

**THE EFFECT OF TECHNOLOGICAL INNOVATION ON LOAN RECOVERY IN A
STUDENT FINANCING ORGANIZATION: A CASE STUDY OF HIGHER
EDUCATION LOANS BOARD.**

BY

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DECLARATION

I declare that this project is my original work and has not been presented for award of any degree in any university.

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This management Research project has been submitted with my approval as the University Supervisor.

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DEDICATION

I dedicate this work to my dear mum Nancy, my dad Samson and most of all my loving sister and brother Ivy and Kelly. Your encouragement and support will forever be cherished in my heart.

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I would like to thank my Supervisor for the guidance and unceasing support he rendered in the course of formulation and writing of the project, to my moderator for being open and candid in your criticism and correction.

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ABSTRACT

Loan recovery and repayment of student loans has been a great challenge throughout the world, the level of student debts are increasing by the day and this has adversely affected the financial health of individuals in general. Due to such difficulties it is necessary for the student loan boards to provide adequate mechanisms of easily repaying the loans so as to increase the amounts recovered by these institutions. This research sought to evaluate the effect of technological innovation on the loan recovery of a student financing organization.

Mechanisms of loan payment such as the use of mobile phones, the use of standing orders, credit cards , debit cards and the use of electronic funds transfer services were examined to understand which one is the most preferred method of loan recovery and also examine the potential of the other methodologies in increasing loan recoveries.

This study made use of qualitative data readily available from the Higher Education Loans Board database; the data gave the yearly amounts of money collected by respective payment mechanisms for the last ten years. A multi linear regression model was used to analyze the net effect of all these methods of payment on the total loan recovery.

The results showed that there is a positive relationship between the various technological innovations and the amount of loan recovered in a given year. Mobile phone payments, electronic funds transfers and the use of standing orders showed a positive effect on loan recovery while the use of debit and credit cards showed a negative relationship with the amount of loans recovered.

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ABBREVIATIONS

ATM- Automated teller Machine

CBK- Central Bank of Kenya

CRM -Customer Relationship Management

DIBS -Diamond Integrated Banking Services

EFT- Electronic Funds Transfer

ESCA- Electronic Smart Card Account

HELB-Higher Education Loans Board

IB- Internet Banking

ICT- Information communication Technology

MMT- Mobile Money Transfer

SMS- Short Messaging Services

SPSS- Statistical Package for Social Sciences

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

There has been a tremendous growth in the technological sector over the past few decades which in turn have resulted in development of new financial instruments and processes in the financial sector. According to Bankley,(2006) technology is the way of doing things better, technologically excellent organizations continuously strive to identify better processes and systems management techniques to ensure that they are market leaders, of particular note is the rapid advancement in the Information and Communication Technology (ICT) which has become instrumental in the development of banks' business strategies, customer services and organizational structures, among other related functions.

Technology innovation is the process through which new (or improved) technologies are developed and brought into widespread use. In the simplest formulation, innovation can be thought of as being composed of research, development, demonstration and deployment (Sagar, 2013).

Technological developments in the financial sector started in the 1950s with the installation of the first automated bookkeeping machine at banks. Automation in the banking sector became widespread over the next few decades as bankers quickly realized that much of the labor intensive information handling processes could be automated with the use of computers.

The first Automated Tellers Machine (ATM) is reported to have been introduced in the USA in 1968 and it was only a cash dispenser. Technological progress has brought in the speedy processing and transmission of information, easy marketing of banking products, enhancement of customer access and awareness, wider banking networking and regional and global links on an unprecedented scale (Jayamaha, 2008).

The growth of internet banking has been of notable importance in the banking sector a development that came as a result of technological innovations. Internet banking provides an extensive, low cost and convenient financial network that facilitates banking services to customers anywhere and anytime. The internet resulted in improved telecommunication networks which enabled banking transactions to be done on-line.

Also, a result of the internet is the integration of e-trading with internet banking and banks' websites, a development necessary for marketing of the banking products. The internet has made it possible to establish low cost financial networking (Porteous&Hazelhurst, 2004). Technological innovations have thus resulted in the development of multiple channels of payment, product development and improvement of existing technologies which have become the fulcrum of the financial sector.

1.1.1 Technological Innovations

Innovations in information processing, telecommunications, and related technologies is known collectively as "information technology" (IT). IT is often credited with helping fuel strong growth in the many economies (Coombs, 1987). IT is defined as the modern handling of information by electronic means, which involves its access, storage, processing, transportation or transfer and delivery (Ige, 1995).

According to Alu(2002) IT affects finance processes of institutions by easing enquiry, saving time, and improving service delivery. In recent decades, investment in IT by commercial banks has served to streamline operations, improve competitiveness, and increase the variety and quality of services provided.

According to Fisher (1998) technology when applied in today's banking environment falls into three specific categories: customer independent (a technology that involves a customer conducting and completing a transaction with a bank entirely independent of any human contact with the institution e.g. ATMs, phone banking and Internet banking); customer assisted (a bank employee will use customer-assisted technology as a resource to complete a transaction e.g. call Centre's customer service officers will use a Customer Relationship Management (CRM)

System to understand a customer's profile and provide instant responses to customers' queries on the banking transactions and up-to-date billings (Gutek&Welsh, 1999) and customer transparent Customer technology which represents the real core of bank operations and customers never see it but expect it.

1.1.2 Loan Recovery

Loan recovery refers to the collection of loans which have matured and are due for repayment by the lender. Recovery of debts is to reclaim that which is due or owned from a contractual debtor, a debtor can either be a business or single individual. In this study it's the student, recovery can be sought through many legal channels but direct negotiations are always required before any legal action is taken. Loan recovery is so much dependent on the level credit risk management techniques applied before the loans are given to the individuals.

Lenders mitigate credit risk using various methods which include; risk based pricing, covenants, credit insurance and credit derivatives, credit tightening, diversification, credit insurance, factoring, debt collection, surety bonds and securitization and netting off.(Smith &Stultz, 1985).

Effective loan recovery will lead to good performance of the loans. Effective performance of loans is a product of performing loans. A performing loan is loan which is not in default, or is not about to be, As a general rule, banks and other financial institutions like to avoid nonperforming loans, because there is a risk that they will not be able to recover the principal left on the loan, let alone the interest which has accrued.

Loan policies define the type of loans offered, loan terms, interest rate policies, loan ceiling and concentration limits. The lending policies provide guidelines for eligibility, information requirements, security and collateral requirements and terms of review (Rose, 2002).

Numerous factors have been identified in various studies as having an impact on credit management and loan repayment. Several factors such as interest rates, age, marital status, location and numbers of dependents are said to impact on the likelihood of default(Lodha, 2011).Loan recovery is thus a very important aspect in loan management for it helps in reducing the risks the lender is likely to incur.

1.1.3 Effects of Technological Innovation on Loan Repayment

Loan repayment is not an easy thing for any financial institution, despite of this credit institutions continue to thrive in the market with the default rate in the banking sector in the year 2012 standing at 4.6% (Kagwe, 2013). Such impressive results cannot be found by default but through a concerted effort of loan repayment mechanisms and necessary infrastructure development in terms of technology. Most studies on this issue of technological innovation will be derived from the banking sector from which the board benchmarks itself with.

Investment in technology is not cheap, it involves large capital outlays which may not translate to productivity and thus returns immediately. However investment in technology cannot be ignored and as such it's not a matter of choice especially in the financial sector. In a study on the "justifying investments in new information technologies" Brian Dos Santos found that investing in information technology is worthwhile though the returns may not be immediate. He asserted that future projects will be more profitable once the full effects of the technology have been felt. This study focuses on technology innovations like ATMs, phone banking and Internet. These belong to the first and second categories studied by (Donnelly, 1992).

Technological changes can be observed and some of their effects can be directly measured internet banking, electronic payments technologies, and information exchanges (White, 2002). These may not be the most important banking technologies, but they illustrate the multiplicity of potential different actual and measured effects of technological progress. With proper employment of technology such that the customer is well attended to the level of satisfaction of the customer is increased and chances of loan repayment increases without having to implement expensive manual follow up strategies.

1.1.4 Higher Education Loans Board

HELB is a State Corporation whose mandate is to source funds and provides loans, scholarships and bursaries to Kenyans studying in recognized institutions of higher learning. The Board disburses loans to any Kenyan undergraduate students enrolled in government or self-sponsored programs in Kenyan Universities and Universities in other member states of East Africa Community recognized by the Commission for Higher Education.

The Higher Education Loans Board was established by an Act of Parliament. The statute known as The Higher Education Loans Board Act, 1995 was legally established as Act of 1995. It came into existence on the 21st day of July 1995 through Kenya Gazette supplement (CAP 213A) pay up their loans from wherever they are using their mobile phones.

1.2 Research Problem

The core mandate of HELB is to lend loans to higher education students who are needy and recover matured loans from those who previously benefited from the loans. There has been an increased demand for higher education in the Kenyan universities; more number of students are enrolling to the universities and colleges. This implies that the government has to invest more resources to the sector in order to educate these students. With the increased number of students and the number of graduates increasing by the day, unemployment, negligence and under employment. The rate of loan recovery is adversely compromised (Kimani, 2011).

The government does not fully fund the budget of HELB but expects the board to meet the students financing needs it is therefore upon the board to ensure that loan recovery is done at a very high rate so as to meet its mandate. In such a scenario there is need for devising ways of assisting the board achieve this crucial target.

According to Yasuharu (2003) implementation of information technology and communication networking has brought revolution in the functioning of the banks and the financial institutions. This revolution is what is so much required in the operation of HELB so as to overcome the challenge at hand. Technological innovation adoption has been on the rise in the financial sector this is due to the changing nature of the customer; Kenyan banks have been in the fore front in adopting these innovations (Okiro, 2013).

HELB performance is pegged on how efficient it will disburse and recover loans from the loanees, as such studies on the effect of technology in the financial sector will be very much applicable to HELB. Operations at the board are not driven by the desire for profits but service provision and enabling the large masses that could otherwise not access education due to poverty to access good education by financing from HELB; it thus bridges the gap between the poor and the rich.

These loans are characterized by low interest rates which do not change and sometimes they are even lower than the inflation rate in the country. However the overall framework is similar to the banking industry, and thus similar studies done in the banking sector are an instrumental tool in this research.

The impact of innovation on performance of banks is misunderstood for two main reasons; first, there is a lack of understanding about the drivers of innovation and secondly innovation's impact on financial institution like a bank's performance remains untested (Mabrouk&Mamoghli, 2010).

Previous studies like Pooja and Singh (2009); Francesca and Claeys (2010); Batiz& Simpson (2002) suggests that e-banking is driven largely by the prospects of operating costs minimization and operating revenues maximization. A comparison of online banking in developed and emerging markets revealed that in developed markets lower costs and higher revenues are more noticeable.

Lazo and Woldeesenbet et.al (2006); have produced mixed results regarding the impact of innovations on bank performance. Pooja and Singh (2009) Franscesa and Claeys (2010) in their studies concluded that innovations had left impact on bank performance, while Batiz-Lazo and Woldeesenbet (2006),Mwania and Muganda (2011) concluded that financial innovation had significant contribution to bank performance.

It is at the center of such mixed conclusions that creates and necessitates the need to carry out a study on the effect of the technological innovations on the student financing organization so as to establish the existing relationships and how best technology can be harnessed to achieve the organizational objectives.

1.3 Research Objectives

To identify the effect of technological innovation on loan recovery at Higher Education

Loans board.

1.4 Value of the Study

The importance of this study cannot be underestimated, many parties will benefit from this study the Higher Education Loans Board is the first party that can benefit from this study upon its implementation, and this study explores the effect of technological innovation on loan recovery. Loan recovery has been a major challenge to HELB as an organization. In the month of May and June 2013 the board rolled out a massive campaign called penalty amnesty whereby past loans which had attracted penalties were being waived off the penalties to encourage loan recoveries.

Loan repayment can be very easily enhanced when technology is employed by increasing payment methods and the accessibility which is not possible without technology. Understanding the impact of technology to a public organization will be beneficial to the government as it endeavors to roll out the famous ‘laptop project’. This research can form a good basis to anchor there project upon.

Innovations in technology have not been widely implemented in the Kenyan economy as the government initiates this projects it’s important to understand the achievements derived from the existing innovations. Technology is a very wide area, scholars and other researchers will find this study crucial when researching on other issues dealing with innovations in technology and how it can be of help to other financial institutions.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section will explore the various theoretical literatures concerning technological innovation and their effect on financial institutions, empirical literature on relevant studies done in this area will be discussed.

2.1 Theoretical Literature

Literature on effect of technology on student financing organizations are scanty and as such much literature will be drawn from other institutions in the same financial sector like banks, microfinance institutions and other financial intermediaries.

2.1.1 Financial Intermediation Theory

Financial intermediation is a process which involves surplus units depositing funds with financial institutions who then lend to deficit units. Matthews and Thompson (2008) identify that financial intermediaries can be distinguished by four criteria: first their main categories of liabilities (deposits) are specified for a fixed sum which is not related to the performance of a portfolio.

Second the deposits are typically short-term and of a much shorter term than their assets. Third high proportions of their liabilities are chequeable this implies that it can be withdrawn on demand and fourth their liabilities and assets are largely not transferable. The most important contribution of intermediaries is a steady flow of funds from surplus to deficit units.

In the traditional Arrow-Debreu model of resource allocation, firms and households interact through markets and financial intermediaries play no role. When markets are perfect and complete, the allocation of resources is Pareto efficient and there is no scope for intermediaries to improve welfare. Moreover, the Modigliani-Miller theorem applied in this context asserts that financial structure does not matter: households can construct portfolios which offset any position taken by an intermediary and intermediation cannot create value (Fama, 1980).

Such an extreme view that financial markets allow an efficient allocation and intermediaries have no role to play- is clearly at odds with what is observed in practice. Historically, banks and

insurance companies have played a central role. This appears to be true in virtually all economies except emerging economies which are at a very early stage. Even here, however, the development of intermediaries tends to lead the development of financial markets themselves. (McKinnon, 1973).

The understanding of the role or roles played by these intermediaries in the financial sector is found in the many and varied models in the area known as intermediation theory. These theories of intermediation have built on the models of resource allocation based on perfect and complete markets by suggesting that it is frictions such as transaction costs and asymmetric information that are important in understanding intermediation.

Gurley and Shaw (1960) and many subsequent authors have stressed the role of transaction costs. For example, fixed costs of asset evaluation mean that intermediaries have an advantage over individuals because they allow such costs to be shared. Similarly, trading costs mean that intermediaries can more easily be diversified than individuals.

Financial intermediaries exist because they can reduce information and transaction costs that arise from an information asymmetry between borrowers and lenders. Financial intermediaries thus assist the efficient functioning of markets, and any factors that affect the amount of credit channeled through financial intermediaries can have significant macroeconomic effects. (Rothschild&Stiglitz,1976).

HELB acts as a financial intermediary in allocating finances from surplus sources which may include government and other philanthropists in form of loans, bursaries and scholarships to the deficit areas or agents i.e. the universities which need tuition fees to facilitate their programs and the students who need money for upkeep in those institutions of higher learning.

2.1.2 Information Asymmetry

The concept of asymmetric information was first introduced in (George, 1970) paper The Market for "Lemons": Quality Uncertainty and the Market Mechanism. In the paper, (George, 1970) develops asymmetric information with the example case of automobile market. His basic argument is that in many markets the buyer uses some market statistics to measure the value of a

class of goods. Thus the buyer sees the average of the whole market while the seller has more intimate knowledge of a specific item.

(George, 1970) argues that this information asymmetry gives the seller an incentive to sell goods of less than the average market quality. The average quality of goods in the market will then reduce as will the market size. Such differences in social and private returns can be mitigated by a number of different market institutions.

This theory is based on the notion that the borrower is likely to have more information than the lender about the risks of the project for which they receive funds. This leads to the problems of moral hazard and adverse selection (Matthews & Thompson, 2008). These problems reduce the efficiency of the transfer of funds from surplus to deficit units.

Numerous authors have stressed the role of asymmetric information as an alternative rationalization for the importance of intermediaries. One of the earliest and most cited papers, Leland and Pyle (1977) suggests that an intermediary can signal its informed status by investing its wealth in assets about which it has special knowledge.

In another important paper, (Diamond, 1984) has argued that intermediaries overcome asymmetric information problems by acting as "delegated monitors." Many others followed, expanding on these two contributions and advancing the literature in substantive ways Gale and Hellwig,(1985).

The banks overcome these problems in three respects: First by providing commitment to long term relationships with customers, Secondly through information sharing and thirdly through delegated monitoring of borrowers. Under direct financing, it is necessary for a lender to collect information to try to redress the information asymmetry. HELB is directly affected by this theory as many investors may want to shy away from investing in the scheme despite heavy investments in terms of modernization of technology and use of current debt management principles. The issue of asymmetric information can also be a reason that HELB has continued to function since loanees may fear to default with the fear of being penalized or prosecuted as specified in the HELB Act (1995) without trying to investigate how many of such kind of individuals have been prosecuted and what was the outcome of that case.

2.2 Theories of technological innovation

The introduction of a new information system or the upgrading of an existing system can be seen as an innovation as, in each case, the result will be something that is seen as new by those involved in its use. The most widely accepted theory of how technological innovation take place is provided by Innovation Diffusion.

Another approach however, that of Innovation Translation which draws on the sociology of translations, more commonly known as actor network theory (ANT), also has much to offer. This is according to (Arthur 2...) in his working paper Information Systems Innovation – two Different Models. Innovation diffusion is based on the notion that adoption of an innovation involves the spontaneous or planned spread of new ideas and Rogers defines an innovation as: “an idea, practice, or object that is perceived as new.” (Rogers, 1995).

2.2.1 The Theory of Innovation Diffusion

In diffusion theory the existence of an innovation is seen to cause uncertainty in the minds of potential adopters (Berlyne,1962) uncertainty implies a lack of predictability and of information. Diffusion is considered to be an information exchange process amongst members of a communicating social network driven by the need to reduce uncertainty (Rogers, 1995).

Uncertainty can be considered as the degree to which a number of alternatives are perceived in relation to the occurrence of some event, along with the relative probabilities of each of these alternatives occurring. Those involved in considering adoption of the innovation are motivated to seek information to reduce this uncertainty (Rogers, 1995).

Diffusion theory contends that a technological innovation embodies information, and so its adoption acts to reduce uncertainty. In illustration of this Rogers cites the innovation of solar panels as reducing uncertainty over future energy costs and reliability of energy supply. The new ideas upon which an innovation is based are communicated over time, through various types of communication channels, among the members of a social system. There are thus four main elements of any theory of innovation diffusion: characteristic of the innovation itself, the nature of the communication channels, the passage of time, and the social system through which the innovation diffuses (Rogers, 1995).

Rogers's argues that the attributes and characteristics of the innovation itself are important in determining the manner of its diffusion and the rate of its adoption. Borrowing from the work of Thomas and Znaniecki (1927) he notes that it is what potential adopters perceive to be the attributes of an innovation that is the important thing.

Rogers's outlines five important characteristics of an innovation which, he argues, affect its diffusion: Relative advantage, this is the degree to which an innovation is perceived as better than the idea it supersedes. Relative advantage is often expressed in terms of economic profitability, social prestige, or other similar benefits. Rogers contends that an innovation's relative advantage is positively correlated with its rate of adoption.

Compatibility or the degree to which an innovation is perceived by potential adopters as being consistent with their existing values and past experiences. Compatibility with what is already in place makes the new idea seem less uncertain, more familiar, and helps to give it meaning. This is important because "the rate of adoption of a new idea is affected by the old idea that it supersedes" (Rogers, 1995). (Rogers, 1995) claims that the perceived compatibility of an innovation is positively related to its rate of adoption.

Complexity or the degree to which an innovation is perceived as difficult to understand and use. Rogers claims that the more complex the innovation, the less likely it is to be quickly adopted. In support of this conjecture Rogers and Daley (1980) point out that in the late 1970s, a period of six to eight weeks of extreme frustration characterized the adoption of a new home computer. Trainability is the degree to which a particular innovation may be subjected to limited experimentation. Rogers' research suggests that if a potential adopter is able to 'play' with the innovation before being faced with an adoption decision, then adoption is more likely.

Observability the more the results of an innovation are visible to others, the more likely the innovation is to be adopted. Rogers cites their high observability in public places and in the media as an explanation for the rapid take-up of video games such as Nintendo, and of cellular telephones.

Attributes of the potential adopter are also seen as an important consideration in the adoption of an innovation. Rogers maintains that these attributes include social status, level of education, degree of cosmopolitanism and amount of innovativeness. A slightly different slant on adoption is offered by Abrahamson and Rosenkopf (1993) who describe what they call the ‘bandwagon effect’. They argue that there are times when people or organizations adopt innovations, not because of their technical properties, but because of the sheer number of others that have already made the adoption.

The bandwagon effect can be one of the reason for adoption of technology, for a very long time the board was hesitant to employ new technology despite its peers like banks absorbing new technologies very fast, the sluggish pace could be attributed to a perception about government entities but a time came when the pressure to finance new students became overwhelming amidst dwindling rate of recoveries. In this regard ways of increasing recoveries and HELB s operations arose and technology became inevitable.

2.2.2 The Theory of Innovation Translation

An alternative view of innovation is that of innovation translation proposed in actor-network Theory (ANT). The core of the actor-network approach is translation (Law, 1992) which can be defined as: “The means by which one entity gives a role to others.” (Singleton &Michael, 1993)

A common approach to researching innovation in Information Systems is to focus on the technical aspects of an innovation, and to treat ‘the social’ as the context in which its development and adoption take place. Approaches of this type which contend that only the ‘most appropriate’ innovations are adopted, and that only those ‘sensible people’ who make these adoptions go on to prosper, assume that all outcomes of technological change are attributable to the ‘technological’ rather than the ‘social’ (Grint&Woolgar, 1997).

At the other extreme social determinism holds that relatively stable social categories can be used to explain technological change (Law & Callon, 1988) concentrates on the investigation of social interactions, relegating the technology to context; to something that can be bundled up and forgotten. This bundling means that fixed and unproblematic properties or ‘essences’ can then be assigned to the technology and used in any explanation of change.

Innovation diffusion asserts that a technological innovation embodies ‘information’: some essential capacity or ‘essence’ that is largely responsible for determining its rate of adoption (Rogers, 1995). The rate of adoption may be fast or slower depending on the causal factors, at Higher education loans board, increase in the number of students accessing higher education placed much pressure on its operations and technology was necessary to solve this issue otherwise the whole programme could be in a mess, management of good records is essential for the success of any credit institution and technological innovations help in maintaining a good database

2.5 Empirical Literature

Agboola (2001) studied the impact of computer automation on the banking services in Lagos and discovered that Electronic Banking has tremendously improved the services of some banks to their customers in Lagos. The study was however restricted to the commercial nerve center of Nigeria and concentrated on only six banks. He made a comparative analysis between the old and new generation banks and discovered variation in the rate of adoption of the automated devices.

Aragba (1998) wrote on the application of information technology in Nigerian banks and pointed out that IT is becoming the backbone of banks’ services regeneration in Nigeria. He cited the Diamond Integrated Banking Services (DIBS) of Diamond Bank Limited and Electronic Smart Card Account (ESCA) of All States Bank Limited as efforts geared towards creating sophistication in the banking sector.

Ovia (2000) discovered that banking in Nigeria has increasingly depended on the deployment of Information Technology and that the IT budget for banking is by far larger than that of any other industry in Nigeria. He contended that On-line system has facilitated Internet banking in Nigeria

as evidenced in some of them launching websites. He found also that banks now offer customers the flexibility of operating an account in any branch irrespective of which branch the account is domiciled. Cashless transactions were made possible in our society of today.

There is a multiplicity of different actual and measured effects of new technologies on productivity growth and industry structure. Some new technologies – such as ATMs in the early 1980s and possibly Internet banking currently or in the near future – may increase productivity significantly in terms of the quality of the service to the consumer, but these benefits may not be easily measured.

Firms may provide the higher quality without charging the full costs due to competitive pressures. In contrast, some new technologies – such as the innovations in processing electronic payments may have very significant and easily observable effects in terms of productivity gains and increased scale economies. Some new technologies – such as innovations in information exchanges may alternatively have significant benefits that can only be measured with nontraditional methods, such as examining the composition of the loan portfolio (Berger, (2002).

The finding that large banks tend to adopt innovations earlier also holds for other banking technologies including the adoption of ATMs (e.g., Hannan and McDowell 1984), securitization and off-balance sheet financial activities and the new portfolio risk models for dealing with proposed Basle international capital standards (Berger &Udell, 1993).

Similarly, small banks can gain access to other large-scale technologies. For example, small banks in the U.S take advantage of scale-efficient processing of paper payments provided by large institutions and are able to tap into nationwide and worldwide ATM networks without each bank setting up its own expansive network. Even some of the benefits of new complex risk management technologies may filter to banks too small to create their own systems through outsourcing, e.g., by purchasing portfolio risk models such as Credit Metrics or Credit Risk (Gordy, 2000).

However, access to these technologies does not necessarily mean that small banks can use these technologies at the same unit cost as large banks – the parties providing the back-office services may charge a relatively high fixed cost or offer significant volume discounts that put small banks at a disadvantage, which may help explain why small banks may be slower to adopt new technologies.

Research suggests that the effects of a new technology may differ very significantly with the way in which it is implemented. The research on front-office technologies suggests that combining new technologies with existing technologies to offer more consumer choice may often be the most effective implementation strategy.

In the 1980s, banks generally combined the new ATM networks with traditional physical offices and today, the large banks that serve most customers are adding transactional Internet sites to their physical offices and ATM networks. For back-office technologies, the implementation strategy also appears to matter. The Federal Reserve appeared to achieve dramatically lower unit costs in processing electronic payments in part by consolidating operations to take advantage of scale economies. The effects of small business credit scoring on lending also appear to vary considerably with whether the bank follows “rules” versus exercises more “discretion” and other factors (Allen, 2005).

Zheng and Zhong (2005) examined the trend in the internet revolutions that have set the Chinese banking sector in motion and the factors which have influenced the adoption of information technology in China. It was revealed that internet availability, awareness, attitude towards change, computer and internet access, cost, trust in one bank, security concerns, ease of use and convenience were the major factors affecting the adoption.

Al-Hajri (2008) examined various factors that might act to determine whether a given technology is likely to be adopted by the banking industry in developing country such as Oman by comparing it with a developed country such as Australia. The result indicated that relative advantage, organizational performance, Customer organizational relationship and ease of use, can shed light on the reasons for adoption of Internet technology.

An exploration done by Singhal and Padhmabhan (2008) revealed that utility request, security, utility transaction, ticket booking and funds transfer were major factors contributing to internet banking adoption. The study examined predictors of intention among users of internet banking to continue using IB services. It was revealed that trust was the strongest predictor followed by compatibility and ease of use.

Mirzal(2009) revealed a significant difference between demographic and attitude of users and non-user groups. The majority of customers were very comfortable and willing to use IB services. Security concerns, lack of technological knowledge and awareness stood out as being obstacles to the adoption of Internet Banking.

Yuttapong (2009) investigated the factors impacting the adoption of internet banking and found that complexity had a negative relationship with intention to adopt the internet banking in Thailand. Further, it was indicated that compatibility had a high positive relationship with intention to adopt IB.

Al-ghamdi and King (2009) explored how IB affects the relationship between customers' trust and their loyalty. The study also examined how factors may affecting IB usage can be different in UK and Saudi Arabia. The study considered privacy aspects, communication, customer experience, usefulness, self-efficacy and ease of use as major factors trust and customer loyalty.

Shirley and Sushanta (2006) studied the impact of information technology on the banking industry and analyzed both theoretically and empirically how information technology (IT related products are internet banking, electronic payments, security investments, information exchanges.

(Berger, 2003) related how spending can affect bank profits via competition in financial services that are offered by the banks. Using a panel of 68 US banks for a period of over 20 years to estimate the impact of IT on profitability of banks, they found out that though IT might lead to cost saving, higher IT spending can create network effects lowering bank profits.

They further contend that the relationship between IT expenditures and bank's financial performance is conditional to the extent of network effect. They say that if network effect is too low, IT expenditures are likely to; reduce payroll expenses, increase market share, and increase revenue and profit. The survey of literature indicates that many researchers have examined factors affecting IB adoption, trends in different countries but not in Kenya. (Nyangosi, 2009)

2.6 Summary and Conclusion

From the empirical studies it can be concluded that adoption of technology by organizations especially public institutions is usually a forced result of circumstances, adoption of this has been pegged on the investments return matrix that the institutions expect from such an endeavor.

Information technology has helped improve the nature of services that institutions that offer especially financial institutions whereby adoption of technology has been highly implemented, however, the impact of technology is found to be more widespread in large institutions which enjoy the economies of scale. Small institutions need to be careful when adopting technological innovations since they involve large capital layouts so that the ultimate adoption cannot comprise the existence of these firms.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research methodology of the study. It describes the research design, data collection and analysis procedures of the study.

3.2 Research Design

Research design refers to the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in the procedure (Babbie, 2002).

In addition Kothari (2004) observed that research design is a blue print which facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible hence yielding maximum information with minimal expenditure of effort, time and money. The author noted that, research design deals with the decision regarding: What techniques were used to gather data? What kind of sampling strategies and tools were used? How time and cost constraints were dealt with?

The function of research design therefore is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. This study used a descriptive design. This design refers to a set of methods and procedures that describe variables. It involved gathering data that describe events and then organizes, tabulates, depicts, and describes the data. Descriptive studies portray the variables by answering who, what, and how questions (Babbie, 2002).

3.3 Data Collection

This study made use of secondary data derived from the HELB loan portfolio since January 2002 December 2012. over the years different technological mechanisms have been introduced among them, mobile money transfer, standing orders, electronic funds transfer and the use of credit and debit cards have been introduced.

3.4 Data Analysis

The research was qualitative in nature. Data was analyzed through the Statistical Package for Social Sciences (SPSS) package version 17. Data was analyzed using descriptive statistics such as frequency tables and percentages, and then linear regression of the factors identified in the constructs

3.4.1 Measurement of Variables

This study was about the effect of technological innovation on Loan recovery, in this regard there were various variables which were defined as follows.

$$\text{Loan recovery } Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_i$$

Loan recovery is the dependent variable denoted asY

Technological innovation as discussed above has various components of which we are determining their influence on the loan recovery (dependent variable), these components are:

Use of debit cards and credit cards, mobile phone payment services, standing orders and Electronic Funds Transfer (EFT)

These factors are the predictor variables; $X_1, X_2, X_3, X_4, \dots$

β_0 is the value of Y when all of the independent variables (X_1 through X_p) are equal to zero, and β_1 through β_p are the estimated regression coefficients. Each regression coefficient represents the change in Y relative to a one unit change in the respective independent variable.

X_1 denoted the predictor variable (independent), mobile money transfer; this was measured by observing amount of loans paid through this means from HELB collection reports, this is a percentage of the total loan recovery.

X_2 denoted the use Electronic money transfer (EFT). This will be measured by getting the percentage of loans paid through EFT in relation to the total loan recovery collections for a specific period.

X_3 denoted the use of credit cards and debit cards, measured by getting the collections received via credit cards from the collection reports in the database in a given period under investigation

X_4 denoted to Use of standing orders, measured by getting the collections received via credit cards from the collection reports in the database in a given year.

Y was the total loan recovered for a particular year

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This section presents the data analysis, findings and discussion of the study in line with the research objectives of the study, the study's research objective was to establish the effect of technological innovations on loan recovery at HELB. To achieve the objective the research raised a number specific objective: to establish the extent to which technological innovations have contributed to loan recoveries and to establish the most effective technological tool or mechanism to be used for increased recoveries.

The analysis of the descriptive statistics of the technological innovation mechanisms is represented in is presented in Table 4.1. This analysis is characterized in terms of mobile money remittances, electronic funds transfers, use of debit cards and use of credit cards and the standing orders.

4.2 Regression Model

Model Summary (Measure of Fitness)

TABLE 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986 ^a	.972	.956	1.73095E8

a. Predictors: (Constant), EFT, S/ORDER, MOBILE MONEY, CREDIT, DEBITCARDS

SOURCE: RESEARCH DATA

The model statistics show that when the independent variables (EFT, Standing Order, Mobile money and Credit/Debit Cards) and dependent variable (Total loan recovery) interact, the model has a Pearson's correlation coefficient (R) of 0.986 and coefficient of determination (R Square)

of 0.972 signifying a strong positive association between the independent and dependent variables.

4.2.2 ANALYSIS OF VARIANCE (ANOVA)

TABLE 2: ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.204E18	4	1.801E18	60.109	.000 ^a
	Residual	2.097E17	7	2.996E16		
	Total	7.414E18	11			

- a. Predictors: (Constant), Eft, S/Order, Mobile Money, Credit/Debitcards
- b. Dependent Variable: Total Loan Recovery

Source: Research data

The Analysis of Variance (ANOVA) was used to test the significance of the regression model as pertains to significance in the differences in the means of the dependent and independent variables. The ANOVA test produced an f-value of 60.109 at 0.000 significance level ($p < 0.05$) signifying significant relationship between the independent and dependent variables.

The model clearly does better than a flat line—the p-value (in the Sig. column) is very low, less than .001. So there is less than a 1 in 1,000 chance that the relationship we found in this sample is actually best described by a flat line.

4.3 REGRESSION COEFFICIENTS

TABLE 3:COEFFICIENTS^A

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	7.142E8	75319222.847		9.482	.000
Mobile Money	8.992	3.096	.576	2.904	.023
Credit/Debitcards	-65.687	7.187	-1.884	-9.140	.000
S/Order	182.234	32.774	.372	5.560	.001
Eft	1.942	.135	1.667	14.340	.000

a. Dependent Variable: TOTAL LOAN RECOVERY

Source: Research Data

From the table the established regression equation is:

4.4 Model Summary

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e_i$$

$$\text{Total Loan Recovery} = 714,200,000 + 8.992 * \text{Mobile Money} - 65.687 * \text{Credit/Debit cards} + 182.234 * \text{S/Order} + 1.942 * \text{Eft}$$

Therefore the model summary is

$$Y = 714,200,000 + 8.992 X_1 + 1.942 X_2 - 65.687 X_3 + 182.234 X_4 + e_i$$

Where X1 is mobile money transfer payments innovations

X2 is the Electronic Money Transfer

X3 is the use Credit and Debit Cards

X4 is the use of Standing Orders

Y is the Total Loan Recovered in a particular year.

In the model, it can be seen that taking the independents variables' value at zero, the Total Loan Recovery would be 714200000. A unit increase in mobile money would lead to a 8.992 increase in Total Loan Recovery, a unit increase in credit/Debit cards would lead to a 65.687 decrease in Total Loan Recovery, a unit increase in standing order would lead to a 182.234 increase in Total Loan Recovery and a unit increase in EFT would lead to a 1.942 in Total Loan Recovery.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

From the analysis and data collected, the following discussions, conclusions and recommendations were made. The responses were based on the objective of the study. The researcher had intended to obtain results on the effect of technological innovations on loan recovery at the Higher Education Loans Board.

5.2 Summary of Findings and Conclusions.

5.2.1 Summary of findings

From the findings in the study it is evident that loan recovery is much dependent on the technological innovations employed by the board in the loan repayment processes. There has been a steady rise in the loan recoveries overtime as more technological mechanisms were introduced by the board.

However, it is clear that there is still some significant amount of loans which will be recovered if the technological innovations would not be employed, with the amount totaling to kshs 714,200,000. This is the value of the constant independent variable (β_0)

The effect of technology has tremendously increased loan recoveries, the introduction of mobile money payment by the board in the year 2009 started on a low note but it has increased overtime, From the results in Table 3 a unit increase in mobile money payment will result in a 8.992 increase in total loan recovery. Credit cards and debit cards account for a significant amount of total loan recovery; its overall effect is though negative. This may be attributed to the small numbers of transactions that uses this mechanism. From the analysis is that the uses of debit and credit cards have a negative impact on the total loan recovery and as such the mechanism should be remodeled or the factors affecting it relooked at.

Standing orders contribute a great deal in the recovery process; with a unit increase in the use of standing orders leading to a 182.234 increase in total loan recovery. Electronic money transfer (EFT) is a technological mechanism that accounts for increase in loan recoveries. From the

research a unit increase in the use of EFT resulted in a corresponding increase in total loan recovery by 1.942.

5.2.2 Summary of Conclusions

From the model of the research, the study finds that it is clear that the technological innovations have a direct linear relationship with the total loan recovery. For the board to realize sustained increased loan recoveries it needs to invest heavily in the use of technology in its loan recovery strategy. These investments in the various technological mechanisms have proved worthwhile in increasing the loan recoveries. Standing orders, mobile phone money payment and electronic funds transfer and use of debit and credit cards are some of the payment solutions that the board has used overtime.

From the performance of the various technological mechanisms it is clear that standing orders, EFT and use of mobile money payment solutions in loan recovery have increased loan recoveries. From the research the mean performance of the credit cards was way below the rest this because this mechanism has not been adequately exploited , when the values of credit cards are regressed against the total loan recovery there exists a positive strong relationship meaning that the negative values assumed by the credit cards and debit cards may be due to underperformance of this mechanism and since no single employer pays for there clients using this means as a way of increasing loan recoveries. The use of credit cards should be discouraged since their net effect is reduction of the total loan recovery.

5.3 Recommendations

From the findings and the objectives of the study; the study recommends the following:

That HELB should embrace more use of technological innovations so as to boost loan recoveries. That the board should aggressively use technology especially the use of mobile phone payments, this technology has lasted for lesser years yet its projections even in the model is very high, with the trend envisaged in the model it may end up overtaking all the other mechanisms, putting in mind only individual payers use this means. Credit cards and debit cards should be done away with since its net effect reduces the loan recovery.

5.4 Limitations of the study

The study was done on effect of technological innovations on loan recovery, various factors were identified but which were not exhaustive as such the results would only be limited to the mechanisms identified.

The various innovations were introduced at different times during the period of study as such the findings are susceptible to errors and may not give a very fair view of the nature of the relationship. Another limitation of this study is that at some point the board discourages the payments from being made using any single mechanism, e.g. debit cards as such the results obtained may not be very representative.

5.5 Areas for Further Research

The research suggests that further research should be done on the effect of mobile money payment on loan recovery so as to understand fully how to tap on this technological innovation for more loan recoveries.

This study has looked at loan payment innovations, further research could be done on the effect of short text messaging and other frequent and timely reminders can have on the overall institutional loan recovery. Further research can be done on the effect of credit cards and debit cards on loan repayment at such like institutions so as to understand why there exists such a relationship and explore ways of making a turn around on this mechanism

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APPENDICES

APPENDIX 1: RESEARCH DATA

YEAR	LOAN AMOUNTS RECOVERED THROUGH VARIOUS TECHNOLOGICAL INNOVATIONS (KSHS)				
	MOBILE PHONE	EFT	DEBIT AND CREDIT CARDS	STANDING ORDERS	TOTAL LOAN RECOVERIES
2002	-	2736263	-	102002.4	575,457,121.84
2003	-	8132403	-	32717.8	621,521,768.78
2004	-	12897233	-	42410	723,559,218.77
2005	-	25821352	-	28236	791,565,281.85
2006	-	43640557	-	146330	982,656,679.03
2007	-	73808724	240482.7	1468259	1,168,534,448.76
2008	-	1.44E+08	9073580	5884824	1,441,684,252.52
2009	495221	7.91E+08	12059942	632533.6	1,819,923,002.34
2010	17856207	1.39E+09	18668390	47765.1	2,103,496,868.49
2011	72499256	1.53E+09	31538026	38465.7	2,411,614,361.44
2012	1.23E+08	1.62E+09	39165143	1613468	2,665,693,867.36