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FACULTY OF COMMERCE

DEPARTMENT OF ACCOUNTING

The impact of the domestic prepaid meter on revenue generation: A case of ZETDC

(Gweru) from 2012 to 2014

BY

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DEDICATION

This research is dedicated first to God for the strength he gave me to carry on, to my family, my husband and my son for the support and encouragement throughout the period of undertaking the project.

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ABSTRACT

The study sought to evaluate the impact of the domestic prepaid meter on revenue generation at Zimbabwe Electricity Transmission and Distribution Company (ZETDC) focusing on Gweru urban district. The main objective of the study was to assess the impact of prepaid meter system on revenue generation and to offer recommendations based on research findings to help ZETDC improve its revenue generation while fulfilling customer satisfaction. Literature review established that while prepaid metering system is good on customer satisfaction it has also promoted revenue generation compared to post paid billing system. In this study descriptive design and case study were preferred ahead of all others on the basis of their strength to solicit both qualitative and quantitative data from the respondents. Questionnaires and interviews were used as research instruments. It is imperative to highlight that the study discovered that although prepaid meter system has improved revenue generation it has so far failed to meet the projected annual sales from 2012 to 2013 and 2014 second quarter. This implies that the prepaid meter system has got a positive impact on revenue generation despite drawbacks like load shedding and bypassing to mention but the main ones. The study recommends that ZETDC must move fast in increasing vending points, increase deduction from 20% from every purchase probably to 40% towards debt, carryout awareness campaigns against tempering with meters and vandalism and government should find strategies of improving power supply in Zimbabwe if the prepaid system is to be fully utilised and revenue to be realised.

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List of Acronyms

ADB	- African Development Bank
CCZ	- Consumer Council of Zimbabwe
CZI	- Confederation of Zimbabwe Industries
IFC	- International Finance Corporation
SADC	- Southern African Development Community
UK	- United Kingdom
UNDP	- United Nations Development Programme
USD	- United States Dollar
ZESA	- Zimbabwe Electricity Supply Authority
ZETDC	- Zimbabwe Electricity Transmission Distribution Company
ZNCC	- Zimbabwe National Chamber of Commerce

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

The research study intends to evaluate the impact of domestic prepaid meter on revenue generation at ZETDC Gweru urban from the period 2012 to 2014. The study also aims to balance service delivery and the financial status of ZETDC. In 2012 the power company introduced prepaid meters with an aim to increase its revenue collection. However, according to ZETDC Southern Region Quarterly Bulletin of 2013, the company seems to experience challenges in revenue collection.

The company is a strategic business unit of ZESA Holdings which is involved in the distribution and retail of electricity to the final end user. In 2012 ZESA Holdings embarked on a prepayment meter project to counter the revenue challenges that were being experienced using the post- paid system. Kotler and Armstrong (2013) states that a prepaid service is meant to empower customers and to control their costs without running the risk of incurring huge bills as is often the case with post- paid transactions.

Under the prepaid project, opening of new ZETDC vending points brought relief to customers as they were able to purchase electricity tokens from additional vending points besides the designated ZETDC banking halls. However, according to ZETDC (2014), two years after the installation of the prepaid meters the revenue challenges still persist as indicated in Table 1.1 below. ZETDC's Managing Director, in the first quarterly report of 2014 states that the power utility company faces more tempering of equipment, theft and vandalism, with some customers using electricity without paying for it where the prepaid meter either reflects lower consumption or the device that measures current is by – passed resulting in loss of potential revenue.

The CCZ (2013) believes that potential consumers will continue to shun the power utility company because of the continued shedding of power to prepaid customers, at the same time earning a bad name of inefficiency. Furthermore, customers have had to wait longer in queues before being served to buy electricity for reasons ranging from constant breakdowns of the vending machines and a few tellers serving the customers.

Table 1.1 Southern Region Sales Revenue

Year	Actual Sales (USD)	Standard Sales (USD)	Variance (%)
2012	156 388 106	211 419 370	(26.03)
2013	165 148 218	224 241 620	(26.35)
2014 (1 st & 2 nd quarters)	86 998 421	100 245 937	(13.22)

Source: ZETDC Southern Region Quarterly Bulletin of 2014

Table 1.1 indicates that although the actual revenue increased a year after the introduction of the prepaid meters, the power utility company has not been able to achieve the target sales in the last 2 years and also in each of the first two quarters in 2014. According to ZETDC (2012) the maximum acceptable level of variance for revenue collection is -7% but the past 2 years and the first 6 months of 2014 shows a deteriorating trend as indicated in Table 1.1 This is also despite the fact that the power utility company has a monopoly in power supply, ZETDC (2014).

Any debt owed by a customer before the installation of the prepaid meter was put into the meter wherein 20% of the money used to buy electricity was applied towards the reduction of the post- paid debt until it is paid in full. ZEDTC (2014) contends that despite this initiative not much has been collected to date. Lucey (2012) is of the view that a breakeven analysis should be carried out before any debt payment plan is concluded to determine the level of

operation at which all the costs are equal to sales. Load shedding is currently being enforced as indicated in Table 1.2 below.

Table 1.2 Southern Region Load Shedding Programme

Year	Interruption time(s)
2014	0500 hours to 2100 hours
2013	Dynamic
2012	Dynamic

Source: ZETDC Southern Region Quarterly Bulletin of 2014

Table 1.2 indicates that in the years 2013 and 2012 there was no scheduled time for load shedding. In 2014, two years after the installation of prepaid meters consumers still experience load shedding on a daily basis, the shortest time is 6 hours and the longest time is 16 hours on a single day. Most factories have cut their night shifts and are now working day shifts only, but due to load-shedding they have had to reduce operations even further. Mr Chinembiri, the Managing Director of ZEDTC, has also highlighted the dissatisfaction of consumers as a result of the continued load shedding. According to CCZ (2013) load shedding impacts on negatively on domestic consumers in terms of cost of living and damages of electrical gadgets as some of the gadgets are so sensitive that they do not need unexpected power outages and sudden power comebacks.

The study therefore, aims to balance customer satisfaction and financial capacity of the power utility company through the provision of a quality, cost effective and efficient service in the multicurrency environment.

1.2 Statement of the problem

The power utility's inability to collect potential revenue from domestic consumers compounded by customer dissatisfaction has resulted in stunted growth of the organization in the energy sector. Inefficiencies and vandalism of distribution infrastructure will eventually lead to a decreasing customer base. The study therefore, seeks to improve customer service and the financial capacity of the power utility company through the provision of a quality, cost effective and efficient service.

1.3 Main research question

What are the factors inhibiting the power utility company from meeting its revenue collection targets?

1.4 Research questions

- i) What are the challenges being faced in applying the domestic prepaid meters?
- ii) What is the relationship between domestic prepaid meter and revenue generation?
- iii) How are other power utilities able to satisfy their domestic prepaid customers and generate revenue?
- iv) What are the possible remedies available to the power utility to overcome its challenges in applying the prepaid meters?

1.5 Research objectives

- i) To investigate the challenges being faced applying the domestic prepaid meters
- ii) To establish the relationship between domestic prepaid meter and revenue generation
- iii) To investigate how other power utilities are satisfying their domestic prepaid customers and generating revenue
- iv) To determine possible solutions to overcome the challenges being faced by the power applying the domestic prepaid meters

1.6 Assumptions

- i) The size of the population under study will not change.
- ii) The power utility company is not about to be liquidated.
- iii) The challenges being experienced in Gweru are the same with other regions in the urban areas in Zimbabwe where the prepaid meters have been introduced.

1.7 Significance of the study

- i) To ZETDC

The management team will use the findings of the study as a base to review the performance of their business and build a good reputation in the energy sector and improve revenue collection.

ii) To the Economy

An increase in revenue generation will mean an increase in tax collection and hence an increase in revenue for the treasury.

iii) To the Policy Makers

The regulators and policy makers may use the findings as reference when making regulations relating to the energy sector and promote economic development for the country.

iv) To the Domestic Consumers

The study provides a platform for domestic consumers to present their views on the performance of the power utility and the challenges that they are facing in relation to electricity consumption.

v) To the Midlands State University

The research will also provide a basis for further research and contribute to the body of knowledge in the energy sector at the university.

vi) To the Researcher

The study will improve the researcher's skills and knowledge of solving other work related challenges in the company in future.

1.8 Limitations of the study

The study was focus on the impact of domestic prepaid meter on revenue generation at ZETDC in the city of Gweru only. The study was be constrained by limitations of time to interview all the participants in the study population, financial resources to reach to all the members in the study population and also limited relevant literature on the area of study.

1.9 Delimitations of the research

The research was focus on the challenges being faced by the utility company in the city of Gweru from 2012 to 2014. Self- administered questionnaires will be distributed to 500 domestic customers and 3 personal interviews will be conducted with mangers at the power utility company to gather data. Direct personal observation will also be used in the study.

1.10 Definition of terms and acronyms

Load shedding The technique used to control the electricity consumption by intentionally switching it off.

Vending machine A point of sale where consumers pay for electricity before using it

ADB - African Development Bank

CCZ - Consumer Council of Zimbabwe

CZI - Confederation of Zimbabwe Industries

IFC - International Finance Corporation

SADC	- Southern African Development Community
UK	- United Kingdom
UNDP	- United Nations Development Programme
USD	- United States Dollar
ZESA	- Zimbabwe Electricity Supply Authority
ZETDC	- Zimbabwe Electricity Transmission Distribution Company
ZNCC	- Zimbabwe National Chamber of Commerce

1.11 Summary

The chapter highlights the challenges that the power utility company faces after the introduction of prepaid meters in an environment with liquidity challenges. Lower revenue generation as a result of customer dissatisfaction may lead to higher operating costs and poor credit rating which could increase the power utility company's cost of capital, and in turn could lead to higher rates of electricity in the long run. The chapter provides evidence of the problem area in the background to the study and indicates what it intends to achieve in the research objectives. Finally, the importance of the study has also been shown to the various stakeholders and an explanation of key terms and acronyms used in the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter will review literature related to the impact of the domestic prepaid meter on revenue generation. It discusses, challenges faced in application of domestic prepaid meters, relationship between domestic prepaid meter and revenue generation, application of domestic prepaid meters and customer satisfaction by other power utilities, remedies available to power utilities to overcome application of domestic prepaid meters, the implications of literature review, and finally the chapter summary.

2.1 Challenges faced in application of domestic prepaid meters

2.1.1 Power thefts through bypass

Joseph (2014) argues that there are challenges and issues of the domestic prepaid system which are linked to the domestic consumer's fraudulent practices. Mohammed, Barua and Arafat (2013) advances that the theft of electricity is so huge in some African states that power utilities are incurring some financial losses instead of getting revenue. The financial loss results in shortage of funds to meet and expand existing power generation and transmission lines leading to failure of power utility companies to satisfy the ever increasing demand of electricity.

Fornell, Rust and Dekimpe (2010) state that prepaid metering system of electricity was first used in RSA in mid 1980s. According to Stoner (2009) the introduction of prepaid electricity

was initially targeted at low income consumers. Musango, Amigun and Brent (2011) have cited massive leaks of domestic prepaid meter units in RSA through by passing the meter. The power utility lost almost 15% of its monthly revenue due to power theft and leakages during the first year of their use. Joseph (2014) is of the view that the power utility suffered loss of revenue due to the culture of non-payment by domestic consumers and other challenges like crime. Furthermore, the challenge may escalate when most residents begin to pay criminals a fee to have their meters bypassed. Anyanrouh (2013) posits that the situation may worsen when the power utility fails to detect or to devise a way to be able to establish the time the consumer would have tampered or by passed the meter. Cassrin and Nicollier (2009) state that in India the power utility had to install specialist meters on electricity poles to detect the domestic consumption of certain areas. If at any time the load on the points selected did not exceed the maximum permissible the gadget turned off the power.

According to Fitch and Graham (2009) in the UK reveals that domestic prepaid consumers with meters were seventeen times more likely to have their electricity supply disconnected for electricity theft than domestic consumers with credit meters. The implication is that domestic consumers who commit the offence are likely to turn into agents who deal with daily challenges of coping with poverty. According to Solomon and Joseph (2011) in Ghana, the power utility reduced its domestic power thefts by 5% after introducing prepaid domestic meters. Under the project a number of prepaid meters are mounted on one pole unlike the postpaid and some prepaid meters which are usually mounted in the homes of the domestic consumers. The introduction of the prepaid system may not be directly linked to electricity theft because during the postpaid era cases of electricity theft by domestic consumers were rampant, (Amit and Mohnish, 2011; Depur, Wang and Devabhaktuni, 2011). However, Nagi

et al (2011) and Smith (2008) relate the theft of electricity to poor systems by power utilities and further influenced by poverty in both developed and developing nations.

According to Group Loss Control Manager, Mr Phillip Mhike, “Between the period January to September 2013, ZETDC lost revenue of \$1 255 672.46 and of that \$1 077 585.68 was recovered”.

2.1.2 Breakdown of domestic prepaid meters and technological risk

Stoner (2009) says that in India there were so many reports of the domestic prepaid meters breaking down where the domestic prepaid customers went for several days before their challenges could be addressed, a situation which led to theft of electricity by the domestic prepaid consumers with the help of the power utility staff. Avison and Myers (2008) say the introduction of prepaid meters in Argentina received with much resistance from the domestic consumers of electricity, as the customers believed that it was meant to exploit them. When the electricity was exhausted the most domestic consumers would break down the prepaid meters, gang up and reconnect electricity illegally. Robins, Coulter and Vohra (2012) reckon that for many people, the issue of change creates fear, uncertainty and doubt especially when a top down approach is used. According to Avison and Myers (2008) before implementing the new prepayment system of electricity, India engaged on a pilot project. There was however, a challenge in that during the testing period the new and better meters were introduced on the market. This meant that the meters that had been installed were all going to be removed resulting in the loss of investment money. Stoner (2009) warns of the risk of technological obsolescence soon after the implementation of the whole project, citing the case in India where most of the domestic prepaid meters were never installed because better meters in terms of technology were available on the market.

The breakdown of prepaid meters is also rampant in Zimbabwe. According to Techzim online newspaper, ZESA is being defrauded of between \$900 000 to as much as \$1 million every month by these breakdowns (<http://www.techzim.co.zw>).

2.1.3 Network breakdown

According to Cassrin and Nicollier (2009) electricity prepayment technology was initially developed in RSA in the 1980s, and in Argentina prepaid meters were first used in 1993 and in the late 1990s the prepaid meters were popular in India. They further state that when these were initially introduced they were localized and did not require any internet. Annon (2010) asserts that the prepaid system has three distinct components. The first is the installed meter at a place where the electricity will be consumed. The second component is the credit vending machine where customers can buy electricity and thirdly, is the supporting device which links the various sales outlets through the internet to the power utility company's management system.

Nnodim (2014) challenges the power utility organizations to ensure adequate infrastructure and resources before launching such a system as loss of service after payment may erode confidence in domestic prepaid consumers and they may switch to other service providers even if the switching costs are high. For organizations such as power utilities with revenue models that depend solely on the internet to deliver services to customers, downtime can be particularly costly. Unplanned down time negatively impacts on revenue generation, reputation and loyalty. Down time costs due to network challenges include lost business with domestic consumers, both short term and long term, employee overtime and the value of lost

data in some cases. Furthermore, it negatively impacts on employee productivity in terms of idle time.

2.1.4 Load shedding

A research conducted by Ogujor (2010) reveals that most power utility organizations in Southern Africa continue to supply inadequate electricity due to one or a combination of factors such as economic growth of the member state, increase in demand of minerals, inadequate investment in power generation and transmission, and rural electrification. In agreement, Amigun, Musango and Brent (2011) state that when an economy grows it is often accompanied with an increase in domestic consumption of electricity.

The Energy Information Administration (2010) indicates that new mining companies such as those mining platinum and coal in the SADC region such as Zimbabwe and Mozambique respectively have contributed to the demand in industrial energy at the expense of domestic electricity supply. The mining companies invest a lot of capital in heavy machinery such as ball mills which consumes a lot of electrical power in their functioning. However, according to the UNDP (2010) since 1984 Zimbabwe has stopped investing in new generation capacity in the energy sector. The observation is supported by USAID (2013) which says that for three decades no one anticipated that the domestic energy system would someday be inadequate to meet the domestic needs and as a result most African countries including Zimbabwe had not been paying enough attention on investing in that sector in terms of expansion and the introduction of new and better ways of electricity production. This may imply that introduction of the prepaid meters for domestic consumers will still face the same challenges with the post paid customers in terms of power cuts.

Holm et al (2008) asserts that the use of old machinery by the power utilities increase the running costs due to constant break downs and the unavailability of spare parts which have since been phased out as new equipment is introduced. The UNDP (2010) also argues that most households and industries in Zimbabwe are subjected to between three and five hours of load shedding daily because of lack of investment in power generation since 1986. Furthermore, it states that no new power generation plants have been built in the country since Kariba in the early 1960s and Hwange power station since the mid of 1980. Furthermore, most countries in the SADC region have power deficits making it difficult to import power for domestic consumption into Zimbabwe. However, studies by Creamer et al (2011) indicate that load shedding depreciate the power utility's equipment faster due to the frequent switching on and off of the equipment. When power is switched off, demand is reduced leading to loss of potential revenue and the increased use of other alternative sources of energy.

Barta (2011) says for a long time the rural population and the poor segment in the peri-urban settlements have relied heavily on fuel wood to meet their energy needs but have now shifted to using electricity. Bond (2011) attributes the increase in domestic energy demand in the SADC region to the increase in the population of SADC member countries especially in the rural areas where small farming and mining operations have taken shape affecting domestic electricity supply, the economic expansion and non-economic tariffs which do not support reinvestment in power generation and transmission lines.

According to Nizar and Dong (2009) the success stories of the prepaid metering systems from UK, India, and Turkey where they were extended to the rural areas in the respective countries have also influenced most African states to follow suit.

2.1.5 Lack of expertise

Edkins, Marquard and Winkler (2010) agree with Odhiambo (2009) that it is important to have adequate labour and experienced experts such as engineers for innovation and repairing of new gadgets in case they develop faults. Furthermore, lack of expert labor may result in failure to address new mechanical or technical challenges and short change domestic consumers.

Hammons and Naidoo (2009) say although Africa has a very small energy sector relative to its geographic size and population, the SADC region has adequate power resources for developing southern Africa. Furthermore, SADC enjoys the benefit of having the most advanced integration schemes of energy on the African continent. However, Amigun, Musango and Brent (2011) argue that despite the availability of resources in the SADC region, most countries in southern Africa suffer from energy crisis due lack of expertise. In addition, the few engineers, artisans and other personnel that were there have since left the continent where there are better working conditions. As a result the broken down prepaid meters have not been repaired or attended to.

2.2 Relationship between domestic prepaid meter and revenue generation

Prepayment system is described by Kotler and Armstrong (2010) as a process where the customer makes a payment for using goods or services before enjoying the use of such goods or services. Zahedi (2010) states that such systems allow the customers to consume electricity

only when they have credit in the electricity account and when the credit is exhausted the supply automatically discontinues.

2.2.1 Increased revenue generation

Holme et al (2008) state that the Southern African region, including Zimbabwe has been experiencing inadequate domestic power supply over the past two decades against an increasing growth in demand and over the past 5 years the power utility companies have been confronted with escalating uncollectable domestic consumer debts and service delivery back logs.

Ogujor and Otasowie (2010) are of the view that that the introduction of prepaid meters is a move meant to improve and increase revenue generation and collection. Furthermore, the standards of living have generally increased over the past decade, with increased use of home appliances leading to increased demand of electricity and potential revenue for the energy sector. Sunday (2013) contends that the aim of installing prepaid meters for domestic use is to improve revenue collection and improve customer service. Hammons (2009) had earlier highlighted the benefits of prepayment metering system that both the customers and the power utility can enjoy and these include the elimination of collection arrears and unpaid bills, lower overheads since there is no meter reading resulting in cheaper electricity and increased usage, elimination of incorrect billing because no bills are sent to the customers, removal of the need to staff from the power utility to disconnect or reconnect errant consumers, load control, elimination of rechecking meter readings and estimated bills, detection of tampering of meters and theft of electricity, and an earlier positive cash flow for the power utility against an arrangement where payment will be expected after use (Hammons 2009).

2.2.2 Decreased revenue generation

According to Ogujor (2010) power utility companies face revenue generation and collection challenges as a result of huge customer debts. This is mostly because electricity bills are dispatched to customers after consumption of electricity. Stoner (2009) discovered that while the economic conditions in African countries may be unfavorable to the ordinary citizen resulting in lower disposable incomes, domestic consumers are generally reluctant to pay for services rendered to them. Furthermore, the domestic consumers are not even prepared to pay for at least half of an estimated bill citing reasons of prolonged power supply cuts, poor customer care services and harsh economic conditions.

Studies by Ariel, Casarin and Nicollier (2009) reveal that while the introduction of prepaid meters increases the revenue collection from domestic consumers, it reduces revenue generation because it is reliability based. Consumers become careful with the way they use electricity. The same view was confirmed by Ogujor and Otasowie (2010) where they observed that consumers become sensitive in electricity consumption and that the degree of sensitivity is affected to an extent by the effectiveness and efficiency of the power utility company in providing the needed service.

According to Miyogo, Ondieke and Nashhppi (2013) the introduction of prepaid meters in the 1980s was meant to supply power to a large number of low income earners and geographically dispersed consumers of electricity. This was done after realizing that low income earners were no able to meet their payment obligations through the post-paid system. Nagi et al (2008) believe that the prepaid metering system results in mixed financial results to

both the energy provider and the consumer of electricity. They cite an example where the prepayment of electricity may result in a decrease in metering having been brought about by the fact that the consumer made payment before consumption which implies a an improvement in revenue collection and a reduction in the power utility's working capital. Further with their argument, the prepayment system from the customer's view may result in a better way of managing their consumption and budgetary control.

2.3 Domestic prepaid meters and customer satisfaction

Joseph (2014) agrees with Anyanrouh (2013) and advises that when implementing a prepayment system regard must be given to the needs of both the power utility organization and the domestic prepaid consumers. Lawal (2008) proposes that to effectively deal with strategies to satisfy domestic customers in power utility companies a critical review of the current revenue management business models and processes should be conducted. Supporting the proposition, Ogujor and Kuale (2008) also say it is essential to identify all the elements that currently affect customer service and revenue performance as this will provide a spring board for effective planning.

However, Naggi et al (2009) state that power utility organizations' sustainability on revenue generation using domestic prepaid system should be based on strategies such as social acceptance, systems integration, cost effectiveness, regulatory support, communication strategy, provision of a measurable service, objective and accurate billing and regular supply of electricity to domestic prepaid customers.

2.4.1 Social acceptance

Sunday (2013) is of the opinion that the public relations officer of the power utilities may assist with campaigns by, for example, assuring consumers that if there are system failures the power utility will compensate the customer for the loss of his or her normal consumption units. Brassing and Pettit (2012) suggest that introducing promotions, competitions and tips on how power may be saved or assist the domestic customers with electricity budgets. That way the domestic consumers will feel that they are part of the new system. Furthermore, isolate areas where there were no challenges in paying bills before the introduction of the prepaid metering system so that they are the last ones to have prepaid meters installed.

2.4.2 Systems integration

Bond (2011) states that data is often lost when systems are being changed or are changed, or where the new system fails to accommodate information which may have been relevant for decision making using the old system. Annon (2010) warns that it is important to maintain the old customer base separately with up to date records in case of complications during the implementation stage, especially where there are seriously network challenges.

2.4.3 Cost effectiveness

Joseph (2014) is of the view that in order to deploy a lot of prepaid meters at any one time, the whole programme must be cost effective. Operating costs should be minimized as much as possible but not at the expense of quality service. The power utility company should target to reduce consumer complaints and be prepared to work odd hours by taking turns for the benefit of the customers until the system is running smoothly.

2.4.4 Regulatory support

Anyanrouch (2013) posits that the energy sector regulatory authorities may facilitate the introduction of the prepaid metering programme to the general population by supporting the power utility companies so that it shows that it has support from the government and instill confidence in consumers. These can also combine efforts to with consumer bodies or association to educate the public of the benefits that are available and the challenges that may be encountered during the implementation stage.

2.4.5 Communication strategy

Effective communication is viewed by Robbins (2012) as a two way process which must create an understanding between people through the use of language. Communication between the service provider and customer should be explicit and not ambiguous. More recently, Mohammad, Barua and Arafat (2013) propose that employee and consumer education as one way of minimizing future resistance to change and elimination of ambiguity when transacting. Employees may not be resisting the change but may be uncertain of their status or comfort. They further argue that at organizational level subordinates and management are often at contrasting points and if information is not relayed properly it may cause harm or panic in consumers. According to Allen (2010) the communication strategy should help to facilitate the alignment of the power utility objectives and customers' expectations. It is only through the proper channels that the relationship between the provider of the service and the consumers can be cemented.

Lawal (2008) stresses that effective communication plays an essential role in promoting awareness among the diverse domestic consumers in any residential area and the implications of not deriving revenue from the people living there. Naggi et al (2009) view a successful

communication strategy encompassing sound policies from the power utility, credibility (good news and bad news carrying the same value) and proven principles.

However, Allen (2010) and Anders (2009) support the use of appropriate communication methodology where they suggest the use of comics, audio or visual presentations, pamphlets, posters, community theatre, workshops and public meetings. Musango, Amigun and Brent (2011) cite empirical evidence of RSA where the environment is not only highly stratified socially, culturally and economically but segmented because of its history from the apartheid regime. It would therefore be unwise to use a single communication strategy to serve the whole society. Ogujor and Kuale (2008) prescribes that the target audience be identified and investigate who can pay and cannot pay for electricity, and why they can and cannot pay. Therefore, for effective communication, stratification is important to ensure that the right message get to the right people in a language they understand. Anders (2009) concludes that effective communication support the financial aspects of revenue generation and enhancement.

2.4.5 Provision of a measurable service

Kotler and Armstrong (2013) are of the opinion that the use of prepaid meters that are technologically advanced and user friendly eliminates fraudulent activities from both the employees and the customers. Ogujor and Otasowie (2010) share the same view in that accurate consumption relative to cost instills confidence in consumers. Amir et al (2011) are of the view that the benefits of managing an efficient and measurable service delivery are the reduction of wastage and pilferage of electricity.

2.4.6 Objective, informative and accurate billing

Ogujor and Otasowie (2010) believe that consumers are reluctant to top pay for services that would have been calculated based on guesses or estimates. If the consumer information and billing information is incorrect the power utility companies run the risk of losing credibility and reputation, and end up chasing away current customers and potential customers. Brassington and Pettit (2010) assert that this will result in reduced customer base and loss of current and potential revenue, and that a system which focuses on billing integrity breeds transparency and a sense of belongingness to the customers.

Robbins, Coulter and Vohra (2012) suggest that a charging system must be informative and must also show the domestic customers some recommended measures to help them reduce consumption, cost of services and improve their standard of living from the saving that would have been made. In addition the billing system should have integrity and charge for the services to be provided.

2.4.7 Regular supply of electricity to domestic prepaid customers

According to Christie (2012) when a contract of sale is concluded each party is obliged to fulfill his or her obligations and by honoring the terms of the agreement. Domestic prepaid consumers enter into contracts of sale each time they buy electricity in advance. Where there is breach of contract the aggrieved party should seek redress at the courts. Stoner (2009) state that a regular and adequate supply of power to consumers of electricity is an essential requirement as it directs behavior and helps consumers when planning.

2.4 Remedies available to power utilities to overcome application of domestic prepaid meters

Briceno – Garmendia and Shkaratan (2011) asserts that the prepaid metering can be a successful win-win proposition for the power utilities and the customers if each player play their role and openly discussing the objectives behind such a project, otherwise improvements are an on-going process. However, Ogujor and Otasowie (2010) suggests that for power utilities to overcome the challenges in application of the domestic prepaid meters, it may be necessary to reform the energy sector, avail vending machines at various outlets, or introduce smart prepaid meters as a way to enhance revenue generation.

2.5.1 Reforming the energy sector

The UNDP (2008) indicates that India launched a campaign in 2000 to control theft of electricity and improve revenue collection. According to Energy Information Administration (2010) in 1999 only 42% of Electricity in India flowing into the distribution system was accounted for on the basis of metered consumption. The theft took place in different ways including tapping electricity directly from power lines and by passing the prepaid meters with the assistance of staff from the power utility companies.

Creamer (2011) outlines the steps taken by the Indian power utility organization to address the revenue leaks. The Indian government enacted new laws on electricity theft, strengthened the law enforcement agents, gave the anti-corruption squad more authority and power in the energy sector, and re-engineered the power utility business processes to improve customer care and service. According to Davenport (2008) a process of changing management and staff incentives by punishing unethical behavior and poor performance was introduced. Furthermore, the transmission and distribution leakages were reduced from 42% in 1999 to

26% in 2003. Moreover, in the same period disciplinary action was taken against 218 members of staff at the power utility organization and a further 87 employees were charged by the state for teeming and lading with consumers in stealing electricity and tampering with prepaid meters. In 2003 the power utility organization in India dealt with 150 000 fraudulent cases involving electricity compared with 9 200 in 1993 and arrested more than 2 000 domestic consumers of electricity for tampering with prepaid meters. Barta (2011) points out that the power utility organization also set up customer relationship management systems and more centers serving customers as one stop shops for handling complaints and buying electricity.

2.5.2 Availability of vending machines

According to Kiprotich, Momanyi and Nyandusi (2012) the key to revenue collection using the post- paid system is debt collection, credit control, indigent management, customer care and management. However, they also allude to the fact that a prepaid system assists in eliminating short comings of the post -paid system. Amir et al (2011) say the provision of a number of outlets which close business at different times or, for instance, filling stations which operate for twenty four hours are the most ideal outlets to sell prepaid electricity vouchers. Kotler and Armstrong (2010) argue that a consumer buys product and or service because of its convenience. Amir et al (2011) also support Armstrong in that confining customers to the same fixed place of payment may result in customers seeking alternative and convenient ways that suit them. Furthermore, mobile phones are now being used to effect financial transactions wherever a customer may be. Consumers often look forward to buying a product or service conveniently from different outlets and vendors who operate for twenty four hours per day play an important role in this process.

2.5.3 Introduction of prepaid meters

According to Briceno – Garmendia and Shkaratan (2011) the UK in 2011 introduced smart meters and has since improved revenue collection by as a result of that decision. Furthermore, the smart meters were introduced to address the challenges that were being experienced with the prepaid metering system and have enhanced customer service and a resultant lower tariff. In support Borenstein (2008) observes that the introduction of smart meters improves the revenue base. However, Anders (2009) argues that new technological challenges may lead to more expensive tariffs in the near because overheads from research and development in the power utility organizations are always passed to the final consumer.

Nizar and Dong (2009) say that in extreme cases the whole prepaid metering system can be by passed resulting in non- detection of power consumption but smart meters have a protection against whole meter by passing. Furthermore, the smart meters often detect unregistered electricity load when fitted with an observer meter. They give an example of the gadget where it can be installed outside an apartment where it measure the energy consumed by the consumers residing there. The household meters then inform the observer meter of their corresponding measured units through the Short Messaging Service. If there is a significant variation the central meter will detect electricity theft.

2.5 Other empirical studies

Bangladesh

Mohammad, Barua and Arafat (2013) state that in Bangladesh the introduction of prepaid meters for basic utilities such as electricity and water sank the poor households deeper into poverty as they could not pay cash up front for the services. Nizar and Dong (2009) argue

that under the prepayment system the domestic consumers cannot afford to pay and will increasingly resort to alternatives like use of firewood and theft of electricity. Furthermore, poor households no longer have the grace to use payment plan on debt settlement while accessing electricity.

Kenya

In Kenya, Miyogo, Ondieke and Nashhppi (2013) argue that the elderly residents face challenges in using prepaid meters. They also state that most of the elderly residents are not familiar with the meters as they fail to understand signs like the flashing red light on their meters, signaling the need the domestic consumer to top up to avoid a power cut. Coupled with that they are also failing to recharge electricity leading to loss of revenue as they often seek alternative sources of power which are simpler for them handle.

North America

Joseph (2014) states that a leading technology provider to the global energy industry, Itron, observes that the deployment of prepaid meters in North America in 2008 has been limited with an adoption rate of 1% because of cost and consumer regulatory opposition. Due to cost constraints (USD225 –USD400 per house hold) the prepayment system has been heavily opposed. They further noted that the domestic customers had a history of non- payment and viewed the new system as economic discrimination.

2.6 Implications of literature review

Prepaid metering systems are introduced in economies by power utility organizations with different objectives as was the case, for example, in RSA in the 1980s where the same system resulted in a favorable change in the social welfare of the consumers in Argentina. From the

foregoing, it is essential that the views of the employees from the power utility organizations and domestic consumers of electricity regarding the changeover from post-paid system to the prepaid system be also critically examined. While better and positive change is expected by rational people, the power utility companies may need to be aware different expectations of their employees and the domestic prepaid consumers of electricity, as negative perception towards change may lead to resistance to change. Empirical studies indicate the different challenges faced by different nations when they introduced the domestic prepaid meters. Theft of electricity by domestic prepaid customers may also not be directly related to the introduction of domestic prepaid meters. This study will therefore attempt to close the gap between the power utility's objectives and the domestic prepaid consumers' expectations and offer solutions, and also the knowledge gap of theft of domestic electricity between the domestic consumer and the supplier of power.

2.6 Summary

While the objectives of introducing prepaid meters seem to vary they have helped to improve the timing of cash flows but reduced the revenue generation in some cases because of its reliability base. However, the roll out of smart metering seems to have contributed in electricity revenue generation and addressed most challenges of the prepared metering system. Poor utilization of existing resources, low customer satisfaction and lack of investment in the energy sector continues to affect the quality of service to consumers of domestic electricity. The next chapter outlines the plan that will be used by the researcher to collect data for the study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The chapter presents the researcher's plan of data collection. It will discuss the research design, the study population, the sampling techniques, the sample size, the respondents, data collection methods, research instruments, validity and reliability, ethical considerations, data presentation and analysis, and finally the summary of the chapter.

3.2 Research design

In this study, the researcher used descriptive design approach which used the questionnaire as the main instrument of data collection. Kumar (2012) says a descriptive design is a design that provides the summary of some aspects of the environment. It can also be viewed as a plan for the study which provides the research with overall framework for collecting data. The descriptive design was preferred ahead of all other for this particular study on the basis of its strength. The design enabled the use of questionnaire to solicit both quantitative and qualitative data from respondents. Leddy (2010) says that descriptive survey investigate in nature and allow accurate recording of observations. The design involves the estimation of percentages of units in a specified population, exhibiting the perceptions of target population as well as determining the degree to which research variables are associated. It is also concerned with relationships and best practices that exist, beliefs and processes that are ongoing, effects that are being felt, or trends that are developing (Best and Khan, 2000).

The descriptive design was useful in exploring relationships and permitting description of phenomenon and events under study. Descriptive design also proved to be useful in obtaining

factual or attitudinal information about people simply by asking them their opinions. The design enables the researcher to gather more information using questionnaires and interviews. It can also measure change in a situation, phenomenon, issue, problem or attitude. Descriptive design proved to be cheap and easy to design and execute becoming most appropriate design for measuring the impact or effectiveness of a program.

3.3 Case study

The researcher used case study research to bring out an understanding of the impact of domestic prepaid meter on revenue generation. Case studies emphasise detailed contextual analysis of a limited number of conditions and their relationships. Researcher Robert (2010) argues that researchers have used the case study research method for many years across a variety of disciplines. Robert (2010) defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used. The first step in carrying out the research study was to determine and define the research questions. The researcher then determined data gathering and analysis techniques. This lays preparation to collect the data and finally to evaluate and analyse the data. Yin (2008) said critics of the case study method believe that the study of a small number of cases can offer no grounds for establishing reliability or generality of findings. However, researchers continue to use the case study research method with success in carefully planned and crafted studies of real-life situations, issues, and problems.

3.4 Research population and sampling

According to Heiman (2009) any law of nature applies to a specific group of individuals. The entire group to which the law applies is called a population. The population contains all possible members of a group, so a population is usually considered to be infinitely large. In

this research we had a total of 6 management employees of ZETDC and so far 2000 consumers with prepaid electricity meters installed in Gweru urban. A sample is a relatively small subset of the population that is intended to represent, or stand for the population Heiman (2008). The individuals measured in a sample are called the subjects. Sampling is a process used in statistical analysis in which the predetermined number of observation will be taken from a large population. In any survey the researcher will find that sampling is one of the important considerations when there is a tight deadline and budget constraints.

The sample of this research is more inclined to ZETDC management as they are the ones who supervise audits and financial statements and are also responsible for revenue collections and monitoring. Other important players in this system are considered equitably and include ZETDC customers in Gweru. Judgmental sampling method, a form of non-probability sampling was used in selecting questionnaire and interview respondents (Monga, 2011). It involved selecting ZETDC Managers with particular traits, that is, who had knowledge of cash flow in particular and electricity payments in general. Judgmental sampling afforded a chance to get data from intended respondents from ZETDC Gweru selected and allowed flexibility in choosing respondent, (Mouton and Prozesky, 2005). The researcher felt a large sample was unrealistic given the limited time to conduct the research. The sampling frame is shown in the Table 3.1 which describes the population size, the sample size and their corresponding percentages.

Table 3.1 Sampling Frame

Respondents	Population Size	Sample Size	%ge of sample over population
ZETDC management Gweru	6	3	50%
ZETDC customers in Gweru urban	2000	50	2.5%

The researcher used purposive sampling method; in this technique the sample represents a group of different non-probability sampling techniques (Patton, 2009). Purposive sampling is also known as judgmental, selective or subjective sampling; purposive sampling relies on the judgement of the researcher when it comes to selecting the units. For the 2000 prepaid customers the researcher felt that a sample size of 50 will be realistic and manageable considering the limited time the researcher has to carry out the study.

3.5 Data source

The researcher made use of both primary and secondary data collection methods.

3.5.1 Primary data

Primary data collection was important particularly to this study because data collected was current and relevant such that conclusions drawn were reliably representative of the study area as well as of the particular time period it was collected. This data was collected using questionnaires that were administered to ZETDC customers in Gweru urban. Structured interviews were designed for ZETDC management in Gweru.

3.5.2 Secondary data

Secondary research can be described as the most widely used method for data collection and has allowed the researcher access to valuable information for little or no cost (Patton, 2009). It thus involved accessing information that is already gathered from either the originator or distributor of primary research. This included collecting information from third party sources such as texts, company web site, sales and accounting records, magazines, articles and reports. Therefore the researcher used previously gathered information from internal and external sources.

3.6 Research instruments

The researcher used three research instruments, which include the questionnaire, the interview and historical data analysis to collect both primary and secondary data. The researcher used the questionnaire as the main research instrument. Interviews were also used as well as desk research to improve the research quality. Primary data is information gathered through interviews and questionnaires. This is also called original data collected specifically for this research. Secondary data was also used in this research study. According to Saunders et al (2003) secondary data can provide a useful source from which to answer research questions. Secondary data for this research study was derived from company profiles, press releases and generated from the media. The collection and analysis of secondary data was through desk research and generated from the media.

3.6.1 Face to face interviews

The personal interview using semi-structured questions was used because it allows the highest flexibility of data collection. This instrument is less costly regarding the delimitation of the study and it provides instant feedback while also the researcher can spontaneously read

facial expressions of the respondents. The interviews targeted management of ZETDC in Gweru, secured by personal visit and telephone appointments. The researcher previously knew most of the respondents as they are workmates. This made it relatively easy to gain access to the respondents and this significantly helped the process of the interviews. The interviews were conducted at various premises of ZETDC in Gweru. Interviewer was able to see and assess respondents' non-verbal behaviour and habits. Unclear or vague answers or questions were clarified during the interview.

3.6.2 Questionnaires

This instrument was used for soliciting for information response directly from the respondent. It was carefully formulated, constructed and sequenced so as to obtain the most useful data in the most cost-effective manner. Pratt Fisher (2004) says, "The questionnaire was designed with the aim of finding out information presented in the research objectives." According to Jancowicz A. D (2005), the design of the questionnaire will affect the response rate and validity and reliability, which can be more enhanced by, careful design of individual questions and clear layout of the questions form. There are two types of questionnaires in use and these can be, open ended or closed ended in nature. According to Krosnick and Presser (2010), a decision has to be made at initial stage to decide whether to use closed questions or open ended questions within the questionnaire. The researcher in this study used closed ended questionnaire. These are designed in such a way that information gathering is not very complicated. Each response question is measured using a 5 point Likert scale denoting, Strongly agree (5), Agree (4), Uncertain (3), Disagree (2) and Strongly disagree(1) as proffered by Agarwal (2011). According to Venek (2012), a Likert scale is a psychometric response scale primarily used in questionnaires to answer closed ended questions and gauge degree of agreement.

3.7 Reliability

Reliability refers to the accuracy, stability, consistency, and dependability of the instrument and the information provided. To ensure reliability of the instruments, internal consistency has been used to evaluate the reliability of the instruments. Internal consistency refers to the use of different questions demanding the same answer in the same questionnaire to test truthfulness of information provided by the respondents. The researcher carried out a pilot study which helped to establish the instruments to be used in order for the instruments to measure what they are intended to measure before using them in the main study as some respondents are unable or unwilling to answer questions, the researcher made sure that respondents were informed about the essence of the research through an introductory letter. The researcher used simple language and resisted from using technical terms. Reliability was achieved through designing good questions by avoiding leading and ambiguous questions.

3.8 Validity

Sattler (2006) defines validity as ‘the extent to which a test measures what it is supposed to measure and also the appropriateness with which inferences can be made on the basis of the test results. Unless the test is valid for the particular purpose for which it is being used the results cannot be used with any degree of confidence.

Validity is concerned with whether the findings are really about what appear to be about. According to bell (2000), validity is concerned with ensuring that the question measures or describes what it intends to find. Even though a question has got high reliability it does not necessarily have high validity. The validity however deals with the general agreement between the theoretical concepts and empirical concepts. To strengthen the validity of the research, the researcher used Interviews and written documents. Interview guides were

assessed by project supervisors to ascertain whether the questions in the guide solicited for the answers to the research questions. Great care was used in choosing words and phrases which the target population could understand. The use of face to face interviews to the ZETDC employees and identified customers assured validity as answers to some questions could be checked from body language. It also allowed the interviewer to probe further on some questions. A valid response rate for this research will be values greater than 50%. Backstrom and Hursh (2009) argue that a high response rate implies that the research findings are unbiased and ensures more accurate research findings.

3.9 Ethical considerations

Hussey and Hussey (2009) suggested that ethics of research include debriefing, informed consent, confidentiality, protection of privacy, protection against harm and protection against identity. The researcher was guided by the above mentioned principles so as to get valuable information in an ethical way. Respondents were not coerced into participating in the research as there was an informed consent meaning that prospective research participants were fully informed about the procedures involved in the research. Furthermore participants were assured that information obtained was not to be available to anyone who is not directly involved in the study. Participants were also assured that they will remain anonymous throughout the study even to the research.

3.10 Data presentation

Data collected was mainly quantitative in nature. The researcher used tables, graphs and pie charts to present data in this study. All quantitative data is to be tabulated first before being further refined through means of data presentation tools. These were used to present responses made to questions from questionnaires and interviews.

3.11 Data analysis

This is a process of systematically applying statistical or logical techniques to describe and illustrate, condense, recap, and evaluate data as asserted by Wegner (2004).

Bodgan and Biklen, (2010) argue that data analysis is an integral part of any research process, such that without an appropriate analytical procedure it is impossible to come up with meaningful findings. Data analysis is the process of systematically searching and arranging the interview transcripts, field notes and other materials gathered to increase understanding and enable to present what is discovered to others.

In this research, data analysis was both statistical and descriptive as the data was expected to on corporate some quantitative characteristics. The data analysis used will consider measures of central tendency; mainly the mode.

3.12 Summary

The chapter discussed the research design for the study and its justification, the sampling techniques used and the sample size to be used to represent the study population, and then showed how data will be collected and used to achieve the research objectives. It indicated the importance of planning in a research study where it prepares for potential threats on the reliability and validity of the research instruments, and also shows how the data will be presented and analysed. The chapter defines limitations of methods used to collect data and states the relative measures to counter the potential challenges that maybe encountered in the field so that research results are capable of being evaluated either by the researcher or by others. The next chapter discusses data presentation and analysis of the findings.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

The previous chapter looked at the methodologies to be used in gathering the data for the study and this chapter presents data obtained from respondents from interviews and questionnaires. Quantifiable data will be represented in the form of charts, graphs and tables. The chapter starts with a description of the respondents that is their characteristics in terms of numbers. It is then followed by the analysis of the findings, which will be categorised into meaningful terms. The research objectives will guide the identification of the categories used.

4.1 Data Analysis on Questionnaires

Data obtained using questionnaires will be presented and analysed in this section.

4.1.1 Questionnaire response rate

A total of 50 Questionnaires were distributed to selected ZETDC domestic customers and 43 responses constituting 86% were returned. The 7 questionnaires that were not returned were as a result of the house holders being away during the time of collection of the questionnaires by the researcher. A total of 3 questionnaires were distributed to ZETDC managers and all 3 were returned constituting 100% response rate. Backstrom and Hursh (2009) argue that a high response rate implies that the research findings are unbiased and ensures more accurate research findings. The response rate is illustrated in Table 4.1 below

Category	Questionnaires sent	Questionnaires received	Response rate
ZETDC domestic customers	50	43	86%
ZETDC Managers	3	3	100%
TOTAL	53	46	87%

Table 4.1: Questionnaire response rate

Source: Primary Data

The table shows the questionnaire response rate where 46 questionnaires representing 87% were returned while 7 representing 13% were not returned back to the researcher. According to University of Texas (2011), a response rate of 50% on questionnaires is deemed to be adequate, 60% as good, while 70% is observed as very good. In Table 4.1 above, a response rate of 87% was obtained from the questionnaires sent out by the researcher on: The impact of the domestic prepaid meter on revenue generation: A case of ZETDC (Gweru) from 2012 to 2014. Linking these results to the conclusions of the University of Texas research (2011), the response rate falls into the “Very good” category and hence further analysis can be done based on this response rate.

4.2 Analysis of questionnaires for ZETD Ccustomers

Question 1: The following are challenges being faced by ZETDC domestic prepaid customers:

a) The power supply is reliable

The respondents' views are illustrated in Fig 4.1 below.

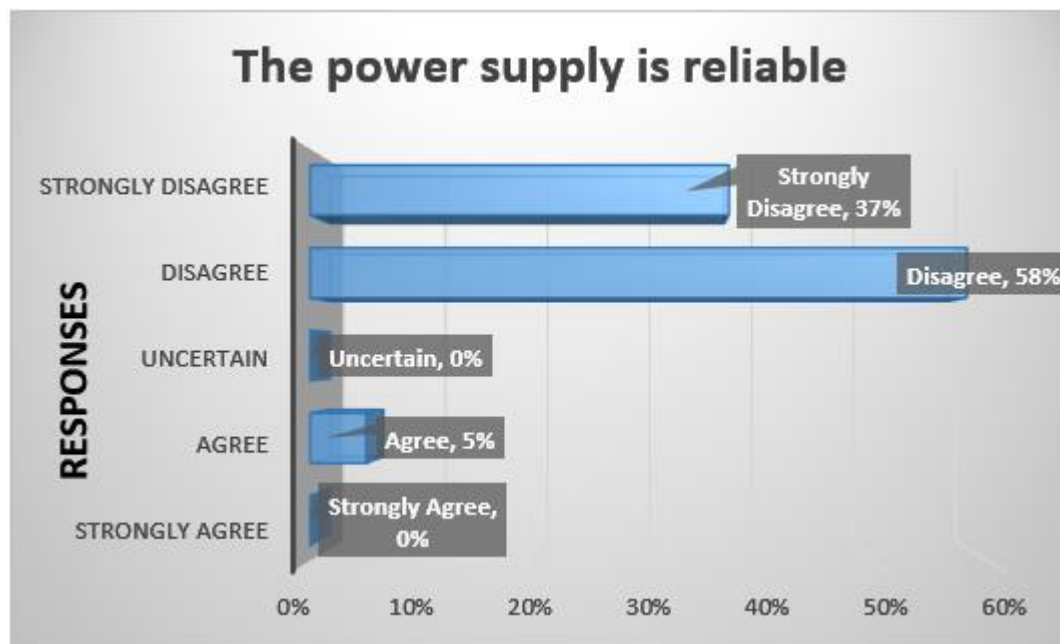


Fig 4.1. The power supply is reliable **Source: Primary Data**

The average Likert scale value of the responses was 1.73 showing that most respondents disagreed. Fig 4.1 above shows that 41/43 (95%) ZETDC domestic customers disagree with the point that power supply is reliable while only 2/43 (5%) agreed that power supply is reliable. If there are more power cuts it follows that the company will lose revenue. According to ZETDC spokesperson, Mr Fullard Gwasira, “the power utility produces an average of 1,300 megawatts of power compared with peak demand of 2,200 megawatts, resulting in daily rationing and blackouts that have paralyzed mines and industry, according

to the Confederation of Zimbabwe Industries” (The Herald Newspaper 20 May 2014).The UNDP (2010) also argues that most households and industries in Zimbabwe are subjected to between three and five hours of load shedding daily because of lack of investment in power generation since 1986. The modal response was 25 for disagree.

b) Breakdown of domestic meters

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	0	0	0	13	30	43
Percentages	-	-	-	30%	70%	100%

Table 4.2. Breakdown of domestic meters Source: Primary Data

The average Likert scale value of the responses was 1.3 showing that that domestic customers generally disagreed that domestic meters do breakdown. A total of 43/43 (100%) ZETDC domestic customers disagreed with the point that there is breakdown of domestic prepaid meters. None of the respondents agreed and also none were uncertain. Stoner (2009) says that in India there were so many reports of the domestic prepaid meters breaking down where the domestic prepaid customers went for several days before their challenges could be addressed, a situation which led to theft of electricity by the domestic prepaid consumers with the help of the power utility staff. However, according to the responses got by the researcher, there seems to be no breakdowns of prepaid meters in Gweru yet. The modal response was 30 for strongly disagree.

c) The vending machine is down most the time.

The customer responses on this question are illustrated in the bar graph below.

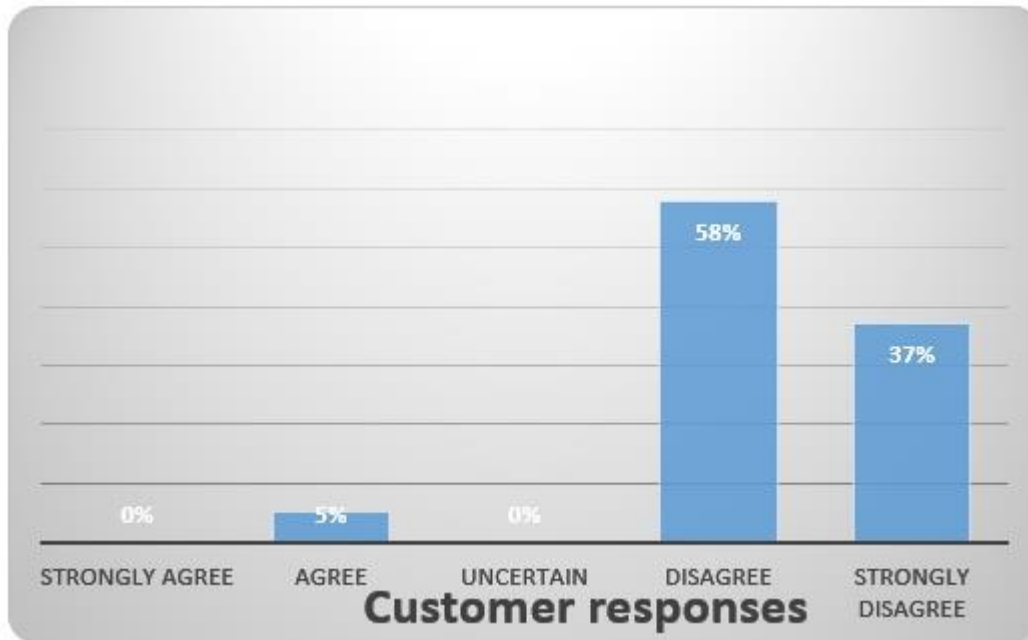


Fig 4.2. The vending machine is down most of the time. Source: Primary Data

The average Likert scale value of the responses was 1.73 showing that most of the customers disagree. Fig 4.2 above shows that 41/43 (95%) ZETDC domestic customers disagree with the point that the vending machine is down most of the times. Only 2/43(5%) agreed that the vending machine is down most of the time. Nnodim (2014) challenges the power utility organizations to ensure adequate infrastructure and resources before launching such a system as loss of service may erode confidence in domestic prepaid consumers and they may switch to other service providers even if the switching costs are high. For organizations such as power utilities with revenue models that depend solely on the internet to deliver services to customers, downtime can be particularly costly. Unplanned down time negatively impacts on revenue generation, reputation and loyalty. The modal response was 30 for strongly agree implying that customers said ZETDC vending machines are reliable.

1. Question 2: Has the introduction of prepaid domestic meters improved revenue generation?

a) I pay less since I shifted to the prepaid system.

The customer responses on this question are illustrated in the pie chart below.

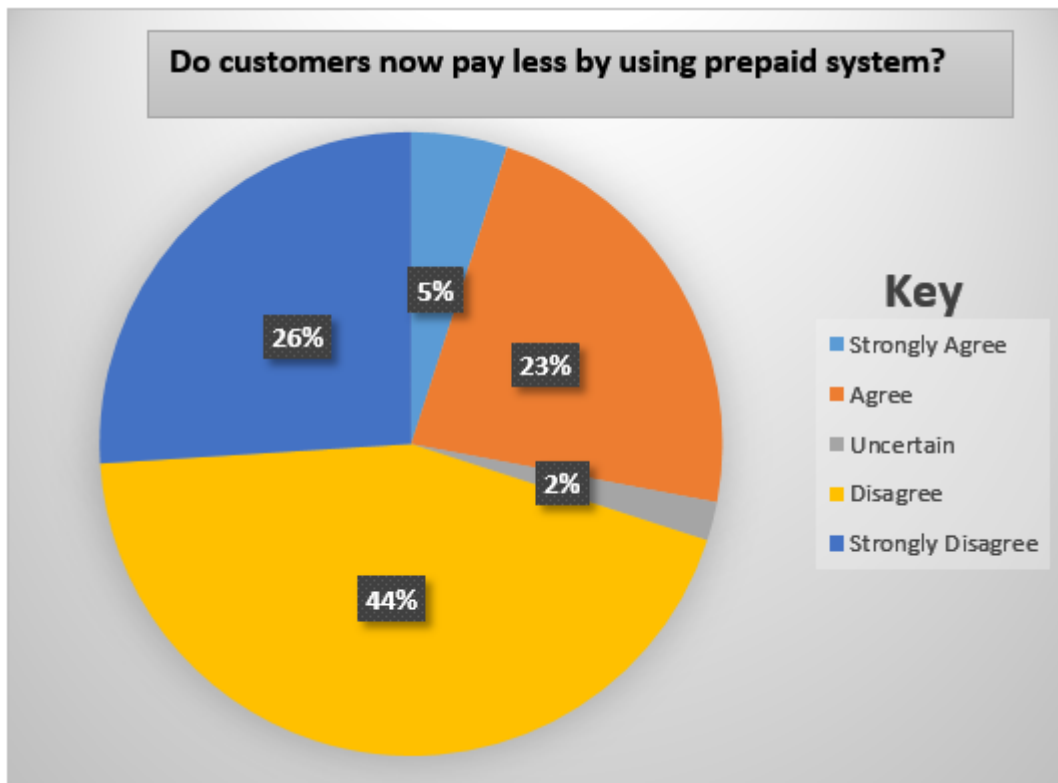


Fig 4.3 Do customers now pay less by using prepaid system?

Source: Primary data

The average Likert scale value of the responses was 2.37 showing slight disagreement. The pie chart in Fig 4.3 shows that 12/43 (28%) ZETDC domestic customers agree that they now pay less since they shifted to the prepaid system. Only 1/43 (2%) was uncertain. 30/43 (70%) of the respondents disagreed. Studies by Ariel, Casarin and Nicollier (2009) in Nigeria show that consumers become careful with the way they use electricity. The same view was confirmed by Ogujor and Otasowie (2010) where they observed that consumers become

sensitive in electricity consumption and that the degree of sensitivity is affected to an extent by the effectiveness and efficiency of the power utility company in providing the needed service. From the findings by the researcher, domestic prepaid electricity users in Gweru feel that they are paying more since the introduction of prepaid meters and this results in them using electricity sparingly. The mode response was Disagree with 19.

b) There is a limit for purchase of electricity.

The customer responses on the question whether there is a limit for purchase of electricity are illustrated in the bar graph in Fig 4.4 below.

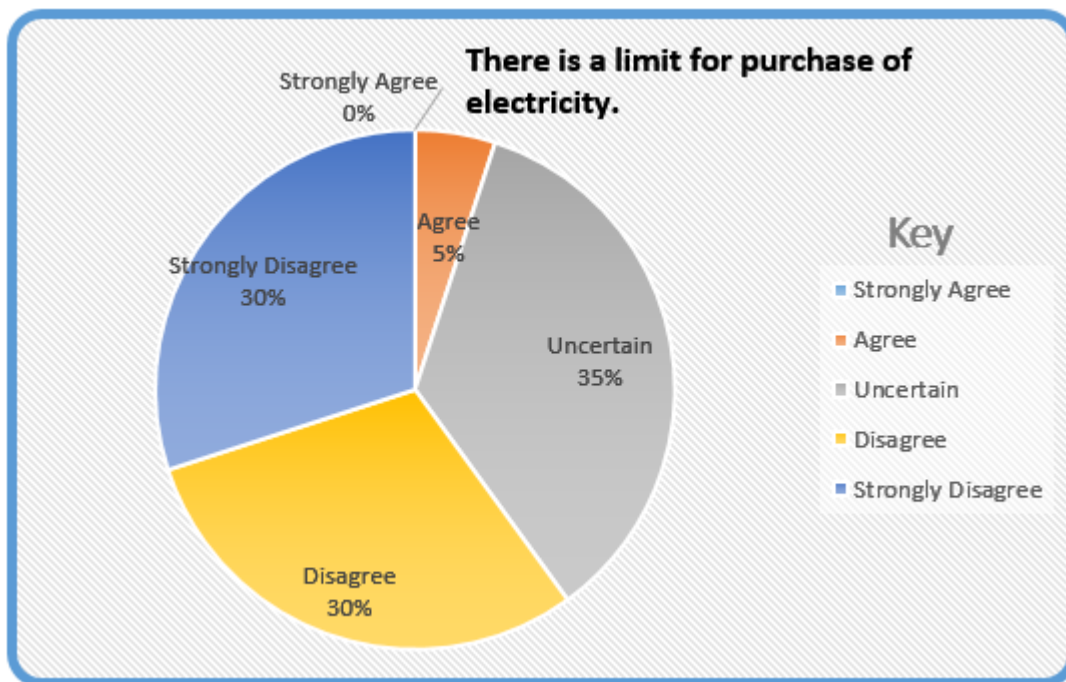


Fig 4.4. There is a limit for purchase of electricity.

Source: Primary Data.

The average Likert scale value of the responses was 2.15 showing that customers largely disagree. Fig 4.4 above shows that 2/43(5%) ZETDC domestic customers agree that there is a limit for purchase of electricity. Also 15/43 (35%) was uncertain and 26/43 (60%) of the

respondents disagreed. The findings by the researcher show that a large number of domestic prepaid electric users disagree with the fact there are a limit for purchase of electricity. However, a majority are also not certain whether there is a limit to the purchase of electricity. Sunday (2013) is of the opinion that the public relations officers of the power utilities may assist with campaigns by, for example, assuring consumers are aware of how much electricity they can purchase, i.e. the lower limit as well as the upper limit. The mode response was 15 for uncertain.

c) There is a minimum amount required when purchasing electricity.

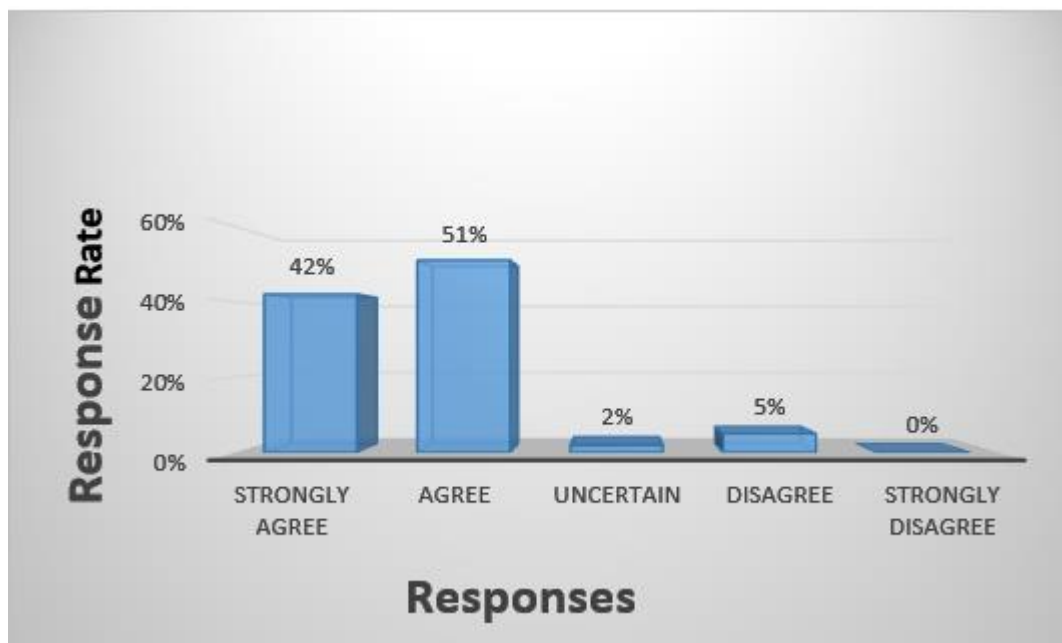


Fig 4.5 There is a minimum amount required when purchasing electricity

Source: Primary Data

The average Likert scale value of the responses was 4.3 customers strongly agree. Fig 4.5 above shows that 40/43 (93%) ZETDC domestic customers agree that there is a minimum amount required when purchasing electricity. Only 1/43 (2%) was uncertain and 2/43 (5%) of the respondents disagreed. Joseph (2014) is of the view that in order to deploy a lot of prepaid

meters at any one time, the whole programme must be cost effective. Operating costs should be minimized as much as possible but not at the expense of quality service. The Setting of a minimum amount for purchasing of electricity helps to cut costs on stationary as well as time. Results from the study shows that there is a general agreement that ZETDC has a minimum amount required when purchasing electricity. The modal response was 22 for agreed.

d) I now consume less power since I shifted to prepaid system

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	10	15	0	11	7	43
Percentages	23%	35%	-	26%	16%	100%

Table 4.3. I now consume less power since I shifted to prepaid system

Source: Primary Data

The average Likert scale value of the responses was 3.23 showing that respondents mostly agreed. Table 4.3 above shows that 25/43(58%) ZETDC domestic customers agree that they now consume less power since they shifted to prepaid system. None was uncertain and 18/43(42%) of the respondents disagreed. Stoner (2009) discovered that while the economic conditions in African countries may be unfavorable to the ordinary citizen resulting in lower disposable incomes, domestic consumers are generally reluctant to pay for services rendered to them. Furthermore, the domestic consumers are not even prepared to pay for at least half of an estimated bill citing reasons of prolonged power supply cuts, poor customer care services and harsh economic conditions. The research findings show that ZETDC customers now

consume less power since they shifted to prepaid system. The modal response was 15 for agree.

e) I am now careful with my consumption

The results of the researcher on whether customers are now careful with their consumption are represented on the bar chart below.

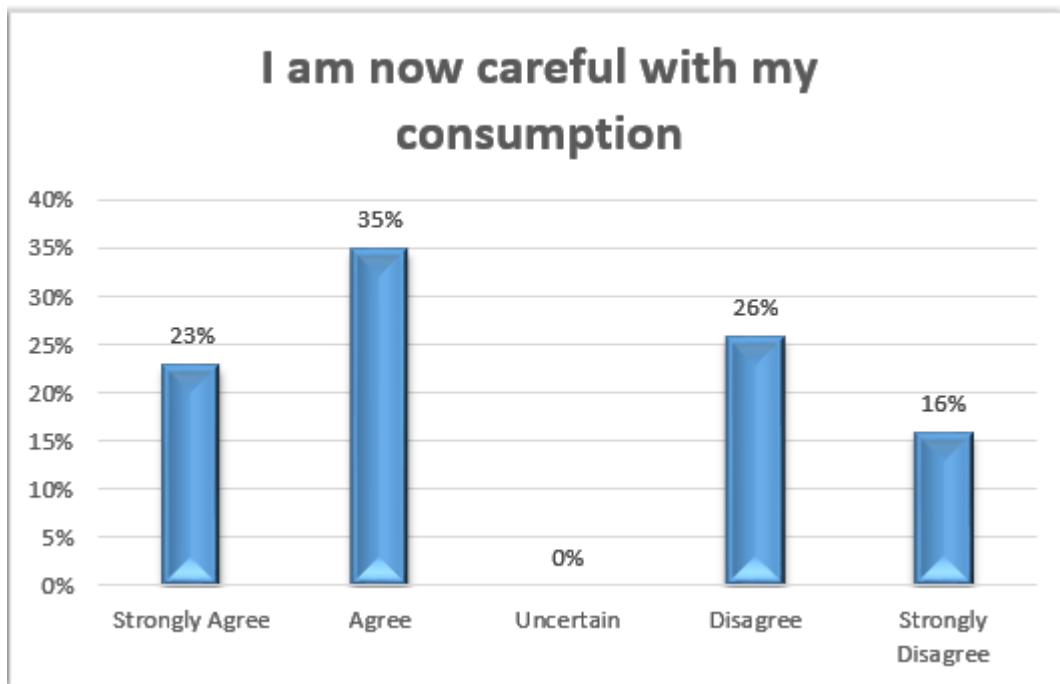


Fig 4.6. Are customers now careful with consumption **Source: Primary Data**

The average Likert scale value of the responses was 3.23 showing that respondents generally agreed. Fig 4.6 above shows that 25/43 (58%) ZETDC domestic customers strongly agree that they are now careful with their consumption of electricity. None was uncertain and 42% (18/43) of the respondents. Studies by Ariel, Casarin and Nicollier (2009) reveal that while the introduction of prepaid meters increases the revenue collection from domestic consumers, it reduces revenue generation because it is reliability based. Consumers become careful with the way they use electricity. The same view was confirmed by Ogujor and Otasowie (2010)

where they observed that consumers become sensitive in electricity consumption and that the degree of sensitivity is affected to an extent by the effectiveness and efficiency of the power utility company in providing the needed service. The study revealed that the majority of ZETDC customers in Gweru are now careful with their electricity consumption. The modal response was 15 for agreed.

Question 3: Has ZETDC improved customer satisfaction?

a) I experience more blackouts since I shifted to prepaid system

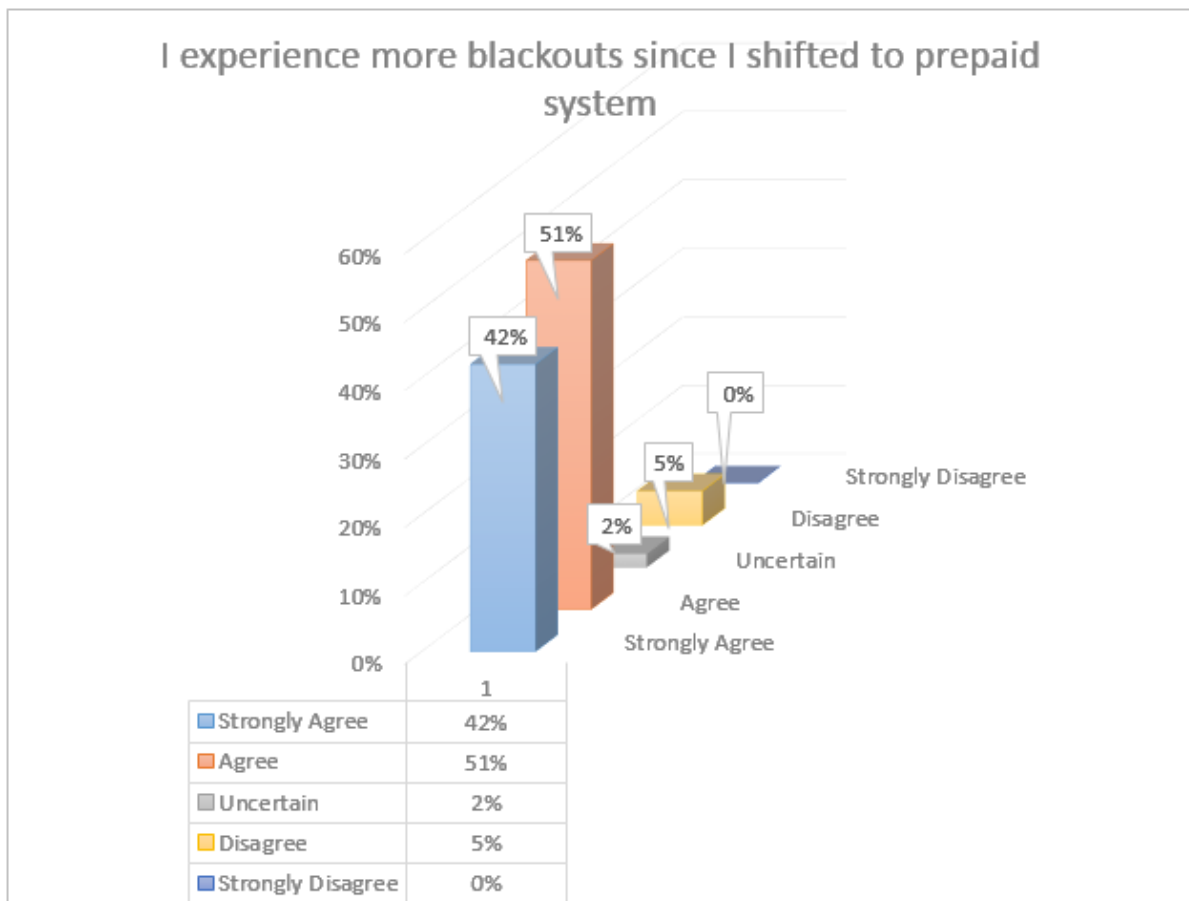


Fig 4.7. Do customers experience more blackouts since shifting to prepaid system

Source: Primary Data

The average Likert scale value of the responses was 4.3 showing that respondents generally agree. Fig 4.7 above shows that 40/43 (93%) ZETDC domestic customers strongly agree that they experience more blackouts since they shifted to prepaid system, while 22/43 (51%) agreed. Only 1/43 (2%) was uncertain. Only 2/43 (5%) of the respondents disagreed. According to ZETDC spokesperson, Mr Fullard Gwasira, “the power utility produces an average of 1,300 megawatts of power compared with peak demand of 2,200 megawatts”. This has resulted in daily rationing and blackouts that have paralyzed mines and industry, according to the Confederation of Zimbabwe Industries (The Herald Newspaper 20 May 2014). The UNDP (2010) also argues that most households and industries in Zimbabwe are subjected to between three and five hours of load shedding daily because of lack of investment in power generation since 1986. Furthermore, it states that no new power generation plants have been built in the country since Kariba in the early 1960s and Hwange power station since the mid of 1980. The study shows that ZETDC customers experience more blackouts since they shifted to prepaid system. The modal response was 18 for strongly agreed.

b) The prepaid vouchers and tokens are easily available whenever I need them.

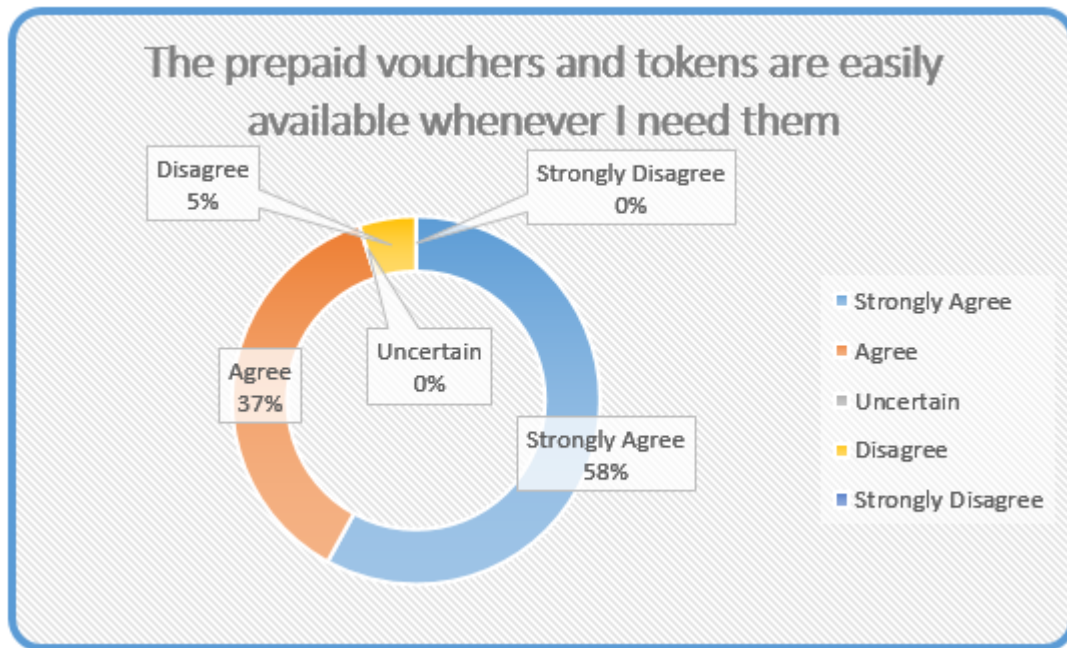


Fig 4.8. Are prepaid vouchers easily available? Source: Primary Data

The average Likert scale value of the responses was 4.48 showing that respondents strongly agree. Fig 4.8 above shows that 41/43 (95%) ZETDC domestic customers strongly agree with the prepaid vouchers and tokens are easily available whenever they need them. Only 2/43 (5%) disagreed that the prepaid vouchers are always available. Nnodim (2013) challenges the power utility organizations to ensure adequate infrastructure and resources before launching such a system as loss of service may erode confidence in domestic prepaid consumers and they may switch to other sources of energy even if the switching costs are high. For organizations such as power utilities with revenue models that depend solely on the internet to deliver services to customers, downtime can be particularly costly. Unplanned down time negatively impacts on revenue generation, reputation and loyalty. Down time costs due to network challenges include lost business with domestic consumers, both short term and long term, employee overtime and the value of lost data in some cases. Furthermore, it negatively

impacts on employee productivity in terms of idle time (Nnodim2013). Results from the study show that most customers find the prepaid vouchers and tokens are easily available whenever they need them. The modal response was 25 for strongly agreed.

c) I wish to change back to post-paid system given a chance.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	15	10	3	11	4	43
Percentages	35%	23%	7%	26%	9%	100%

Table 4.4. Customers wish to change back to post-paid system given a chance

Source: Primary Data

The average Likert scale value of the responses was 3.49 showing that respondents generally agree. Table 4.4 above shows that 25/43 (58%) ZETDC domestic customers agree that they wish to change back to post-paid system given a chance, while 10/43 (23%) agreed. Only 3/43 (7%) was uncertain. 15/43 (35%) of the respondents disagreed. Joseph (2014) agrees with Anyanrouh (2013) and advises that when implementing a prepayment system regard must be had to the needs of both the power utility organization and the domestic prepaid consumers. Lawal (2008) proposes that to effectively deal with strategies to satisfy domestic customers in power utility companies a critical review of the current revenue management business models and processes should be conducted. The research results show that while some ZETDC customers like the prepaid system, the majority wish to change back to post-paid system given a chance. The modal response was 35 for strongly agreed.

d) I spend little time at the outlet to buy electricity vouchers

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	10	15	0	11	7	43
Percentages	23%	35%	-	26%	16%	100%

Table 4.5. Customer spend little time waiting to buy electricity vouchers

Source: Primary Data

The average Likert scale value of the responses was 3.23 showing that respondents generally agree. Table 4.5 above shows that 10/43 (23%) ZETDC domestic customers strongly agree that they spend little time at the outlet to buy electricity vouchers, while 15/43 (35%) agreed. None was uncertain and 26% (11/43) of the respondents disagreed while 7/43 (16%) strongly disagreed. Amir et al (2011) say the provision of a number of outlets which close business at different times or, for instance, filling stations which operate for twenty four hours are the most ideal outlets to sell prepaid electricity vouchers. Kotler and Armstrong (2010) argue that a consumer buys product and or service because of its convenience. Amir et al (2011) also support Armstrong in that confining customers to the same fixed place of payment may result in customers seeking alternative and convenient ways that suit them. Furthermore, mobile phones are now being used to effect financial transactions wherever a customer may be. The study shows that while the majority of ZETDC customers are happy with service time, quite a number are still feel they are spending a lot of time at the outlet to buy electricity vouchers. The modal response was 15 for agreed.

4.3 Analysis of questionnaires for ZETDC managers

Question 1: Has the introduction of prepaid domestic meters improved revenue generation?

a) The objective of installing prepaid meters was to increase revenue.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	0	2	0	0	1	3
Percentages	-	67%	-	-	33%	100%

Table 4.6. The objective of installing prepaid meters was to increase revenue

Source: Primary Data

The average Likert scale value of the responses was 3 showing that respondents generally agree. Table 4.6 above shows that 2/3 (67%) ZETDC agreed that the objective of installing prepaid meters was to increase revenue, while 1/3 (33%) disagreed. Ogujor and Otasowie (2010) are of the view that that the introduction of prepaid meters is a move meant to improve and increase revenue generation and collection. Sunday (2013) also contends that the aim of installing prepaid meters for domestic use is to improve revenue collection and improve customer service. Hammons (2009) had earlier highlighted the benefits of prepayment metering system that both the customers and the power utility can enjoy and these include the elimination of collection arrears and unpaid bills, lower overheads since there is no meter reading resulting in cheaper electricity and increased usage, elimination of incorrect billing because no bills are sent to the customers, removal of the need to staff from the power utility to disconnect or reconnect errant consumers, load control, elimination of

rechecking meter readings and estimated bills, detection of tampering of meters and theft of electricity, and an earlier positive cash flow for the power utility against an arrangement where payment will be expected after use (Hammons 2009). The study revealed that objective of installing prepaid meters by ZETDC was to increase revenue. The modal response was 2 for agreed.

b) The introduction of domestic prepaid meters has improved revenue generation

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	1	1	0	0	1	3
Percentages	33%	33%	-	-	33%	100%

Table 4.7. The introduction of domestic prepaid meters has improved revenue generation

Source: Primary Data

The average Likert scale value of the responses was 3.33 showing that respondents generally agree. Table 4.7 above shows that 2/3 (67%) ZETDC managers strongly agree that the introduction of domestic prepaid meters has improved revenue generation. Also 1/3 (33%) disagreed. Ogujor and Otasowie (2010) are of the view that that the introduction of prepaid meters is a move meant to improve and increase revenue generation and collection. Furthermore, the standards of living have generally increased over the past decade, with increased use of home appliances leading to increased demand of electricity and potential revenue for the energy sector. Studies by Ariel, Casarin and Nicollier (2009) reveal that while the introduction of prepaid meters increases the revenue collection from domestic consumers, it reduces revenue generation because it is reliability based. Consumers become careful with

the way they use electricity. The study revealed that introduction of domestic prepaid meters has improved revenue generation.

Question 2: How do other utilities satisfy their domestic customers and maximize on revenue collection?

a) **We were involved in sensitizing the domestic consumers on the benefits of using prepaid meters.**

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	2	1	0	0	0	3
Percentages	67%	33%	-	-	-	100%

Table 4.8. Managers were involved in sensitizing the domestic consumers on the benefits of using prepaid meters. **Source: Primary Data**

The average Likert scale value of the responses was 4.67 showing that respondents strongly agree. Table 4.8 above shows that 3/3 (67%) ZETDC managers agreed that they were involved in sensitising the domestic consumers on the benefits of using prepaid meters. Sunday (2013) is of the opinion that the public relations officers of the power utilities may assist with campaigns by, for example, assuring consumers that if there are system failures the power utility will compensate the customer for the loss of his or her normal consumption units. Brassing and Pettit (2012) suggest that introducing promotions, competitions and tips on how power may be saved or assist the domestic customers with electricity budgets. That way the domestic consumers will understand the benefits of using prepaid meters. The study

shows that management in Gweru was involved in sensitizing the domestic consumers on the benefits of using prepaid meters. The modal response was 2 for strongly agreed.

b) Prepaid domestic customers are still experiencing load shedding

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	1	1	0	1	0	3
Percentages	33%	33%	-	33%	-	100%

Table 4.9. Prepaid domestic customers are still experiencing load shedding

Source: Primary Data

The average Likert scale value of the responses was 3.67 showing that respondents generally agree. Table 4.9 above shows that 2/3 (67%) of the ZETDC managers strongly agree that prepaid domestic customers are still experiencing load shedding. Also 1/3 (33%) was disagreed. A research conducted by Ogujor (2010) reveals that most power utility organizations in Southern Africa continue to supply inadequate electricity due to one or a combination of factors such as economic growth of the member state, increase in demand of minerals, inadequate investment in power generation and transmission, and rural electrification. In agreement, Amigun, Musango and Brent (2011) state that when an economy grows it is often accompanied with an increase in domestic consumption of electricity. The Energy Information Administration (2010) indicates that new mining companies such as those mining platinum and coal in the SADC region such as Zimbabwe and Mozambique respectively have contributed to the demand in industrial energy at the expense of domestic electricity supply. The findings by the researcher also show that there is inadequate supply of electricity in Zimbabwe.

Question 3: What are the possible remedies available to the power utility company to overcome its challenges in revenue generation?

a) There are strong penalties for customers who tamper with prepaid meters

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	2	1	0	0	0	3
Percentages	67%	33%	-	-	-	100%

Table 4.10. There are strong penalties for customers who tamper with prepaid meters

Source: Primary Data

The average Likert scale value of the responses was 4.67 showing that respondents generally agree. Table 4.10 above shows that 3/3 (100%) of the ZETDC managers agree that they are strong penalties for customers who tamper with prepaid meters. According to Davenport (2008) a process of changing management and staff incentives by punishing unethical behavior and poor performance was introduced. In India the transmission and distribution leakages were reduced from 42% in 1999 to 26% in 2003. Moreover, in the same period disciplinary action was taken against 218 members of staff at the power utility organization and a further 87 employees were charged by the state for teeming and lading with consumers in stealing electricity and tampering with prepaid meters. In 2003 the power utility organization in India dealt with 150 000 fraudulent cases involving electricity compared with 9 200 in 1993 and arrested more than 2 000 domestic consumers of electricity for tampering with prepaid meters. According to the study, there are strong penalties for customers who tamper with prepaid meters in Zimbabwe. The modal response was 2 for strongly agreed.

b) There are cases of domestic customers who have been apprehended since the introduction of prepaid meters for electricity theft.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	TOTAL
Responses	2	1	0	0	0	3
Percentages	67%	33%	-	-	-	100%

Table 4.11. There are cases of domestic customers who have been apprehended

Source: Primary Data

The average Likert scale value of the responses was 4.67 showing that respondents generally agree. Table 4.11 above shows that 3/3 (100%) ZETDC domestic customers strongly agree that there are cases of domestic customers who have been apprehended since the introduction of prepaid meters for electricity theft. Creamer (2011) outlines the steps taken by the Indian power utility organization to address the revenue leaks. The Indian government enacted new laws on electricity theft, strengthened the law enforcement agents, gave the anti-corruption squad more authority and power in the energy sector, and re-engineered the power utility business processes to improve customer care and service. Results from the study show that there are cases of domestic customers who have been apprehended since the introduction of prepaid meters for electricity theft in Gweru. The modal response was 2 for strongly agreed.

4.4 Analysis of interviews for ZETDC managers

An analysis of the responses to interviews carried out will be analysed in this section

4.4.1 Interviews response rates

A total of 3 interviews were scheduled with ZETDC managers in Gweru urban offices. All the interviews were successfully carried out representing 100%. The interview response rate is shown in the table below.

Category	Scheduled interviews	Interviews carried out	Response rate
Total	3	3	100%

Table 4.12 Interviews response rate

Source: Primary data

4.4.2 Interviews analysis

Question 1: Has pre-paid metering increased ZETDC revenue inflow?

The results from the interviews show that there is a mixed feeling on whether prepaid meters have helped to increase revenue inflow at ZETDC. 2/3 (67%) of the interviewees said that revenue inflow had increased while 1/3 (33%) interviewee said that there has been no improvement on revenue inflow but there has been a cut on expenditure. The utility company has cut costs on reading meters and billing as well as printing and distribution of statements to customers. Ogujor and Otasowie (2010) are of the view that that the introduction of prepaid meters is a move meant to improve and increase revenue generation and collection. Sunday (2013) contends that the aim of installing prepaid meters for domestic use is to improve revenue collection and improve customer service. Hammons (2009) had earlier highlighted the benefits of prepayment metering system that both the customers and the

power utility can enjoy and these include the elimination of collection arrears and unpaid bills, lower overheads since there is no meter reading resulting in cheaper electricity and increased usage, elimination of incorrect billing.

Question 2: What are the challenges brought by prepaid metering system?

ZETDC managers highlighted a number of challenges. All 3/3 (100%) the interviewed managers agreed that the major challenge is power theft through tempering with the meter. Other challenges cited included that of meter faults as well as financial constraints in completing the program of installing prepaid meters. Stoner (2009) says that in India there were so many reports of the domestic prepaid meters breaking down where the domestic prepaid customers went for several days before their challenges could be addressed. Joseph (2014) also noted that there are challenges and issues of the domestic prepaid system which are linked to the domestic consumer's fraudulent practices. Mohammed, Barua and Arafat (2013) advances that the theft of electricity is so huge in some African states that power utilities are incurring some financial losses instead of getting revenue. The financial loss results in shortage of funds to meet and expand existing power generation and transmission lines leading to failure of power utility companies to satisfy the ever increasing demand of electricity.

Question 3: Has your organisation achieved its objectives by installing prepaid meters?

The interviews showed that ZETDC has gone a long way in meeting its set objectives. Their major objective was to minimise power demand by encouraging customers to use electricity sparingly. Another objective was to encourage customers to pay their outstanding bills as well as the current bills. All 3/3 (100%) the interviewees cited that this is no longer an issue

since customers have to pay for electricity before they use the energy. Prepayment system is described by Kotler and Armstrong (2010) as a process where the customer makes a payment for using goods or services before enjoying the use of such goods or services. Zahedi (2010) states that such systems allow the customers to consume electricity only when they have credit in the electricity account and when the credit is exhausted the supply automatically discontinues.

Question 4: What efforts have you made to recover debts owed by domestic customers?

From the interviews 2/3 (67%) of the managers revealed that ZETDC has designed a payment plan whereby the utility allows owing customers to purchase electricity but deducts 20% from the purchase to settle the debt. Another 1/3 (33%) of the interviewed managers also stated that there are some customers have made payment plans with the company on settling their debts. Joseph (2014) states that a leading technology provider to the global energy industry, Itron, observes that the deployment of prepaid meters in North America in 2008 has been limited with an adoption rate of 1% because of cost and consumer regulatory opposition. Due to cost constraints (USD225 –USD400 per house hold) the prepayment system has been heavily opposed. They further noted that the domestic customers had a history of non-payment and viewed the new system as economic discrimination.

Question 5: How do you intend to counter challenges arising from installation of prepaid meters?

The researcher gathered that ZETDC has lined up a number of measures to counter challenges arising from installation of prepaid meters. On the issue of customers tempering with prepaid meters, all 3/3 (100%) of the interviewees said that the utility company is

embarking on a move to install these meters on electricity poles outside households. The financial constraints will be solved by engaging the government and private companies to partner with ZETDC and support the programme so that every house is installed with a prepaid meter. Another interviewee also revealed to the researcher that the utility's Loss Control Unit (LCU) is planning to install Geographical Information Systems (GIS) on households. The GIS system will provide information to the system stationed at the offices. The LCU will be able to detect tempering of meters. Amigun, Musango and Brent (2011) argue that despite the availability of resources in the SADC region, most countries in southern Africa suffer from energy crisis due lack of expertise. In addition, the few engineers, artisans and other personnel that were there have since left the continent where there are better working conditions. As a result the broken down prepaid meters have not been repaired or attended to.

4.5 Chapter summary

The chapter presented and analysed data from primary sources namely, questionnaires and interviews carried out by the researcher using tables and graphs. It has been noted that there is collaboration between primary data and secondary data collected through journals, textbooks and other secondary sources. The analysis laid bare the phenomenon of prepaid metering and its effects of revenue generation and collection. The next chapter will now give conclusions on the study and also suggest recommendations to both the ZETDC power utility and their prepaid electricity customers.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter focuses on executive summaries, conclusions, recommendations and suggests areas of further research to authors interested in the impact of the domestic prepaid meters on revenue generation. The recommendations are the view that if properly implemented will improve the revenue generation at ZETDC.

5.1 Executive summary

Chapter one introduced the background to the study at ZETDC on the impact of the domestic prepaid electricity meters on revenue generation. The statement of the problem, the main research question, the research questions and the objectives were outlined. The first chapter also indicated the limitations of the research, the delimitations and the justification of the study. The terms that perceived to of importance in the study were defined.

Chapter two focused on the analytical review of the literature on various on various authors on the impact of the domestic prepaid electricity meters on revenue generation. Fornell, Rust and Dekimpe (2010) gave valuable literature on the challenges of installing prepaid meters and the challenges which are encountered on revenue collection from a study in Kenya. Mohammed, Barua and Arafat (2013) also gave the solutions that can be adopted to enhance revenue inflow and the controls that should be adopted to improve stop power theft and revenue leakages from a study in India.

Chapter three covered research methodology used to gather data and establishment of research interview questions. The researcher implemented descriptive research design and stratified sampling. The researcher followed quantitative research. The researcher further indicated the population required for sampling, validity and reliability of data gather.

Chapter four covered data presentation and analysis gathered from questionnaires and interviews conducted at ZETDC in Gweru and domestic prepaid customers in Gweru. There was a response rate of 87% from questionnaires and all the three interviews planned were conducted. The research findings were analysed using tables, charts and graphs.

5.2 Conclusions

The objective of the study was to investigate the challenges being faced by ZETDC in implementing the prepaid electricity meters in Gweru. The challenges noted include tempering of the prepaid meters by customers and also financial constraints. The power utility has plans to install the prepaid meters on poles outside households so that the meters are not reachable. On finance, the utility company is engaging the government as well as private organizations to support the programme.

The study also exposed that consumers have since become sensitive in electricity consumption and that the domestic prepaid electricity users in Gweru feel that they are paying more since the introduction of prepaid meters and this results in them using electricity sparingly. In general, ZETDC customers now consume less power since they shifted to prepaid system.

The introduction of prepaid meters came with benefits which include the elimination of expenses incurred in collection arrears and unpaid bills, lower overheads since there is no meter reading resulting in cheaper electricity and increased usage, elimination of incorrect billing because no bills are sent to the customers, removal of the need to have staff from the power utility to disconnect or reconnect errant consumers. The study revealed that introduction of domestic prepaid meters has improved revenue generation to a large extent.

The findings by the researcher also show that there is inadequate supply of electricity in Zimbabwe and that ZETDC customers continue to experience blackouts since they shifted to the prepaid system. ZETDC management in Gweru feels that there are strong penalties for customers who tamper with prepaid meters in Zimbabwe.

5.3 Recommendations

- i. ZETDC must move fast in implementing measures installing prepaid meters on poles outside households to curb power theft by unscrupulous customers who team up with rogue ZETDC employees to tamper with prepaid meters. Power theft is heavily bleeding the power utility of its revenue.
- ii. The government of Zimbabwe should source funding for the power utility company to renovate and upgrade power generation plants. This will enable ZETDC to meet the power demands of the customers and lessen load shedding. If there is less power generated it means that the utility will lose revenue.
- iii. ZETDC must carry out awareness campaigns to discourage customers from tampering with prepaid meters.
- iv. ZETDC must increase prepaid vouchers selling points and also extend opening hours so that customers do not spend much time in queues.

- v. The power utility must approach customers who owe and encourage them to pay up even beyond the 20% deduction being made on sales.

5.4 Areas of further study

Future research that replicates the present study in other government led institutions could lead to better understanding of the concepts presented in this study. Further research can also examine the extent to which the findings in this research can be applied to the improvement of service delivery in the energy sector.

5.5 Chapter summary

The summary assessed the major findings from the research study and recommendations have been suggested to the power utility and to the government of Zimbabwe.

BIBLIOGRAPHY

Amir et al (2011). “Management Introduces RCM Project.”NEPA Review. (July-Sept, 2001): Vol 6 pp 35-56.

Amit and Mohnish (2011) B-A Prepaid Meter using mobile Communication: International Journal of Engineering, Science and Technology.

Annon (2010) Executive Information System Implementation in organisations in South Africa and Spain: A comparative analysis, Computer Standards and Interfaces, August, Vol 28(6), pp 625-634.

Anyanrouh (2013) Cognitive Process Used by Survey Respondents to Answer Behavioral Frequency Questions, Journal of Consumer Research, Vol 4, pp 280-288

Barta (2011) Municipalities and Finance: A Sourcebook for Capability Building”, Earthscan, London, ch4.

Best and Khan (2000) Prepaid meters in electricity: A cost benefit analysis, Working Paper Series, IAE Business School, Austral University, March, 2009.

Barta (2011) Developing the Computer Self- efficacy Scale investigating the relationship between Self efficacies, Gender and experience with computer, journal of Education computing research, Vol 26 (2) pp 133-135.

Bodgan and Biklen (2010) Energy policy 31 (2003) 911-927.

Bond (2011) Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology, IS Quarterly, 3, 3, 319-342.

Borenstein (2008) User Acceptance of Computer Technology: A Comparison of Two Theoretical Models, Management Science, 35, 8, 982- 1003.

Brassing K. and Pettiti V. (2012) “Business Process Management: Survey and Methodology”, IEE Transactions on Engineering Management (42:2), pp119-128.

Briceno-Garmendia and Shkaratan (2011):”Infrastructure Reform and the poor learning from Latin America’s Experience” LAC Regional Studies Program, WBISTudies in Development

Cassrin O. and Nicollier P. (2009), Revenue Management: Maximising revenue in Hospitality.

Christie (2012), “Water Subsidy Policies: A Comparison of the Chilean and Colombians Schemes.” The World Bank Economic Review, Voll7, 3: pp391-407.

Colosi (2006), Modeling and analysis of business process Haryana and International Good Practices, World Bank and Ministry of <http://books.google.co.uk/books?id=9JV4f>

Consumer Council of Zimbabwe (2013).

Creamer L. (2011). A Test of Technology Acceptance Model: The Case of Cellular Telephone Adoption In: Proceedings of the 33rd Hawaii International Conference on System Sciences (HICSS-33), Hawaii, And USA.

Depur S SS, Wang R, LandDevabhaktuni, V (2011)An Empirical Study of Perceived Usefulness and Perceived ease of Use on Support System Use over Time. International, journal of information management, VOL 14 (45) pp317-329.

Edkins and Marquard and Winkler (2010)India: Improving Urban Water Supply and Sanitation Service Provision” Lessons from Business Plans for Maharashtra, Rajasthan, Haryana and International Good Practices”, World Bank and Ministry of Urban Development, India.

Fitch J. and Graham H. (2009) UK “India: Improving Urban Water Supply and Sanitation Services Provision. Lessons from Business Plans for Maharashtra, Rajasthan, reengineering, International Journal of Production Research, vol 40, no.11.

Fornell M, Rust I. and Dekimpe U. (2010), Reliability Assessment of Electric Power Distribution: A Case study of 2 x 15MVA, 33/11Kv Ugbowo Infection Substation” Ph.D. Thesis University of Benin: Benin City. Nigeria

Glasser F. and Strauss J. (2009), The Impact of Revenue Management Decisions on Customer Attitudes and Behaviours: A case study of Leading UK Budget Hotel Chain

Hammon J. and Naidoo Y. (2009). Revenue management under a general discrete choice model of consumer behaviour. Management Science, 50(1): 15-33

Heiman O. (2009). Distributional Effects of Liberalising, UK Residential Utility Markets Fiscal Studies Vol 19: pp295-320

Holmet U. (2008) “Installation of Individual Water Meters Increases Revenue collection efficiency by 15 Urban Developments, India

Fornell, C., Rust, R.T and Dekimpe, M.G (2010). The Effect of Customer Satisfaction on Consumer Spending Growth. Abstract. Journal of Marketing Research (JMR) Volume 47, Number 1. Available on

<http://www.marketingpower.com/AboutAMA/Pages/AMA%20Publications/AM>

[A%20Journals/Journal%20of%20Marketing%20Research/TOCs/SUM_2010.1/Effect_of_Customer_Satisfaction.aspx](http://www.marketingpower.com/AboutAMA/Pages/AMA%20Publications/AM%20Journals/Journal%20of%20Marketing%20Research/TOCs/SUM_2010.1/Effect_of_Customer_Satisfaction.aspx). Downloaded on 18th August 2013.

Hong, K. K., & Kim, Y. G. (2002). The critical success factors for ERP implementation: An organizational fit perspective. Information & Management, vol. 40, 25–40.

- Hope, K. R. Sr. (2001). The new public management: Context and practice in Africa. International Public Management Journal, Vol. 4, pp.119-134
- Levasseur, R. E. (2001). People Skills: Change Management Tools – Lewin’s Change Model. Interfaces, vol. 31(4): 71-73.
- Njeje N. (2007). Assessment of the Levels of Training and Development in Trade Union and Their Effects on Industry. Unpublished MBA report, Egerton University, Kenya.
- Njoroge, J. (2005). Power Quality in the Competitive Market: The Consumer Perspective on Monitoring, Reporting and Benchmarking of Service Quality”, 18th International Conference on Electricity Distribution, Turin.Session Two
- Ogujor, E.A (2007). Reliability Assessment of Electric Power Distribution: A case study of 2 x 15MVA, 33/11kV Ugbowo Injection Substation. PhD Thesis: University of Benin, Benin City. Nigeria.
- Ofir, C and Simonson, I (2007). The Effect of Stating Expectations on Customer Satisfaction and Shopping Experience (Abstract). Journal of Marketing Research, Vol. XLIV, No. 1, February 2007. Available at <http://www.marketingpower.com/AboutAMA/Pages/AMA%20Publications/AMA%20Journals/Journal%20of%20Marketing%20Research/TOCs/summary%20fe%202007/Effectjmrfeb07.aspx>. downloaded on 18th August 2013.
- OgujorE.A. and Otasowie P. (2010). Pre -Paid Meter: Impact On Revenue Generation In Nigeria”. International Journal of Academic Research Vol. 2. No. 3. Pp. 54-57
- Powell, C. (2001). A Leadership Primer, Department of the Army United States of America, Washington D. C.

Rogerson, M. (2001). Resistance and the Background Conversations of Change. Journal of Organizational Change Management. Vol. 15 (2): 105-121

Stoner, A. (2009). 22nd AMEU Technical Convention 36 AMEU Proceedings 2009: Pretoria: South Africa.

A Paper Presented in A Conference on Future Global Energy Needs held in South Africa.

Stratman, J. K., and Roth, A.V. (2002). Enterprise resource planning (ERP) competence constructs: Two-stage multi-item scale development and validation. Decision Sciences Journal, vol. 33, 601–626.

Sornes, M., Stephens B, Saetre T. and Browning S. (2004). “Centralisation and governance: Does decentralization improve public service delivery”? The World Bank PREM Notes No. 55, June 2001.

Taylor, H. (2001). “Human resources management and new public management: Two sides of a coin that has low value in developing countries’ in W. McCourt and M. Minogue (Ed.). The Internationalization of Public

Management: Reinventing the Third World State, Edward Elgar, Cheltenham.

Tewari, D. D. and T. Shah, (2003). An Assessment of South African prepaid electricity experiment, Lessons learned, and their policy implications for developing countries. Energy Policy Vol. 31, 911 – 927.

APPENDIX 1 –Letter of permission

Midlands State
University
Established 2000



Midlands State University
Private Bag 9055
Senga
Gweru

30 August 2014

The General Manager
ZETDC Southern Region
P O Box 34
Gweru

Dear Sir

APPLICATION FOR AUTHORITY TO CARRY OUT RESEARCH AT ZETDC

My name is Loice Dube, a fourth year student at Midlands State University undertaking the Bachelor of Commerce Accounting Honours Degree. The research is entitled: **“The impact of the domestic prepaid meter on revenue generation: A case of ZETDC (Gweru) from 2012 to 2014”**.

The research is submitted in partial fulfilment of the requirements of the Bachelor of Commerce Accounting Honours Degree at Midlands State University. I am kindly seeking permission to conduct the research.

Your support is highly appreciated.

Yours Faithfully

Loice Dube (Registration Number R0224866)

APPENDIX 2- Questionnaire for ZETDC domestic customers

My name is Loice Dube, I am a Midlands State University student studying for an Honours Degree in Accounting. As part of my studies I am required to do a research project for which these questions have been prepared to help collect data. My research topic is entitled “**The impact of the domestic prepaid meter on revenue generation: A case of ZETDC (Gweru) from 2012 to 2014**”. All responses will be treated in the strictest of confidence and will only be used for academic purposes.

Instructions

Do not write your name anywhere on this questionnaire

Respond to all questions

Place a tick in the appropriate box or boxes or fill the in space provided (comment).

KEY

SA Strongly Agree

A Agree

U Uncertain

D Disagree

SD Strongly Disagree

1. The following are challenges being faced by ZETDC domestic prepaid customers.

	SA	A	U	D	SD
a) The power supply is unreliable					
b) Breakdown of domestic prepaid meters					
c) The vending machine is down most of the time.					

2. Has the introduction of prepaid domestic meters improved revenue generation?

	SA	A	U	D	SD
a) I pay less since I shifted to the prepaid system					
b) There is a limit for purchase of electricity					
c) There is a minimum amount required when purchasing electricity					
d) I now consume less power since I shifted to prepaid system					
e) I am now careful with my consumption of electricity					

3. Has ZETDC improved customer satisfaction?

	SA	A	U	D	SD
a) I experience more blackouts since I shifted to prepaid system.					
b) The prepaid vouchers and tokens are easily available whenever I need them					
c) I wish to change back to post- paid system given a chance.					
d) I spend little time at the outlet to buy electricity vouchers.					

APPENDIX 3- Questionnaire for ZETDC Managers

My name is Loice Dube; I am a Midlands State University student studying for an Honours Degree in Accounting. As part of my studies I am required to do a research project for which these questions have been prepared to help collect data. My research topic is entitled “**The impact of the domestic prepaid meter on revenue generation: A case of ZETDC (Gweru) from 2012 to 2014**”. All responses will be treated in the strictest of confidence and will only be used for academic purposes.

Instructions

Do not write your name anywhere on this questionnaire

Respond to all questions

Place a tick in the appropriate box or boxes or fill the in space provided (comment).

KEY

SA Strongly Agree

A Agree

U Uncertain

D Disagree

SD Strongly Disagree

1.Has the introduction of prepaid domestic meters improved revenue generation?

	SA	A	U	D	SD
a) The objective of installing prepaid meters was to increase revenue.					
b) The introduction of domestic prepaid meters has improved revenue generation.					

2. How do other power utilities satisfy their domestic customers and maximize on revenue collection?

	SA	A	U	D	SD
a) We were involved in sensitizing the domestic consumers on the benefits of using prepaid meters.					
b) Prepaid domestic customers are still experiencing load shedding					

3. What are the possible remedies available to the power utility company to overcome its challenges in revenue generation?

	SA	A	U	D	SD
a) We were involved in sensitizing the domestic consumers on the use of the prepaid meters					
b) There are strong penalties for customers who temper with prepaid meter					
c) There are cases of domestic customers who have been apprehended since the introduction of prepaid meters for electricity theft					

APPENDIX 4- Interview guide For ZETDC Managers

Interview Guide for ZETDC Managers

1. Has pre-paid metering increased ZETDC revenue inflow?

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2. What are the challenges brought by prepaid metering system?

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3. Has your organisation achieved its objectives by installing prepaid meters?

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4. What efforts have you made to recover debts owed by domestic customers?

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5. How do you intend to counter challenges arising from installation of prepaid meters?

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6. What is the way forward in solving the challenges?

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