THE E-ZWICH A FACILITATOR OF FINANCIAL MOBILITY AND INCLUSION; A CASE STUDY OF THE CENTRAL REGION OF

GHANA



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DECLARATION

I hereby declare that this submission is my own work towards the Commonwealth Executive Masters in Business Administration and that to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.



DEDICATION

This work is dedicated to Mr. & Mrs. Larbi for their support in the successful completion of this work.



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THAT CONTRACT

ABSTRACT

Technological advancement has brought significant changes to banking worldwide. Ghana is not an exception to this development in the banking industry. This development has drawn the attention of many stakeholders including researchers who have tried to investigate issues concerning electronic banking in Ghana. The purpose of this study is to investigate how an innovation in electronic banking, the e-zwich has facilitated mobility and inclusion in the Ghanaian financial industry. The study uses the Central Region of Ghana as a case study. Through the means of questionnaire administration and interview I came out with findings to see how effective the e-zwich has been with regard to financial mobility and inclusion. Quantitative approaches were used in gathering information from 100 randomly selected respondents made up of 70 individuals and 30 merchants. The study found out that although individuals have acquired the e-zwich card, only a few of those have actually used the card, the majority keeping it as a 'decorative' item. The research also found that most merchants do not own e-zwich Point of Sale (POS) devices and that the few who had them already had bank accounts with at least one of the banks in the country. The data collected for this study showed that the mobility effectiveness of e-zwich was being achieved since all respondents who were users of the e-zwich responded that they had benefited in that line by using their card with other institutions from the one who issued them their cards. The analysis also showed that the inclusiveness effect of the e-zwich was failing since users already had accounts with one of the banks in the country. The findings show that the unbanked who are the target for the inclusiveness feature of the e-zwich are not patronizing its usage. The study ends by making recommendations on how to improve the inclusiveness effect of the e-zwich. There is the need to create more awareness and produce more e-zwich cards. It was also

recommended that banks train their staff on e-payments to enable them promote its implementation.



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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

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.

A cashless economy is one that operates without physical cash but all systems are still in place. Money is usually in electronic transfers which could offer benefits to governments, banks, and the public. The establishment of a cashless economy offers the chance to establish

a wide standard for electronic cash, putting the world at its own feet in the face of globalization.

In an era where finance has been expanded to include even the non-banking people, people are already using cashless means of paying for purchases through checks, credit and debit cards. With computers of massive capabilities now existing, very few people will argue that the world, as it exists today, is not proceeding to a cashless economy, a useful and convenient way of banking.

The information technology revolution in the banking industry began in the early 1970s, with the introduction of the credit card, the Automatic Teller Machine (ATM) and the ATM networks. This was followed by telephone banking, cable television banking in the 1980s, and the progress of Personal Computer (PC) banking in the late 1980s and in the early 1990s (Giannakoudi, 1999). Information technology enabled electronic channels to perform many banking functions that would traditionally be carried out over the counter to improve customer satisfaction (Giannakoudi, 1999). The evolution of electronic banking such as internet banking from e-commerce, has altered the nature of personal banking relationships and has many advantages over the traditional banking delivery channels. This include an increased customer base, cost savings, mass customization and product innovation, marketing and communications, development of non-core businesses and the offering of services regardless of geographic area and time all aimed at improving customer satisfaction (Giannakoudi, 1999).

The first banking institutions were set up in British West Africa in the late 19th century. Backed by the London-run African Banking Corporation, the Bank of British West Africa was opened in 1894. West Africa and its banking institutions were controlled by the British until 1957.

In 1957, the Gold Coast gained its independence from British rule and officially adopted the name of Ghana. With the nation now free to form its own banking system, it developed a new national currency, the Cedi.

The Bank of Ghana, established in 1953 by the Bank of England, became the main banking institution in the country and oversaw issues of currency, business and personal banking. Further development and economic policies allowed the bank of Ghana to open branches across the nation.

Today, the banking system in Ghana has seen a wide range of policies implemented to keep up with the western world. 1989 saw the inception of the Ghana Stock Exchange, and Ghana has worked with the IMF (International Monetary Fund) and World Bank to develop new, progressive policies. Banking has moved from cash transactions through cheques transactions and now Ghanaian banking is going global with e-transact.

The use of biometrics - such as fingerprints, face or iris scans, or voice prints - to enhance security has been a major focus of discussion round the world. A boom in interest in the topic was sparked in the aftermath of the September 11 attacks in the United States, said Bruno Struif, Deputy Manager for Security and Smart-card technology at the nonprofit Fraunhofer Institute for Secure Telecooperation in Germany.

Biometrics can not only be used to verify cardholder identity, but such a system would prevent unauthorized persons from using lost or stolen cards and passwords. Executives from the chip-card industry are excited by the apparent new opportunities in biometric security, such as cards to identify individuals for banking, immigration, and other activities. But critics caution that major roadblocks, both technical and legal, must be scaled before such systems can be made practical.

Electronic transactions have boomed as the world has become increasingly more interconnected and mobile. But most transactions are simply variations on the same idea. For example:

Debit Cards — Debit cards are accepted almost as readily as cash by most retailers and consumers continue to embrace their convenience. The swipe of a debit card at the cash register creates an almost instant debit from the cardholder's checking account, and a credit to the seller's account. The seller gets paid sooner (checks and credit purchases can take days to process), and consumers are more likely to spend within their means. For the first time in 2009, Americans made more debit purchases than credit card purchases, a sign that the economy is weighing on consumers' desire to reduce their credit burden.

Smart Cards — smart cards are similar to debit cards, but there is one major difference: value is stored on a microchip imbedded in the card, so there is no network connectivity needed to use it. This frees the card to be used for virtually any transaction, from mass transit fares and a cup of coffee, to major purchases and bill payments. Some cards must be inserted in a reader; others are "contactless" and can simply be held in proximity to the reader. As long as there are compatible readers where you wish to use a smart card (at a toll booth, the gas station and vending machines), you need never have change in your pocket for small, routine purchases. Some cards can also store personal information to help authenticate the identity of the user, and can be "recharged" when funds run low. Smart cards have achieved

limited penetration in the United States, but are experiencing tremendous growth in Europe and Asia.

Prepaid Cards — millions of prepaid "gift cards" are sold each year, providing gift givers a convenient way to give money for a specific purpose, like a fast food chain or a specialty retailer. Other cards look and work much like credit cards, with a certain amount pre-loaded on them. When those funds are used, the card can be reloaded and used again.

Mobile Payment Devices — as more of our daily lives get carried around with us in a single electronic device, the mobile phone is becoming a new frontier for cashless payment. An entire handset is passed by a reader, and the cost of a cup of coffee, a newspaper or bus fare is debited from a bank account. Instead of carrying a debit card, a transit card and a purse full of coins, all that is needed is the mobile device. Unlike a smart card, a mobile device has a screen where balances and other account information can be displayed and managed. If the device is lost or stolen, it can be contacted and deactivated remotely.

Online Payments — some early forays into cashless payment were on the Internet. How was an auction site seller in Oregon going to collect payment from a buyer in Massachusetts? Forcing that buyer to pay by check or money order would have worked against some of the fundamental advantages of Internet commerce, namely, speed and convenience. With online payment services like PayPal, a store of funds is deposited and made available for payment to member businesses. PayPal currently has more than 78 million active accounts in 190 markets and 19 currencies around the world.

Automatic Direct Withdrawals — all that businesses like a utility, an insurance company or a credit card issuer need to make automatic withdrawals from a checking account is a

routing number — which is used by check processors to identify your financial institution — and an account number. As long as there is sufficient money in the account, it's hands-off convenience from there on.

These are some of the examples of how the cashless economy is being advanced in the global world.

As with the acceptance of any technology, there is a chicken and egg proposition: People won't use smart cards or adapt mobile phone payments until there are enough retailers or vending machines that accept them. Likewise, sellers will hesitate to invest in the technology to accept cashless payments until they are sure there is sufficient demand.

The growth of cashless payment options is a classic question of blazing a trail or playing it safe. Ultimately, today's decisions create both leaders and followers. In the meantime, checking accounts will be phased out in the United Kingdom by 2018, cashiers are finding fewer occasions to count out change, and "playing with Monopoly money" has a whole new meaning.

1.1.2 THE CASE OF GHANA

The Ghana Interbank Payment and Settlement Systems Limited (GhIPSS) is a subsidiary of the Bank of Ghana which was set up in 2007 with the mandate to set up and operate the National Switch with smartcard payment System and the provision of smartcard services. GhIPSS responsibility is to manage, develop and promote these systems on an ongoing basis.

E-zwich is the brand name for the National Switch and Smart card payment system. The ezwich payment system is an innovative method for improving accessibility to banking and retail services in Ghana. The e-zwich card is a biometric card that uses fingerprint to identify subscribers to the e-zwich payment system. The e-zwich system offers Deposit taking financial institutions (i.e. Universal banks, Rural banks and Savings and Loans) a platform that enables them to interoperate. This therefore, enables e-zwich cardholders to perform banking and retail transactions at the outlets of other e-zwich financial institutions.

The e-zwich smart-card is currently the only card in Ghana that provides the convenience of nationwide access as well as greater control over transactions for cardholders, retail merchants and other corporate users.

1.2 STATEMENT OF THE PROBLEM

The e-zwich was formally launched in Ghana by the Bank of Ghana in 2008. At the launching, the then Governor of the Bank of Ghana, Dr Paul Acquah described it as having been primarily designed "...for promoting branchless banking and financial inclusion."

This statement in its entirety defines the three – tier objectives of the e-zwich card which are for branchless banking, for financial inclusion and lastly for debit facilitation. However, in recent times, the question has arisen whether the system has met its objectives since its inception. It is important to assess whether the e-zwich has improved mobility and inclusiveness in the financial industry. Most surveys which have been done on e-zwich has focused on identifying challenges and limitations to the implementation of e-zwich (Kumaga, 2010; IMANI, 2010) and has come out with suggestions on how to mitigate these challenges and limitations. Limitations like funding and education have been identified by these researches as being inhibiters to the successful implementation of the e-zwich. However despite the limitations and challenges affecting the implementation of e-zwich, there is the need to ascertain the effectiveness of e-zwich with regard to its three tier objectives by actually monitoring the implementation process. Without monitoring, the process implementers of e-zwich will be working to remove obstacles to the implementation whilst the objectives of the implementation are still not being met. This underscores the importance of measuring actual patronage and usage of the e-zwich in the light of achieving set objectives of the product. If customers do not derive any satisfaction from the use of the e-zwich, its adoption would be meaningless to the banks and the industry as a whole. If the government cannot through the implementation of the e-zwich achieve a cashless economy, a secure way of doing business and a successful means of bringing the unbanked into the financial industry, e-zwich could be considered to be a total waste of resources (IMANI, 2010). This research is therefore conducted to provide information to enable implementers measure the level of success of e-zwich meeting its set objectives by using the Central Region of Ghana as a case study.

1.3 RESEARCH OBJECTIVES

Generally, the study seeks to measure the extent to which the e-zwich has been able to meet is set objectives. Specifically the study seeks to:

- 1. To find out some challenges faced in the implementation of Electronic Payment Systems (EPS).
- 2. To find how the E-zwich uses biometric smart card technology to operate.

 To find out if the E-zwich objectives of financial inclusiveness and mobility has been achieved.

1.4 RESEARCH QUESTIONS

1. What are some of the challenges faced in the implementation of Electronic Payments Systems?

2. How similar are Biometric smart cards to the E-zwich card?

3. Has the E-zwich achieved its objective of financial mobility and inclusion in Ghana?

1.5 BRIEF METHODOLOGY

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

The research includes a study of literature on Electronic Payments Systems (EPS) and Ezwich. This involved researching and reading literature on general information on EPS. The information derived encompasses types of EPS as well as the benefits of EPS. A key feature of this phase was a thorough review of the challenges of EPS especially in Africa. On the basis of information collected through the review, mainly secondary data, theoretical framework for the research was written in Chapter 2. To obtain a better understanding of ezwich and its operation, some senior officials of the Ghana Interbank Payment and Settlement System (GHIPSS) were interviewed and all available data which would impact on the research was collected. Questionnaires were designed and distributed to one hundred (100) respondents across the Central Region of Ghana. The respondents were made up of seventy (70) individuals and thirty (30) merchants. The questionnaires were designed differently for individuals and differently for merchants. The administration of the questionnaires was done with the aid of two (2) research assistants who had been specifically engaged for that purpose. Respondents were given ample time of a week within which they were expected to have completed the questionnaires. The whole process of the questionnaire administration was to enable researcher collect primary information which was used as the main source of data for the research work. The final phase of the research involved the analysis of data obtained through administering the questionnaires and a final comprehensive report of findings and recommendations written.

1.6 SCOPE AND LIMITATION OF THE STUDY

The study concentrated mainly on explaining what Electronic Payment Systems are and the challenges that arise in their implementation in Africa. The study briefly looked at different kinds of Electronic Payment Systems and delved more into the nature of smartcards and how they are combined with biometrics to come out with products like the E-zwich. Finally the study tried to measure the effectiveness of the e-zwich in meeting its set objectives by collecting data from both individuals and merchants in the Central Region of Ghana.

The limitations of the study lies in the sheer size of the Central Region and its population which might make the findings from the sample size not reflect the true outlook of e-zwich effectiveness. Although the research was structured to cover the whole Central Region, it was impossible to access some remote parts of the regions due to bad roads and transport unavailability. Literacy rate in some parts of the region that were scheduled to be sampled made it impossible to administer questionnaires in these areas. Respondents sampled from these areas could not comprehend questionnaires and therefore had to be disregarded as respondents.

1.7 SIGNIFICANCE OF THE STUDY

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 has not been any assessment yet. An empirical study in this area is expected to inform the stakeholders of how E-zwich has been able to effectively achieve its primary objective since it was launched. The stakeholders involved are GHIPSS, Government of Ghana, Banks, other Financial Institutions and individuals. The information gained through this research can effectively be used to strategise in the implementation of e-zwich to help further achieve is primary objectives.

1.8 ORGANISATION OF THE WORK

The work is organized into five different chapters. The first chapter provides the primary introduction of this study. It proposes the extensive construction inherent in this study. It thus provides adequate background of information to allow the reader understand the reason behind the study and what the researcher intends to accomplish by undertaking the study. The chapter gives an overview of the whole study. Chapter two of the work reviews earlier research related to the research topic with specific reference to the research objectives. It presents extracts from books, journals and collected works that are helpful in carrying out this work and justifying key conclusions and recommendations. Chapter three provides details of how data was collected, organized and analysed. It suggests the varied techniques and tools used to collect and analyse data to gain valid results. Chapter four provides research findings and analysis obtained through the methodology outlined in chapter three. The final

chapter, chapter five provides a summary of findings, conclusions from the study and recommendations for users of the research.



CHAPTER TWO

LITERATURE REVIEW

2.1 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" (2007 Federal Reserve noncash payments study.

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).

2.2 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.

2.2.1 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)

2.2.2 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.

2.2.3 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).

2.2.4 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.

2.2.5 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 ecommerce 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).

2.2.6 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.

2.3 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.

2.4 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 e-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

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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".

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(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

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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).

2.5 WHAT ARE SMART CARDS?

A smart card, typically a type of chip card, is a plastic card that contains an embedded computer chip-either a memory or microprocessor type-that stores and transacts data. This data is usually associated with either value, information, or both and is stored and processed within the card's chip. The card data is transacted via a reader that is part of a computing system. Systems that are enhanced with smart cards are in use today throughout several key applications, including healthcare, banking, entertainment, and transportation. All applications can benefit from the added features and security that smart cards provide. According to Eurosmart, worldwide smart card shipments will grow 10% in 2010 to 5.455 billion cards. Markets that have been traditionally served by other machine readable card technologies, such as barcode and magnetic stripe, are converting to smart cards as the calculated return on investment is revisited by each card issuer year after year.

First introduced in Europe nearly three decades ago, smart cards debuted as a stored value tool for payphones to reduce theft. As smart cards and other chip-based cards advanced, people found new ways to use them, including charge cards for credit purchases and for record keeping in place of paper.

In the U.S., consumers have been using chip cards for everything from visiting libraries to buying groceries to attending movies, firmly integrating them into our everyday lives. Several U.S. states have chip card programs in progress for government applications ranging from the Department of Motor Vehicles to Electronic Benefit Transfers (EBTs). Many industries have implemented the power of smart cards in their products, such as the GSM digital cellular phones as well as TV-satellite decoders.

Smart cards improve the convenience and security of any transaction. They provide tamperproof storage of user and account identity. Smart card systems have proven to be more reliable than other machine-readable cards, like magnetic stripe and barcode, with many studies showing card read life and reader life improvements demonstrating much lower cost of system maintenance. Smart cards also provide vital components of system security for the exchange of data throughout virtually any type of network. They protect against a full range of security threats, from careless storage of user passwords to sophisticated system hacks. The costs to manage password resets for an organization or enterprise are very high, thus making smart cards a cost-effective solution in these environments. Multifunction cards can also be used to manage network system access and store value and other data. Worldwide, people are now using smart cards for a wide variety of daily tasks. The most prominent application of smart card technology is in Subscriber Identity Modules (SIM), required for all phone systems under the Global System for Mobile Communication (GSM) standard. Each phone utilizes the unique identifier, stored in the SIM, to manage the rights and privileges of each subscriber on various networks. This use case represents over half of all smart cards consumed each year. The Universal Subscriber Identification Modules (USIM) is also being used to bridge the identity gap as phones transition between GSM, UTMS, and 3G network operators.

Smart cards make it easy for consumers to securely store information and cash for purchasing. The advantages they offer consumers are:

- The card can carry personal account, credit and buying preference information that can be accessed with a mouse click instead of filling out forms.
- Cards can manage and control expenditures with automatic limits and reporting.
- Internet loyalty programs can be deployed across multiple vendors with disparate POS systems and the card acts as a secure central depository for points or rewards.
- Micro Payments paying nominal costs without transaction fees associated with credit cards, or for amounts too small for cash, like reprint charges.

Around the globe, bank controlled co-ops (Visa, MasterCard, Discover, and American Express) have rolled out millions of smart cards under the EMV (Europay, MasterCard, VISA) standard. Often referred to as chip and PIN cards; these are the de facto types of cards for bank issuance in most countries except the U.S. As Canada has just recently started its regulatory shift to EMV cards, the U.S. will be the sole island in North America that has not yet made the adoption, which is being driven by the increased types of fraud with both credit and debit cards. Smart cards have been proven to secure transactions with regularity, so much
so that the EMV standard has become the norm. As banks enter competition in newly opened markets such as investment brokerages, they are securing transactions via smart cards at an increased rate. This means:

- Smart cards increase trust through improved security. Two-Factor Authentication insures protection of data and value across the internet. Threats such as the "Man in the middle" and "Trojan Horses" that replay a user name and password are eliminated
- This is improving customer service. Customers can use secure smart cards for fast, 24-hour electronic funds transfers over the internet
- Costs are reduced: transactions that normally would require a bank employee's time and paperwork can be managed electronically by the customer with a smart card

2.6 WHAT IS **BIOMETRICS**?

Biometrics is the science and technology of measuring and analyzing biological data. In information technology, biometrics refers to technologies that measure and analyze human body characteristics, such as DNA, fingerprints, eye retinas and irises, voice patterns, facial patterns and hand measurements, for authentication purposes (Jain *et al.* 1999).

Biometrics (or **biometric authentication**) consists of methods for uniquely recognizing humans based upon one or more intrinsic physical or behavioral traits. In computer science, in particular, biometrics is used as a form of identity access management and access control. It is also used to identify individuals in groups that are under surveillance.

Biometric characteristics can be divided in two main classes: **Physiological** are related to the shape of the body. Examples include, but are not limited to fingerprint, face recognition,

DNA, Palm print, hand geometry, iris recognition, which has largely replaced retina, and odour/scent. **Behavioral** are related to the behavior of a person. Examples include, but are not limited to typing rhythm, gait, and voice. Some researchers have coined the term **behaviometrics** for this class of biometrics (Jain, A., Hong, L., & Pankanti, S. 2000)

Strictly speaking, *voice* is also a physiological trait because every person has a different vocal tract, but voice recognition is mainly based on the study of the way a person speaks, commonly classified as behavioral.

2.6.1 Biometric functionality

Many different aspects of human physiology, chemistry or behavior can be used for biometric authentication. The selection of a particular biometric for use in a specific application involves a weighting of several factors. Jain *et al.* (1999) identified seven such factors to be used when assessing the suitability of any trait for use in biometric authentication. Universality means that every person using a system should possess the trait. Uniqueness means the trait should be sufficiently different for individuals in the relevant population such that they can be distinguished from one another. Permanence relates to the manner in which a trait varies over time. More specifically, a trait with 'good' permanence will be reasonably invariant over time with respect to the specific matching algorithm. Measurability (collectability) relates to the ease of acquisition or measurement of the trait. In addition, acquired data should be in a form that permits subsequent processing and extraction of the relevant feature sets. Performance relates to the accuracy, speed, and robustness of technology used. Acceptability relates to how well individuals in the relevant population accept the technology such that they are willing to have their biometric trait captured and assessed. **Circumvention** relates to the ease with which a trait might be imitated using an artifact or substitute. No single biometric will meet all the requirements of every possible application. Below is a diagram showing the basic block diagram of a biometric system.



Figure 2.1: The basic block diagram of a biometric system (Damato, 2007)



Source: www.wikipedia.org

A biometric system can operate in the following two modes (Jain, Anil K.; Ross, Arun 2008). In **verification** mode the system performs a one-to-one comparison of a captured biometric with a specific template stored in a biometric database in order to verify the individual is the person they claim to be. This process may use a smart card, username or ID number (e.g. PIN) to indicate which template should be used for comparison. 'Positive recognition' is a common use of verification mode, "where the aim is to prevent multiple people from using same identity".

In **Identification** mode the system performs a one-to-many comparison against a biometric database in attempt to establish the identity of an unknown individual. The system will

succeed in identifying the individual if the comparison of the biometric sample to a template in the database falls within a previously set threshold. Identification mode can be used either for 'positive recognition' (so that the user does not have to provide any information about the template to be used) or for 'negative recognition' of the person "where the system establishes whether the person is who she (implicitly or explicitly) denies to be". The latter function can only be achieved through biometrics since other methods of personal recognition such as passwords, PINs or keys are ineffective.

The first time an individual uses a biometric system is called *enrollment* (Damato, 2007). During the enrollment, biometric information from an individual is captured and stored. In subsequent uses, biometric information is detected and compared with the information stored at the time of enrollment. Note that it is crucial that storage and retrieval of such systems themselves be secure if the biometric system is to be robust. The first block (sensor) is the interface between the real world and the system; it has to acquire all the necessary data. Most of the times it is an image acquisition system, but it can change according to the characteristics desired. The second block performs all the necessary pre-processing: it has to remove artifacts from the sensor, to enhance the input (e.g. removing background noise), to use some kind of normalization, etc. In the third block necessary features are extracted. This step is an important step as the correct features need to be extracted in the optimal way. A vector of numbers or an image with particular properties is used to create a *template*. A template is a synthesis of the relevant characteristics extracted from the source. Elements of the biometric measurement that are not used in the comparison algorithm are discarded in the template to reduce the file size and to protect the identity of the enrollee

If enrollment is being performed, the template is simply stored somewhere (on a card or within a database or both). If a matching phase is being performed, the obtained template is passed to a matcher that compares it with other existing templates, estimating the distance between them using any algorithm (e.g. Hamming distance). The matching program will analyze the template with the input. This will then be output for any specified use or purpose (e.g. entrance in a restricted area) (Damato, 2007). NUST

2.6.2 Performance

The following are used as performance metrics for biometric systems (Krause & Tipton, 1999)

- false accept rate or false match rate (FAR or FMR): the probability that the system incorrectly matches the input pattern to a non-matching template in the database. It measures the percent of invalid inputs which are incorrectly accepted.
- false reject rate or false non-match rate (FRR or FNMR): the probability that the • system fails to detect a match between the input pattern and a matching template in the database. It measures the percent of valid inputs which are incorrectly rejected.
- receiver operating characteristic or relative operating characteristic (ROC): The • ROC plot is a visual characterization of the trade-off between the FAR and the FRR. In general, the matching algorithm performs a decision based on a threshold which determines how close to a template the input needs to be for it to be considered a match. If the threshold is reduced, there will be less false non-matches but more false accepts. Correspondingly, a higher threshold will reduce the FAR but increase the FRR. A common variation is the Detection error trade-off (DET), which is obtained

using normal deviate scales on both axes. This more linear graph illuminates the differences for higher performances (rarer errors).

- equal error rate or crossover error rate (EER or CER): the rate at which both accept and reject errors are equal. The value of the EER can be easily obtained from the ROC curve. The EER is a quick way to compare the accuracy of devices with different ROC curves. In general, the device with the lowest EER is most accurate.
- **failure to enroll rate (FTE or FER)**: the rate at which attempts to create a template from an input is unsuccessful. This is most commonly caused by low quality inputs.
- **failure to capture rate (FTC)**: Within automatic systems, the probability that the system fails to detect a biometric input when presented correctly.
- **template capacity**: the maximum number of sets of data which can be stored in the system.

The promise of biometrics in financial services markets is only now being fully realized. Large-scale deployments involving high-value services require a technology that is both easy to use and reliable. Some programs, such as in India, will involve many millions of users under conditions that are less than ideal. More developed markets like those in Chile and Brazil have been busy building the infrastructure for secure transactions for more than a decade. These systems have been designed from the beginning to combine biometrics and other user credential—like smart cards—to securely support transactions at ATMs. Government-issued documents, e.g., national ID or citizen ID cards, now support a variety of financial services programs. These smart credentials, coupled with biometrics authentication, are provisioned for a variety of e-government and commercial services and have enabled more secure online and offline financial transactions. In the rapidly developing market in

India, the government has recently launched a massive and ambitious identification program, known as UID, to enroll more than 1 billion of its citizens over a several year period. This is one of the largest biometrics programs in history. It also makes India arguably the largest biometrics market in the world today. UID has already made a major impact on the way that financial services and public distribution services will be provided in India. A number of commercial financial services providers have already developed a wide range of biometrically-equipped mobile banking terminals that can securely authenticate both the agent and the client. These handheld terminals can be used to deliver services directly to Indian citizens. They also make it possible to transact business in the field rather than at the more traditional fixed kiosk or ATM. "Microbanking" is growing very rapidly and as such is creating a very large and growing demand for robust biometric sensors. Biometrics has allowed financial services providers to safely expand their businesses, securely deliver services and make it simpler for customers to transact business with them. Another benefit is that people are assured that deposits and/or withdrawals are accurately recorded. Bottom line: everyone benefits (Scarfo, 2011).

These progressive programs may be shaping the future of how financial services are delivered and provided in Ghana as well. With the explosive increase of online transactions, retailers and financial services providers must look for new and better ways to securely transact business. The greater use of biometrics is inevitable as the only sure way of knowing who is at the other end of that transaction will be the use of a biometric signature. We also see very real potential for combining biometrics with a smart device, be it a card, smart phone or other device, to totally reinvent how services are delivered. Leveraging the explosive growth of smart phones, for example, and combining virtual credentials with biometrics authentication will undoubtedly provide a whole new delivery system for transacting business.

Biometrics technology can be integrated with banks, *ATM machines*, into USB keys that can be hooked into computers, at retail locations to be used with credit cards and *ATM cards*, and anywhere you may make a financial transaction. It will act on its own or in conjunction with your PIN to securely identify you as the owner of the card and the person who has access to the money being exchanged.

Identity theft is a huge and growing problem in this world of electronic money. So many of our financial transactions now have no physical cash involved. It's all done via computers. This is convenient, but opens up a whole new world to anyone who has the skills and will to steal.

Not only can your "cash" be stolen, they can steal your credit cards, bank account info, access to your line of credit, credit rating - the list is virtually endless. They cannot, however, steal your iris or your finger print. If, when you're conducting a financial transaction of some kind, you have to be identified physically through the use of biometric technology before the transfer is completed, it becomes impossible for anyone else to intercept the money, or your financial information. If you have to prove who you are before making a credit card purchase, it doesn't matter if someone else has your card number; they won't have your physical identifiers and the transaction won't be completed.

Biometric technology protects both sides during a financial transaction. When buying liquor, a retailer can use biometrics to find out for sure if a customer is of legal drinking age.

Someone selling products restricted in some way are able to tell if they are selling to someone who is permitted to buy them.

Biometric technology is reducing fraud, making fraud prevention easier, and decreasing the risk that your identity will be stolen astronomically. It's making financial transactions more secure safer for both businesses and consumers. Even in these times of economic uncertainty, companies are realizing the benefits of investing the money necessary to implement biometric technology. The money saved by doing so far outweighs the initial outlay, and the peace of mind is priceless.

There have been various debates on the use of biometric cards in general all over the world. These debates were sparked especially after the September 11 attacks in the United States according to Bruno Struif, Deputy Manager for Security and Smart-card technology at the nonprofit Fraunhofer Institute for Secure Telecooperation in Germany. Biometrics could be used to verify cardholder identity, he said. Such a system would prevent unauthorized persons from using lost or stolen cards and passwords.

The use of biometrics, such as fingerprints, face or iris scans, or voice prints, to enhance security was a major focus of discussion at the Omnicard 2002 conference on chip-card technology in Berlin (Perera, 2002).

Andreas Wieberneit, Senior Software Engineer at Dermalog Identification Systems GmbH, described a national ID card project his company has implemented in the Southeast Asian country of Brunei. Starting in 1999, Brunei replaced existing registries of citizens, legal residents, and frequent visitors with a system of chip cards carrying encrypted data, including photos and thumbprints. Corresponding copies of the data are stored in a central database, making it easy to verify if an applicant for an identification card is fictitiously maintaining a separate identity, for example. Wieberneit acknowledged, however, that a system that works for tiny Brunei, with fewer than 350,000 inhabitants, might not work for a bigger country.

Christoph Thiel, a cryptography and technical security specialist with Germany's Sparkasse group of savings banks however foresees the use of the technology facing a number of hurdles. He believes that a system that tests thumbprints to verify bank ATM transactions will always be less consumer-friendly than the current system using a card and a password. "The customer must be assured that he'll be able to get money. If he has his card, the correct code, and money in his account, he gets money. But if a thumbprint is given, there's no 100 percent guarantee of a correct procedure," Thiel said. In fact, customers would still need a password as a backup, he added (Perera, 2002).

Richard Aufreiter, Product Manager for personal device security at Utimaco Safeware is also of the view that 'lots of people don't feel good about the idea of biometric data being stored centrally'. He adds that there are still no widely accepted standards for the encryption and storage of biometric data to begin with, making it hard for different proprietary security systems to share one set of stored prints. Aufreiter admitted, though, there will be no abuse of the system if a person other than the proper cardholder entered the first print, unless a bank employee were present to verify identity.

The FFIEC is an interagency council that develops standards for the federal auditing of financial institutions by bodies such as the Federal Reserve System and the Federal Deposit Insurance Corp. (FDIC) in the United States. In 2005, it issued a set of guidelines, titled "Authentication in an Internet Banking Environment" calling on banks to upgrade their

single-factor authentication processes -- typically based on user name and passwords -- with a stronger, second form of authentication by the end of 2006. The guidance left it largely up to the banks to choose whatever second form of authentication that they felt was the most appropriate for their needs. The FFIEC listed several available authentication technologies that banks could choose from, including biometrics, one-time passwords and token-based authentication. Since the guidelines were issued, many banks have added a second authentication layer for users when conducting certain kinds of online transactions. However, in many cases, the added measures have been largely cosmetic in nature and have done little to bolster authentication in the way the FFIEC had originally intended, says Litan (2005), an analyst at Gartner.

Consumer behavior is very important in any transaction especially when it comes to the use of biometrics. Brentnall, Crowder and Hand (2010) contend that consumers exhibit large evidence of change with the information and streams of data available and presented to the consumer. They contend that consumers weigh the likelihood of an innovation being successful before they commit to it.

This view is shared by Rabino, Onufrey and Moskowitz (2009) that in service marketing, customer service satisfaction and the transition of the economy from product manufacturing to a service-oriented economy have received extensive attention in the business world. In this kind of an economy, customers who experience a high level of satisfaction become repeat, loyal customers. The result of loyalty in banking is that customers remain customers, even when they have a negative experience. In addition to loyalty, an emerging area of interest is customer advocacy, which is built on the basics of customer satisfaction and loyalty. The

'advocate' customer in turn communicates with other individuals who might become new customers.

Chibba (2009) discusses the importance of financial inclusion in achieving the Millenium Development Goals. He contends that in the global world, the chosen and conventional methods of tackling poverty and attempting to achieve the MDGs are not sufficient. Financial inclusion (FI) offers incremental and complementary solutions to tackle poverty, to promote inclusive development and to address the MDGs.

However, biometrics come with their own problems both legal and security. Moradoff (2010) gives an overview of the emerging biometric system, its growth and accesses its impact on the global world especially in the face of terrorism, privacy and human rights. Sarel & Marmorstein (2006) examines how secure the banking sector is and how banks are losing money and profit to account hijacking and online fraud. They examine to what extent biometrics and the need to involve the consumer in security measures will aid to reduce these security risks.

2.7 THE E-ZWICH

Consider all the ways you can manage money without ever touching currency or coins: online banking, direct deposits, automatic teller machines, debit cards, smart cards, e-filing of tax returns, online portfolio management etc. proponents of a cashless economy have been saying that these methods will lead to the fall of physical currency which would become, inconvenient, bulky, expensive to make and use. Granted all these thoughts, cash is still the preferred medium of exchange for millions of transactions. Through history, money has included salt, beads, shells, gold, coins and many other tangible items. Paper money came along as a way of carrying around the value of another commodity (gold for example), without having to actually lug it around in your pocket. Each of these items has been accepted as payment, because people were confident they could in turn offer it in exchange for things from others. If enough people believe that the thing they are accepting as payment today will still have value in the future, you have the basis for a system of money (Clifton, 2010).

Without access to financial services, there are few methods of keeping cash secure. One woman in a case study community stated that her mother used to put money in a tin can that would be put under a flat rock and another woman described how people would wrap money in clothe and sew it under clothing they wore. These methods lead to money damage, found and spent by children or forgotten about or stolen. Participants in a poverty assessment identified access to financial services as vital to their ability to deal with poverty and cover consumption shortfalls without recourse to money lenders or intra-family borrowing (van de ruit et al 1001). The difficulty in saving in secure forms encourages immediate consumption.

Today, rather than physically carrying cash from Bank A to Bank B, funds are transferred electronically. Bank B has confidence that the money actually exists, so it can loan the funds, pay interest to depositors and pay its own expenses. Transactions are faster and more secure than ever before.

The Ghana Interbank Payment and Settlement Systems Limited (GhIPSS) was set up as a subsidiary of the Bank of Ghana mandated to set up and operate the National Switch with smartcard payment System and the provision of smartcard services, to manage the Cheque Truncation system and to operate an Automated Clearing House (GACH) for direct debit and direct credit. The company was also mandated to operate a help desk to assist the payment system in general. GhIPSS responsibility is to manage, develop and promote these systems on an ongoing basis (Kumaga, 2010).

E-zwich is the brand name for the National Switch and Smart card payment system. When the Ghana Interbank Payment and Settlement System (GhIPSS) launched the e-zwitch in April 2008, the then Governor of the Bank of Ghana, Dr Paul Acquah described it as having been primarily designed "...for promoting branchless banking and financial inclusion."

The e-zwich payment system is an innovative method for improving accessibility to banking and retail services in Ghana. The e-zwich system offers deposit-taking financial institutions (i.e. Universal commercial and merchant banks, rural banks and savings and loans) a platform that enables them to interoperate. This therefore, enables e-zwich cardholders to perform banking and retail transactions at the outlets of other e-zwich financial institutions.

As an e-zwich cardholder, a customer has available to them a large group of banks and their branches where e-zwich transactions can be performed. It is therefore no more necessary to commute to a specific bank just to do banking transactions. The e-zwich was designed to facilitate the mobility of funds from one station to another without actually using cash but electronic transfer. This makes it easier for business and facilitates the quick transaction of business deals, arrangements and agreements.

The e-zwich smart-card is currently the only card in Ghana that provides the convenience of nationwide access as well as greater control over transactions for cardholders, retail merchants and other corporate users (IMANI, 2009).

The e-zwich card was created with a transaction feature. By this, the e-zwich Point of Sale (POS) supports both online and offline transactions. This dual capability ensures that e-zwich services can be accessed in all parts of the country whether or not the area has good communications network. Transactions such as Cash Deposit, Cash withdrawal and Sale are completed offline and consequently could be successfully completed in the remotest part of the country without regard to the efficiency of the telecommunication infrastructure.

By this statement, it is inferred that the e-zwich system was put in place to promote branchless banking. Systems in the banking sector of Ghana that existed were cash and cheques systems where people had to go to their deposit holding bank to transact business. This required that the person or account holder be always present in order to do a business transaction. E-banking systems of which the e-zwich is part of is supposed to make banking a very convenient exercise and as comfortable as possible. Banking services for the e-zwich include savings, cash withdrawal and cash deposits.

Another feature of the e-zwich is the money transfer. The e-zwich also offers a variety of very cost effective and speedy money transfer options to users. Money transfers can be made from or to other e-zwich cards or to and from traditional bank accounts. Depending on the type of transfer, the recipient could receive the remittance by the next day or immediately the transfer is completed by the sender. This is according to GhIPSS on their website www.ghipss.com. Money transfer to an e-zwich card (the card number of the recipient card is required) is successfully completed with the creation of a 10-digit code by the system host (switch). When a transfer to another e-zwich card is done online, the 10-digit code is created immediately and printed on the sender's receipt. This code enables the recipient to receive the money but has to be loaded by the recipient's card on an e-zwich device (POS or e-zwich

ATM). The code is an irreversible and secure tool usable only by the recipient card. The code can however be loaded manually together with the transferred amount offline or directly from the switch online. There are different options of money transfer available on the ezwich system. These are card to card transfer, cash to card transfer (transfer with card), card to bank (Online real-time) and the third party payment (linked/One-off account transfer). These are all aimed at making banking and business transactions convenient to the card holders.

The e-zwich system is for financial inclusion within the economy. This means that more people are to sign on to the banks and have access to money. The more people who save in the financial sector or banking system, it would be easier to transact business with the e-zwich facility. The e-zwich is supposed to be a debit card where a person's money was already in the bank and does not have to go all the way to the bank to have fiscal cash to pay for any transaction. The e-zwich card carries the account balance of the holder and the holder can purchase anything anywhere and this is charged to the card. However in this case, the card is not credit but rather debit since the money's going to be taken from the card holders' account from whichever bank the card holder has an account.

For purposes of this study, financial inclusion will refer to e-zwich card holders who do not hold the card as a prestige ornament but rather use it extensively or occasionally to transact business. This presupposes that there are some card holders who have the card for prestige purposes, probably as a status statement of having a debit card. Inclusiveness will also refer to individuals who have the card and use them but they do not have bank accounts in any of the banks in Ghana. To be able to be a card holder, one must not necessarily have an account at any of the commercial banks in the designated region. A key difference between the e-zwich card and other electronic payment instruments is the fact that e-zwich can be accessed more widely than most. Currently, all the major banks, rural banks and savings and loans companies offer services to all e-zwich cardholders regardless of the bank that issued the card. Retail and corporate merchants are also able to offer e-zwich services to all e-zwich cardholders. As e-zwich cardholders, customers therefore can leverage on the branch network of all participating financial institutions for all e-zwich transactions as if they were outlets of the bank without any complications.

Information from the GhIPSS website shows that e-zwich cardholders are to benefit from the highest security standards through the biometric (fingerprint) client authentication system. As a requirement, all fingers of a cardholder are scanned during enrolment and the templates stored on the client card. When performing any transaction, the e-zwich device (ATM or POS), will demand the verification of the cardholder by comparing the fingerprint presented on the device scanner to any of those stored on the card. By implication, a stolen or lost card cannot be used by anyone except the owner. Any transaction that results in the movement of funds off an e-zwich card requires the biometric verification of the cardholder before the transaction can be successfully completed. This is to manage the risks from fraud and impersonation that have plagued banking for a long time.

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CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

This chapter discusses the methodology used for this research. It starts with the design of the study, analyzing the target or population studied, narrowing down on the sample population and the techniques of sampling. The chapter also discusses sources of data, data collection techniques and how data was analyzed in this research.

3.2 RESEARCH DESIGN

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). The researcher used a case study design because the research was limited to the Central Region of Ghana. The case study approach is often associated with descriptive or exploratory research, without being restricted to these areas (Ghauri, 1983; Bonoma, 1985; Yin, 1994). The study was an exploratory research since it tried to find out how effective e-zwich has been in facilitating mobility and inclusion in Ghana.

3.3 POPULATION

The population of the study is made up of the all individuals in the Central Region of Ghana who can legally own a bank account (individuals above age eighteen) and all registered businesses within the Central Region. The region was chosen because of the proximity to the researcher and the status of the region as being the second most densely populated region in Ghana (<u>www.modernghana.com</u>).

3.4 SAMPLING AND SAMPLING TECHNIQUE

A simple random sampling method was used to select individuals and merchants to respond to the questionnaires across the Central Region. This technique was used to ensure a fair representation of the populace of the region was achieved and to ensure the questionnaire administration was devoid of sentiments and emotions of the administrators. Seventy individuals were chosen in the region as well as 30 merchants making a total of 100 respondents to the research. The response rate from sampled respondents was 100%. Two research assistant were used in administering and collecting questionnaires from randomly selected individuals and merchants in some parts of the region. Completed questionnaires were checked for completeness and analysed by use of SPSS

3.5 SOURCES OF DATA

In this study a questionnaire was used for collecting primary data. Series of questions were asked for which respondents had to provide answers. The questionnaires were structured as defined by deVaus(1996) where various persons are required to answer the same questions. The data collected from the questionnaire was then analyzed by statistical methods and tables drawn to that effect.

Apart from data solicited from questionnaires, written data was also sought from journals both online and available.

Secondary data used in this study were derived from books, journals, websites and interviews with officials in banks that use electronic payment systems

3.6 INSTRUMENTS OF DATA COLLECTION

Two main instruments were used to collect data for the study. These are questionnaires and interview. The questionnaire was used to collect data from the individuals and merchants sampled in the Central Region of Ghana. The questionnaires were designed to elicit information of card usage or non-usage and reasons for these. The questionnaires were administered over a period of three weeks and respondents were allowed a period of one week within which to answer questionnaires. Two senior managers at GhIPSS were interviewed to get information on the operation of e-zwich and the statistics held on its issuance. The interview technique used during our interview is called semi structured interview (Bryman, 2005). This method compared to unstructured interview, implies that the interviewer has a list of questions in advance which can be brought up at different stages in the interview. The respondent has the freedom of answering the questions the way they prefer. The technique was adopted in order to gain a thorough understanding of the problem under study. This technique offered the respondents the opportunity to express themselves as much as possible. The technique also made it possible for questions to be explained very well to respondents for the right reaction to be gained. The other method, the unstructured method, means that the interviewer does not have a list of questions in advance. The interviewer lets the respondent freely answer questions and decide the direction of the interview.

3.7 METHOD OF DATA ANALYSIS

The study used both qualitative and quantitative data analysis. Creswell (2002) defines qualitative study as "an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher is required to build a complex picture, analyze words and report detailed views of informants. The researcher conducts the study in a natural setting.

The quantitative data for this study was received through administering questionnaires to randomly selected individuals and merchants. After a week the filled questionnaires were collected and checked for completeness. The responses to the questionnaire were carefully fed into the Statistical Package for Social Science (SPSS), a software which is widely used by researchers for data analysis. The results from SPSS were produced in tabular and graphical form which has been presented in chapter four of this work and analysis of their implication done.

The qualitative data for the study was acquired from extensive reading from books and journals on EPS and also from holding interviews with stakeholders of the e-zwich. All the data and information acquired through these means was put together to get a general and indepth understanding of EPS, biometrics, smart cards and the operation of e-zwich. Officials of GHIPSS who were interviewed explained the detailed operation of the e-zwich and how this was being managed to ensure all its objectives are met. They provided the researcher with details of their operation as GHIPSS and how they connect to the financial institutions in the country.

3.8 RELIABILITY AND VALIDITY OF TEST INSTRUMENTS

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. Reliability test was conducted using the Cronbach coefficient alpha. A typical reliability for a researcher designed instrument is approximately 0.7 or higher which according to the coefficient is acceptable. The Cronbach coefficient alpha for this study was 0.77. To ensure validity of the instruments, the questionnaire was pretested with 18 individuals and 3 merchants before it was re-administered. The purpose was to ensure that anomalies were corrected so that the items could measure exactly what it was intended to measure. This was achieved as can be seen from the result that have been outlined in chapter four

3.9 CENTRAL REGION OF GHANA

3.9.1 Demographic characteristics

The region's population is 1,593,823. The corresponding 1984 population was 1,142,335. This means that the region's population is growing at a rate of 2.1 per cent per annum.

Figure 3.1; A map of the Central Region of Ghana

Central Region *Source: www.modernghana.com*

The region is also the second most densely populated in the country, with a population density of 162 persons per square kilometer. Out-migration, which continues to be a problem in the region, is declining gradually with immigrants constituting about a quarter of the population in all the districts. Between 1984- 2000, the region recorded a net out-migration rate of 14.3 per cent compared to that of 15.4 per cent recorded in the period 1970-1984.

Roughly between 20 and 37 per cent of the population in the districts are migrants. Twifo-Hemang-Lower Denkyira has the highest proportion of migrants of (37%) and Ajumako-Enyan-Essiam has the least (20%). Inter-regional migrants are more than intra-regional migrants in three districts, while four other districts receive more intra-regional migrants. In almost all the districts, most of the immigrants come from the Western, Greater Accra, Ashanti, Volta and Eastern Regions. The region is typically rural in nature, though there has been an increase in the urban population from 28 per cent in 1960 to 37.5 per cent in 2000. The most urbanised districts, which are about two-thirds urban, are Cape Coast, Awutu-Efutu-Senya and Agona.

3.9.2 Social characteristics

Adult literacy rate in the region is slightly more than 50 percent, with the highest being 75.3 per cent in Cape Coast and the lowest 45.2 per cent in Abura-Asebu-Kwamankese. There is a larger proportion of literate males (69.8%) than females (46.3%). Nearly 40 per cent of the region's inhabitants have never been to school. About 50 per cent of people in the region have attained primary or middle /JSS education. Very few people have gone beyond the basic level to the secondary or tertiary levels. Apart from Cape Coast, which has a number of SSSs and a university, barely 2 per cent of the residents in the districts have attained tertiary

education. At the post-secondary (pre-tertiary) level, there are more males than females in all the districts with the exception of Cape Coast, where there are more females (5.5%) than males (2.7%).

3.9.3 Economic characteristics

Unemployment is much lower in the region (8.0%) than the national average (10.4%). Two districts, Mfantsiman (14.8%) and Cape Coast (11.3%), have values exceeding the national average. Unemployment affects females (8.2%) more than males (7.8%) in almost all the districts.

The phenomenon of working children is also a problem in a number of districts where about 5 per cent of children under age 15 years are engaged in economic activities.

3.9.4 Occupation and industry

The predominant industry in all districts except Cape Coast is agriculture (52.3%), followed by manufacturing (10.5%). Agriculture (including fishing) is the main occupation and employs more than two thirds of the work force in many districts. Cocoa production is concentrated in Assin, Twifo-Hemang-Lower Denkyira and Upper Denkyira while oil palm production is mainly in Assin and Twifo-Hemang-Lower Denkyira. Other major agricultural enterprises are pineapple and grain production. Fishing is concentrated mainly in the six coastal districts.

Agriculture remains the main occupation for both males and females in all the districts except Cape Coast. More males (8.6%) than females (4.6%) are engaged in professional/technical occupations while more females (18.2%) than males (6.0%) are involved in sales work. It is important to note that in all the districts, except Cape Coast, less than 10 per cent active population are engaged in service activities.

3.9.5 Employment status

A significant proportion of the working population is self-employed without employees. Employees account for 12.6 per cent of the region's working population, but in the District of Cape Coast the proportion is much higher, 33.1 per cent. The self-employed with employees and apprentices constitute 5.1 per cent and 3.4 per cent respectively.

3.9.6 Institutional sector of employment

Over 80 per cent of the working population in all the districts work in the private informal sector. Between 6 and 20 per cent of the working population in all districts are engaged in the public and semi-public/parastatal sectors.

All the information on Central Region was acquired from a secondary source; www.modernghana.com

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CHAPTER FOUR

DISCUSSION AND PRESENTATION OF RESULTS AND FINDINGS

4.1 Introduction

This chapter looks at the data collected from respondents of questionnaires from all parts of the Central Region in Ghana and produces charts and graphs to compare some variable characteristics that were evident in answers given by respondents. It presents a section for individual respondents and a different section for merchants.

4.2 Individuals

Table 4.1:	Cardholder	• or Non-Cardholder
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		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non Cardholder	18	25.7	25.7	25.7
	Cardholder	52	74.3	74.3	100.0
	Total	70	100.0	100.0	

Source: field data 2011

From the data collected and the analysis presented in the frequency table, it can be seen that out of the 70 respondents to the questionnaires, 52 were e-zwich cardholders and this is approximately 74.3% of the total sampled. 18 of the respondents do not own an e-zwich card and this forms 25.7% of the respondents. This implies that majority of people in the Central Region own an e-zwich card This further implies that more than 50% of the populace of the Central Region are aware of an electronic payment system called the e-zwich and have acquired an e-zwich card.

4.3 Active or Passive Users

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	37	52.9	52.9	52.9
	Occasional	9	12.9	12.9	65.7
	Frequent	6	8.6	8.6	74.3
	Not Applicable	18	25.7	25.7	100.0
	Total	70	100.0	100.0	

Table 4.2: Active or Passive User

Source: field data 2011

Again the frequency tables show that there are 15 actual users of the e-zwich card of the 52 cardholders and out of this only 6 are frequent users of the card. The rest of the 15 are all occasional users, meaning they use their cards less than three times in a week. The number of card holders who responded they never used their cards was 37 accounting for 52.9% of the total respondents to the questionnaires (71.15% of cardholders). This implies that although more than 50% of the populace are aware of the e-zwich, they are not patronizing its usage since a majority of them weren't using the e-zwich cards even though they had them.



		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Convenience	1	1.4	1.4	1.4
	Fashionable	15	21.4	21.4	22.9
	Mobility	33	47.1	47.1	70.0
	Not Applicable	19	27.1	27.1	97.1
	Security	2	2.9	2.9	100.0
	Total	70	100.0	100.0	

Table 4.3: Reason for owning Card

Source: field data 2011

It can be seen that 33(47.1%) of the respondents were motivated by the mobility characteristic of the e-zwich card in choosing to own a card. 15 of the respondents find the card fashionable hence their decision to own one. 2 respondents' decision to own the card was based on the security features of the e-zwich card and only 1 respondent owns the card because of its convenience. It can also be seen that although 18 people responded as not owning an e-zwich card and hence an expected 18 'Not Applicable' was expected for the reason for owning card, there are 19 'Not Applicables', meaning one person had a totally different reason for owning a card but questionnaire structure did not allow for such reason to be captured. The above data is an indication that the mobility feature of the e-zwich card has been a major influence in determining whether people own a card or not. This information can be used in the marketing of e-zwich by focusing on the mobility characteristics of the card when designing adverts and public awareness programs to educate people on e-zwich. Respondents have attested to the fact that, mobility is the most appealing feature of the e-zwich.

 Table 4.4: Existing Account

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NO	39	55.7	55.7	55.7
	YES	31	44.3	44.3	100.0
	Total	70	100.0	100.0	

Source: field data 2011

The research also showed that 31 respondents to the questionnaires actually had accounts with one of the banks in Ghana whilst 39 of them did not have an account in any of the banks. This means 44.3% of respondents had bank accounts and 55.7% of respondents did not have a bank account. The results above confirm that a majority of the Ghanaian population remains unbanked. This was estimated to be 80% at the beginning of 2011 (source:http://ghana.gov.gh/index) and the situation therefore gives rise to the objective of the e-zwich that is specifically to address and tackle the high percentage of unbanked in the country. The results show there is more work to be done if the e-zwich is to rope in the unbanked into the financial sector.

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Figure 4.1. Relationship between Cardholders or Non-Cardholders and Existing Bank Account

The graph seeks to draw out a relationship between cardholders or non-cardholders and whether they have an existing bank account in any bank or not. It shows that of the respondents sampled, most cardholders did not have accounts with any bank with a few having bank accounts. For the non-cardholders, majority of them had accounts and a minority did not have a bank account with any bank. The results give an indication that since majority of cardholders do not have an account with any of the banks, there is a great chance of achieving the inclusion objective of the e-zwich if they use their cards. Cardholders who already have accounts are not considered since they are already connected to the financial industry through their accounts. Frequent usage of the card by those who have account will only go to enhance achieving the mobility objective. The key is to get those who hold cards and have no accounts to use their cards.

Figure 4.2. Relationship between Cardholders or Non-Cardholders, Existing Bank Account and Card Usage



The graph shown in goes beyond the first graph to compare Cardholders, Non-Cardholders, Account holders and Non-Account holders and card usage. This graph is presented in a 3 dimensional view and it shows that most of the respondents who own e-zwich card and who do not use the card, do not have bank accounts with any of the banks in Ghana. Significantly approximately 25 of the individual respondents to the questionnaires fall in this category. All 5 of the frequent users of the e-zwich card had bank accounts with one of the banks in the

country. It can also be seen that approximately 10 of the non-cardholders also had accounts with banks. This information significantly shows that although there is patronage for the e-zwich product, the patronage for the actual service in line with meeting the objective of inclusion is very low. Administrators of the e-zwich with this information can therefore devise new strategies to curtail this phenomenom.



Figure 4.3. Relationship between Card or NonCardholder and Greatest Benefit from Card

The final graph presented shows the best advantage respondents have received from the ezwich card usage. From the data, all 15 users of the card responded to 'Mobility' being the best advantage. Non-cardholders responded to 'Not Applicable' whilst the remaining 37 cardholders who do not use their cards responded to 'Nothing'. The response from the 15 users of the card shows that the mobility feature of the e-zwich card is a very desirable feature and can be a strong point to base on in marketing the product. Other cardholders need to be motivated to identify with one of the objectives of the e-zwich in order to get them to use the product. This therefore requires a strong marketing strategy to be formulated

4.4 Merchants

This section presents the data received from administering questionnaires to merchants.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non POS holder	21	70.0	70.0	70.0
	POS holder	9	30.0	30.0	100.0
	Total	30	100.0	100.0	7

Table 4.5: POS holders or Non POS holders

Source: field data 2011

It is clearly seen from the data presented in the table that out of the 30 merchants sampled only 9 had an e-zwich Point Of Sale (POS) device installed at their establishment. This forms 30% of the total respondents. 21 merchants (70% of total sampled) did not have a POS device installed at their establishment. The implication is that there is a low patronage of POS amongst merchant. This confirms a report by IMANI Ghana (February 2010) attributing low patronage to difficulty in processing transactions using e-zwich card. Merchants complain of frequent off-lines during processing of transaction.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	1	3.3	3.3	3.3
	Occasional	8	26.7	26.7	30.0
	Not Applicable	21	70.0	70.0	100.0
	Total	30	100.0	100.0	
Source:	field data 2011		111	JOL	

 Table 4.6: Active or Passive Transactions

The table above shows the activity rate or the number of transactions experienced by merchants on their POS device. 8(88.9% of POS owners) out of the 9 respondents who own POS devices responded to having occasional transactions (less than 3 transactions a week) at their POS. 1 owner of a POS device responded to never receiving transactions at his POS. The rest of the respondents had no POS device so were rated Not Applicable for the transaction activity at POS. The results above show that there is patronage from cardholders of the e-zwich at the POS of merchants and this could be encouragement for other merchants to also acquire a POS.



4.5 Different Issuers

Table 4.7: Different issuers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	5	16.7	16.7	16.7
	Occasional	4	13.3	13.3	30.0
	Not Applicable	21	70.0	70.0	100.0
	Total	30	100.0	100.0	

Source: field data 2011

The table above provides information on particular transactions that are received at the POS of merchants. Of the 9 POS owners, 5 never receive transactions on cards from different Banks as the issuer of their POS. This is approximately 55.56% of the merchants who own POS. 4 of the merchants with POS occasionally (less than three times a week) receive transaction from cards issued by different issuers from the issuer of their POS. 21 respondents which form the part of the respondents that do not own e-zwich POS device were rated Not Applicable for this data. More education needs to be done on e-zwich to inform cardholders of the mobility feature of the card. This will encourage usage of the product extensively and will encourage more merchants to own POSs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Convenience	1	3.3	3.3	3.3
	Fashionable	2	6.7	6.7	10.0
	Mobility	5	16.7	16.7	26.7
	Not Applicable	21	70.0	70.0	96.7
	Security	1	3.3	3.3	100.0
	Total	30	100.0	100.0	

Table 4.8: Reason for owning POS

Source: field data 2011

The table above shows reasons why the sampled merchants and respondents to the questionnaires choose to own e-zwich POS device. 1 (3.3% of respondents) thought it was convenient to own an e-zwich POS, 2 (6.7% of respondents) thought it was fashionable owning the POS device, 5 (16.7% of respondents) owned it because of its mobility features and finally 21(70% of the respondents) were rated Not Applicable because they did not own a POS. Just like for the e-zwich cards, majority of merchants who own a POS, own it because of its mobility function and this is an indication that the strongest selling feature of the e-zwich is its mobility and therefore marketing strategies should focus on this characteristic.

Table 4 9.	Existing	Account
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		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	30	100.0	100.0	100.0

Source: field data 2011

All merchants sampled had existing bank accounts with one of the banks in the country irrespective of whether they had a POS device or not. This results implies that the effort at
roping in the unbanked population into the banking industry should be directed at individuals since most of the businesses are already linked to the industry through their accounts.

4.6 DISCUSSIONS

From the data gathered and presented above it can be inferred that a lot of individuals in the Central Region own e-zwich cards. This is evident from the 74.3% of respondents sampled who responded to owning cards. The data also shows that only 15 respondents who own card use them if even occasionally. A greater number of card holders (37) never use their card and this statistics defeats the inclusiveness objective of the e-zwich card for this study. Inclusiveness will be achieved when card holders actually use the card. The results of this observation from the data is that out of the 70 individuals sampled, only 15 will qualify to meet the inclusive objective of the e-zwich card. Majority of individuals have the cards but never use them hence defeating the inclusiveness objective. Of the individuals sampled it can also be inferred from the graph that majority of card holders do not have account with any bank in the country and does will not benefit from the financial industry if they do not use their cards. The 3 dimensional graph that shows the relation between card holders or noncardholders and usage of the card, shows that a lot of the sampled individuals fall in the category of those who have a card, do not use it and do not have a bank account. If these individuals were users of their cards then financial inclusion could be achieved since the card will serve as a channel for their personal finances to be added to the financial industry of the country.

From the data presented it is seen that the major reason for owning cards amongst the respondents is Mobility. 33 respondents (47.1%) responded to owning cards because of

mobility and the major advantage cardholders have derived from the e-zwich card is the mobility feature. All 15 users of the card amongst the respondent admitted this was the best advantage for them personally gotten from using the e-zwich card. The objective of e-zwich card to ensure mobility and easy access to financial services can be said to be on course and to a large extent being achieved since respondents who actually use the card attest to the fact that they enjoy that feature of the product.

The data received from the merchants indicates that most merchants in the Central Region of Ghana do not own POS devices. This is evident from the fact that out of the 30 merchants sampled only 9 (30% had POS terminals). 21 (70%) which is a large majority of the merchants sampled did not have the POS device. It was also clear from the finding that all the merchants had bank accounts with one of the banks in the country and therefore were already included in the financial industry. The owning of a POS device for merchants in the Central Region therefore did not necessarily mean they get the benefit of inclusion into the financial industry.

It can also be seen from the data that of the 9 respondents who own POS devices, only 1 never receives transactions from e-zwich cardholders. 8 of the respondents receive occasional e-zwich transactions and out of these 4 receive occasional transaction from cards issued by different banks from the bank that issued their POS. This implies that 50% of POS devices that undertake e-zwich transactions occasionally transact business with cards issued by a different bank from the one that issued the device. This is one of the objectives set by Ghipss in launching the e-zwich system; to enable interoperability between banks or for the purpose of this essay 'mobility'. An e-zwich cardholder can transact business with any bank or any POS device with no regard for what bank issued the device.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter summarises the work carried out in the preceding chapters and makes conclusions on the research. It also suggests some recommendations so as to help in achieving the objective of the e-zwich card facilitating mobility and inclusion in the Central Region.

5.2 Summary

The study was focused on measuring the effect of e-zwich in facilitating mobility and inclusion in central region. The mobility objective of the e-zwich was aimed at achieving an era of interoperability amongst financial institutions where individuals can transact business with any bank no matter which bank they are affiliated to. Individuals should be able to go to a Ghana Commercial Bank branch and transact business even though they do not have an account with that bank. To a large extent the research for this study has shown that this objective was on course and both individuals and merchants are able to transact business with others even though they may belong to different banks.

Individuals can also easily access their money through any bank no matter where they find themselves.

The second objective being addressed in this essay is inclusion. The administrators of ezwich set this objective so as to be able to rope in the unbanked populace of the country into the financial industry. This will enable the financial industry to have access to a majority of individual finance in the economy and to enable the industry to invest more and plan better for the economy. It will also enable the central bank in its quest for a cashless society where the costs of producing physical notes and coins will be drastically reduced due to the electronic transactions of the e-zwich. The data received and analysed from the Central Region shows this objective is not being achieved. Data received shows a majority of people in the region have the e-zwich cards but never use them. Most of these card holders do not also have accounts with the banks in the country and therefore their personal finances do not form part of the national finance. A lot of people hold the cards for fashion and have never used the cards for the whole length of time they have owned them. This definitely defeats the objective of inclusion set out with the role out of the e-zwich payment system and a critical view of this must be taken.

5.3 Conclussion

In conclusion the study which took into account the IMANI Ghana report of February 2010 concludes that the e-zwich is being successful in its objectives in facilitating mobility but has not been successful in achieving inclusion with reference to the Central Region of Ghana. The people of Central Region who own e-zwich cards and POS devices and transact business with have attested to the fact that mobility is easily facilitated by the use of the e-zwich. Data collected from the region shows that a lot of people who have collected the cards never use them and of these only few have accounts with the banks in the country.

5.4 Recommendation

There is the need to create more awareness to entice the unbanked people into the banking system. About 80% of the population of the Central Region 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 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.

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APPENDIX A

Questionnaire for Individuals

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

INSTITUTE OF DISTANCE LEARNING

TOPIC:EZWICH, A FACILITATOR OF MOBILITY AND INCLUSION: ACASE STUDY OF THE CENTRAL REGION OF GHANA

Questionnaire for Individuals

- Do you own an e-zwich card?
 a. Yes
 b. No
- 2. Which of the financial Institutions in Ghana issued your Card?
- 3. Do you have a Bank Account with any Bank?a. Yesb. No
- 4. Do you have an Account with the issuers of your Card?a. Yesb. No
- 5. How often do you use your card?a. less than three times a week b. three times in a week c. more than three times in a week d. never
- 6. Do you have specific banks you use when transacting business with your card?a. Yesb. No
- 7. if you answered yes to question 4, do you have specific reasons why you use particular banks?
 - a. Convenience b. Accessibility c. My bankers d. Other
- Why do you choose to own an e-zwich card?
 a. Security b. Convenience c. Mobility d. Fashionable
- What kind of transactions do you normally perform with your e-zwich card?

 a. Receiving money b. Cashless purchases c. Savings d. Transfer of funds e. Nothing
- 10. Do you think the e-zwich card is better than other cards in the system?
 - a. Yes b. No

11. What will you say is the best advantage you've gotten out of owning an e-zwich card?

a. Convenience b. Mobility c. Security d. Nothing

12. How will you access the performance of e-zwich?

a. Excellent b. Very good c. Good d. Bad

13. Is the e-zwich card easily accessible?



APPENDIX B

Questionnaires for Merchants

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

INSTITUTE OF DISTANCE LEARNING

TOPIC:EZWICH, A FACILITATOR OF MOBILITY AND INCLUSION: A CASESTUDY OF THE CENTRAL REGION OF GHANA

Questionnaire for Merchants

- Do you own an e-zwich Point of Sale (POS) device?
 a. Yes
 b. No
- 2. Which of the financial Institutions in Ghana installed your POS device?

- 3. Do you have an account with the installers of your POS device?
 - a. Yes b. No
- 4. How often do you get e-zwich transactions?

a. less than three times a week b. three times in a week c. more than three times in a week never

5. Do you get card holders of different institutions from your POS issuers transacting business with

you?

- a. less than three transactions with cards from different institutions in a week
- b. three transactions with cards from different institutions in a week
- c. more than three transactions with cards from different institutions in a week
- d. never
- 6. Why do you choose to own an e-zwich POS terminal?

a. Security b. Convenience c. Mobility

- 7. Do you find transactions with the e-zwich card better than other cards in the system?a. Yes b. No
- 8. Has the installing of the POS terminal enhanced your business in any positive way?a. Yes b. No

9. What is the single most important benefit you have gained from owning an e-zwich POS?

a. Convenience b. Mobility c. Security d. Nothing

- 10. How will you access the performance of e-zwich?
 - a. Excellent b. Very good c. Good d. Bad

