



School of Management

## **The challenges of implementing Electronic Payment Systems – The Case of Ghana's E-zwich Payment System**

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## **ABSTRACT**

This study investigates the challenges of implementing and using electronic payments in Ghana. In addition, it also attempts to assess the degree of usage of card based payments systems i.e e-zwich, debit and credit cards. Several electronic payment systems have been introduced into the country in recent times with the most significant being e-zwich smart card payment system, a national domestic smart card payment system meant to reduce the large amount of cash held outside the banking system. Despite the progress made, it is estimated that only 20% of the population have bank accounts and 90% of the cash issued by the Bank of Ghana is still held by the non-bank public

The study uses primary data collected through deep interviews with Ghana Interbank Payment and Settlement Systems (GHIPSS), the company in charge of the e-zwich payment system in Ghana and senior officials of some of the major banks in Ghana. Questionnaires were also distributed to shops and individuals that use e-zwich and debit cards.

The implementation of e-zwich although have challenges is a step in the right direction for national development. The study revealed also that e-zwich has the potential to reduce the unbanked in Ghana and is beginning to show some good signs in terms of some good initiatives by GHIPSS. However, more education of the public and the banks is needed to realise its full potential.

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# CHAPTER 1: INTRODUCTION

## 1.0 Background

Electronic Payment Systems apart from their convenience and safety also have a significant number of economic benefits (Ann Cobb, 2004). The major economic benefits of EPS include mobilizing savings and ensuring most of the cash available in the country are with the banks. This will make funds available to borrowers (businesses and individuals). Furthermore, an electronic payment system has the ability to track individual spending; to facilitate the design of products by the banks. This information is also useful to the government when making economic decisions. EPS also have the ability to reduce cash handling and printing costs. According to (Moody's Analytics, 2010) real global GDP grew an extra 0.2% a year on average beyond what it would have without card usage. Simply put card usage increases a country's GDP by 0.2% annually.

Moving from a society where 90% of cash is held outside of the banks to a cashless society is a big change. It is therefore an enormous challenge for the government, financial institutions, individuals and other stakeholders responsible for making this system achieve its economic benefits. There are likely to be operational, financial, economic and marketing changes that need to be managed properly.

E-zwich is the brand name for the national switch and smart card payments system. This is an integrated and interoperable payment infrastructure for switching and clearing electronic payments initiated at payment terminals owned by different financial institutions with various types of payment cards. The E-zwich payment system is the national switch for universal electronic payment system in Ghana.

This provides a common platform for most retail payment transactions in the country through the integration of all bank switches thereby enabling interoperability of all ATMS and Point of Sale (POS) systems<sup>1</sup>.

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<sup>1</sup> [www.e-zwich.com](http://www.e-zwich.com)

Ghana Interbank Payments and Settlements Systems Limited (GHIPSS) is a company set up by the Bank of Ghana to work with banks to improve payment systems. The company also has the responsibility to provide a range of technology driven solutions and associated services which support and contribute to the general efficiency of the Ghanaian payment systems and to provide affordable and convenient access by residents to banking services.

## 1.1 Context and Motivation

Over the years we have experienced a progression of value transfer systems starting from barter, through bank notes, payments orders, cheques, and later Credit Cards.( Asokan, et. al., 2000) This has finally evolved into Electronic payment systems which enables commerce on the Internet.

Modern trends indicate that electronic payment systems have become a significant element in all trade and commerce activities globally. The scope of electronic payments extends from under one dollar to Multi-Million dollar transactions. Despite the benefits that electronic payment systems has brought to other economies such as the western developed countries, economies in Africa, which are still in the early stages of applying electronic payment systems are yet to experience its maximum economic and operational impact. ( Ackorlie, 2009).

Consequently they have been slow to restructure and adapt to the new global economic reality resulting in lost opportunity and diminished competitiveness.

Unlike the developed world, electronic payment systems are rare in developing countries like Ghana where cash is still king. Implementing such a system in a developing nation where majority of citizens are used to cash and cheque based transactions requires a lot more effort.

Since the implementation of E-zwich payment system in Ghana, which is a national switch and smart card payment system about two and a half years ago, there has not been any due diligence work in this area. This project creates an opportunity to obtain feedback from the major stakeholders regarding the challenges they face. This research is intended to identify obstacles that are causing the low patronage of EPS.



## 1.2 Objective of Research

The primary objective of this thesis is to investigate and increase awareness of the current challenges of implementing and using electronic payment systems in Ghana, using e-zwich payment system as a case study. The thesis also seeks to evaluate or measure the degree or level of usage of e-payments in Ghana. This thesis is more or less a major due diligence exercise for all the major stakeholders in implementing electronic payment systems (EPS) in Ghana.

## 1.3 Value of Research

The proposed research is significant mostly due to the fact that Electronic payment systems are now gaining familiarity in Ghana. E-zwich is the first ***national*** Electronic payment that has been implemented in Ghana by the Bank of Ghana, and since its implementation there hasn't been any assessment yet. An empirical study in this area is expected to inform the stakeholders of how E-zwich and other Electronic payments systems has or has not made any economic impact. The stakeholders involved are GHIPPS, Government of Ghana, Banks, other Financial Institutions and individuals.

According to a related study by (Appiah & Agyemang, 2007) offline technology will be most suited in Ghana considering the low level of technological infrastructure in Ghana. E-zwich is an offline payment and thus serves as an implementation of this recommendation. A study in this direction I believe is very important.

Furthermore, this research is also expected to increase awareness of the challenges of electronic payments and serve as a guide for future implementation of such systems by developing countries with low level of technological infrastructure.

## 1.4 Thesis scope

The thesis investigates the answers to the following questions

- What are the obstacles to the implementation and use of e-zwich?
- Has the implementation of e-zwich contributed to increased usage of e-payments?

## 1.5 Research Methodology

The following gives a brief outline of methodology used for this research work. Details of the methodology can be found in Chapter 3.

1. Study of literature on electronic payments systems and E-zwich. This includes literature on general information on EPS. This information encompasses types of EPS as well as the benefits. A key feature of this phase is also a thorough review of the challenges of EPS especially in Africa.
2. On the basis of information collected, mainly secondary data, theoretical framework was written in Chapter 2.
3. The Chief Operating Officer of GHIPSS was interviewed so as to obtain a better understanding of e-zwich. All available data was collected.
4. Designing and distribution of questionnaires to 30% of the banks in Ghana and responses thereof obtained as well as conducting of deep interviews. The researcher administered the questionnaires and conducted deep interviews along side. This is to collect primary data which is the main source of data for this research work
5. Designing and distribution of questionnaires to ten (10) individual customers of E-zwich with different income levels and responses obtained thereof as well as conducting interviews. This is a major source of primary data
6. Designing and distribution of questionnaires to ten (10) shops using E-zwich and responses obtained thereof. The researcher administered the questionnaires and conducted deep interviews alongside. A source of primary data.

7. This final phase involved the analysis of data obtained and a final comprehensive report of findings and recommendations written.

## 1.5 Outline of Thesis

This thesis is organized into five main chapters as described below:

Chapter 1: This chapter gives an overview of the whole thesis. This is presented in this current section.

Chapter 2: provides an overview of existing literature on Electronic payment systems and E-zwich.

Chapter 3: provides details of methodology used in performing this research.

Chapter 4: provides research findings and analysis obtained through this methodology.

Chapter 5: presents recommendations derived from research findings and analysis as well as conclusions of this work. At the end of the thesis document, a set of references and appendices are included.

## 1.6 Limitations to the Study

The researcher encountered some challenges in writing this thesis. Attempts to collect data covering a period of five years was not successful as the banks were unable to provide this information, as a result only electronic transactions covering the current year was available.

## CHAPTER 2: LITERATURE REVIEW OF ELECTRONIC PAYMENT SYSTEMS

In today's world many people across the globe make payments electronically rather than in person or cash. Vassiliou (2004) defines electronic payment as a form of financial exchange that takes place between the buyer and seller facilitated by means of electronic communication. According to (Cobb, 2004), the value of electronic payment goes way beyond the immediate convenience and safety of cards to a greater sphere of contributing to overall economic development.

A report by financial research and consulting firm Celent in India, indicates that the value of retail e-payments in India is expected to reach between US\$150 billion to US\$180 billion by the end of 2010.

“More than two thirds of all non-cash transactions payments in the United States are made electronically, with the biggest increase in electronic payments occurring between 2003 and 2006 according to a US central bank. The central bank's non-cash payments study found that about 19 billion more electronic payments were made in 2006 than 2003”.<sup>2</sup> Undoubtedly the last three decades have witnessed major advancement in payment technologies.

There are several payment markets that can be identified each using specific forms of money. “The business-to-consumer (B2C) payment is used in commercial activities where the merchant is paid directly by the consumer for goods and services” (Radu, 2003). This type of payment is also called retail payment. The direct payment between two persons is called person-to- person (P2P). Administration-to-consumer (A2C) payment addresses the payment of taxes toward the government. Finally, the payment intervening between companies buying and those offering products and services is referred to as Business-to –Business (B2B)(Radu , 2003). This thesis focuses mainly on B2C payments. In this chapter, we will look at some general features of EPS briefly and then focus on the benefits and challenges.

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<sup>2</sup> 2007 Federal Reserve noncash payments study

## 2.1 Electronic Payment Models

The Implementation of EPS is dependent on the consumer's payment behaviour. Thus, EPS are designed to address consumers with credit, debit or prepaid payment behaviour. "Commerce always involves a payer and a payee who exchange money for goods or services, and at least one financial institution which links "bits" to "money" (Asokan, et. al., 2000). In most existing payment systems, the latter role is divided into two parts: an issuer (used by the payer) and an acquirer (used by the payee). Electronic payment from a payer to payee is implemented by a flow of real money from the payer via the issuer and acquirer to the payee.

### 2.1.1 Credit Cards

In pay-later (credit) payment systems, the payee's bank account is credited the amount of sale before the payer's account is debited (Asokan, et. al., 2000). Credit card systems fall into this category. Credit cards allow customers to make purchases up to a prearranged ceiling. The credit that is granted is either settled in full by the end of a specified period, generally a month, or can be settled in part, with the remaining balance extended as credit (Asokan, et. al., 2000). Credit cards are internationally known to customers and accepted by merchants. They are also easy to use on the internet, as only the credit card details need to be sent to the beneficiary in order to effect a payment (Vassiliou, 2004)

### 2.1.2 Debit Instruments

In pay-now payment systems, the payer's account is debited at the time of payment. ATM card based systems fall into this category. According to (Vassiliou, 2004), debit instruments allow the payer to have purchases directly charged (debited) to funds on his/her account at a deposit-taking institution such as a bank. Debit instruments include direct debits, debit cards and cheques.

### 2.1.3 Prepaid Payment Services

In prepaid payment systems, a certain amount of money is taken away from the payer by debiting that amount from the payer's bank account before purchases are made (Asokan, et. al., 2000). This amount of money can then be used for payments later. This payment system requires that consumers make the provision of funds before engaging any payment transaction. Smartcard-based electronic purses, electronic cash as well as (certified/guaranteed) bank cheques fall in this category (Asokan, et. al., 2000). E-zwich payment system also falls into this category.

Asokan argues that, both pay-now and pay-later could be classified as direct payment systems: a payment requires an interaction between payer and payee. There is also indirect payment systems where either the payer or payee initiates payment without the other party (payee or payer respectively) involved on line (Asokan, et. al., 2000).

### 2.1.4 Cumulative Collection Services

Cumulative collection services are mainly used for the processing of smaller e-payments which are cumulated and then paid (Vassiliou, 2004). The payment service provider collects all transactions of registered customers and submits them periodically (e.g. at the end of each month) as a single charge to the customer. The collection procedures could be compared to the delayed payments to settle credit or delayed debit card bills (Vassiliou, 2004).

One benefit of cumulative collection services as indicated by Vassiliou (2004) is that customers who do not have access to, or do not wish to use their credit or debit cards online might be able to use these services. A further benefit is that no sensitive information needs to be transmitted in a transaction.

Vassiliou (2004) further argues that, cumulative collection services are capable of providing a more cost-efficient facility for micro-payments than traditional payment instruments.

### 2.1.5 Payment Portal Services

“Payment portals are payment service providers that offer a wide range of the different payment options described in the previous sections and provide merchant accounts to online retailers in general” (Vassiliou, 2004). Payment portals take care of the payment side of e-commerce operations for merchants. Merchants can redirect the customers to the payment portal’s site when making online payments, where customers are given a choice between several means of payment. After successful completion of the payment, the portal notifies the e-merchant that the order can be shipped. (Vassiliou, 2004).

### 2.1.6 Mobile Phone Payments

Several initiatives have emerged for initiating e-payments from mobile phones by using short messages (SMS) or phone calls. These have also been referred to as m-payments (Vassiliou, 2004). Vassiliou further indicates that most m-payments initiatives follow a simple model where the customer (payer) first identifies him/herself to the merchant by providing his/her phone number or by calling the merchant. The merchant forwards the payment and customer information to the payment service provider (e.g. through the mobile network). The service provider then presents the payment information to the payer for confirmation and upon confirmation (e.g. with a PIN number) records the transaction. The communication between the customer and the payment provider and/or merchant can take place through phone calls and/or short messages.

The paid amount is collected by direct debit from the payer’s account and credited to the beneficiary’s account. Operational examples of this model in the EU include Paybox (Austria, Germany, Spain, Sweden and the United Kingdom), Mint (Sweden) and e-pay (Finland) (Vassiliou, 2004). According to Vassiliou, Mobile devices are well positioned for making payments, because the penetration level of digital mobile phones is higher than that of personal computers. “It is also possible to use mobile phones for all types of payments, both at manned and unmanned payment terminals, for internet payments and possibly for payments between consumers” (Vassiliou, 2004). M-payments have been introduced by MTN in Ghana recently.

## 2.2 On-line vs Off-line

Payments can be performed on-line, involving an authorization server (usually as part of the issuer or acquirer) in each payment, or off-line, without contacting any third party during payment.

The obvious problem with off-line payments is how to prevent payers from spending more money than they actually possess. In a purely digital world, a dishonest payer can easily reset the local state of his system after each payment to the state before the payment. Therefore off-line payment systems that prevent double spending require tamper-resistant Hardware, such as smart cards at the payer end(Asokan et al, 2000). Often, tamper resistant hardware, such as security modules of point-of-sale (POS) terminals, is also used at the payee end – it is mandatory in the case of shared-key systems and in cases where the payee does not forward individual transactions but only totals.

On-line systems obviously require more communication, but not necessarily tamper-resistant hardware (Asokan et al, 2000). In general, they are considered more secure than off-line systems.

## 2.3 Benefits of Electronic Payments

A study by the Federal Reserve Financial Services Policy Committee indicates that electronic payment transactions in the United States have exceeded check payments for the first time in history. The total number of electronic transactions equaled 44.5 billion dollars in 2003, while the number of checks paid totaled 36.7 billion dollars. Obviously a trend among consumers can be identified; consumers are becoming more comfortable in doing business electronically and using a digital medium to conduct their business.

According to a study by (Fiallos & Wu), the arrival of the internet has taken electronic payments and transactions to an exponential growth level. Consumers could purchase goods from the internet and send unencrypted credit card numbers across the network, which did not provide much security and privacy. But a wide variety of new secure network payments schemes have been developed as consumers became more aware of their privacy and security.



Digital money has significant benefits for financial institutions, banks and merchants (Fiallos & Wu, 2005). Digital Money is an electronic payment technology, which can provide anonymous flexible electronic payment, like paper cash, but with added security requirements needed for internet transactions. In a related work by (Lee, et. al, 2003), a secure electronic cash system can guarantee anonymity of legitimate users but also provides traceability about illegally issued cash or laundered money. If illegal activity did take place, it can cancel anonymity of the digital cash in order to protect the bank (Lee, et. al , 2004) added that since digital money can trace double spending, and double spending protects content by exposing the double spender's identity, digital cash is a fool proof way of guarding against illegal redistribution of intellectual property and materials. Digital Money can also be used to deter illegal content copying and distribution by inserting tracing content factors into the digital cash payment scheme that prevents users from individual replication activity (Lee, et. al.,2004). By using this function, legal, anonymous purchasers can spread contents to other paying anonymous users while abiding by copyright laws. Using digital money in industries like digital entertainment can increase the demand for products through easier and safer dissemination channels. Digital Money can trace who is illegally reproducing and distributing copyrighted intellectual material, therefore increasing security for authors and at the same time deterring lost revenue and sales for digital media entertainment companies (Lee, et. al., 2004).

Digital Media entertainment, as well as intellectual property providers and distributors, can also implement this technology and its safety features in order to ensure greater copyright compliance between consumers (Fiallos & Wu, 2005). By adopting such a method of payment and distribution, software and intellectual property piracy can be halted and eventually eliminated.

Digital Money can provide financial institutions with decentralized structures, faster transaction and decision making processes, and more cost effective ways of doing business. (Fiallos & Wu).

Electronic Payments as argued by (Cobb, 2005) have a significant number of economic benefits apart from their convenience and safety. These benefits when maximized can go a long way in contributing immensely to economic development of a nation.

Automated electronic payments help deepen bank deposits thereby increasing funds available for commercial loans – a driver of all of overall economic activity. According to (Cobb, 2005), efficient safe and convenient electronic payments carry with them a significant range of macro-economic benefits. “The impact of introducing electronic payments is akin to using the gears on a bicycle. Add an efficient electronic payments system to an economy, and you kick it into a higher gear. Add better-controlled consumer and business credit, and you notch up economic velocity even further.”(Cobb, 2005)

“While the high level of cash transactions creates an opportunity for the electronic payment industry, it also imposes a cost on local economies. Cash has to be minted, securely transported, counted and reconciled, kept secure and maintained for re-use time and time again. The per-payment cost is high, and will always remain high whereas the costs of electronic system are fixed. Once the infrastructure has been built, the costs per-transaction is very low” (Cobb, 2005).

When cardholders use their cards at the point of sale they are helping to keep money in the banking system. EPS can help displace shadow economies, bring hidden transactions into the banking system and increase transparency, confidence and participation in the financial system. (Cobb, 2005).

As also mentioned by (Al Shaikh, 2005), there is a correlation between increase in point of sales volumes and rise in demand deposits. “Automated electronic payments act as a gateway into the banking sector and as a powerful engine for growth. Such payments draw cash out of circulation and into the bank accounts, providing low cost funds that can be used to support bank lending for investment – a driver of overall economic activity. The process creates greater transparency and accountability, leading to greater efficiency and better economic performance” (Al Shaikh, 2005).

In a similar narrative by (Hord, 2005) electronic payment is very convenient for the consumer. In most cases, you only need to enter your account information -- such as your credit card number and shipping address -- once. The information is then stored in a database on the retailer's Web server. When you come back to the Web site, you just log in with your username and password. “Completing a transaction is as simple as clicking your mouse: All you have to do is confirm your purchase and you're done” (Hord, 2005).

Hord (2005) further emphasises the fact that electronic payment lowers costs for businesses. The more payments that is processed electronically, the less money is spent on paper and postage. Offering electronic payment can also help businesses improve customer retention. “A customer is more likely to return to the same e-commerce site where his or her information has already been entered and stored” (Hord, 2005)

According to (Cobb, 2005), “electronic payments can thus lower transaction costs stimulate higher consumption and GDP, increase government efficiency, boost financial intermediation and improve financial transparency”. She further added that “Governments play a critically important role in creating an environment in which these benefits can be achieved in a way consistent with their own economic development plans”.

(Humphrey et al, 2001) also support the fact the introduction and use of electronic payment instruments holds the promise of broad benefit to both business and consumers in the form of reduced costs, greater convenience and more secure, reliable means of payment and settlement for a potentially vast range of goods and services offered worldwide over the internet or other electronic networks. One such benefit is that electronic payments enable bank customers to handle their daily financial transactions without having to visit their local bank branch. Electronic payments products could save merchants time and expense in handling cash (Appiah and Agyemang, 2006).

According to (Humphrey, Pulley and Vesala 2000), the resource cost of a nation’s payment system can account for 3 percent of its GDP. Since most electronic payments cost only about one-third to one-half as much as paper-based non-cash payment, it is obvious that the social cost of a payment system could be considerably reduced if it is automated (Appiah and Agyemang, 2007). Automating and streamlining electronic payments made from self-serve channels such as ATMs, branch office terminals and point-of-sale (POS) systems can reduce paper-based errors and costs.

A research work carried out by Visa Canada Association in collaboration with Global Insight (A leading economic and financial consulting firm) revealed that electronic payments provide transactional efficiency to consumers, merchants, banks and the economy. Electronic payments have contributed \$C 107 billion to the Canadian economy since 1983 and represents nearly 25% of the \$C 437 billion cumulative growth in the Canadian economy over the same period.

Over the same two decades, \$C 60 billion of the increase in Personal Consumption Expenditures was directly attributable to electronic payments, with credit card holding a commanding share of this growth (\$C 49.4 billion) over debit cards (\$C 10.4 billion). (Visa Canada, 2004).

According to (Ackorlie,2009), Ghana has lagged way behind most of the world (including many of its peers in Africa) in the general quest to boost micro economic activity by reducing the role played by physical cash in daily transactions and by encouraging the creation of a cashless society.

However, experts in the financial sector have stressed that unless something radically innovative, functional and savvy is introduced, which accounts for attitudes as well as the huge un-banked population, the country's dream of building a functionally cashless society in the shortest possible time could be elusive (Ackorlie, 2009).

## 2.4 The Unbanked and Technology

As many as 80 per cent of Ghana's population neither has nor operate a bank account, although the majority of the "un-banked" are economically active in either the formal or informal sectors of the economy (Ackorlie, 2009). This is the case for most African and developing nations. The term unbanked means the person does not have a checking or savings account (Anderson-Porisch, 2006).

A research work by (Anderson-Porisch, 2006) mentions the following as some of the reasons for the unbanked in the United States of America:

- Lack of understanding of the banking system and expectations for having a bank account
- Past negative banking experience
- Lack of appropriate identification and/or documentation needed to open a bank account
- Unstable living situation
- Cultural conflict including bank practices that varies with personal beliefs.

According to a report by Visa and Global Insight, more than two billion individuals age 15 and over are unbanked. “Electronic payment systems can help the unbanked join the banking system with significant benefits to them and to the societies in which they live” (Commonwealth Business Council & Visa, 2004). Hernando de Soto mentions in his book, *The Mystery of Capital* that a large percentage of business assets held in the informal economy of many developing countries reduce the size and productive capacity of their total official economies. In a similar way, a cash based society is a diminished society. The informal economy runs on cash outside of the banking and official economic systems. “When cash remains outside the banking system, the possibilities for supplying productive capital to the economy are muted.” (Commonwealth Business Council & Visa, 2004). Data from Global insight indicates a direct correlation between a specified shift of currency into lendable reserves and increases in GDP. Bringing cash into the banking system generates an equal increase in bank reserves, enabling banks to facilitate more consumer and commercial loans, thereby stimulating business growth and consumption. The total value of the loans is several times that of the original deposits. Global insight estimates this to 10 to 15 times the amount of the deposit.

### 2.4.1 Using E-payments to reduce the unbanked

The emergence of credit, debit and prepaid card systems gives the unbanked an important option for bringing cash into the formal economy. “Prepaid cards are particularly interesting, because the funds are actually on deposit at a regulated financial institution, but the process of establishing and managing accounts is much more cost effective and less risky than traditional debit accounts for smaller levels of deposit” (Commonwealth Business Council & Visa, 2004). Anderson-Porisch (2006) argued that technology provides the opportunities to transition the unbanked population into a banking relationship. According to her paper, “the Debt Collection Improvement Act of 1996 required that recurring federal benefit payments be made electronically through electronic funds transfer (EFT) as a low-cost account for those who cannot qualify for or afford a checking account. As a result, there has been an increase in people using this option for receiving federal benefits”.

The Commonwealth Business Council also argues that payroll, pension and benefit cards can be effective entry-level instruments for banking and subsequent mainstream financial services- and they allow a greater proportion of funds to remain within the banking system until they are spent.

Teenagers and young adults are often ineligible to open a bank account. But because of employment, stipends or transfers from their parents or guardians, they may possess a sizeable amount of money. “Prepaid card products for young people can teach them vital money skills, while keeping their funds in the banking system. One such solution is a re-loadable prepaid card that features financial literacy tools and allows parents or guardians to monitor transactions online”(Commonwealth Business Council & Visa, 2004). This has been used in the US, Brazil, Mexico, Puerto Rico, Indonesia and Jordan.

In banking the unbanked, financial institutions that are part of an international payment system can issue prepaid cards to customers, including those who currently do not have a banking relationship, enabling them to receive funds safely and conveniently. Depending on the type of card, recipients can withdraw cash at an ATM or buy goods and services at merchants (Commonwealth Business Council & Visa, 2004). In developing countries, remittances represent the primary source of foreign exchange and generate a significant engine for consumer spending. Ghana being a developing country is no exception. For example, foreign remittances to Nicaragua are estimated to total nearly 30% of GDP (Inter-American Development bank, 2004). However a chunk of these remittances are held in cash and circulate within the informal economy and therefore being kept outside the banking system. These remittances do not contribute as strongly to formal economic growth as they could. Prepaid cards described above can help resolve this issue.

Banked or "un-banked", it is obvious that the active population is now hurting under the burden of the inconveniences and constrictiveness of having to endure heavy, cumbersome and usually unsafe cash-based payments in their day-to-day affairs and transactions (Ackorlie, 2009).

The use of any electronic transaction as a common platform for the financial sector would reduce physical circulation of cash.

The use of Information Communication Technology (ICT) products to simplify and speed up financial transactions has become part of everyday life in the developed world, whereas several parts of Africa had no such experience. (Ackorlie, 2009).

The use of the electronic transactions system to do business is indeed not common in Africa. In the advanced economies, physical circulation of cash is limited because most people use electronic means to buy and pay for goods and services. The physical handling of money currencies is therefore reduced and the advantage here is that the government does not spend huge sums of money to print new currencies to replace worn out ones.<sup>3</sup> In the next section there will be a deep discussion of some of the challenges that is impeding the use of electronic payments in Africa.

## 2.5 Challenges of Electronic Payments

Electronic payments despite its numerous benefits comes with its own challenges even in the developed world. We will look at the general challenges and later on focus on specific challenges in developing economies especially Africa. The identified challenges as revealed by previous research works are Security, Infrastructure, Regulatory and Legal issues and Socio-Cultural challenges.

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<sup>3</sup> A speech by the vice president of Ghana quoted in the Chronicle News paper

## 2.5.1 Security

The Security of Information and data is crucial in all Information systems. Information Security is the practices, procedures and technology put in place which ensure that information is safeguarded from

- modification or accidental change (integrity),
- unauthorized access (confidentiality), and
- is readily available (availability) to authorized users on request.

Electronic payments systems are no exception; an unsecured e-payment system may not get trust from its users. Trust is very critical to ensure acceptance from users. According to (Worku, 2010), e-payment and e-banking applications represent a security challenge as they highly depend on critical ICT systems that create vulnerabilities in financial institutions, businesses and potentially harm customers. “It is imperative for banks to understand and address security concerns in order to leverage the potential of ICTs in delivering e-banking applications”(Worku, 2010). A secure electronic financial transaction has to meet the following requirements:

### **Integrity and Authorisation**

Integrity is defined as the accuracy, completeness and validity of information in accordance with business values and expectations (CISM Review Manual, 2006). Integrity of payment systems means that no money is taken from a user unless a payment is authorized by him. In addition, users might require not receiving any payment without their explicit consent; this is desirable when users want to avoid unsolicited bribery (Asokan et al, 2000).

### **Confidentiality**

Confidentiality is defined as the protection of sensitive or private information from unauthorized disclosure (CISM Review Manual, 2006). Some parties involved may wish confidentiality of transactions.



Confidentiality in this context means the restriction of the knowledge about various pieces of information related to a transaction; the identity of payer/payee, purchase content, amount etc. Typically, participants involved want to ensure that communications are private (Asokan et al, 2000). Where anonymity or untraceability are desired, the requirement may be to limit this knowledge to certain subsets of the participants only (Asokan et al, 2000).

### **Availability and Reliability**

Availability is ensuring that information systems and data are ready for use when they are needed; often expressed as the percentage of time that a system can be used for productive work. All parties require the ability to make or receive payments whenever necessary (Asokan et al, 2000).

### **Enhancing E-payments Security**

According to (Taddesse & Kidan, 2005), the most common method of securing e-payments is using cryptographic based technologies such as encryption and digital signatures. Applying these technologies reduce speed and efficiency and as a result compromise has to be made between efficiency and security . The following are some of the technological means to secure e-payments:

- Secure Electronic Transaction (SET): This is an open standard developed by Master Card and Visa to provide a solution to security problems for online credit card payment system (Ullah, 2010). This is achieved by providing digital certificate for both customer and merchant. According to (Taddesse & Kidan, 2005), this did not found acceptance because it was complicated and required both customer and merchant to download 5MB of software.
- 3D Secure is Visa alternative to SET and does not require certificate to authenticate (Ullah, 2010).
- Smart Card Security: Data stored on a smart card is encrypted and cannot be assessed without password/PIN and thus provide strong security. Taddesse & Kidan( 2005) argue that magnetic strip cards i.e. debit cards, credit cards etc are being replaced by smart cards.

Proper policies, procedures and appropriate Government laws must also be put in place to ensure technologies provide maximum security.

## 2.5.2 Infrastructure

Infrastructure is necessary for the successful implementation of electronic payments. Proper Infrastructure for electronic payments is a challenge (Taddesse & Kidan, 2005). For electronic payments to be successful there is the need to have reliable and cost effective infrastructure that can be accessed by majority of the population.

Electronic payments communication infrastructure includes computer network such as the internet and mobile network used for mobile phone. In addition, banking activities and operations need to be automated. A network that links banks and other financial institutions for clearing and payment confirmation is a pre-requisite for electronic payment systems (Taddesse & Kidan, 2005).

Mobile network and Internet are readily available in the developed world and users usually do not have problems with communication infrastructure. However, in Africa mobile networks and internet are not easily accessible. “Poor communication infrastructure is one of the reasons that hinder the e-payment system in Africa” (Taddesse & Kidan, 2005). According to Worku (2010), low level of internet penetration and poorly developed telecommunication infrastructure impede smooth development and improvements in e-commerce in Ethiopia. A study by Microfinance Nigeria indicated that efforts by the Nigerian, Government and other financial and ICT stakeholders to move Nigeria’s payment system from a cash-dependent platform to the globally acceptable electronic-driven alternative may be impeded by dearth of critical telecommunication infrastructure. In developing countries many of the rural areas are unbanked and lack access to critical infrastructure that drives electronic payments. According to Microfinance Nigeria (2010), some of the debit cards technologies like Automated Teller Machines (ATMs) are still seen by many as unreliable for financial transactions as stories told by people suggested that they could

lose their money through fraudulent deductions, debits and other lapses for which the technology had been associated with by many over the last few years.

In a related work, by Mishra (2008) in Nepal, Telecommunication and electricity are not available throughout the country, which negatively affect the development of e-payments. According to Mishra, the development of information and communication technology in Nepal is a major challenge for e-payments development. Since ICT is in its infant stages in Nepal, the country faces difficulty promoting e-payment development.

### 2.5.3 Regulatory and Legal issues

National, regional or international set of laws, rules and other regulations are important requirements for the successful implementation of e-payment schemes. Some of the major elements include rules on money laundering, supervision of commercial banks and e-money institutions by supervisory authorities, payment system oversight by central banks, consumer and data protection, cooperation and competition issues. (Taddesse & Kidan, 2005). According to Taddesse & Kidan, (2005) the virtual and global nature of e-payment also raises legal questions such as which jurisdiction will be competent and about applicable laws in disputed cases, validity of electronic, electronic contracts and electronic signature. A legal and regulatory framework that builds trust and confidence supporting technical efforts is an important issue to be addressed in implementing e-payments. As indicated by Worku (2010), lack of suitable legal and regulatory framework for e-payment in Ethiopia, an African country is a challenge. According to Worku (2010) Ethiopian current laws do not accommodate electronic contracts and signatures. Ethiopia has not yet enacted legislation that deals e-payments and e-commerce concerns including enforceability of the validity of electronic contracts, digital signatures and intellectual copyright and restrict the use of encryption technologies. In a related work, Mishra (2008) argues that no laws and regulations have been promulgated to cover the legal status and issues of e-payments. This matter has been given high priority and a legal framework is expected soon (Mishra, 2008)

National regulatory and legal framework that aligns with regional and international agreements is crucial in creating a certain and reliable environment (Taddesse & Kidan, 2005).

Adopting model laws at the global level such as UNCITAL Model law on e-signatures (2001) can help the purpose.

#### 2.5.4 Socio-Cultural Challenges

Cultural and historical differences in attitudes and the use of different forms of money (e.g. use of credit card in North America and use of debit cards in Europe) complicate the task of developing an electronic payment system that is applicable at international level (Taddesse & Kidan, 2005). According to Taddesse & Kidan (2005), difference in the degree of the required security and efficiency among people of different cultures and level of development aggravates the problem.

Consumer's confidence and trust in the traditional payments system has made customers less likely to adopt new technologies. New technologies will not dominate the market until customers are confident that their privacy will be protected and adequate assurance of security is guaranteed. (Taddesse & Kidan, 2005). New technologies also requires the test of time in order to earn the confidence of the people, even if it is easier to use and cheaper than older methods.

### 2.6 Electronic Payment in Africa

Electronic payments in most African countries is very limited in use or virtually non-existent. According to Taddesse & Kidan ( 2005), most African countries lack the infrastructure and proper legal and regulatory framework for electronic payments. E-payments infrastructure such internet and mobile networks are not widely available in Africa. Furthermore banks and other financial institutions are not adequately automated to enable e-banking and e-payment. Legal and regulatory framework is also non-existent in most African countries.

## 2.6.1 Challenges of Electronic payments in Africa

In a research work by Taddesse & Kidan (2005), the following have been identified as barriers for the introduction, adoption and growth of Electronic payments in the African Context:

- Most banks in Africa do not deliver credit cards. People usually have to open bank account outside the continent in order to get a credit card.
- Behavioural constraints: The fact that African Society is cash-based, people are accustomed to using cash for most of their transactions.
- Banks attitudes: African banks are very conservative; they use very few innovative products and marketing techniques.
- Lack of confidence: the security issue is one of the major challenges in the development of e-payments in Africa.

In a related study by Worku(2010), the following are some of the challenges Ethiopia faces in adopting e-payments and e-banking:

- Low level of internet penetration and poorly developed telecommunication impede smooth development and improvement in e-payments and e-commerce.
- Lack of suitable legal and regulatory framework for e-payments: Ethiopian current laws do not accommodate electronic contracts and signatures.
- Inadequate banking system
- Political and economic instabilities in neighbouring countries: Political instabilities inevitably disturb smooth operations of business and free flow of goods and services.
- High rates of illiteracy: low literacy rate is a serious impediment for adoption of e-payments as it hinders the accessibility of banking services. For citizens to fully enjoy the benefits of e-payments, they should not only know how to read and write but also possess basic ICT literacy.
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- High cost of Internet: The cost of Internet access relative to per capita income is a critical factor. Compared to developed countries, there are higher costs of entry into the e-payments and e-commerce market. These include high start-up investments costs, high costs of computers and telecommunication and licensing requirements.
- Frequent power interruption: Lack of reliable power supply is a key challenge for smoothly running e-payments and e-banking
- Resistance to changes in technology among customers and staff due to:
  - 1 Lack of awareness on the benefits of new technologies
  - 2 Fear of risk
  - 3 Lack of trained personnel in key organisations
  - 4 Tendency to be content with the existing structures.
  - 5 People may be resistant to new payment mechanism.

According to Microfinance Nigeria (2010), urban dwellers are not receptive to the efforts of ICT investors to migrate payment system through substantial investments in crucial infrastructure like Point of Sale (POS) terminal in thousands of supermarkets, fuel stations, hotels, recreational centres and many others.

## 2.6.2 E-Payment initiatives in Africa

As indicated earlier on, African e-payment system is not well developed and very limited in use. However, some African countries have seen remarkable progress in e-payments and e-commerce. As per Taddesse & Kidan (2005) study, some North African countries such as Tunisia and Egypt are well ahead of the other African countries.

The study revealed that, the Egyptian government formed the Ministry of Communication and Information Technology (MCIT) to facilitate Egypt's transition into global information society.

It has adopted legal and regulatory framework for e-business and e-commerce. A complete and comprehensive e-payment infrastructure that allows for many payment options such as credit cards, pre-paid cards, transfer of checks and payment on fixed and mobile telephone has already been started to develop. The study also indicated that Telecom Egypt introduced e-billing system in 2001 that allows customers to view and pay their monthly telephone bill online. 48 thousand online bill payments were made within 18 months of its operation. Almost all the banks operating in Egypt are currently fully automated and have core-banking applications providing SWIFT and fast cash services, as well as their own switching software for online transactions. Information network linking the central bank of Egypt with 50 banks using the frame relay technology has been established. Furthermore banks have communication links between their branches.

According to Taddesse & Kidan (2005), Tunisia has also made considerable effort in the area of Electronic payments. The government of Tunisia has passed a law regarding Electronic Exchange and Electronic Commerce in the year 2000. Furthermore there has been some initiatives to transform the banking system. For example, the national clearance network managed by the Société Interbancaire de Telecompensation SIBTEL links all Tunisian banks using two Fiber Optic rings, ISDN, leased lines and X.25 links. The paper indicated that Tunisia has developed a multipurpose e-payment system called E-DINAR. E-DINAR allows for internet purchasing of goods and services, ATM money withdrawal, and payment at POS. Tunisia has also developed e-payment gateway for international payment certified by VISA.

## CHAPTER 3.0 RESEARCH METHODOLOGY

Ghauri & Gronhaug (2005) distinguishes between three (3) main classes of research design; exploratory, descriptive and casual. In both descriptive and casual research designs the problem is structured and understood. When the research problem is badly understood an exploratory design is adequate. This research can be classified as descriptive because it is structured and well understood. The key characteristics of descriptive research are structure, precise rules and procedures (Ghauri & Gronhaug, 2005).

This study involves the use of survey interviews of payments organizations, banks and individuals that originated and processed electronic payments. The case study was e-zwich; the first domestic electronic prepaid card in Ghana. E-zwich transactions were estimated via a survey of GHIPSS, Commercial Banks and individuals. The case study approach is often associated with descriptive or exploratory research, without being restricted to these areas (Ghauri, 1983; Bonoma, 1985; Yin, 1994). In business studies, case study research is particularly useful when the concepts and variables under study are difficult to quantify. Case study is a description of a management situation. A case study often involves data collection through multiple sources such as verbal reports, personal interviews and observations as primary data sources (Ghauri & Gronhaug, 2005). This type of work is highly complementary to incremental theory building from normal science research. According to Yin (2002), case study can also be defined as an empirical enquiry that looks into contemporary phenomenon within its real life situation. The focus of this study is on contemporary phenomenon with some real life context and includes observation and systematic interview, so the case study method is the preferred choice.

Furthermore this is a relatively new research area and existing theory seem inadequate so the case study approach is most suited.

In this study it was necessary to first review Electronic payments as well as its challenges. Through in-depth case study of e-zwich, as well as limited study of credit and debit cards, the challenges and level of usage of EPS were investigated and analysed.



### 3.1 Scope of Research

This study attempted to collect data on electronic payments made in Ghana from 2004 to date but only obtained data for the current year. Transactions from consumers, businesses and government entities are included in the statistics gathered. Data has been gathered in the area of Electronic payment options used by buyers of goods and services, including point-of-sale transactions. Electronic transactions were limited to E-zwich, Debit & Credit Cards in use.

Organisations and individuals engaged in the business of originating, switching and/or processing of E-zwich and other electronic payments transactions and remittances were identified based on Industry directories and information gathered from GHIPSS. These included the GHIPSS, Commercial Banks, merchants and individuals.

### 3.2 Sampling

Respondents selected for the study were sampled from originators and processors of electronic payments. The population for this thesis includes about 30% of the commercial banks and some selected users of electronic payment systems. As indicated in Chapter 2 there are twenty –six (26) Commercial banks in Ghana and eight (8) of these were sampled for this research. The users identified included shops and institutions using point of sale devices as well as individuals using electronic cards for transactions. About three thousand (3000) e-zwich Point of Sale devices are in use and about four hundred thousand (400,000) e-zwich cards have been distributed. The banks sampled included both domestic owned banks and domestic branches of foreign-owned banks. A lot of effort was made to maximize the completeness and quality of responses from these banks, institutions and individuals.

### 3.2.1 Sampling Design

The population for this thesis was stratified before sampling first by category of user or originator and then by size. There were three primary strata in the design:

- Commercial Banks
- Shops, Supermarkets etc.
- Individuals/Customers

These categories were chosen because members of each category contributed significantly to the use and processing of EPS. Grouping them in this way improves the precision of the estimates. The Commercial banks were further stratified by size and by whether they were domestic banks or domestic branches of foreign banks. The other categories i.e. shops and customers were selected using Simple Random Sampling technique and some level of discretion.

## 3.3 Data Collection and Validation of Data

Participation in the study was voluntary but was encouraged by the researcher through emails and follow up calls.

### 3.3.1 Data Collection

Primary and Secondary data was collected from GHIPSS. The Chief Operating Officer as well as the head of Information Technology Services and Business Development departments were interviewed. This was achieved through deep and structured interviews. Documents, Presentation Slides and literature were also obtained for review. Data gathered included the origin, technology, objectives and current performance of e-zwich.

The major questions asked were open-ended and are as follows:

- What is the history of e-zwich? This is to obtain a historical background of e-zwich, how it started and who's idea it was etc.
- Why is e-zwich a prepaid card? This is to ascertain why e-zwich is not either a debit card, credit card or any other card but a prepaid card.
- What are the objectives? This is to obtain the objectives of why e-zwich was introduced and the motivation.
- What are the major initiatives put in place to increase the use of e-zwich? This is to assess the extent of work and the level of usage.
- What are the major Challenges of e-zwich? In the literature review the challenges cover four main areas i.e. Security, Infrastructure, Legal & Regulatory Framework and Socio-Cultural issues. This question which is the main focus was to obtain challenges from the implementers of this first national domestic electronic system.
- In addition data covering the number of cards issued, amount on cards, cards that are linked to bank accounts for the period between December 2008 and October 2010 was obtained and analysed.

The main interviewee was the chief operating officer of GHIPSS, however he directed the researcher to other departmental heads such as Technology Services, Business Development and Finance where specific details were required.

The survey questionnaires to the banks is semi structured and focused on types of electronic payments in use, percentage split of transactions between cash and electronic for a period of five years. The questionnaire also assessed the ability of banks to monitor electronic transactions as well as challenges that the banks face in handling electronic transactions.

One or more senior executives of the Card Center department of the Commercial banks on the potential participant list were interviewed. Reminder calls were made to non-responding banks, shops and customers.

Emails were also sent to follow-up with the participants. In addition, follow-up clarification calls were made to each participant in the event there was misclassified or incomplete data.

The survey questionnaires to e-zwich users i.e point of sale users as well as e-zwich card holders also focused on type of electronic payments used by shops as well as individual card holders. It also covered percentage split of transactions between cash and electronic for a period of five years. Questionnaire for individual card holders also captured items as educational level, age group and profession.

### 3.3.2 Questionnaires

The questionnaires used made every reasonable effort to gather historical annual data from participants for the years 2004 to 2009 but as indicated earlier this was not possible. Some limited data was also gathered on Debit and Credit cards in use in Ghana. The questionnaires and data collection forms varied depending on whether it was a bank, merchant or individuals. The survey questionnaires to the banks focused on type of electronic payments; mainly debit credit and e-zwich cards in use by the bank and electronic transactions as compared to cash transactions for the period 2004 to 2009. The questions were in three sections as follows:

**Section A:** The main questions were, the name of the bank and types of electronic payments in use. The electronic payments were categorised into debit, credit, prepaid, internet banking and mobile banking and the banks were required to tick or indicate cards issued to its customers. The objective of this section is to have a broad overview of the types of e-payments issued by the banks and used by customers.

**Section B:** The banks were asked to provide percentages of withdrawal amounts for the three main card categories i.e credit, debit and prepaid cards from 2004 – 2009. This was a challenge as most of the banks could not provide this information for a five year period but only for the current year. The idea behind this question was to assess whether the use of e-payments has increased or decreased over the last five year period.

Other questions asked include the most used card for that bank, the number of e-zwich card and debit cards issued, percentage of customers that use e-payments and percentage of customers that use e-zwich. These questions were asked to enable the researcher evaluate the level of usage of e-payments.

**Section C:** This section asked about challenges that the banks faced in using e-payments. The objective was to obtain the challenges from the perspective of the banks.

The questionnaire to the merchants and individuals also covered similar areas indicated above. In most cases the researcher conducted interviews alongside completing the questionnaires. The questions to the shops are as follows:

**Section A:** The main questions were the name of the shop, the type of shop such as Supermarket, boutique etc and types of electronic payments accepted by shop. The electronic payments were categorised into debit, credit, prepaid, and others, the shops were required to tick or indicate cards accepted. The objective of this section is to have a broad overview of the types of e-payments accepted by the shops.

**Section B:** The shops were asked to provide estimated percentages of payments amounts for the three main card categories i.e credit, debit and prepaid cards and then cash payments from 2004 – 2009. This was a challenge as most of the shops could not provide this information for a five year period but for only the current year. The idea behind this question was to assess whether the use of e-payments has increased or decreased over the last five year period. Other questions asked include the most used card for that shop, percentage of customers that use e-payments and percentage of customers that use e-zwich. These questions were asked to enable the researcher evaluate the level of usage of e-payments.

**Section C:** This section asked about challenges that the shops faced in using e-payments. The objective was to obtain the challenges from the perspective of the shops.

The questions to the individual card users are as follows:

**Section A:** The main questions were the profession, age, educational level and types of electronic payments used by that individual. The individuals were required to specify their profession, tick

an age range and educational level. The electronic payments were categorised into debit, credit, prepaid, and others, the individuals were required to tick or indicate cards accepted. The objective of this section is to have a broad overview of the types of e-payments used by the individuals.

**Section B:** The individuals were asked to provide estimated percentages of payments amounts for the three main card categories i.e. credit, debit and prepaid cards and then cash payments from 2004 – 2009. This was a challenge as most of the individuals could not provide this information for a five year period but for only the current year. The idea behind this question was to assess whether the use of e-payments has increased or decreased over the last five year period. Other questions asked include the most used card for that individual and monthly average of electronic payments in totality and then averagely monthly for e-zwich payments. These questions were asked to enable the researcher evaluate the level of usage of e-payments.

**Section C:** This section asked about challenges that the individuals faced in using e-payments. The objective was to obtain the challenges from the perspective of the individuals.

Prior to administration, the questionnaire forms were pre-tested with some selected participants to obtain feedback about the forms and guidance on how to improve their clarity and ease of use.

### 3.3.3 Validation of Data Received from Participants

The data were obtained directly from primary sources whenever possible. Responses were reviewed for consistency and compared with other submissions. In addition, secondary sources of data were considered. The researcher validated the findings through existing relationships with electronic payments industry sources and other available research and reports that were reviewed.

If the numbers and values reported by the study participants appear to be inaccurate based on industry knowledge, they were identified and data was verified through email or telephone communications to ascertain that reporting errors were avoided.

## CHAPTER 4 RESEARCH FINDINGS

### 4.1 Development of E-payments in Ghana

There are presently twenty-six (26) Universal banks, as well as over one hundred and twenty-nine (129) rural and community banks in Ghana and these are regulated by one central bank i.e Bank of Ghana. In addition there are forty-four (44) licensed Non-Bank Financial Institutions. Ghana's economy is a medium sized economy which has experienced an influx of foreign banks in recent times. About six (6) foreign banks have opened in last five years.

The forms of electronic payment currently prevalent in Ghana are:

- Debit Cards
- Credit Cards
- Automated Teller Machine
- Electronic Funds Transfer at Point of sale
- Internet Banking
- Mobile Banking
- E-zwich payment system (introduced in 2008 by the Bank of Ghana)

Products on the market include mobile money transfer, text and pay, cashless mobile phone top up service, debit card, credit card and the newest of all e-zwich smartcard. Most of the universal banks issue Debit cards. Debit Cards are used to withdraw money from Automated Teller Machines as well as make payment of purchases at Point of Sale outlets. It is important to note that only few restaurants and shops have established POS machines to perform transaction through debit cards.

Most of the banks partner with the telecommunication service providers to offer mobile phone money transfer services to their customers. Some of the EPS on the Ghanaian market include the following:

**Etranzact:** a leading name when it comes to assorted money transfer products.

**Cal Bank's ATM mobile phone TOP-UP service:** this is premiering on the market.and

**ECOBANK's credit card :** introduced in 2007 is still the only one on the market.

Afric Xpress, a global electronic payment specialist that opened business in 2008 hopes to add mobile money transfer to its product line soon. Another electronic platform with a vision of polishing the informal micro-banking system is the Pesewa Power Trust (PPT). It is a new system that ensures the integrity of collectors and gives assurance to patrons that their contributions are safe. PPT issues all contributors such as people who sell in the market and retail shops, street hawkers, drivers and their mates with personal smartcards that register all their micro contributions. The collectors authenticate all contributions with the help of a collection device – that stores and updates all new contributions, on the collection device as well as on the contributor's smart card.<sup>4</sup>

The Bank of Ghana has been active recently in initiating measures to improve the financial system in Ghana. It introduced e-zwich smart card in 2008, which is the main course focus of this thesis.

Even though the development of electronic money system in Ghana is still in its infant stages, which implies very few people make use of the available product and services, analysts claim the market's prospects can be estimated by the rate of penetration of mobile phone usage. Firstly, the country in the recent times witnessed the influx of internationally acclaimed telecommunication companies opening offices for business or making strategic take-overs. From the low national tele-density of just about 0.7 per cent in 2000, Ghanaians' access to telephones rapidly rose to 5.5 per cent by the end of 2003<sup>5</sup>. By the close of 2008 Ghana's tele-density had sky rocketed to 50 per cent. National Communications Authority (NCA) figures point to an exponential growth in the number of mobile phone subscribers from 7,604,053 at the beginning

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<sup>4</sup> Business & Financial Times, 2009 Banking Survey

<sup>5</sup> Business & Financial Times, 2009 Banking Survey



of 2008 to 11,302,647 subscribers by December 2008 (Business & Financial Times, 2009 Banking Survey).

The remaining of this chapter provides findings obtained through deep interviews with the Chief Operating Officer (COO) of GHIPSS as well as representatives of some major banks. Furthermore, questionnaires were also completed by eight of the Commercial Banks.

Primary data was also obtained from retail shops and individuals who use electronic payments. Although the main focus was on E-zwich smart card payment, limited research work was also carried out on the level of usage, benefits and impact of Debit and Credit Cards in Ghana.

## 4.2 E-zwich Payment System

As indicated in Chapter one, e-zwich is the brand name for the national switch and smart card payments system. This is an integrated and interoperable payment infrastructure for switching and clearing electronic payments initiated at payment terminals owned by different financial institutions with various types of payment cards. The e-zwich payment system is the national switch for universal electronic payment system in Ghana. This provides a common platform for most retail payment transactions in the country through the integration of all bank switches thereby enabling interoperability of all ATMS and Point of Sale (POS) systems. This thesis however focuses mainly on the smart card payment system.

As per interview with the Chief Operating Officer of GHIPSS as well as presentations and literature obtained from GHIPSS, the emergence of e-zwich started with the launch of the National Payments Systems Reforms launched in 1995 made up of representatives from the Bank of Ghana and the banks. The key objectives of these reforms as obtained through interview are as follows:

- Promote Financial Inclusion by making it easier and more affordable for the unbanked and under-banked to access financial services.
- Reduce the over reliance on cash for transactions
- Encourage Financial Deepening and promote savings
- Reduce risks in Payments and Settlements

- Increase efficiency and speed in clearing and settlement

E-zwich was launched in May 2008 by the Bank of Ghana in collaboration with the banks. The implementation of e-zwich is managed by GHIPSS. GHIPSS was set up to provide Payment Systems Infrastructure and Clearing and Settlement services and is currently implementing and managing the following

- e-zwich
- Cheque Codeline Clearing with Truncation
- Automated clearing house.

According to the Bank of Ghana, 90% of Currency issued was held by the Non Bank Public (Bank of Ghana 2007 Annual report). There is a large unbanked and under-banked population with an estimated 20% of population banked.

Ghana is rated as one of the countries in Africa with less than 20% of households having access to financial services (Source, MFW4A).

The results of the above factors are an underserved population:

- Perpetuating a cash based economy
- With a low rate of savings mobilisation
- Unacceptable high cost of funds – caused in part by the high demand for the cash held by the banks and the high interests demanded by their predominantly commercial customers for deposits.
- Low level of financial intermediation
- High percentage of borrowers accessing funds from non-banking sources and paying a very high risk premium on their borrowings, savings and investments

As per discussions with the Manager of Business Development department of GHIPSS and according to data obtained from GHIPPS and as indicated in the chart below, the total e-zwich cards issued to the public as at October 2010 stood at 445,520. The total value on cards stood at GHC3, 108,423.60 equivalent to \$2,158,627.50.

Figure 4.1 A chart of E-zwich Card enrolments and amount of cards from 2008-2010

The total merchants registered to accept payments on e-zwich for the period stood at about 5000. Out of the 445,520 cards issued 227,768 were not linked to bank account. This implies that at least **227,768** people have been roped into the banking system using e-zwich

#### 4.2.1 Reasons for the unbanked

The following were identified as some of the reasons for the unbanked in Ghana: The Finance Director and the manager of business development were interviewed.

- **Lack of flexibility and convenience:** the unbanked are of the opinion that they will not have access to their money as and when they need it especially on weekends.
- Lack of knowledge and understanding of the banking system. Ghana has a high illiteracy rate.

- **Past negative bank experience:** In Ghana, during a coup de etat some years back, people with amounts greater than a particular threshold had their bank accounts allegedly frozen and their monies taken from them. Analysts claim this experience has discouraged some people from saving in a bank or financial institution.
- Some of the unbanked are of the opinion that they do not have enough money or they do not qualify to save with a bank.

#### 4.2.2 Major initiatives to tap the unbanked

The banked population of 20% in Ghana is low as compared to developed and emerging economies. The table below shows some selected countries and the % of banked population.

Table 4.1 Banked population in selected countries

Country	Total Population	%Population 15 years and Older with bank accounts
Germany	81,915,000	98%
Singapore	4,325,000	95%
United Kingdom	59,855,000	91%
United States	293,580,000	88%
Japan	127,857,000	85%
Canada	31,765,000	85%

Country	Total Population	% Population 15 years and Older with bank accounts
Australia	19,921,000	85%
Ireland	3,950,000	63%
Malaysia	23,824,000	55%
Argentina	38,852,000	49%
South Africa	44,813,000	46%
Mexico	104,726,000	35%
Poland	38,460,000	30%
Egypt	72,649,000	23%
India	1,065,070,607	20%

Source: Visa International and Global Insight, 2004 data. This was published by the Commonwealth Business Council.

Ghana's population is estimated at 22,000,000 and according to the bank of Ghana 20% have bank accounts.

E-zwich has the potential to overcome the reasons why people do not save with banks. The points below highlight some of the initiatives by GHIPSS to bank the unbanked. These were the findings as per discussions with held the Finance Director and Manager of Business Development in GHIPSS.

- E-zwich Card Penetration in the agricultural sector is on the increase. Some Palm Nut and Maize farmers are currently paid using e-zwich. Plans are also far advanced to enable the Government purchase cocoa from cocoa farmers using e-zwich instead of cash. Cocoa is one of Ghana' major export products and a major source of foreign exchange. The farmers will be required to have e-zwich cards to enable them sell their cocoa.

Electronic money will be transferred to their e-zwich cards; they can then go to any bank to cash their money, irrespective of whether they are customers of that bank or not. The idea is that they will only cash what they need at a time thus making available the money to the banks until it is needed by their owners. Most of these farmers are unbanked and thus a successful implementation of these initiatives will draw these farmers into banking system. Apart from the advantage of making more funds available to the banks it will minimize corruption.

Some banks pay interest on money kept on e-zwich cards to make it more attractive to customers.

- All tertiary students on the national loan scheme currently have their loans being disbursed on e-zwich cards. This loan scheme is being managed by the Ghana Student Loan Trust Fund.
- Some National Service Persons are currently paid using e-zwich cards. Plans are advanced to pay all Service persons using e-zwich. National Service is a scheme which mandates all tertiary students to serve the nation by working for a public institution at least one year after graduating. The National Service Secretariat posts these students to the various institutions.
- Plans are also far advanced to pay all government workers using e-zwich. This will be implemented in phases. This will significantly reduce Ghost names in the Government payroll once completed.
- Some companies currently pay salaries and Pension benefits using e-zwich cards.
- Some banks are also disbursing loans using e-zwich cards. This gives the banks a wider customer base. The banks are able to disburse loans to customers in rural areas using e-zwich where they do not even have a presence. The customers also repay their loans using e-zwich in any available bank convenient to them.

- Discussions regarding using e-zwich for remittances are in progress. Remittances account for a significant percentage of GDP. However, the money is mostly cash and in the pockets of people.
- Second Cycle students are not eligible to have bank accounts. These students receive money from their parents for school and can use e-zwich instead of cash which has its own risks. Efforts are being made to get these students on e-zwich. Secondary schools will be provided with POS to be managed by the school bursar. Students will then convert the e-money to cash as and when it is needed.
- There has been a lot of publicity by GHIPSS on TV, radio, newspapers as well as face to face campaigns on e-zwich and its benefits.

It must be noted too that access to money on e-zwich is far easier than an ordinary bank account. With e-zwich you can access your money from any bank, not necessarily your bank and from any e-zwich POS. This makes it very flexible and convenient.

Furthermore, e-zwich being a biometric smart card is very secured as payments and withdrawals are authenticated using finger print of the owner. As a result, security is not a challenge with e-zwich.

### 4.2.3 Challenges

As per interviews conducted the following challenges were identified: The interviewees were the COO and Manager of Business development of GHIPSS.

Some of the banks are conservative and also lack understanding of the advantages of the e-zwich platform and as a result are not apply as much effort in promoting it as they should.

**Acceptance:** It is a herculean task to educate and convince the Ghanaian populace to use Electronic products. Ghanaians are accustomed to physical cash. Carrying of a chip representing thousand of cedis does not give the people the same feeling of carrying hard cash. A lot more education is required. The education must also extend to the banks as some of the banks do not understand the e-zwich system and are not providing the level of support needed to drive it.

**Ignorance:** People are not aware of the benefits of Electronic payments to the individual as well as the economy. They are not motivated enough to use e-zwich and other electronic products.

**Network Issues:** Although E-zwich works offline, an online connection is needed for POS devices at the end of each day to perform settlements. This is normally enabled and facilitated by any of the local mobile telecommunication companies. This connection is sometimes not successful thus frustrating the users. The success of data transfer is dependent on bandwidth availability and signal strength in the area.

**Lack of tips:** Some sales people are of the opinion that with the introduction of e-payments they will be losing out on getting tips from customers and are thus reluctant to use the POS devices.

#### 4.2.4 Results from interviews with the banks and data obtained from questionnaires.

The Directors of the Electronic banking departments of the banks where the main interviewees, on occasions where the director is not available a manager in the department was interviewed. Some of the banks also had e-zwich co-ordinators; these are personnel dedicated to the deployment of e-zwich. These co-ordinators also assisted in answering questions.

Data gathered from the bank questionnaires indicated that about 54% of people with bank accounts use electronic products with about 26% of those e-zwich customers. The banks were unable to provide trend analysis of Electronic Card usage including e-zwich. Percentage of E-zwich transactions as compared to total transactions is estimated at about 0.11%. This estimate was obtained from only one bank. The rest of the banks were unable to provide this information. However judging from the trends in data gathered it can be assumed that this figure is not likely to be significantly different from the rest of the banks.

Interviews conducted with banks as well as data obtained from questionnaires revealed the following challenges as well:

- **General illiteracy of electronic banking products:** Most Ghanaians do not understand and appreciate the benefits of electronic banking to individuals and the society as a whole. As a result they have been reluctant and slow to adjust to the new economic reality leading to poor patronage, lost opportunities and diminished competitiveness.



- **Limited availability of electronic transaction platforms:** The few individuals who are willing to use electronic cards have difficulty in finding avenues to use electronic cards. They sometimes get frustrated and convert their money to cash in purchasing items instead of using their cards.
- **Low level of acceptance:** The few Ghanaians who understand electronic transactions are still into traditional banking and cash transactions.
- Lack of understanding and co-operation from partners (fellow banks). Some banks attend to their customers first before attending to e-zwich card holders from other banks although e-zwich customers are charged for transactions which all stakeholders benefit from.
- Network connectivity problems when issuing new cards. Issuing e-zwich cards is an online activity and thus requires connectivity which is sometimes an issue and depends on signal strength and bandwidth availability of the mobile Telecommunication company at the time of connection.
- Lacks of full access to the e-zwich database to enable the banks obtain critical information in a timely manner. GHIPSS has given only limited access to the banks because of risk issues.

#### 4.2.5 Results from interviews with e-zwich users

Interviews conducted with some users of e-zwich cards also revealed the following challenges:

- Most shop owners are not ready for the electronic payments. Sometimes points of sales are faulty thus denying customers the opportunity of using cards to purchase items.
- Some users have also indicated that in some instances only one person is able to operate the Point of Sale device and as such once that person is not available electronic transactions can not be made thus frustrating users.
- Service Charges at some banks is also a factor impeding users from loading money onto their e-zwich cards. They indicated that these service charges are sometimes quite high thus discouraging them.
- On the other hand, some shop owners complained that customers are not patronizing e-zwich and electronic products in general.

- Some users found it cumbersome to transfer money from their bank account to their e-zwich cards and were of the opinion that e-zwich would have been more user friendly if it was a debit card instead of a prepaid card.

Although some users are complaining that they do not find Point of Sale devices, the shops are also complaining customers are not patronizing the available Point of Sale devices.

The next section gives an overview of findings obtained through interviews and observation on debit card usage in Ghana.

### 4.3 Debit Cards

Visa is the commonly used debit card in Ghana although some of the banks have their own proprietary debit cards. Most of the commercial banks issue debit cards mostly visa. Debit cards are used to withdraw cash from automated teller machine (ATMs) and to make payment of purchases by using point of sale (POS) outlets. It is important to note that very few departmental stores and restaurants have established POS machines to perform transaction through debit cards. In Ghana, people are hesitant to receive payment through electronic medium due to lack of proper education about e-payment.

As per interview conducted with Shop managers the following were some of the challenges identified:

- **Network Problems:** Most of the shops interviewed mentioned network problems as one their major challenge. Unlike e-zwich, debit cards work online implying that a break in network communication prevents transactions from taking place successfully thus frustrating customers. It was observed by some of the shops that these problems occur most of the time after a heavy rainfall.
- **Double Transaction:** In some instances some customers have complained of their bank accounts being debited twice the amount of good purchased.

## 4.4 Quantitative Analysis of Findings:

Descriptive statistics was used to ascertain the level of usage of electronic payments. The questionnaires obtained were analysed and findings from deep interviews were also analysed.

Data was gathered from questionnaires sent to banks, shops and individuals. A total of 30 questionnaires were sent to Commercial Banks, Shops and individuals. 10 questionnaires were sent to each category. Of the 10 questionnaires sent to the banks 8 responded positively approximately 80% response rate. Out of the 10 questionnaires given to shops to answer 9 responded given a response rate of 90%. Finally, out of the 10 questions sent to individuals 7 responded positively given a response rate of 70%. In most cases the researcher administered the answering of the questionnaires and those questions that were found unclear and difficult to understand were explained.

### 4.4.1 Bank Questionnaires

All the 8 banks that responded have a higher percentage of retail customers to corporate customers. Out of the 8 banks 7 issues visa debit cards while 1 one currently issues its proprietary debit card. The six have proprietary cards but these have virtually been replaced by visa debit cards. All the 8 banks issue e-zwich cards. Out of the 7 banks only one issues visa credit cards. All the 7 banks perform some form of Internet Banking and Mobile Banking. The Internet banking mainly involves checking of account details online and printing of bank statements. Mobile banking currently involves informing customers of transactions and bank balance through SMS.

As indicated earlier, 7 out of the 8 banks were unable to provide a trend of the usage of electronic products for the period 2005 to 2009. 5 out of the 8 banks have used debit cards for more than 5 years. 7 of the banks indicated VISA debit as their most used card. 5 of the banks have more than 50% of their customers using electronic products. However, most of these transactions are withdrawals from Automatic Teller Machines (ATM) as compared to Point of Sale (ATM) usage

On the average 26% of bank customers have been issued e-zwich cards. Out of the cards issued only 31% had values on them.

All the 8 banks responded positively that they do monitor electronic transactions and e-zwich transactions. They also indicated that analyses of these transactions have impacted positively in their operations.

**Table 4.2**

<b>No. of Questionnaire to banks</b>	<b>Responses</b>	<b>Response rate</b>
10	8	80%

#### 4.4.2 Shop Questionnaires

The 9 shops that answered the questionnaires included 4 Super Markets, 2 boutiques, 1 fashion House, 1 Interior Decoration Shop and 1 hotel. Out of the 9, 7 accept both VISA and ezwich whiles the remaining 2 accept only e-zwich. On the average visa transactions make up about 20% of total payments. However, most of the visa customers are expatriates. Nevertheless, visa payments among Ghanaians have been on the rise. 7 shops recorded 1% or less for e-zwich payments compared to total payments ever since its introduction in 2008. Only 1 supermarket recorded about 20% ezwich transactions as compared to total payments. This shop does not accept VISA cards.

1 shop indicated that no e-zwich payment has been made ever since acquiring the Point of Sale device for about a year.

**Table 4.3**

<b>No. of Questionnaire to shops</b>	<b>Responses</b>	<b>Response rate</b>
10	9	90%

**Table 4.4**

<b>Type of shops</b>	<b>Number</b>
Super Market	4
Boutique	2
Fashion House	1
Hotel	1
Interior Decoration	1

#### 4.4.3 Individual Questionnaire.

The 7 individuals were professionals and use both VISA debit and ezwich cards. Most of them admitted the VISA debit card is mostly used to withdraw money from ATM. Only about 1 % of payments was ezwich payments. Only one of the professionals uses VISA credit Card.

**Table 4.5**

<b>No. of Questionnaire to individuals</b>	<b>Responses</b>	<b>Response rate</b>
10	7	70%

## Chapter 5 Conclusion & Recommendations

### 5.1 Conclusion

This study has investigated the challenges of implementing electronic payments especially in Ghana. The study also assessed the level of usage of e-payments in Ghana. The case study, E-zwich payment system is a domestic prepaid card or electronic purse.

Despite the numerous benefits that electronic payments bring to the nation, banks and individuals, it also has its own challenges. The challenges as discussed in the study can be categorised into four main groups i.e Security, Infrastructure, Legal & Regulatory issues as well as Socio-Cultural issues.

**Security:** The study revealed that security is not an issue for e-zwich but may be an issue for debit cards which use PIN for authentication. E-zwich being a biometric smart card payment system is much secured. Transactions are only authorised by the customer's finger print thus making it very secured.

**Infrastructure:** E-zwich uses the mobile networks available for connectivity. Some of the mobile networks have presence in most parts of the country thus facilitating a wider coverage for e-zwich. A recent project to connect all the rural banks to the central bank is also major booster for e-zwich. Discussions with the main stakeholders revealed connectivity issues when issuing e-zwich cards and making settlements for the day. Both of these activities are online activities and require connection using any of the mobile Telecommunication Network. Most e-zwich activities are offline thus reducing too much dependence on network connectivity.

The implementation and support of the e-zwich infrastructure is expensive. However, the Bank of Ghana has provided adequate funding to GHIPSS for the e-zwich project. Although there are infrastructure challenges in terms of connectivity and cost, these are not very major.

**Legal & Regulatory Framework:** A legal framework for payments encompassing electronic payments currently exist. This is managed by the Bank of Ghana. This is not a challenge in Ghana

**Socio-Cultural issues:** The high illiteracy rate coupled with a highly unbanked population requires more education for customers to understand and adopt e-payments. Furthermore, the population is used to cash and are reluctant to use e-payments. As the study revealed, this is the major challenge for e-zwich.

Some of the banks also lack understanding and not capitalising on the advantages of this platform. On the contrary, GHIPSS has also not responded in a timely manner to some of the requests from the banks.

**Level of usage of e-payments:** Cashless society in Ghana is picking up gradually. Products on the market include mobile money transfer, text and pay, cashless mobile phone top up service, debit card, credit card and the newest of all e-zwich smartcard. Most of the universal banks issue Debit cards. Debit Cards are used to withdraw money from Automated Teller Machines as well as make payment of purchases at Point of Sale outlets. It is important to note that only few restaurants and shops have established POS machines to perform transaction through debit cards.

Electronic payments in Ghana during the past few years have undergone significant progress, but are still paper-based. The outcome of the study shows that cash transactions are still very dominant in Ghana. Shops visited indicate that e-zwich transactions are less than 1%. Nevertheless, Ghana has the basic infrastructure to implement any electronic payment especially offline payment systems. The introduction of ezwich may be a step in the right direction but more work and time must be invested into it to enable it achieve its objectives. It is estimated that e-zwich has introduced about 200,000 customers into the banking system in the last two and half years. If this trend continues then Ghana's objective of reducing the unbanked will be realized.

Another major finding revealed that several initiatives have been taken by GHIPSS to reduce the unbanked population using e-zwich especially in the rural areas where the unbanked are mainly located.

## 5.2 Recommendations

There is the need to create more awareness to entice the unbanked people into the banking system. About 80% of the population is unbanked and issuing more ezwich cards will automatically get more people into the banking system. GHIPPS and the banks must perform more education and advertisement on electronic payments so that the Ghanaian population will appreciate and use electronic products available. The use of cash comes with its own disadvantages and problems that electronic payments can eliminate. Cash and cheques must go through several processes which increases their risk of being lost or stolen. Such processes include transportation and counting. Most Ghanaians are not aware of the benefits of electronic payments and are therefore slow to adopt it.

The banks must also be educated to promote e-payments; training programs for senior management of the banks will assist in achieving this.

As a result of limited access granted to the banks to the e-zwich database, it is recommended GHIPSS respond to the needs of the banks in a timely manner.

The process of using e-zwich for remittances should be accelerated. As a developing country, money from this angle contributes a lot to our GDP.

Experience has shown that leadership from within government is important in making electronic payments successful. According to a paper published by the Commonwealth Business Council, Dr. Atef Ebeid (2004) decided to take action on economic modernization by launching a vision for modern payments in his country. It is recommended that the Government of Ghana provide the needed leadership and support for electronic payments.

It is also further recommended that strategic segments of the economy be the subject of focus first especially the unbanked segment. In that way the vision of reducing the unbanked will be done gradually and systematically.



Ultimately, there is the need to consider a dedicated data network for e-zwich online transactions rather than rely on the mobile telecommunication networks.

## Appendix A

### Commercial Banks Interviewed

Name of Bank
Standard Chartered Bank
ECOBANK
Guaranty Trust Bank
Cal Bank Ltd.
Fidelity Bank
UT Bank
United Bank for Africa
Zenith Bank

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