AFRICA POWER AND LIGHTING COMPANY LTD

KPLC – KENYA POWER AND LIGHTING COMPANY LTD

MPATM – MOBILE PRODUCT AUTHENTICATION TM

FDI FOREIGN DIRECT INVESTMENT

TAM – TECHNOLOGY ACCEPTANCE MODEL

ED - ELECTRICITY DISPENSER

CDU – CASH DISPENSING UNIT

SMS – SYSTEM MASTER STATION

CRP – INFORMATION AND BILLING SYSTEM

STS – STANDARD TRANSFER SPECIFICATION

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

Investment in Information Communications Technology (ICT) has enabled the global economy change noticeably over the past few years (Laudon and Laudon, 2006). This has happened more predominately in the developed world although this trend is being observed in the developing economies also. ICT and its use in organizations has been seen to play a greater part in creating organizational and technological change that has help in increasing productivity (Brynjolfsson and Hitt, 1997). Further it has gradually developed to be a virtual tool towards economic growth (Oyuke, 2007).

Once the proper infrastructure is in place ICT has been seen to improve the social-economic growth. This investment in Kenya and Africa as a whole has been a major issue in that most companies having been apprehensive about the initial cost associated with automation and having over looked the future gains once the systems are up and running (Kagami and Tsuji 2000). There are good examples in the developed world where ICT investment has had significant impact on their individual gross domestic product (GDP); the increase in GDP was 7.8% for the Unites States, 8.8% in the UK and 8.7% in Australia these growths were linked to more citizen participation, increased competitiveness and the improvement in productivity (Bhatnagar, 2005; kodakanchi et al, 2006). American businesses have spent \$1.8 trillion on ICT development i.e. purchasing hardware for the information systems, on telecommunication equipments and software development or purchase. An addition \$1.7 trillion has been spent on consultants to improve both business and management approaches in order to reinvent or reengineer the way business operations are undertaken in order to fully benefit from the new technology (Laudon and Laudon, 2006).

1.1.1 ICT and innovation

Innovation is an important instrument that is used in entrepreneurship. This is the act of utilizing existing resources to accomplish increased capacity, which will ultimately lead to wealth creation (Drucker, 1985).

In information systems research, the nature of the innovation in developing economies is of paramount importance (Lyytinen and Rose, 2003). The impact and nature of ICT innovation must be understood before trying to understand ICT innovations (Avgerou, 2008). Initially, in developing countries the ICT innovations had focused on transparency and reducing corruption (Silva, 2007). However this approach has changed in that the focus is now based on knowledge alliance (Puri, 2007). ICT innovation is relatively rare in developing economies (Walsham, 2007). This trend is slowly changing. Change in innovation in ICT has been seen in production and influence on how it influenced administrative or industrial transformation (Christensen, 1992). ICT innovation has been based on the way these innovations impact the socio- economic conditions in developing countries (Avgerou, 2008: Walsham et al. 2007). Innovation in ICT should be approached based on the problem it aims to solve. (Iyer and Davenport, 2008)

There has been significant and rapid growth in ICT in most of urban African areas. Development initiatives across Africa are being driven by ICT innovations in recent years (Jensen, 2002). ICT is playing an important role in the researcher's efforts to make work easier. A whole array of technologies is expected to change the face of business in a world that is changing from enterprise alone to the individual consumer. The computing devices will shrink and the mobile phone will increasingly become the tool of personal computing (Laudon and Laudon, 1998). The major areas of innovation in the world today will actively be used in the new prepaid electricity system. i.e. cloud computing for the huge databases and mobile telephony for the token purchases (Tewari, 2003).

The mobile phone use in Kenya has increased drastically in the last few years consequently many innovation services are associated with this technology. A large number of services are being accessed via the mobile. There has been a great growth in mobile usage. (<http://www.safaricom.com>) Many businesses are trying to change their processes in order to capitalize on this. The increased use of internet via these devices has implied that a large number potential customer can be accessed and more can be done via this media i.e. advertising, purchase etc. New and more innovative mobile devices are hitting the market i.e. Tablets, Smart phones, notebook etc (Gartner, 2012).

Teleconferencing, another innovation of ICT that is being seen as the new method of communication in the ICT sector, it is expected that communication via video will be about 51% of internet traffic by 2014 and the number is projected to increase to 91%. Teleconferencing is widely being used in many board rooms around the world; this is greatly reducing travel costs. This telepresence has helped and will continue to help break international boundaries with people from all over the world being able to interact via this media. Outsourcing is increasingly using this method especially in India (Chambers, 2009).

1.1.2 ICT adoption and challenges of implementing a new system

Information System implementation can be unsuccessful if the process is not approached properly (Lyytinen and Hirschheim 1987). It is the sum total of activities that are required to make a new technology operational and assist in its smooth adoption (Laudon and Laudon, 1988). Change should be expected with the implementation of new ICT systems (Davis and Olson 1985). This has seen the complete change in the staffing structures in some organizations (Eason, 1988; Sahay and Robey, 1996). Resistance to change has been experienced in some cases and this has led to problems in the implementation process of a new innovation. These new innovations have been rejected or have led to job related stress (Lorenzi and Riley, 2003). There are important factors to consider when determining the success or failure of a IS innovation (Lucas 1981).

There are some issues that come up to prevent successful implementation. These issues are the company's internal socio-cultural dynamics, the interrelationship of the members of the organization and how receptive they are to the new innovation. The lack of proper information flow or communication can prevent successful implementation because some people may not appreciate the new innovation. The implementation process should be undertaken as a team effort in order to create ownership of the new innovation, lack of this leads to failure. The key stakeholders of the new innovation should be involved in the whole process so they can give their input, exclusion can lead to implementation problems. Managerial inadequacies or incapability have been shown to lead to new

innovation failure. Resistance to change is another key factor leading to failure of implementation of new systems. Lack of ownership of the new system has led to the system being ignored or rejected completely (Davies, 2002)

It is essential that these above obstacles and preexisting states are understood, this will go a long way in overcoming them (Bodtker and Jameson, 2001). In addition to this, the state of mind of the participants should be understood and taken into consideration in order to be able overcome the obstacles (Barki and Hartwick, 2001). There should be a discussion to analyze managerial and interpersonal conflicts that can affect the result of the project. There are five models that help to combat conflict, these are asserting, compromise, accommodating, avoiding and problem solving. They help in working through the social dynamics that can be there in system development (Newman and Robey, 1992). The causes of stress should be identified in order to resolve problems that come up when dealing with the participants (Mumford, 2003). It is useless working on the conflicts without first getting to know what could be behind these differences. If proper information is lacking at the very start it will hinder any progress in solving the conflicts (Ljungström and Klefsjö, 2002). In order for the organization to achieve its ultimate goal of self improvement, barriers that can stop the new system processes and change in the way jobs are undertaken must be identified and removed (Ciborra and Andreu, (2001).

1.1.3 Prepaid Meters

Prepaid Electricity is one of the innovations of ICT and is the focus of this study. In this the service is paid for before the service is rendered, a token technology and a system approach to management are used (Bezuidenhoudt, 2000). The system approach to management is the approach where the organization is considered in its totality and both the human and material resources are organized in order to meet the organizational objectives (Jenkins, 1968). Prepaid vending was first used in Italy in 1975 (Maledevi, 2001). This system has been used in other countries like South Africa, Indonesia, India, Australia and New Zealand just to name a few. Kenya power has introduced prepaid

meters. This technology has also been used in the water services in other countries e.g. South Africa. (Tewari, 2003)

Currently Kenya Power is the only vendor (sale point). Third party vendors have been selected and will soon come on board. These vendors will use applications which can be installed on the personal computers or mobile devices to connect to the vending server. This technology allows a customer to receive a token in which the purchased electricity information is encoded. At the customer premises, the token is keyed into the interface unit which then increases the current units by the units purchased. A token can only be accepted by the meter it is generated for. Tokens can be purchased using Safaricom and Airtel bill paying systems. Currently prepaid meters are being used for domestic use only (<http://www.kplc.co.ke>).

The prepaid metering project commenced in Kenya power on April 2009 as a pilot run. The success of the run led to the rollout in March 2011, and by 30th June 2011 a total of 123,000 prepaid meters had been installed in towns throughout the country, however Nairobi got the most of the prepaid meters (Njoroge, 2011). The credit based metering and billing processes are still widely used and the procedures are in place. This presents a challenge when introducing a new prepaid system. This old system is characterized by high labor intensity, high credit, financial risks and other cost related factors. Prepaid metering offers the company the possibility of decreasing the administrative and financial cost of electricity delivery. This will ultimately yield higher returns to the utility company (Arthur, 1989).

1.1.4 Kenya Power

KPLC is a limited liability company that was incorporated in 1922 as East Africa Power and Lighting Company (EAP&L) and was later rename Kenya Power & Lighting Company Ltd in 1983 after the dissolution of the East African community. There has been a rebranding exercise recently and a name change to Kenya Power. Kenya Power is responsible for the transmission, distribution and retail of electricity throughout Kenya. KPLC owns and operates the national transmission and distribution grid, and retails electricity to more than 1,200,000 customers throughout Kenya. Its vision is to achieve

world class status as a quality service business enterprise so as to be the first choice supplier of electrical energy in a competitive environment. Kenya Power has been and has continues to be on the front line in embracing ICT and investing heavily in it to ensure that it meets it goals and objectives of “To provide world class power that delights our customers”. ICT has helped the company greatly in its endeavor to reduce cost and increase efficiency (<http://www.kplc.co.ke>).

1.2 Statement of Problem

Kenya Company was motivated by strategic and economic reason before it opted to replace the post paid electricity system - where the customer pays after using the service to the current prepaid electricity system. The demand for good quality, dependable and reliable electricity has steady increased in the past few years. Kenya Power on the other hand has been making massive losses due to illegal connection, corruption and huge debts. In addition to the financial aspects Kenya Power was faced with public relation nightmare of trying to convince the public of its ability to deliver on its promise of providing world class service.

In Kenya Power and other companies around the world, implementation of new innovations has become an important part of doing business in order to take advantage of the new improved way of performing activities and bring about required change in order to remain competitive. The implementation of new innovation will only be successful only if it has been accepted and meets the approval of entire organization (Dawson 1994). Change can sometime cause a lot of upheaval and stress. In situations where an ICT innovation is to be implemented an overhaul of how processes are undertaken and a staff restructuring maybe required. This may affect all the dynamics of the organization. Implementation of any new innovation has a percentage risk of failure (Lau and Kuang, 1998). The change in technology will change the socio-cultural and technical dimensions of the organization (Laudon and Laudon, 1998).

In Kenya a new innovation in the medical sector that helps to ensure that goods purchased by consumers are not counterfeit by confirming the products authenticity via text message has been introduces by the Sproxil and Bharti Airtel. Sproxil uses the

Mobile Product Authentication TM (MPATM) solution to verify the products (Gondwe, 2012). Sproxil's solution is widely used by Pharmaceutical companies to curb the counterfeit drug industry. The company received the IBM SmartCamp Boston award in 2009 and has had regulatory endorsements in Nigeria and Kenya. The company is expanding to Asia and Africa (<http://www.sproxil.com>). This study shows that ICT innovation is continuously being adopted in Kenya. Many companies like Kenya Power are adopting new innovation in order to improve their business processes. Prepaid metering is one such innovation.

The study was trying to answer the following two main questions, firstly has Kenya Power met its intended goals of improving the transmission, distribution and retail of electricity to its customer at the same time increasing profits and reducing costs? Secondly what were the challenges Kenya Power encountered in the prepaid electricity system?

1.3 Objective of the study

- a) To establish the benefits of the prepaid meters
- b) To determine the challenges of implementation of the prepaid meters.
- c) To determine the effect of the prepaid meters on the performance of Kenya Power.

1.4 Value of Study

The information derived from the study will assist Kenya power managers in their approach to future ICT innovations. The academicians and the business world will be better informed by the information derived from the experience of the implementation of this new system in Kenya power. The parties interested in implementation of new ICT systems will have a clue of the possible obstacles that might occur.

CHAPTER TWO: LITERATURE REVIEW

2.1 Information and Communication Technologies.

ICT is the information and communication technology network. ICTs are today used to carry information at phenomenal speeds (Wong, 2001). Operation of an organization and society in recent years has been based on the use of computers and technology. Computers and technology has become fundamental to most function (Kroecker, 2010; Yonck, 2010). The use of these great speeds has enabled people to transfer massive quantities of data in a very short time hence encouraging advancement in a great number of ways. These advancements in information transfer through use of computers will increase communication and transactions within business cycles and this has helped eliminate regional boundaries (Jalava and Pohjola, 2001). The use of ICT in many diverse sectors of the society has lead to growth of production and revenue (Basu and Ferald, 2008). The increase of this infiltration of ICT in the business world has further been enabled by the internet (Chinn and Fairlie, 2007).

Studies show that ICT has brought significant change and has impacted the world in a number of ways, i.e. poverty alleviation, economic productivity and sustainable development (Madon, 2000; Pur, 2007; Walsham, 2001). The cost of doing business has been reduced by ICT in the international and transnational arena (Rangan and Sengul, 2009). While the use of computers and their connections is necessary for socio-economic development (Hinson and Sorensen, 2006) a more comprehensive or inclusive use of ICT has been necessary in most parts of the world (Price, 2006). The reason being more than just for development issues ICT has also enabled multinational corporations to transfer knowledge with a lot of ease (Rangan and Sengu;, 2009). This ease in communication has been noted in increased GDP growth (Altig and Rupert, 1999). This has also been seen as the ability to multitask (Aral, Brynjoltsson, and Van Alstyne, 2006). Organizations can be reshaped and reformulated internally, as well as reorganized the interrelations within the companies and also with other organization in the same network (Burt and Taylor, 2000).

Corporation can use networks to be able to disseminate information and convey important management information (Castells, 1996; Quinn, 1992). The ability to reformat information, calculate, store, retrieve essential data is also enabled by ICT (McLoughlin, 1999). ICT is being used in all sectors of the economy including the nonprofit organization (Burt and Taylor, 2006) this utilization of ICT was displayed in the 2008 US presidential campaign (Cardoso, Cunha and Nascimento, 2004).

2.2. ICT Innovations

ICT facilitates the speed at which knowledge is diffused and technological expertise dispersed, it has provided a global market place and a mean in which people can interact and exchange ideas (Edward, 2001). These Technological innovations have assisted Africa to be able to compete on global scale, reduce poverty and been able to boost economic growth (Greenwood, 1999). The growing economies should have an ICT strategic plan in their overall strategic development objectives. ICT has been shown to have a great impact in reducing poverty and helping the economic growth (Castell, 2001).

The ICT innovations have come with their share of challenges. Most developing countries have yet to liberalize their telecommunication sector, leading to poor communication infrastructure and unreliable services to the ICT industry. The access to hardware and software required to fully migrate from the manual systems to the automated systems are not affordable in most situations leading to delays in implementation. The perceived high costs of developing communication infrastructure for the new technology has also been seen as a cause of concern (Souter, 2004)

The taxes previously levied on ICT hardware have just recently been removed and this has greatly helped in development of this sector. The technical training of human resources required in the development of the new innovations has been slow and the required training institutions unavailable. Most developing economies have been faced with social- political issues and hence not being conducive to foreign investment. Foreign direct investment (FDI) has not been forth coming in most African countries (Atkinson, 2002).

The new ICT Innovations has brought numerous benefits to the developing economy. The efficiency of performing tasks has increased drastically with costs coming down and competitiveness increasing. The previously unknown small scale businesses are getting the required exposure globally and they are now able to access a global export market and essential market information (Nishimto, 2005)

The online educational programs are now able to be accessed by the poor who would previously miss out on this chance. Renowned local and international institutions can now train their students without having direct contact. The health services especially in the rural areas of Africa have been enhanced with the new ICT innovations. State of the art systems are being used to diagnose and treat life threatening medical conditions. The Government has also not been left behind in utilizing the ICT innovations. E-Government systems have been established in many areas to increase the ease in which the government provides its service to the population. The ICT system has been able to provide the zero tolerance to corruption that is being advocated in most developing countries (Yoshitomi, 2001).

2.3 Adoption of New Technologies

The increased productivity in an economy will only be seen when the new ICT innovation is adopted effectively, effective adoption of new innovation will help in aiding economic growth (Pilat and Lee, 2001).

The ability of a firm to learn from the experience of other firms in the same sector locally or international becomes a major benefit in the adoption process. This enables the firm to be able to avoid possible obstacles and have a smoother adoption while remaining competitive (Arvantis, 1997). The expected benefits of the ICT innovation will definitely affect the adoption process, the expectations of the innovation should be clear to all stakeholders. The literacy levels of the individuals adopting the new system, the better the understanding of the new innovation (Baldwin, 1998) The readiness of the organization to adopt the new system, i.e. external factor like supplies, customers and business environment, also the internal factors like hardware, software accessibility and the internal structures of the organization (black, 2001)

2.3.1 The Diffusion Approach to Adoption

The theory suggests that an individual's opinion about a new innovation is influenced by the media and the interaction between people. This two factors influence the individual's choices. The theory consists of four elements; the innovation, the communication channel (media), time factor and finally the consequences. Information from the innovation is passed through the media, which has its opinion leaders who offer their input. This input will either lead to adoption or rejection of the innovations. The influence of the opinion leaders is either direct or through intermediaries who help in the diffusion process. There are five adoption categories innovators, early adopters, early majority, late majority and laggards (Rogers, 1997)

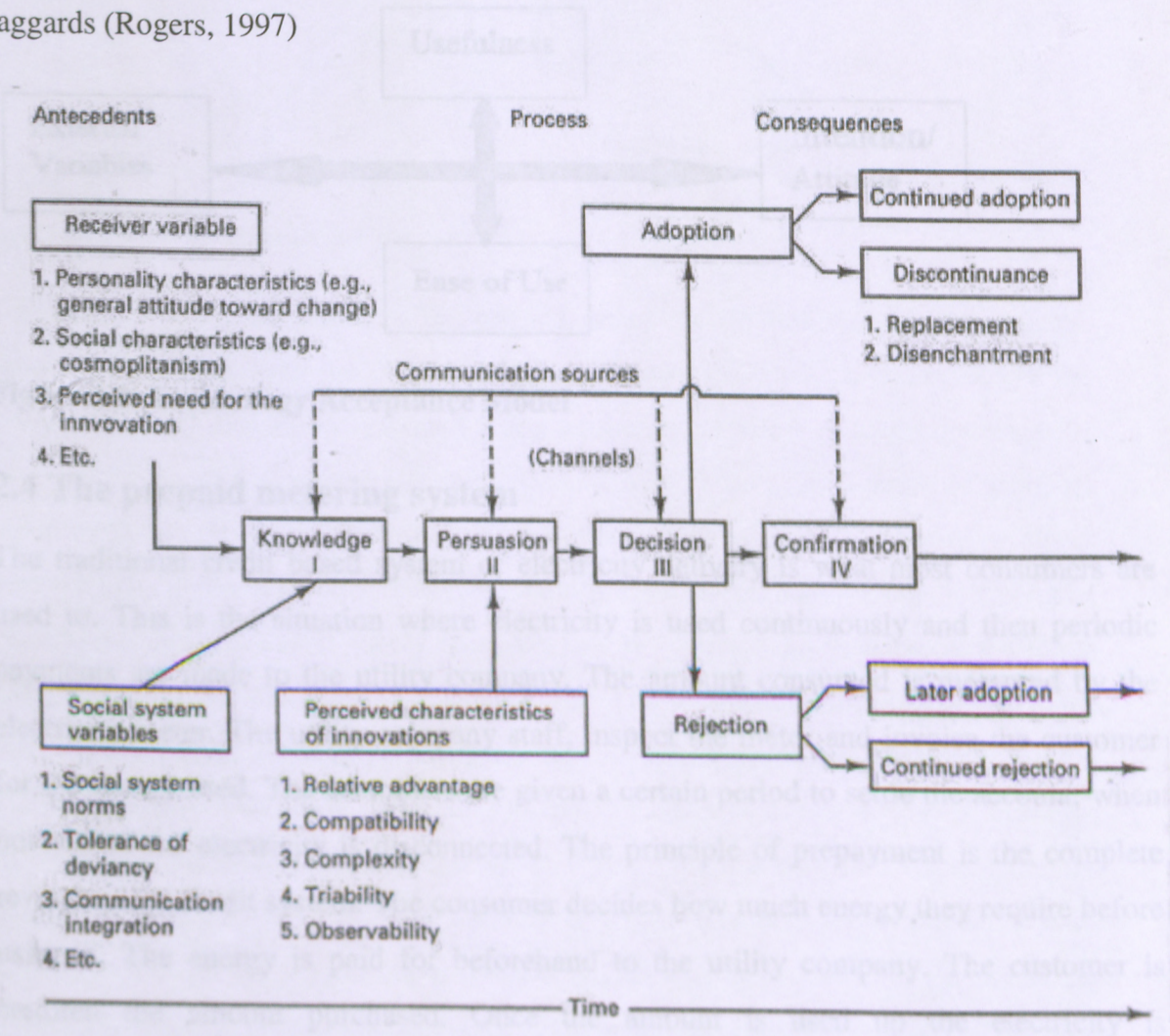


Figure 2.1: Rogers' Diffusion of Innovation model



2.3.2 Technology Acceptance Model

The Technology acceptance model suggests that when an individual is presented with a new innovation they take a number of factors into consideration before considering its use. This will include the expected usefulness and the expected ease of use (Davis 1989). TAM ignores all the external factors that might influence decision to use a new technology i.e. economic, supplier influence, competition and consumer factors. These entire factors are mediated by the perceived usefulness and ease of use (van Akkeren and Cavaye, 1999).

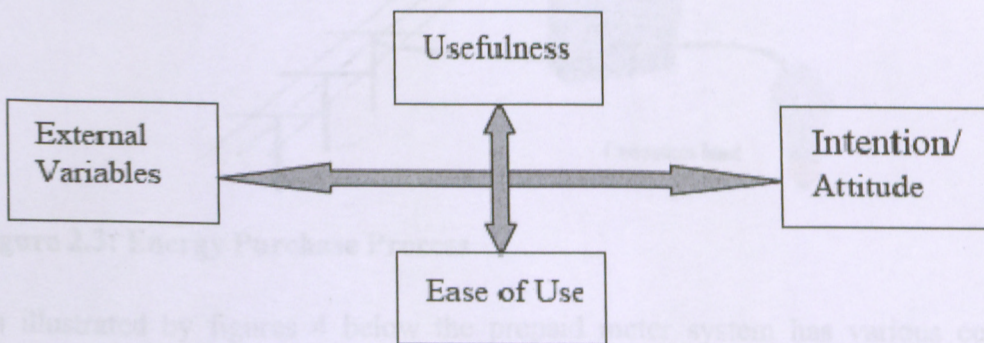


Figure 2.2: Technology Acceptance Model

2.4 The prepaid metering system

The traditional credit based system of electricity delivery is what most consumers are used to. This is the situation where electricity is used continuously and then periodic payments are made to the utility company. The amount consumed is measured by the electricity meter. The utility company staff, inspect the meter and invoice the customer for the energy used. The customers are given a certain period to settle the account, when not settled the electricity is disconnected. The principle of prepayment is the complete reverse of the credit system. The consumer decides how much energy they require before using it. The energy is paid for beforehand to the utility company. The customer is credited the amount purchased. Once the amount is used up the electricity is automatically disconnected, unless further payments are made. (www.eskom.co.za) The process of purchase is illustrated in figure 3.

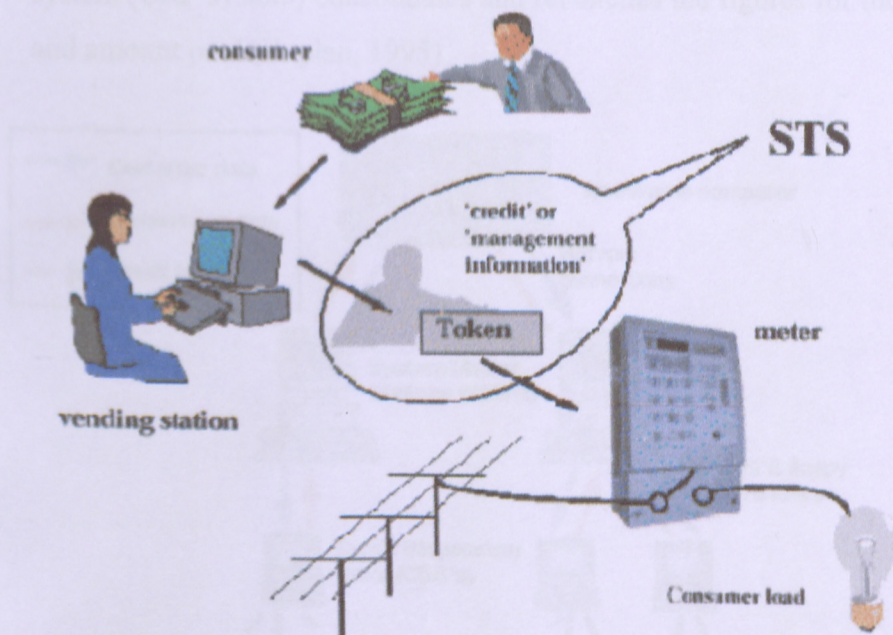


Figure 2.3: Energy Purchase Process

As illustrated by figures 4 below the prepaid meter system has various components. Firstly there is the prepaid meter or electricity dispenser (ED) which is installed in the customer's house. The ED is activated when a token is imputed. A token indicates the amount of energy the consumer has purchased. A token represents a string of numbers entered in to the ED to authenticate the transaction. The token is a string of numbers communicated to the customer orally, in written form or via sms or email. A crucial aspect of the token is that it uses a non transferable system. This is done by the token having a unique code that work with specific ED. The incentive of theft is removed, this gives the customers increased security. The consumers purchase electricity form a vending station or CDU(cash dispensing unit). The CDU as a vending outlet purchase bulk electricity according to estimated needs. The master station (SMS) downloads the information necessary for crediting the CDUs with electricity. While the CDU bulk information on individual customer purchases is periodically uploaded to the SMS. The system can operate continuously if the communication network is good. The SMS consolidated the pooled information on various CDU activities and upload to the

mainframes computers. The credit and tariff management and information and billing system (CRP system) consolidates and reconciles the figures for the electricity consumed and amount paid (Kaplan, 1995).

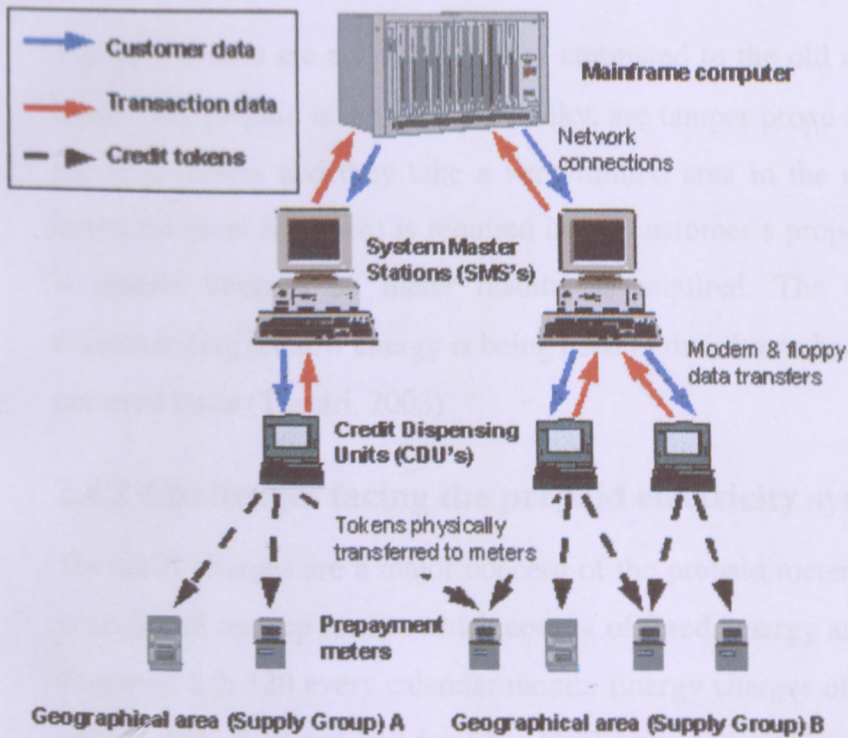


Figure 2.4: Various Components of the Prepaid System

2.4.1 Benefits of the prepaid electricity

The prepaid system has provided efficiency in production, distribution and revenue collection. These important processes are currently being accomplished more effectively. The billing delays previously experienced have been reduced leading to improved customer service and happier customers. The company's cash flow cycle has drastically improved with the cycle being cut short because the customer pays before service is offered (Owen, 2010). The company had to wait twenty one days for payment (<http://www.kplc.co.ke>).

The cost of staffing has been reduced with some processes i.e. disconnection, reconnection and meter reading being completely eliminated. This new method has also

helped as a way to recover old debts. This is in the situation where a customer buys the token (units) and a percentage of the amount purchased can go toward clear outstanding debts. The hassles associated with the disconnection and reconnection process have been removed i.e. reconnection fees and getting the staff to reconnect (Njoroge, 2010).

The new meters are easy to install as compared to the old meter which took up a lot of space. The prepaid meters are less bulky, are tamper prove and are more secure than the previous meters and they take a very limited area in the customer's premises. Only a keyboard (user interface) is required in the customer's property. Privacy of the customer is upheld because no meter reading is required. The customer also has a better understanding on how energy is being used in their home because the purchase is done on per need basis (Tewari, 2003)

2.4.2 Challenges facing the prepaid electricity system

The tariff charges are a major concern of the prepaid meters. Domestic customer's tariff is set based on step format which consist of fixed, energy and third party charges, a fixed charge of ksh 120 every calendar month. Energy charges of ksh. 2 per unit for 0-50 units bought, ksh. 8.10 per unit for 51 – 1500 units and 18.57 per unit for units above 1,500. Third party charges vary from month to month depending on the following factors, adjustments in fuel costs, foreign exchange rate changes and the inflation rate fluctuation. Hence a certain amount of Kenya shillings used my result in different numbers of units depending on the time of the month and number of units purchased (<http://www.erc.go.ke>).

Taxes and levies can be adjusted by the government at any time. There is the taxable value of electrical energy the fifth schedule of the VAT Act Cap 476 states that "VAT shall be exempt in the supply of electrical energy to a domestic household where the consumption does not exceed two hundred kilowatt-hours (200kWh)." When one exceeds 200kWh in a particular month, VAT charges shall be levied on all the electrical energy (units) bought from the beginning of the month. Customers are usually required to buy tokens so as to get units/ tokens when one does not exceeds 200kwh per month (<http://www.kenyalaw.org>).

Prepaid Meters have also been seen to have the following challenges; there were faulty meters at rate of 4% of the total installed. This was realized after installation and this caused unforeseen complications of repeat jobs and replacements. There are also inadequate vending services currently. The mobile phone services are proving to be unreliable, due to frequent unavailability or delays of the paybill service (Njoroge, 2011).

2.4.3 Effects the prepaid meters on performance in Kenya Power

The prepaid system had a number of immediate solutions for the major problem facing the company. The prepaid system has decreased fraud by complete elimination of meter tampering and illegal connections. The billing cycle that previously took twenty one days has been reduced to nothing because the customer pays before rather than after the service is rendered. The issue of estimates or incorrect readings has been completely removed hence increasing billing accuracy; this is due to the fact that the meter reading activity is not included in the new system.

The process of reconnection and disconnection has been eliminated by the new system. These activities are not part of the new system. The customer's privacy has been enhanced because no meter reader will be required to read the meter. The new system automatically updates the serves. The banking halls in most pay points in Kenya power have been decongested with the majority of domestic customers being on the prepaid system which has different and more purchasing and payment methods. The company was looking for system that would minimize the above problem and be cost effective and offer the best service to the customer. (<http://www.kplc.co.ke>).

2.5 Summary

This chapter presents a review of literature relating to the purpose of the study. The chapter is arranged in such a way as to show relevance to the research question. The chapter covers ICT in general, ICT innovation, Adoption of new technology and finally the prepaid metering system, its benefits, challenges and impact on performance.

2.6 The Conceptual Framework

To clarify the concept of the fundamental effects of prepaid electricity implementation in Kenya Power its essential to understand the conceptual framework show the interplay between the independent variables and the dependent variables.

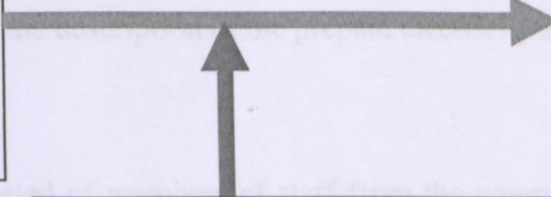
The independent variable is a property of an observable fact, which in turn affects others i.e. the dependent variables (Mugendi, 2003).

Independent Variables

- Increase efficiency.
- Improved customer service.
- Cash flow improved.
- Reduction of costs.
- Ease in installation.
- Less bulky installation.
- Customer privacy.
- Tamper prove.

Dependent Variable

Performance as a result of Prepaid Meter



- ### Intervening Variables
- Step tariff for domestic customers.
 - Inadequate vendors.
 - Third party charges(Government Taxes and levies)
 - Internal organizational dynamics.
 - New innovation resistance.
 - External resistance.

Figure 2.5: Conceptual Framework

CHAPTER THREE: RESEARCH METHODOLOGY

Strata	Strata size	Proportions %	Sample size
3.1 Research Design	123	37.73	19
	103	32.52	17
	100	31.27	14
	7	2.15	1
	3	0.92	0
	3	0.92	0
Total	326	100	50

This chapter will detail how the research was undertaken. Research design consists of the master plan that lays out the set of decision which details the methodology of the collection and analysis of data (Mathooko, 2007).

A descriptive research design was used. This implies that the study was descriptive in nature. The data was collected from the members of the population and used in the survey research to describe existing phenomena through interviews on the individual's attitude, behavior, perception and firsthand experience. The qualitative and quantitative data was utilized for this study. The status of the different variables were examined, the reliability of the data from this type of population was more reliable (Mugenda and Mugenda, 2003). This descriptive research helped bring out a more accurate, reliable and increase validity of the systematic description of the prepaid electricity system in Kenya Power.

3.2 Population

The population consisted of members of staff from the commercial services division in Kenya Power. The Commercial Services Division is headed by the chief manager commercial services. The division is divided into customer services, customer relation and marketing. Customer service consists of a manager, chief engineers, other engineers, technicians and customer officers. The target population will be 326 officers. These are the staff direct involved in the new system.

3.3 Sample design

The researcher was interested in Nairobi due the fact that prepaid meters have only been installed in the major town in Kenya. The study also focused on Nairobi due to logistical and financial constraints. The sampling method was the stratified random sampling. Sample size was 50, which was 15.3% of the population. The population size was 326 employees; sample size was arrived at by using the proportions of the different strata to total population.

Table 3.1 Population and Samples

Strata	Strata size	Proportion %	Sample size
Engineer/ Technician	123	37.73	19
Clerks/debt collectors	107	32.82	17
Customer service/relation officers	71	21.78	11
Installation inspectors	25	7.67	3
Total	326	100	50

3.4 Data collection

The instrument of data collection was semi structured questionnaires. The self completing, three stage questionnaire was used to address the research objectives. The first section was about the personal details of the respondent, second section was on establishing the benefits of prepaid meters and the third challenges of implementing of prepaid meters. The respondents were staff members from the commercial division who deal with billing of customers, contracting customers, call center, collection and reading.

3.5 Data Analysis

Quantitative characteristics in terms of frequencies, means and percentages were derived from the data collected. The data was then edited and analyzed using SPSS software to arrive at the frequency distribution and measures of central tendencies. Tables were used in section (b) and (c). In section (a) graphs and tables were used to represent the different respondents' characteristics and details.

CHAPTER FOUR: RESEARCH FINDING

4.1: Introduction

This chapter will present the research finding and the analysis of the data collected from the field based on the objectives of the study. The data will be presented in the form of tables, frequencies and percentages.

The study was undertaken during the month of October 2012. The study targeted staff from the commercial services division of Kenya Power. Questionnaires were distributed to 50 staff members of the division, with permission from the human resources department. The questionnaires were handed out by the researcher himself. The questionnaires were collected the next day due to time constraints. A total of 50 questionnaires were returned but only 45 were useable. After data collection, all questionnaires were coded for open ended questions. The data was then run through SPSS 11.50 (Statistical Package for Social Scientists) for analysis.

Qualitative and quantitative data were obtained through the questionnaires. During the data analysis, frequencies were run, variables taken through cross tabulation and comparisons made. Qualitative data was summarized and key themes that emerged from discussions were drawn.

4.2: General information

This section sought to find the background information of the respondents so as to give the descriptive information of the sample to enable researcher decide if the sample is representative and reliable. A total of 50 questionnaires were received from the respondents. A total number 5 questionnaires were unusable to due to incompleteness. This implies 45 questionnaires were used this represents a 90% response rate. The general information aims at getting general background of the respondents.

4.2.1 Gender

Out of 43 respondents, 14 were men who represented 31.1% while 29 were women or 67.4%. More women are employed in the commercial services department, especially in the call center. The ladies have a propensity towards the social sciences like public relations, customer services and marketing

Table 4.1 Gender

	Frequency	Percent	Cumulative Percent
Male	14	32.6	32.6
Female	29	67.4	100
Total	43	100	

Source: Primary Data

4.2.2 Age of respondents

The ages of the respondents range from 24 years to 44 years with a mean age of 30.13 years. The prepaid metering section is relatively new in Kenya Power.

Table 4.2 Age

	N	Minimum	Maximum	Mean	Std Deviation
Age	32	24	44	30.13	5.735

Source: Primary Data

4.2.3 Level of education

The respondents were asked to state their level of education. Findings are given in table 4.3 below.

Table 4.3 Level of education

	Frequency	Percentage	Cumulative Percent
High School	1	2.3	2.3
Diploma	12	27.9	30.2
Undergraduate	23	53.5	83.7
Post Graduate	7	16.3	100.0

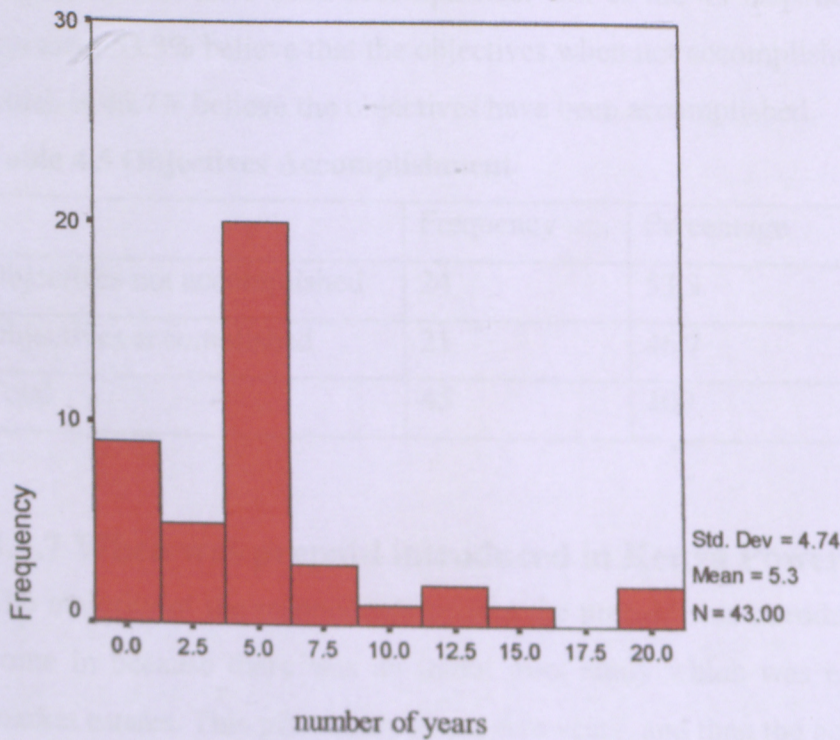
Source: Primary Data

Majority of the staff in the function of prepaid metering are basically undergraduates who represent 53.5% of the respondents and diploma holders represent 27.9%. The rest of the level of education represents a significantly low percentage.

4.2.4 Years of experience

The years of experience range from between months to twenty 20 years, with a large number are having 5 years experience.

Graph 4.1 Years of Experience



4.2.5 Permanent staff

Majority of the respondents are working on contract basis. They make 82.2% of the total, while the permanent staff makes 17.8%. Kenya Power has a larger number of employees on contract basis this is more common in the newer sections like prepaid metering. This trend is being embraced more and more by the local companies. The table below gives the figures.

Table 4.4 Permanent Staff

	Frequency	Percentage	Cumulative Percent
Non Permanent	37	82.2	82.2
Permanent	8	17.8	100
Total	45	100	

Source: Primary Data

4.2.6 Objectives of the prepaid system been accomplished.

The respondent responded in the following way when asked whether the objectives of the prepaid system have been accomplished. Out of the 45 respondents, 24 of them which represent 53.3% believe that the objectives when not accomplished, while 21 respondents which is 46.7% believe the objectives have been accomplished.

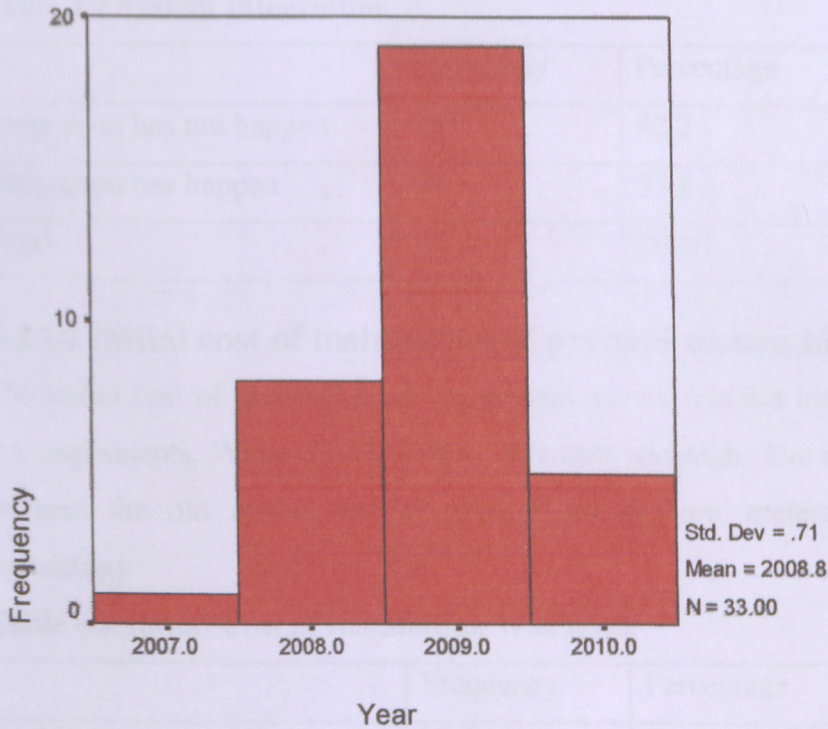
Table 4.5 Objectives Accomplishment

	Frequency	Percentage	Cumulative Percent
Objectives not accomplished	24	53.3	53.3
Objectives accomplished	21	46.7	100.0
Total	45	100	

4.2.7 When was prepaid introduced in Kenya Power

The majority of the respondents believe the prepaid was introduced in 2009. The mix up come in because there was an initial pilot study which was carried out in selected up market estates. This pilot study lasted five years, and then the actual launch was started in 2009.

Graph 4.2 When was prepaid was introduced



4.2.8 Token vendors' availability

When dealing with token vendors' availability, 68.8% of the respondents believe that they are not available, while 31.1% believe they are. Vendor contracting is an ongoing process and a large number of new vendors are expected to be introduced in the market.

Table 4.6 Token Availability

	Frequency	Percentage	Cumulative Percent
Token vendors not available	31	68.9	68.9
Token vendor available	14	31.1	100
Total	45	100.0	

4.2.9 New system integrated well with the old system

On the issue of integration of the old with the new prepaid system. 42 % believe that has not happened while 57.8% believe it has. The business processes in a company should

never be interpreted by a new innovation being introduced. The changeover should be smooth and the customer should not even notice the change.

Table 4.7 System Integration

	Frequency	Percentage	Cumulative Percent
Integration has not happen	19	42.2	42.2
Integration has happen	26	57.8	100
Total	45	100.0	

4.2.10 Initial cost of installation of prepaid system high.

The initial cost of installation of the prepaid meters was not high according to 48.9% of the respondents. While 33.3% believe this cost was high. The initial is likely to be high because the old meters are being replaced by new meters which use a different technology

Table 4.8 Initial Cost of Installation Was High

	Frequency	Percentage	Cumulative Percent
Initial cost was not high	22	48.9	48.9
Initial cost was high	15	33.3	82.2
unsure	8	17.8	100
Total	45	100.0	

4.2.11 The most popular method of buying tokens.

The most popular method of buying tokens is through the mobile purchase which represents 93.3%, while buying through Kenya power branches represent 6.7%, this is because the money transfer services like Mpesa are available 24 hours a day and are widely available.

	Frequency	Percentage	Cumulative Percent
Fraud is possible	30	66.7	66.7
Fraud is not possible	15	33.3	100
Total	45	100.0	

Table 4.9 Most Popular Method of Buying Tokens

	Frequency	Percent	Cumulative percent
Mobile purchase – ie mpesa, airtel money etc	42	93.3	93.3
External vendors	-	0	0
Kenya power branches	3	6.7	100
Total	45	100	

4.2.12: The most reliable method of purchasing token

The respondents believe the Kenya power branches are the most reliable, this represent 85.7%, while mobile purchases represent 14.3%. The money transfer method is unreliable or slow, hence reducing the trust in them.

Table 4.10 Most Reliable Method of Purchase

	Frequency	Percent	Cumulative percent
Mobile purchase – ie mpesa, airtel money etc	6	14.3	14.3
External vendors	-	0	0
Kenya power branches	36	80.0	100
Total	42	100	

4.2.12 Possibility of fraud in prepaid

When responding to the question 66.7% believe fraud is possible with this new system, while 33.3% believe fraud is not possible. Fraud is and continues to be a major factor in Kenya Power. This was one of the major motivator of Kenya Power introducing the prepaid meters.

Table 4.11 Possibility of Fraud

	Frequency	Percentage	Cumulative Percent
Fraud is possible	30	66.7	66.7
Fraud is not possible	15	33.3	100
Total	45	100.0	

4.3 Benefits of prepaid meters

The researcher was trying to investigate whether the following benefits have been realised. Using Likert scale, the respondents were supposed to state whether they strongly, agree, disagree or strongly disagree. When the mean is closer to 1 with a small standard deviation this implies that the respondents strongly agree. When the mean is closer to 4 this implies that most respondent disagree. The standard deviation indicates how dispersed the response where across the different option.

Table 4.12 Table of Benefits from Prepaid System

	MEAN	STD. DEV
Increasing efficiency in the business process	2.2	1.10
Improve customer service	2.3	0.89
Cash flow has improved	2.2	0.91
There has been a reduction of staff, installation and repair costs	2.8	1.09
The new prepaid meter is easier to install	2.0	0.92
Customer privacy is enhanced, no meter reading required	1.3	0.80
The prepaid meter is more secure	1.8	1.09
Overall financial feasibility, more cost effective system	2.0	0.94
Corruption has been reduced	2.3	1.15
The new system has technological efficiency – more reliable data	2.0	1.00
The new system has incorporated well with the old system	2.6	0.99
The prepaid system is in line with company strategic inventiveness goals	2.0	0.82
The entire new system is secure	2.4	1.21
Implementation and adoption of new prepaid meters has gone on well	2.9	1.25
The new meter has been received well in the market	2.8	1.81

4.4.1 Overcoming challenges of adoption.

When the respondents were answering this question 51.2% believe that problems arising while 34.9% believe they

4.4 Challenges of implementing the prepaid system.

Table 4.13 Challenges of Implementing the Prepaid System

	MEAN	STD.DEV
When the customer is purchasing the token	1.56	0.76
When the customer is loading the token	2.3	1.16
The prepaid meters are having mechanical problems (faulty meters).	1.8	0.92
Getting through to the call centre for help takes a long time	2.4	1.27
Repairs and replacements are being done slowly	2.4	1.04
The processes of new connections are inefficient	2.6	1.14
The new system has not helped reduce staff, connection and repair cost	3.0	1.17
The customer/ company interaction has not improved	3.2	1.26
Customer satisfaction has decreased	3.7	1.16
There is no change in the level of corruption with the new meters	3.7	0.9
The customers do not understand the prepaid system	2.6	1.26
Vendors selling the tokens are not readily available	2.4	1.19
The employees have not adjusted to the new innovation	3.1	1.24
The new prepaid system is being resisted by employees	3.6	1.27
The new prepaid system is being resisted by customers	3	1.24

Key: to Explain the Table 4.12 and Table 4.13

1.00-1.75	Strongly agree.
1.76-2.51	Agree.
2.52-3.32	Disagree.
3.33-4.00	Strongly disagree.

4.4.1 Overcoming challenges of adoption.

When the respondents were answering this question 51.2% believe that problems arising as a result of adoption of prepaid metering are easily resolved, while 34.9% believe they are not easily resolved. 14% believe they are very easily resolved

Table 4.14 Overcoming Challenges of Adoption

Not easily resolved	34.9%
Easily resolved	51.2%
Very easily resolved	14%

4.5 Performance Measures

There is high percentage of the respondents agree that the performance measures have been accomplished with the new prepaid system. This is clearly indicated by Table 4.15.

Table 4.15 Performance Measures

	YES	NO
Decreasing fraud in order to increase profits	84.4%	15.6%
Reducing billing cycle and enhancing revenue collection	93.3%	6.7%
Ensuring accurate billing and revenue figures	86.7%	13.3%
Reducing staff costs in the business process	75.6%	24.4%
Increasing customer privacy	91.1%	8.9%
Decongesting banking halls in Kenya Power	80%	20%

4.6 Regression Analysis

A multivariate regression model was applied to determine the relative importance and the relationship between the independent variables and performance (Dependent variable), in regard to the prepaid system in Kenya Power. The regression model was as follows:

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \epsilon$$

Model		Sum of Squares	df	Mean Square	F	Sig.
Where:	Regression	17.58	6	2.930	44.231	.000(a)
	Residual	2.574	39	0.066		
Y = Performance		20.154	45			

a = Constant Term

β_1 = Beta coefficients

X_1 = Decreasing fraud

X_2 = Reducing billing cycle

X_3 = Accurate billing

X_4 = Reducing staff costs

X_5 = Increasing customer privacy

X_6 = Decongesting banking halls in Kenya Power

Table 4.16 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.845(a)	0.714	0.697	0.257

a Predictors: (Constant), Decreasing fraud, Reducing billing cycle, Accurate billing, Reducing staff costs, Increasing customer privacy, Decongesting banking halls in Kenya Power

The R² is called the coefficient of determination and tells us how the dependent variable varied with the independent variables. From Table 4.16 above, the value of adjusted R² is 0.697. This implies that, there was a variation of 69.7% of performance with the predictors; decreasing fraud, reducing billing cycle, accurate billing, reducing staff costs, increasing customer privacy and decongesting banking halls in Kenya Power.

Table 4.17 ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.58	6	2.930	44.231	.000(a)
	Residual	2.574	39	0.066		
	Total	20.154	45			

a Predictors: (Constant), Decreasing fraud, Reducing billing cycle, Accurate billing, Reducing staff costs, Increasing customer privacy, Decongesting banking halls in Kenya Power

b Dependent Variable: Performance

The study used ANOVA to establish the significance of the regression model from which an f-significance value of $p < 0.001$ was established. This shows that the regression model has a less than 0.001 likelihood (probability) of giving a wrong prediction. This therefore means that the regression model has a confidence level of 99.9% hence high reliability of the results.

Table 4.18 Coefficients Results

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.116	0.186		0.623	0.535
Decreasing fraud	0.577	0.068	0.559	8.478	0.000
Reducing billing cycle	0.157	0.043	0.257	3.676	0.000
Accurate billing	0.052	0.024	0.139	2.115	0.033
Reducing staff costs	0.008	0.001	0.505	7.097	0.000
Increasing customer privacy	0.339	0.196	0.150	1.730	0.085
Decongesting banking halls in Kenya Power	0.499	0.149	0.237	4.012	0.000

a Dependent Variable: Performance

From the regression analysis, the following equation was established:

$$Y = 0.116 + 0.577X_1 + 0.157X_2 + 0.052X_3 + 0.008X_4 + 0.339X_5 + 0.499X_6$$

The regression model shows that holding all the independent variables constant, performance at Kenya Power would be achieved at 0.116. It was established that a unit

increase in decreasing fraud as one of the goals accomplished by the prepaid system in Kenya Power would cause an increase in performance of 57.7%, a unit increase in accurate billing and reducing staff costs through the prepaid system would cause an increase in performance of 5.2% and 0.8% respectively. The study further shows that there is a significant relationship between performance and four of the goals accomplished by the prepaid system in Kenya Power; these are: decreasing fraud ($p=0.000<0.005$), reducing billing cycle ($p=0.000<0.005$), accurate billing ($p=0.038$), reducing staff costs ($p=0.000<0.005$) and decongesting banking halls in Kenya Power ($p=0.000<0.005$).

The objective of this research was to establish the benefits of the prepaid meters in Kenya Power as it continues to be adopted there in the company. The study shows that benefits that the company was aiming to accomplish have been realized to a large extent and the new prepaid system has greatly increased the efficiency and effectiveness of the company to accomplish its goals and objectives.

The study also clearly indicated that there are major challenges that the company is urgently required to address, i.e. the vendors' availability and reliability. The respondents agree that there are quite a number of challenges in the implementation process although they are of the opinion that these are minor and they can easily be resolved if they were addressed promptly.

The respondents agree that the performance measures that the company was trying to accomplish have to a great extent been accomplished. They agree that the prepaid meter has drastically improved the business processes, reduced corruption, improved money collection etc. The new innovation has greatly helped to improve the attitude of the customer towards the company.

5.3 Conclusion

The findings of the research support the notion that the objectives of the company in implementing the new prepaid meters have been achieved although there is a lot more to be done. The shift from the credit based system to the prepaid system was well calculated and the benefits are gradually being realized as awareness is created and the consumers of

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter will address and summarize the findings of the research, give conclusions and recommendations based on the objectives outlined in chapter one. The limitation and additional studies that can be carried out will be highlighted in this chapter also.

5.2 Summary of findings

The objective of this research was to establish the benefits of the prepaid meters in Kenya Power as it continues to be adopted them in the company. The study show that benefits that the company was aiming to accomplish have been realized to a large extent and the new prepaid system have greatly increased the efficiency and effectiveness of the company to accomplish its goals and objectives.

The study also clearly indicated that there major challenges that the company is urgently required to address i.e. the vendors' availability and reliability. The respondent agree that there quite a number of challenges in the implementation process although they are of the opinion that these are minor and they can easily be resolved if they were address promptly.

The respondents agree that the performance measures that the company was trying to accomplish have to a great extent been accomplished. They agree that the prepaid meter have drastically improved the business processes, reduced corruption, improved money collection etc. The new innovation has greatly help to improve the attitude of the customer towards the company.

5.3 Conclusion

The findings of the research support the notion that, the objectives of the company in implementing the new prepaid meters have been achieved although there is a lot more to be done. The shift from the credit based system to the prepaid system was well calculated and the benefits are gradually being realized as awareness is created and the consumers of

the service understand it more. There are few challenges but these are minimal when considering the larger picture of the benefits and performance improvements that have so far been seen. The studying has also shown that Kenya power has been successful in implementing a new system in a very short span of time without the usual adoption problems that come with new innovation. The Kenya Power employees who were the focus of our study have accepted the changes very well and they are supporting the new systems. They agree more is require to be done, especially in educating the consumer on the prepaid metering system.

5.4 Recommendations

The company is required to create more awareness of the new system especially amongst its customers. The company should also create a feedback mechanism from its customers so as to be able to know the challenges facing the new innovation and rectify it quickly. The prepaid system has no major challenges; the challenges that come up can easily be resolved. i.e. the vendor availability issue. Challenges should be anticipated and resolved quickly before the consumer realizes the problem. The call center should be expanded to cater for the ever growing numbers of domestic consumers on prepaid meters. This system has fixed some of the issues arising from credit based system used in other utility companies like Nairobi water. These companies should develop similar systems.

5.4.1 Recommendation for Further Research

The challenges, though minor in some instances need to be study more in order to ensure they are resolved. Market studies should be carried out to analyze the needs of the consumers. Kenya power should have studies focusing on other countries that have already implement this system in order to avoid making the same mistakes and have a better system. An example of such a country is South Africa.

5.5 Limitations

The study had a number of limitations. The respondents were at first fearful about giving out information about the new system, they were unsure where the information was to be used. The majority of the respondents are very busy, because they are continuously

serving customers, they had very little time. The other limitation was the research had to be done in a very short time span hence making it very hard to leave the questionnaires. The research had to be undertaken during working hours which caused a lot of inconveniences to the respondents.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE TO KENYA POWER STAFF.

Please fill in the following questionnaire.

SECTION A: GENERAL INFORMATION. (Tick appropriately)

1. Name (optional)

2. Gender: male () or female ().

3. Age ()

4. Level of education

High school ()

Diploma ()

Undergraduate ()

Post graduate ()

5. Job title.....

6. Years of experience ()

7. Permanent staff

Yes () No ()

8. Have the objectives of prepaid system been accomplished?

Yes () No ()

9. When was the prepaid system introduced in Kenya Power?

10. Are the token vendors readily available?

Yes () No ()

11. Has the new system integrated well with the existing system?

Yes () No ()

12. Was the initial cost of installation of prepaid system high? Tick where appropriate.

Yes () No ()

13. Which is the most popular method of buying tokens? Tick where appropriate.

Mobile purchase – ie mpesa, airtel money etc	
External vendors	
Kenya power branches	

14. Which is the most reliable method of purchasing the tokens? Tick where appropriate.

Mobile purchase – i.e. mpesa, airtel money etc	
External vendors	
Kenya power branches	

15. Is fraud possible with the new prepaid meters?

Yes () No ()

SECTION B: BENEFITS OF PREPAID METERS

16. Has the prepaid system accomplished its goals? Tick where appropriate.

1 - Strongly agree 2 - Agree 3 - Neither agree or disagree 4 - Disagree 5 - Strongly disagree

	1	2	3	4	5
Increasing efficiency in the business process					
Improve customer service					
Cash flow has improved					
There has been a reduction of staff, installation and repair costs					
The new prepaid meter is easier to install					
Customer privacy is enhanced, no meter reading required					
The prepaid meter is more secure					
Overall financial feasibility, more cost effective system					
Corruption has been reduced					
The new system has technological efficiency – more reliable data					

The new system has incorporated well with the old system					
The prepaid system is in line with company strategic innovation goals					
The entire new system is secure					
Implementation and adoption of new prepaid meters has gone on well					
The new meter has been received well in the market					
Any other benefits (list below)					

SECTION C: CHALLENGES OF IMPLEMENTING THE PREPAID SYSTEM.

17. Has the prepaid system experienced any problems? Tick where appropriate.

1 - Strongly agree 2 - Agree 3 - Neither agree or disagree 4 - Disagree 5 - Strongly disagree

	1	2	3	4	5
When the customer is purchasing the token					
When the customer is loading the token					
The prepaid meters are having mechanical problems (faulty meters).					
Getting through to the call centre for help takes a long time					
Repairs and replacements are being done slowly					
The processes of new connections are inefficient					
The new system has not helped reduce staff, connection and repair cost					
The customer/ company interaction has not improved					
Customer satisfaction has decreased					
There is no change in the level of corruption with the new meters					
The customers do not understand the prepaid system					
Vendors selling the tokens are not readily available					
The employees have not adjusted to the new innovation					
The new prepaid system is being resisted by employees					
The new prepaid system is being resisted by customers					
Any other challenges(list below)					

18. How well do you overcome the challenges that you came across during prepaid meters adoption? Tick where appropriate.

Not easily resolved	
Easily resolved	
Very easily resolved	

SECTION D: PERFORMANCE MEASURES

19. The major goals accomplished by the prepaid system in Kenya Power? Tick where appropriate.

Decreasing fraud in order to increase profits

Yes () No ()

Reducing billing cycle and enhancing revenue collection

Yes () No ()

Ensuring accurate billing and revenue figures

Yes () No ()

Reducing staff costs in the business process

Yes () No ()

Increasing customer privacy

Yes () No ()

Decongesting banking halls in Kenya Power

Yes () No ()