EFFECT OF ADOPTION OF REAL-TIME GROSS SETTLEMENT SYSTEM (RTGS) ON INTER-BANK SETTLEMENT EFFICIENCY IN THE KENYAN BANKING INDUSTRY

BY

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DECLARATION

This research project is my original work and has not been presented for examination in any other university.

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This research project has been submitted for examination with my approval as University superior.

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DEDICATION

I dedicate this research project to my family members who offered me unconditional love and support throughout the course of the project. Special thoughts go to my wife Barbara and little ones Chumba, Cheptoo and Chichi.

ABSTRACT

The main objective of the study was to assess the effect of adoption of real-time gross settlement system on interbank settlement efficiency in the Kenyan banking industry. One important strategic objective stated by the National Payment System (NPS) Division of the Central Bank of Kenya in the Framework and Strategy Document (2004) was to introduce an efficient and modern inter-bank payment system that would eliminate slow transaction speeds, longer settlement times, high costs of transactions, errors and fraudulent transactions in financial institutions.

A census survey was conducted in which the study collected responses from all the forty-four licensed commercial banks operating in Kenya. Both primary and secondary data was used in the study. Primary data was collected through a semi-structured questionnaire and secondary data was collected from statistics accumulated from the payment systems both at the Nairobi Clearing House and the Central Bank of Kenya. Data collected was quantitative in nature and analysis was done using descriptive statistics. The study concludes that the adoption of real-time gross settlement system has improved the efficiency of interbank settlement in the Kenyan banking industry. The real-time gross settlement system has led to increased volumes of processed payments, while decreasing the volumes of Cheques and EFT through the Automated Clearing House. The study findings serve as stimuli to policy makers to understand the industry better and to acknowledge that embracing technology, particularly in the banking sector and will bring benefit both in the micro and macro economy.

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LIST OF ABBREVIATIONS

ATM:	Automatic Teller Machine
BIS:	Bank for International Settlement Systems.
CBK:	Central Bank of Kenya
CPSIPS:	Core Principles for Systemically Important Payment Systems
CPSS:	Committee on Payment Settlement Systems.
DNS:	Deferred Net Settlement
EFT:	Electronic Funds Transfer Systems
KEPSS:	Kenya Electronic Payment Settlement Systems
MICR:	Magnetic Ink Character Recognition
NPSS:	Net Payment Settlement Systems.
RTGS:	Real Time Gross Settlement Systems.
STP:	Straight through Processes

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Central banks have a strong interest in promoting safety and improving efficiency in payment systems as part of their overall concern with financial stability. They play a key role in domestic payment system development and, in many cases, operate large-value payment systems.

According to Central Bank of Kenya's Framework and Strategy Document (2004), Kenya's Payment's system has been beset by problems such as inherent settlement risks; over reliance of cash as a medium for settling financial obligations by the paying public; the use of cheques to settle high value payment transactions; unregulated card based payment system; fragmented payment systems; lack of information and systems to manage the inter-bank exposures resulting from payment transactions of banks' customers and the implicit dependence on the financial backing of the central bank to ensure that clearing banks will be able to settle their daily exposure to one another.

Other problems included legal uncertainty regarding multilateral netting, as a basis for determining inter-bank exposure, which was not adequate to support modern payment system, and lack of coordinated public awareness among the payment system stakeholders. In addition, the existing payment system then suffered from built-in inefficiency.

The Central Bank of Kenya conducted a survey on payment systems in Kenya and came up with the Framework and strategy document that documents the problems facing payments system in Kenya. the reform objectives and the strategies to be used in achieving the stated objectives. One important strategic objective stated by the National Payment System (NPS) Division of the Central Bank of Kenya in the Framework and Strategy Document (2004) was to introduce an efficient and modern inter-bank payment system that would eliminate slow transaction speeds. longer settlement times. high costs of transactions. errors and fraudulent transactions in financial institutions.

The Inter-Bank Payment System is a key component of country's future modern. integrated. and electronic payments infrastructure. It addresses the need of credit institutions and their customers for security. certainty and timeliness of payment. The RTGS as an electronic payments and settlement system which is designed for to increase efficiency in payments and settlement, while at the same time reduce settlement risks. A Real-Time Gross Settlement System (RTGS) is an online system allowing the instantaneous transfer and settlement of funds and securities between banks. Transfer of money takes place from one bank to another on a "real time" and on "gross" basis. Settlement in "real time" means payment transaction is not subjected to any waiting period. The transactions are settled as soon as they are processed. "Gross settlement" means the transaction is settled on one to one basis without bunching or netting with any other transaction. Real time gross settlement exists to settle large transactions between banks so that they can continue to extend credit to each other and to customers. Once processed, payments are final and irrevocable. Examples include the fed wire in the

United States and CHAPS in the United Kingdom. In Kenya, the local RTGS system is called KEPSS (Kenya Electronic Payments and Settlement System). The RTGS system is an integral part of the National Payment Systems.

In the past, interbank settlement was majorly reliant on the clearing house – where banks would prepare electronic journal files of all the transactions received previously, then present them the following business day at the clearing house to the partner banks under an arrangement called Deferred Net Settlement (DNS). This presented a challenge in that payments could not be settled same day, and further, the failure of one bank to honour settlement obligations of other banks was very high. Hence the introduction of the RTGS to 'correct' these shortcomings.

This study seeks to find out the extent to which the Real Time gross Settlement system (RTGS) has impacted on Inter-Bank settlement efficiency as an objective of the Central Bank of Kenya in its reform objectives as contained in the CBK National Payment System Framework and Strategy Document (2004).

1.1.1 Payment Systems

National Payment system can be defined as the whole combination of instruments and infrastructure through which money moves from one point to another in order to effect payments. These systems have emerged as a central area that affects all other areas and sectors in both developing and developed economies.

According to Kiptepkut (2007), Payment System refers to the economy-wide payment system or the entire web of payment instruments in an economy. It consists of a number of individual payment systems which are broadly categorized into two groups: wholesale as well as retail. A payment system has also been defined as "incorporating particular set of payment instruments, technical standards for the transmission of payment messages and agreed means of settling claims among system members, including use of a nominated settlement institution" (CPSS 2003.9).

The importance of payment systems mainly stems from their role in financial sector and the economy as a whole. The developments taking place in the banking industry due to technological progress has resulted in changes in the payment systems field. Payment system operates on the following generally accepted service standards.

"Anyone can make payments to whomsoever one likes, whenever one likes, in whatever type of currency one likes, at the cost of a few cents per transaction. There are no settlement delays or mountains of paperwork and value is received instantaneously. There are no distinctions in costs or delays between a domestic and a foreign currency transaction. Interest is computed real-time rather than on a "settlement day", a relic from the ancient times, when accounting was done manually. Finally, privacy and security are guaranteed." (CPSS, 2003).

Essential payment system infrastructures in Kenya include the Nairobi Automated Clearing House, Kenya Electronic Payments and Settlement System (KEPSS),

Automated Teller Machines (ATMs) and Securities Settlement System (like Central Depository System-CDS). On the other hand, the most commonly used payment instruments are cash, cheques, electronic funds transfer (EFT), plastic cards (Credit, Debit, Charge, Smart or prepaid) and postal orders.

Kenya's legal infrastructure supporting payment system include the Banking Act Cap 488, Central Bank of Kenya Act Cap 491, Bills of Exchange Act, System(s) Agreements, Rules and Procedures as well as other applicable international laws, principles and recommendations.

1.1.2 Settlement Efficiency of Payment Systems

One of the most fundamental functions of the financial sector is to provide efficient mechanisms to make and receive payments. By reducing transaction costs, the payment system facilitates trade and allows greater specialization by agents in the economy. Over the past few decades, there has been a rapid increase in technological innovation in the financial sector (Hussain & Hussain, 1991).

Nowhere is such innovation more apparent than in the electronification of means of payment. In most countries, the payment system is provided by commercial banks in a symbiotic partnership with the central bank. Central banks tend to provide the medium to settle small payments (i.e., cash) and to support an interbank system that settles large value and time-critical payments. Historically, interbank payments have been settled via netting systems. In a netting system, the settlement of payments is deferred for some

countries have begun investing heavily in improving their financial systems, and now RTGS is a common choice for the interbank payment system (Bech & Hobijn, 2007).

At the end of 2006, the use of RTGS systems had diffused to 93 of the world's 174 central banks (Bech & Hobijn, 2007). In its quest to improve settlement efficiency and reduce settlement risks, the Central Bank of Kenya introduced the Kenya Electronic Payments and Settlement System (KEPSS), which is the Kenyan implementation of the RTGS in the year 2005.

1.1.4 The Banking Industry in Kenya

The Banking industry in Kenya is governed by the Companies Act, the Banking Act, the Central Bank of Kenya Act and the various prudential guidelines issued by the Central Bank of Kenya (CBK). The banking sector was liberalized in 1995 and exchange controls lifted.

The CBK, which falls under the Minister for Finance docket, is responsible for formulating and implementing monetary policy and fostering the liquidity, solvency and proper functioning of the financial system. According to the Central bank of Kenya Website (www.centralbank.go.ke) , as at July 2010 there were forty four (44) licensed commercial banks and one mortgage finance company, fifteen micro finance institutions and one hundred and twenty seven foreign exchange bureaus.

Out of the 45 institutions, 32 are locally owned and 13 are foreign owned. The locally owned financial institutions comprise 3 banks with significant shareholding by the

period of time, usually until the end of the business day. At the end of the deferment period, all payments are tallied up, and money is exchanged on either a bilateral or multilateral net basis among the participants. Commonly, this process is referred to as deferred net settlement (DNS) (Bech & Hobijn, 2007)

The volume of interbank payments has increased dramatically over the last thirty years, mainly due to the rapid financial innovation and the integration and globalization of financial markets. As the volume and value of transactions increased, central banks became worried about settlement risks inherent in netting systems. In particular, central banks were concerned about the potential for contagion (or even a systemic event) due to the unwinding of the net positions that would result if a participant failed to make good on its obligations when due. Consequently, over the last couple of decades, many countries have chosen to modify the settlement procedure employed by their interbank payment system with a view to reducing settlement risks and the potential for system-wide implications. Most central banks have opted for the implementation of a real-time gross settlement (RTGS) system. An RTGS system reduces settlement risk, as payments are settled individually and irrevocably on a gross basis in real time. This ensures immediate finality, hence improved efficiency.

By 1985 three central banks had implemented an RTGS system. A decade later, that number had increased to sixteen, but RTGS was still utilized predominately by industrialized countries. In recent years, however, both transitional and developing

Government and State Corporations, 28 commercial banks and 1 mortgage finance institution.

Over the last few years, the Banking sector in Kenya has continued to growth in assets, deposits, profitability and products offering. The growth has been mainly underpinned by an industry wide branch network expansion strategy both in Kenya and in the East African community region; Automation of a large number of services and a move towards emphasis on the complex customer needs rather than traditional 'off-the-shelf' banking products; Players in this sector have experienced increased competition over the last few years resulting from increased innovations among the players and new entrants into the market.

According to the Central bank of Kenya Annual Report (BSD 2009), the Banking Sector registered good performance in 2009 notwithstanding local and global turbulences. Total assets grew by 14 percent from Ksh. 1.18 trillion in December 2008 to Kshs. 1.35 trillion in December 2009. The growth was mainly underwritten by an increase in loans and advances. Deposits increased by 16 percent from Ksh. 864 billion as at end of December 2008 to Ksh. 1 trillion in December 2009. This growth was supported by aggressive deposit mobilisation by banks and branch expansion. The sector's pre-tax profit increased by 13 percent from Ksh. 43.3 billion in December 2008 to Ksh. 48.9 billion in December 2009. The increased profitability was largely attributable to the growth in credit. The ratio of gross non-performing loans to gross loans stood at 8.0 percent as at December 2009 compared with 9.2 percent registered in December 2008. The decline in gross non

performing loans was supported by enhanced credit appraisal standards adopted by banks in 2009.

1.2 Statement of the Problem

Efficiency in the banking sector is recognized by central banks as a precondition for macroeconomic stability (Ngalande, 2003) and important for effective monetary policy execution (Hartmann, 2004). In addition, a banking sector's ability to allocate credit efficiently is expected to have positive implications for economic growth (Galbis, 1977). With the demand for a more efficient and transparent form of settlement for commercial banks, the Central Bank of Kenya introduced the Real Time Gross Settlement (RTGS) system in the year 2005. From that period till now, the RTGS system has had tremendous impact on the payments and settlement mechanism in Kenya.

As noted by Kiptepkut (Kiptepkut, 2007), Kenya's National Payment and Settlement System has not been thoroughly studied, and a lot of work has to be done to bring to light the developments in this field and the impact in the payment system and the economy as a whole. This study seeks to establish the extent to which the RTGS system has impacted on the efficiency of Inter-bank Settlements in the Kenyan Banking environment compared to the traditional Deferred Net Settlement method that commercial banks were settling their obligations amongst themselves. The study seeks to use turnaround time, volumes (transactions per day) and cost of transactions as parameters to measure the impact of the introduction of this system in the Kenyan banking system. The goal of the

study is to find out the extent to which the strategic objective of CBK has been achieved in the area of improving settlement efficiency.

1.3 Research Objectives

The main objective of the study was to assess the effect of adoption of real-time gross settlement system on interbank settlement efficiency in the Kenyan banking industry.

The specific objective of the study is to determine the difference in the average turnaround time, average number of interbank settlement transactions and average value per transaction for an interbank settlement transaction before and after the introduction of RTGS.

1.4 Importance of the Study

The Payment System has importance for the functioning and integration of both banking and financial markets. A small, but growing, literature has analyzed how and why commercial banks adopt new technologies (e.g., Hannan and McDowell 1984, Gowrisankaran and Stavins 2004, and Akhavien, Frame, and White 2005). However, to my knowledge, no studies have focused on central bank adoption of new technologies, including RTGS systems. This is important, given the key role the central bank plays in the financial sector. Moreover, the adoption decision by a central bank is potentially interesting in its own right, as it might be different from the profit considerations driving technology adoption in the private sector. Kiptepkut (2007) attempted to shed some light into the payment reform objectives of Kenya's National Payment System. But no known

study has been conducted to ascertain the extent to which introduction of the RTGS has gone towards achieving these objectives.

This study will be important to financial institutions and policy makers interested in the development of national and international economic and financial systems, since they have become increasingly aware of the role and importance of an efficient national payment system. Scholars, especially from the developing countries in Africa interested in the area of financial and settlement efficiency will find this study to be of help. The study will, in addition, add to the body of knowledge in this subject.

CHAPTER TWO

LITERATURE REVIEW

2.1 Electronic Payment and Settlement

In 1965, Thomas J. Watson, then chairman of IBM, made the following prediction:

"In our lifetime we may see electronic transactions virtually eliminate the need for cash. Giant computers in banks, with massive memories, will contain individual customer accounts. To draw down or add to his balance, the customer in a store, office or filling station will do two things: insert an identification into the terminal located there; punch out the transaction figures on the terminal's keyboard. Instantaneously, the amount he punches out will move out of his account and enter another." (Hussain & Hussain, 1991 p543).

As Watson predicted, this same process, repeated thousands, hundreds of thousands, millions of times each day now occurs. Billions exchange hands without the use of one pen, one piece of paper, one cheque, or one currency note. A network of terminals and memories extend across city and state lines for electronic funds transfer (EFT), although we have not altogether eliminated paper money and coins. Watson's prophesy has today become a reality. Billions of money are moved daily from one set of accounts to another using computers and telecommunications without any currency exchange or paper to record and process transactions. Information on cheques (payee, amount, account number, cheque writer, depositor, institution) is converted into electronic impulses and

transmitted through a telecommunications channel to the nearest settlement institution (automated clearing house) or settlement engine such as the RTGS.

The banking industry was a pioneer in commercial use of computers. Recognizing that the number-crunching and file-handling capabilities of computers for recurring and repetitive processes could enhance productivity, banks began investing heavily in accounting systems as early as the 1950s and continued to do so in the 1960s and 1970s. As the Governor of the Bank of England once noted/ British banks would need to employ the country's entire population to deal with the business they now do (Hussain & Hussain, 1991). But this early commitment to information technology has been partly responsible for the failure of banks to take full advantage of modern computer technology — many are still using systems that are ten to fifteen years old. These systems were designed to cut costs in back-room accounting operations, not to provide managers with analytical reports or help in managing the bank's financial resources. For example, few banks can do portfolio analysis; few banks have implemented systems to provide information needed to gain a competitive advantage in financial markets.

The electronic revolution in banking basically centers on changes in the distribution channels of financial institutions. The presence of computer and information technologies in today's banks has expanded dramatically. Some estimates indicate that, since the 1980s, about 50 percent of all new capital investment in organizations has been information technology (Westland and Clark, 2000). Yet for technologies to improve productivity, they must be accepted and used by these organizations.

Computerization in the Kenyan banking industry got off to a slow start and only picked up momentum in the 2000's (Marketing Intelligence, 2003, p81). The increasing volume of banking transactions was the inevitable motivator for the introduction of computers in Kenyan commercial banks. Then, by linking up technological developments in telecommunications and information technology, real-time online electronic funds transfer came into existence. A large part of the electronic funds transfer process takes place within the banking premises and thus may not be very evident to the populace.

Having an efficient funds transfer mechanism alone without an equally efficient system of settlement may not bring about the envisaged metamorphosis in the payment system. The Central Bank of Kenya (CBK), through its National Payments reform agenda, introduced settlement system that provided an efficient real-time settlement system without exposure to the systemic risks apparent with the netting mechanism. Kenya's National Payment System, Framework and Strategy Document (2004) states the following reform strategies adopted by the Central Bank with a view to achieving Kenya's National Payment System Reform objectives.

Risk reduction strategies: This involves the introduction of an on-line settlement system, implementation of risk reduction measures in bilateral and multilateral netting schemes, cheque truncation, introduction of same day settlement and payment systems oversight.
Appropriate Legal and Regulatory Framework: This strategy called for the review of the statutory powers of the Central Bank regarding payment systems and adoption of legal

framework that ensures enforceability of payment service agreements and legal certainty in respect of industry practices.

Interfacing between the trading system and payment strategies: this strategy is based on the understanding that payment systems are fragmented and predominantly paper based. It seeks to review Financial Market Practices from the National Payment System perspective, encouragement of electronic trading and payment mechanisms in the trading systems, introduction of mechanisms to relay information associated with payment to the beneficiary and to review cross-border and foreign currency market practices from the National Payment System perspective.

According to Central Bank of Kenya's Framework and Strategy Document (2004), Kenya's payment system is beset by problems such as inherent settlement risks, over reliance of cash as a medium for settling financial obligations by the paying public, the use of cheques to settle high-value payment transactions, unregulated card-based payment system, fragmented payment systems, lack of information and systems to manage inter-bank exposure resulting from payment transactions of banks' customers and the implicit dependence on the financial backing of the central bank to ensure that clearing banks will be able to settle their daily exposure to one another. In addition, the existing payment system suffered from built-in inefficiency.

2.2 RTGS System

An RTGS system is a gross settlement system in which both processing and final settlement of funds transfer instructions can take place continuously (i.e., in real time). As it is a gross settlement system, transfers are settled individually, i.e., without netting debits against credits. An RTGS system can thus be characterized as a funds transfer system that is able to provide continuous intraday finality for individual transfers provided that a sending bank has sufficient covering balances or credit.

In RTGS or large-value funds transfer system, the transmission and processing of payment messages are typically automated or electronic, while settlement takes place in central bank funds, i.e., final (irrevocable and unconditional) transfer of value is recorded in the books of the central bank.

2.3 Benefits of an RTGS system

According to Mañalac et al (2005), the benefits of an RTGS system to its major users include the following : (1) Flexible liquidity management - In order to reduce risk, large-value net settlement systems have to respect binding intraday limits on participants' positions, which normally cannot be increased during the day. Once these limits have been reached, payments are blocked. Liquidity is effectively trapped in the net settlement system until at the end of the day when the balances of such netting systems are settled by means of a payment through the RTGS environment. However, in RTGS, liquidity can in principle be available to participants at all times through the provision of collateralized intraday credit to participants. This will ensure higher turnover of funds and facilitate

liquidity management compared with net settlement systems, where liquidity is trapped until end-of-day settlement. (2) Risk reduction - The development of RTGS systems is one response to the growing awareness of the need for sound risk management in large-value funds transfer systems. An RTGS system can offer a powerful mechanism for limiting settlement and systemic risks in the interbank settlement process. It can substantially reduce the duration of credit and liquidity exposures. To the extent that sufficient covering funds are available at the time of processing, settlement lags will approach zero, thus eliminating the primary source of risks in interbank funds transfers. (3) An RTGS system can provide a firm foundation for the management of payments system risks as it can give participants the possibility of settling payments in central bank money with immediate finality, thus eliminating the settlement risk between participants which is inherent in other payments mechanisms. RTGS payments will become final for receiving participants once funds have been credited to their account held at the central bank. This means that participants will in principle be able to pass on customer payments they receive to the final beneficiary immediately and without credit risk.

The reduction of financial risks in an RTGS system is particularly important and beneficial to the counterparties to the exchange, i.e., business, corporate and banks. The failure of a large bank to make its payments could have knock-on effects on others, including other banks and their customers, possibly leading to payments gridlock with potential systemic consequences. For bank customers, the resulting liquidity shortfalls may be costly, forcing the party expecting a payment to engage in relatively expensive borrowing or less–than–profitable asset sales. If the liquidity shortfall is very serious, an

induced default on other contracts, or even bankruptcy, may result. (4) Real-time operation - The high speed at which payments in RTGS will be processed will facilitate and improve cash management. Moreover, this will enable participants to increase their turnover of funds. For cross-border RTGS payments, under normal circumstances, the lag time between the debiting of the account of the sending participant and the crediting of the account of the beneficiary participant will almost be nil. The rapid processing of funds, which will be credited to the appropriate account with finality, will yield direct benefits for participants.

Moreover, with RTGS, international corporate cash management will be able to make substantial efficiency gains. The real-time execution of RTGS payments will reduce the float and make it possible to optimize cash management. Participants' corporate customers may, therefore, be particularly interested in having their financial payments executed via RTGS. (5) Accurate and reliable transmission of information in RTGS payment messages – No payment-related information will be lost in RTGS. The payment instruction, if provided in accordance with the standards, will always be forwarded in its entirety to the beneficiary participant. (6) Cost savings. The fee ch arged for RTGS transactions will be based on the number of transactions made by a participant. RTGS will result in cost savings for the following reasons:· incoming funds will be available for immediate re-use: it will be possible to reconcile accounts on an intraday basis; immediate reaction will be possible should any problem arise with regard to the transfer of a payment; and the need to split liquidity among several payments systems during the day can be avoided. C ost savings under an RTGS system will improve the overall

efficiency in the market for payment services. This, in turn, will create the conditions for an efficient financial system and economy. In developing economies, in particular, slow, unreliable and costly means of payments can dampen business activity and retard the development of liquid financial markets. Thus, the resulting greater efficiency under an RTGS system will indirectly benefit the users of the system in terms of higher productivity, which can translate into higher profitability.

2.4 Significance of Efficient Payments Systems

Payment Systems are critical to the effective functioning of the financial system. They are the means by which funds are transferred among banks. Robust payment systems are key requirements in maintaining and promoting financial stability and supporting the effectiveness of financial markets BIS (2001). The public depends on it to transfer funds among themselves.

Poorly designed systems can contribute to systematic crises if risks are not adequately contained, with the result that financial shocks are passed from one participant to another. Furthermore, inefficient settlement system will chock up the banking / financial markets, thereby causing distrust from the public. The effects of such disruption could extend beyond the system and its participants, threatening the stability of money markets and of other domestic and international financial markets. According to Sheppard (1996), Payment systems are crucial for the economy, and their safety and efficiency should be part of objectives of public policy. They are vital elements in the financial infrastructure

of the economy acting as a necessary channel for effective economic management particularly through monetary policy and a means of promoting economic efficiency.

Effective and efficient payment systems are vital for the economic development of emerging economies. World Bank, Policy Research paper number 1336. VISA (2004), cites Paul Acquah of Bank of Ghana statement that "An efficient payment system enhances savings mobilization and financial intermediation". If a payment system is inefficient and unreliable, it may take weeks rather than days for a payment instruction to move from the payer's bank and for the final recipient's account to be credited. This process may also be uncertain causing money to be tied up in the payment system and making it unavailable for other productive purposes. BIS CPSS (2001) identified aspects of Inefficiencies in Payment systems to include Poor operational performance viz: system cannot cope with the level of demand, has technical or organizational problems, high levels of returned payments. High costs possibly reflected in charges compared to systems with similar services elsewhere and excessively high set up or operational costs when a participation joins or leaves the system. "The importance of payment systems for financial sector stability arises from the possibility that problems in the payment systems, affecting only one participant, run the risk of becoming systemic. Masha (2002). Modern and efficient payment systems promote efficiency of financial intermediation and are likely to build support for the operations of the free market institutions.

2.5 Interbank Settlement In Kenya

The Central Bank of Kenya has been aware of the numerous benefits of an efficient payment system, especially in its role in the effective implementation of the monetary

policy operations and financial stability, and is collaborating with the Bankers Association in co-ordinating the modernization and the reform programme of the payment system in Kenya.

It is now some seventeen years since the Central Bank of Kenya (CBK), in joint collaboration with the industry association, Kenya Bankers Association (KBA), launched its first initiative to create a modern payment system. The starting point was the need to improve the system for clearing cheques, at that time the only and most important non-cash payment instrument in use. Cheques were then cleared locally in the centres where the Central Bank had branches. The cheques were listed on hand-operated machines and reconciled manually. In co-operation with the commercial banks, new procedures and rules for inter-bank clearing and settlement were designed based on MICR technology, resulting into a centralised automated clearing house with-national wide clearing cycle reduced from 3 to 4 weeks to 3 days. (T+3) presently and high value are clearing at T+2. The result of this policy shift was the reduction of clearing time from a high of fourteen (14) days to three (3) days currently.

The clearing and settlement arrangement was divided into retail and wholesale segments and there were no limits to the value of credit or debit items that pass through the Clearing House. The Central Bank facilitates the ACH operations through the Kenya Bankers' Association (KBA) which owns, operates, and administers the clearing for cheques and EFTs that are used by banks. Membership is restrictive and banks must

comply with certain criteria approved by KBA. Members share Clearing House expenses via KBA.

Presently, in order to facilitate interbank settlement electronically through KEPSS, each bank has opened a settlement account in each of the currency that it participates in. The four accepted currencies that can be opened in KEPSS are the Kenya Shilling (KES), US Dollar (USD), Sterling Pound (GBP) and Euro (EUR).

Interbank settlement is carried out using SWIFT network. Electronic settlement instructions in proper SWIFT messages are securely transmitted to KEPSS where the paying bank is debited and the receiving bank is credited. KEPSS operates in a credit-push mechanism the payer must always initiate the transactions as opposed to debit push, where the receiver initiates the payment to debit payer's account.

In the event that the paying bank does not have sufficient funds to accommodate the payment, the payment will be queued in the KEPSS system, waiting the time when the bank will have sufficient funds to cover the obligation. In the event that this does not happen at the end of day, the bank can then borrow from other commercial banks, or the Central bank of Kenya as a last resort, where they will be given an overnight loan at an agreed interest rate.

Interbank payment traffic in KEPSS has been on the rise since the system was rolled out in July 2005 (Appendix 1). KEPSS implementation helped phase out the previous paper-

based inter-bank settlement system and completely transformed the management of liquidity in the banking industry. Statistics available for the Kenya shilling leg indicate that the system moved Ksh 8.563 billion with 142.445 payment messages in 2006: Ksh 9.599 billion with 180.312 payment messages in 2007: and Ksh 17.269 billion with 273.941 payment messages in 2008 (further analysis of the payments statistics is presented in the Appendix 1)

During the year 2008. the Central Bank in conjunction with Kenya Bankers Association initiated other modernization programs which are ongoing and are expected to be realised this year. These include; Cheque Truncation. Value Capping. Failure to Settle Mechanism. and the Government Payments System (G-Pay) Project. All of these are aimed at mitigating various risks and enhancing the efficiency and effectiveness of our payments system.

Value capping was introduced in October 2009. Value capping is a limit set on amounts that can be cleared through the clearing house. Items that are cleared through the clearing house are cheques and electronic funds transfer instructions (EFTs). The limit set for value capping is Kshs 1million. USD 35.000 EUR 30.000 and GBP 15.000 and above that will NOT be processed through the Nairobi Automated Clearing House as from 1st October 2009.

The introduction of G-Pay system. together with value capping in particular ushered in a new dimension in how government paid its suppliers and employees. Previously. the

government, being one of the biggest spender of finances, had been a single biggest player in the cheque payment system. All payments made by the government departments were through cheques. G-Pay has changed all that. Beginning October 2009, CBK introduced G-Pay system to interface to the government accounting system called Integrated Financial Management & Information System - IFMIS. This provided a straight-through mechanism where all the payments from the government accounting system are channelled through to KEPSS for settlement without human intervention. In effect, this meant that suppliers and government employees received monies in their bank accounts a few minutes after the payments are released from the paying ministries. This has cut off the time one would have waited for the cheques to clear from three days to just less than five minutes. At the moment, no more cheque payments by the government are allowed.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research Design

A census survey was conducted for the study. In census survey research, the researcher collects responses from the entire population.

3.2 Population

For this study, the researcher collected responses from all the forty-four licenced commercial banks operating in Kenya. This is because only registered commercial banks are participants in the KEPSS.

3.3 Data collection

Both primary and secondary data was used in the study. Primary data was collected through a semi-structured questionnaire. Structured interviews are best suited for engaging in respondent or focus group studies in which it would be beneficial to compare/contrast participant responses in order to answer a research question (Lindlof & Taylor, 2002).

The questionnaires were addressed to the Treasury Managers of the commercial banks, because Treasury managers are the people in charge of management of the accounts in

KEPSS on behalf of commercial banks. They are in a good position to give a rating of how KEPSS has impacted on interbank settlement efficiency.

Secondary data was collected from statistics accumulated from the payment systems both at the Nairobi clearing house and the Central bank of Kenya.

3.4 Data analysis and presentation

Data of quantitative nature was analyzed using descriptive statistics and appropriate deductions made.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the analysis and findings of the study. The main objective of the study was to assess the effect of adoption of real-time gross settlement system on interbank settlement efficiency in the Kenyan banking industry. To achieve the main objective, the study determined the difference in the average turnaround time, average number of interbank settlement transactions and average value per transaction for an interbank settlement transaction before and after the introduction of RTGS.

The researcher sent out thirty five (38) semi-structured questionnaires to treasury managers of commercial banks licensed by the Central Bank of Kenya. Out of the current forty four (44) commercial banks, only 38 could provide data that would be useful to the study as the other six (6) were not operational in the Kenya banking industry by the time the RTGS system was implemented. They are (with the dates of registration) Gulf African Bank Limited (1/11/2007), First community Bank Limited (29/04/2008), Ecobank Kenya Ltd (01/11/2005), UBA Kenya Bank Ltd (24/09/2009) and Family Bank (01/05/2010). This is because the study was to analyze the relationship between the sets of data before and after the implementation of the RTGS in July 2005. Out of the thirty eight (38) commercial banks, thirty two (32) responded to the questionnaire.

4.2 General Information on the Banks That Participated In the Study

This section presents the general information about the banks that participated in the study. This includes ownership and classification (large, medium or small). All the banks that responded to the questionnaire were participants in KEPSS since it is a requirement that any bank wishing to participate in the Kenya clearing house must be a member of the RTGS.

4.2.1 Bank profiles by size

The respondent commercial banks that were interviewed were classified as either large, medium or small as per the classification in the Central bank of Kenya's Bank Supervision website classification.

Table 4.1: Bank profiles by Size

Bank Size	**N=32**	
	Frequency	**Percentage**
Large	9	28.125
Medium	14	43.75
Small	9	28.125

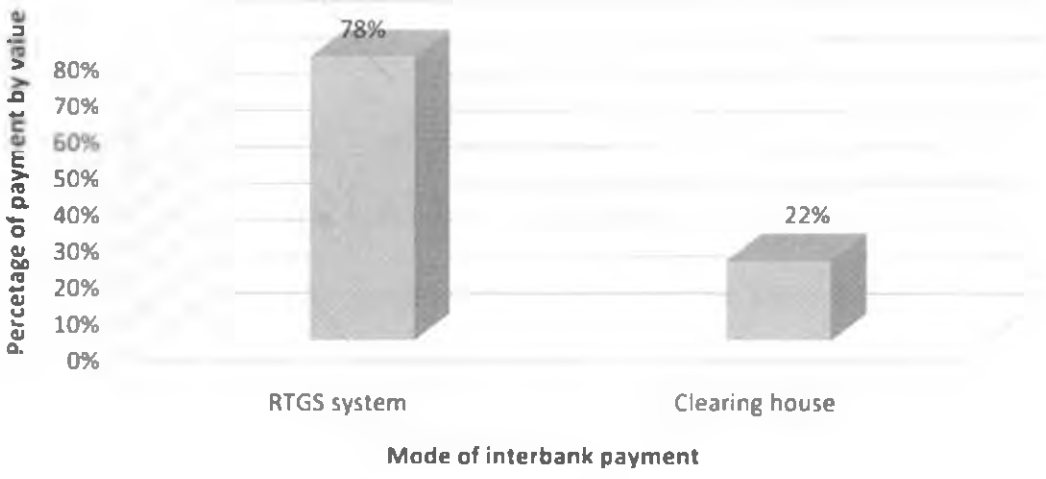
Source: Researcher (2012)

From table 4.1 above, almost half of the respondents were from medium-sized commercial banks.

4.3 The mode through which interbank payments by value are processed.

The respondents were requested to indicate the mode through which interbank payments by value are processed and the study findings are shown in figure 4.1 below.

Figure 4.1: The mode through which interbank payments by value are processed



Source: Researcher (2012)

The study findings in figure show that majority (78%) of payments by value are processed via RTGS while the remaining 22% are processed via clearing House.

The respondents were asked to state the trend in their clearing volumes of the systems listed in table below with specific reference to the clearing house. The response was rated on a three-point-scale whereby 1= No change, 2=Declining, and 3= Increasing. Mean and standard deviations for the responses were computed as shown in figure 4.2

Table 4.2: The trend in clearing volumes of cheques and EFT

System	Mean	Std Dev
Cheques	2.08	0.654
EFT	2.15	0.443

Source: Researcher (2012)

The responses with mean close to 1 indicated no change in the trends of clearing volumes, mean close to 2 denoted declining trends in your clearing volumes and mean close to 3 denoted increasing trends in your clearing volumes. From the study findings in table there were declining trends in the clearing volumes of Cheques and EFT as shown by means of 2.08 and 2.15 respectively.

4.4 Duration taken to settle inter-bank payment

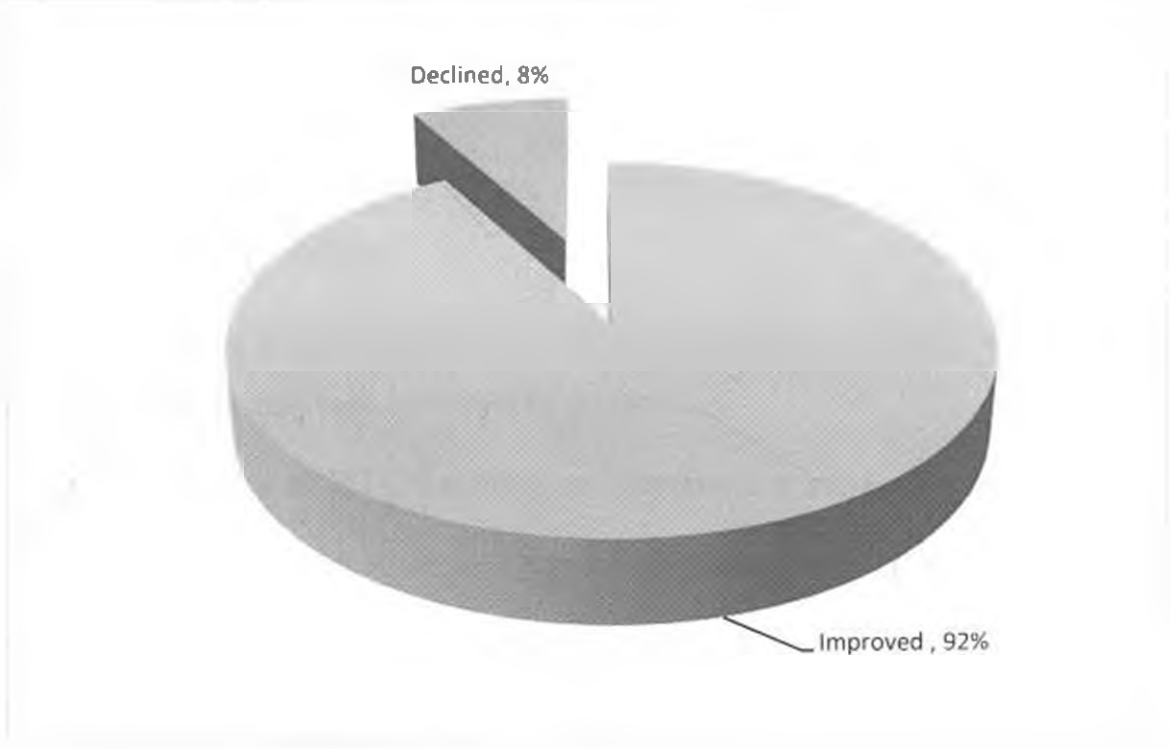
In line with the duration taken to settle inter-bank payment, the Central Bank of Kenya (in its rules for participation in the RTGS) has instructed all commercial banks to pass on the added advantages introduced by the RTGS system to their customers by making sure they credit their customers accounts within 2 hours of receipt of a transaction from another bank. This has impacted positively on the turnaround time for an interbank transaction.

The study established that the commercial banks were settling most of their payments on real-time basis against each other – thereby showing a positive response towards the RTGS system. In the quest to be efficient in operations given the real-time nature of the RTGS, most banks have installed state of the art systems to enable them offer competitive services to their clients. It is worth noting that by settling on real time amongst them, commercial banks are improving on efficiency while at the same time reducing systemic risks involved with the Deferred Net Settlement (DNS).

4.5 The efficiency of RTGS system

The respondents were asked to indicate efficiency improvement/decline and the percentage of improvement/decline in inter-bank settlement efficiency from the time the RTGS system was rolled out. Figure 4.2 . illustrates the study findings.

Figure 4.2: The efficiency of RTGS system

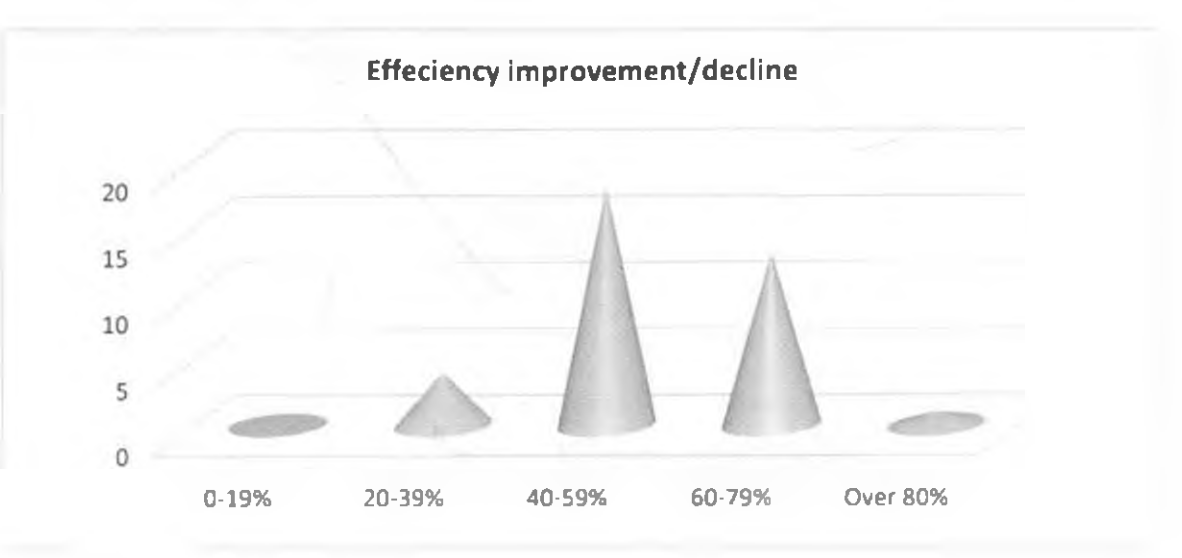


Source: Researcher (2012)

From the study findings in figure 4.2, majority (92%) of the respondents stated that the efficiency of interbank settlements in the RTGS system era has improved.

The respondents were further requested to indicate the percentage to which the efficiency of interbank settlements in the RTGS system environment has improved. The study findings are shown in figure below

Figure 4. 3: Improvement in efficiency of interbank settlements using RTGS system



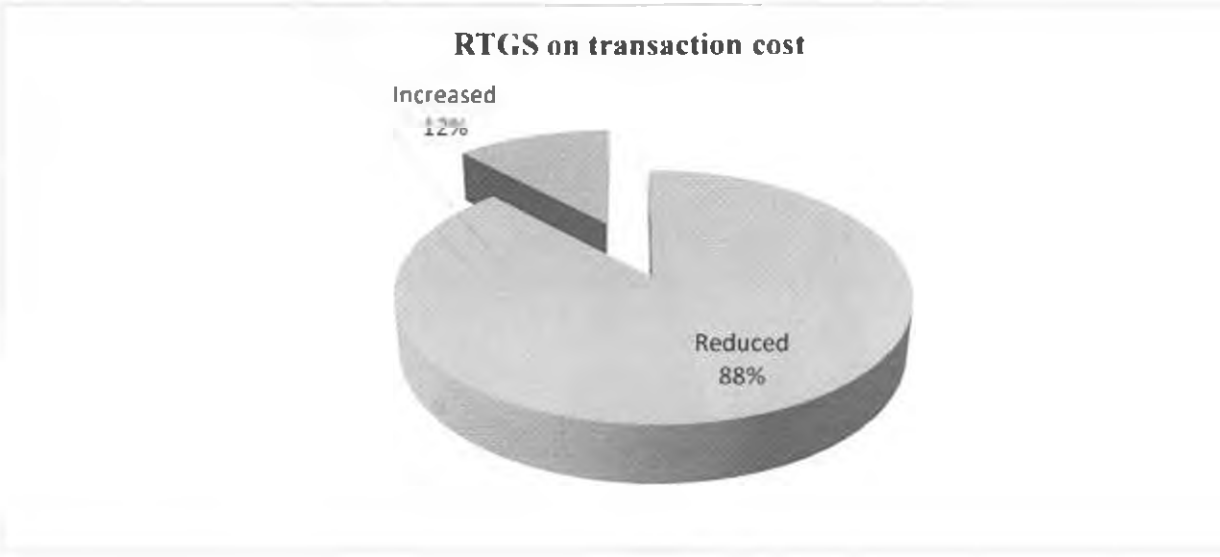
Source: Researcher (2012)

The study findings in figure 4.3 indicate that RTGS system has led improvement in efficiency of most inter-bank settlement by 40-59 %.

4.6 The influence of RTGS system on interbank transaction cost

The respondents were asked to state whether the introduction of the RTGS system reduced or increased the average interbank transaction cost. Figure shows the study findings.

Figure 4.4: Influence of RTGS system on interbank transaction cost

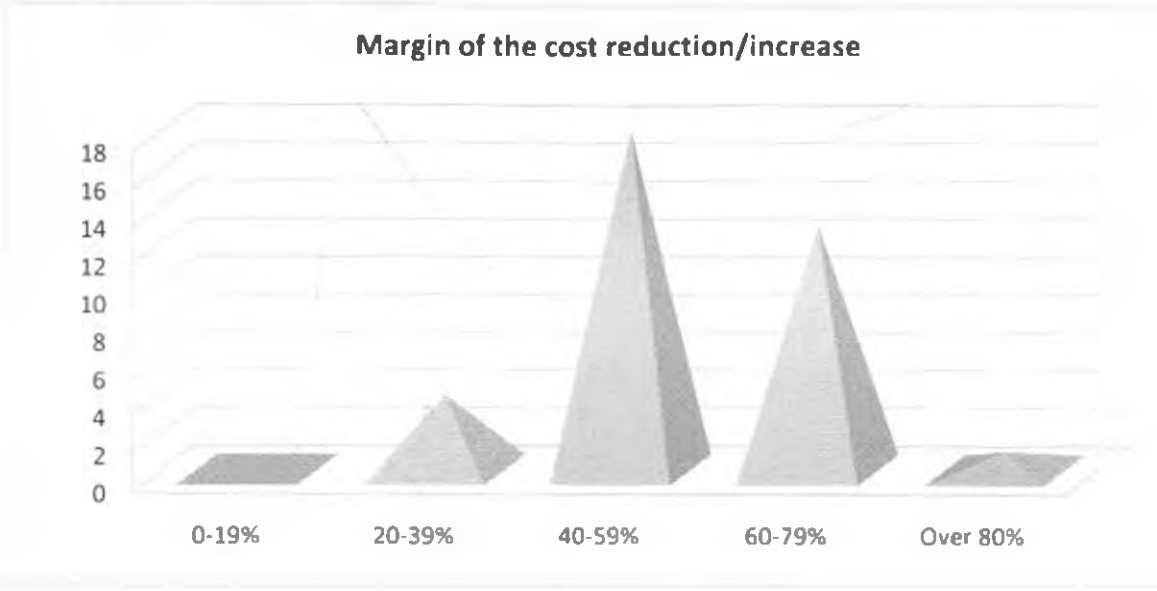


Source: Researcher (2012)

From the study finding in figure 4.4, majority of the respondents (88%) stated that the introduction of the RTGS system reduced the average inter-bank transaction cost.

The study further explored on the estimated margins of the cost reduction/increase and the study findings are shown in figure4.5 below

Figure 4.5: Margins of the cost reduction



Source: Researcher (2012)

The study findings indicate that RTGS system has reduced the margins of the cost of most banks by 40-59 %.

4.7 Important attributes of an inter-bank payment system

The respondents were asked to rate the importance of three attributes (safety, smoothness and efficiency) with which funds (money) is transmitted among payment system participants. Mean and standard deviations for the responses were computed as shown

Table 4.3: Important attributes of payment systems

	Mean	Standard Deviation
Safety	4.98	0.105
Smooth	4.25	0.243
Efficient	4.82	0.297

Source: Researcher (2012)

The responses with mean close to 1 indicated not important, 2 less important, 3 moderately important, 4 important and 5 highly important. The study findings in table indicate that majority of the respondents view efficiency, smoothness and safety of the payment system as highly important, as indicated with mean scores of 4.98, 4.25 and 4.82 respectively

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of study findings, discussion and conclusion of the study. The chapter also presents the limitations of the study, suggestions for further research and implications for policy and practice.

5.2 Summary, Conclusions and Recommendations

The objective of the study was to assess the effect of adoption of real-time gross settlement system on interbank settlement efficiency in the Kenyan banking industry. The following is the summary of the study finding

5.2.1 Summary and discussions of the study findings

Robust payment systems are key requirements in maintaining and promoting fluid financial stability and supporting the effectiveness of financial markets BIS (2001). The study established that the adoption of real-time gross settlement system has improved the efficiency of interbank settlement in the Kenyan banking industry. Majority of the banks stated that RTGS system has led to improved efficiency of most inter-bank transaction settlement by 40-59 %. The improvement in efficiency has been observed in regard to payments by value that are processed via RTGS, trends of clearing volumes of Cheques

and EFT, the duration taken to settle inter-bank payment and the reduction in the average inter-bank transaction cost.

The study established that majority of payments by value are processed via RTGS. There was a general reduction in the clearing volumes of Cheques and EFT as opposed to the increase in volumes and values for RTGS payments. The commercial banks are settling most of their payments on real-time basis against each other – thereby showing a positive response towards the RTGS system. In the quest to be efficient in operations given the real-time nature of the RTGS, most banks have installed state of the art systems to enable them offer competitive services to their clients.

The adoption of real time payments in RTGS system has improved the efficiency of commercial banks while at the same time reduced systemic risks involved with the Deferred Net Settlement (DNS). The study findings are in tandem with (CPSS, 2003) who reported that enables bank clients to make payments to whomsoever one likes, whenever one likes, in whatever type of currency one likes, at the cost of a few cents per transaction. CPSS (2003) also stated that there are no settlement delays or mountains of paperwork and value is received instantaneously. Moreover, there are no distinctions in costs or delays between a domestic and a foreign currency transaction while privacy and security are guaranteed.

The study findings also tally with Bech & Hobijn, (2007) who stated that the volume of interbank payments has increased dramatically over the last thirty years due to the rapid

financial innovation and the integration and globalization of financial markets. The modification of the settlement procedure employed by interbank payment system has reduced settlement risks and the potential for system-wide implications. The RTGS system in Kenya reduces settlement risk, as payments are settled individually and irrevocably on a gross basis in real time. This ensures immediate finality and the overall efficiency of the settlement system as opposed to Cheques and EFT processed which carried with them huge risks, for example if a bank was to go under while its obligations were held within the Deferred Net Settlement system.

In regards to the duration taken to settle inter-bank payment, the Central Bank of Kenya (in its rules for participation in the RTGS) has instructed all commercial banks to pass on the added advantages introduced by the RTGS system to their customers by making sure they credit their customers accounts within 2 hours of receipt of a transaction from another bank. This has impacted positively on the turnaround time for an interbank transaction.

The study findings revealed that the introduction of the RTGS system reduced the average inter-bank transaction cost. Majority of commercial banks have reduced the estimated margins of cost by 40-59 %. The study also established that majority of the respondents view the efficiency of Kenya's payment system as highly important whereas the smoothness and safety of the Kenya's payment system were rated as moderately important.

The study findings on the improved interbank settlement efficiency as a result of adoption of real-time gross settlement system in the Kenyan banking industry are in line with Manalac *et al* (2005) who reported that RTGS system enhance efficiency in the banking sector by increasing flexible liquidity management, reducing risk and provision of a firm foundation for the management of payments system risks as it can give participants the possibility of settling payments in central bank money with immediate finality, thus eliminating the settlement risk between participants which is inherent in other payments mechanisms.

The study findings revealed the National Payment System (NPS) Division of the Central Bank of Kenya achieved its objective to introduce an efficient and modern inter-bank payment system that would eliminate slow transaction speeds, longer settlement times, high costs of transactions, errors and fraudulent transactions in financial institutions. The objectives are stipulated in CBK National Payment System Framework and Strategy Document, 2004.

5.2.2 Conclusion

The study concludes that the adoption of real-time gross settlement system has improved the efficiency of interbank settlement in the Kenyan banking industry. The real-time gross settlement system has led to increased volumes of real-time processed payments as opposed to the use of Cheques and EFT. RTGS has shortened duration taken to settle inter-bank payment and reduced the average inter-bank transaction cost.

The study also concludes that commercial banks in Kenya have enhanced their competitive advantage through the adoption of real-time gross settlement systems. RTGS allows commercial banks to settle most of their payments on real-time basis against each other. The adoption of real time payments in RTGS system has reduced the systemic risks involved with the Deferred Net Settlement (DNS) which was formerly carried through the Automated Clearing System in relation to high-value payments. RTGS eliminates settlement delays and mountains of paperwork and value is received instantaneously.

The study concludes that technological innovation in Kenya banking system has greatly improve the operational efficiency and lead to the achievement of the objectives of the Central bank of Kenya in regards to introduction of an efficient and modern inter-bank payment system. Central bank of Kenya introduced RTGS as a strategic response to eliminate slow transaction speeds, longer settlement times, high costs of transactions, errors, fraud and reduce settlement systemic risks. This is a big strategic leap that has enabled the Central Bank transform settlement in the banking industry in line with its vision.

5.3 Limitations of the Study

The study assessed the effect of adoption of real-time gross settlement system on interbank settlement efficiency in the Kenyan banking industry. However the study did not investigate whether the effects of adoption of real-time gross settlement system on interbank settlement efficiency vary in different countries due to different level of

technological advancement in their operational systems. The study findings cannot be generalized to the efficiency of banking systems that apply other forms of technology different from real-time gross settlement.

5.4 Suggestions for Further Research

The study suggest further research on the extent to which constraints in bank interoperability in the Kenyan banking industry hinder the efficiency of interbank settlement through application of real-time gross settlement system. The further study will compliment the findings of this study by providing information on ways through which the constraints in bank interoperability in the Kenyan banking industry can be overcome with a view to enhancing efficiency of banks through adoption of real-time gross settlement system.

5.5 Implications for Policy and Practice

The findings of this study will serve as stimuli to policy makers to understand the industry better and to acknowledge that embracing technology, particularly in the banking sector, will bring benefit both in the micro and macro economy. As noted earlier in the study, an efficient interbank settlement system is very necessary if the country's economy has to show positive improvement. An inefficient settlement system on the other hand ties up funds that would have gone into positively impacting on the economy. As noted by Sheppard (1996), Payment systems are crucial for the economy, and their safety and efficiency should be part of objectives of public policy. They are vital elements in the financial infrastructure of the economy acting as a necessary channel for

effective economic management particularly through monetary policy and a means of promoting economic efficiency.

Finally, the industry players (commercial banks) need to automate most of their systems through straight-through processing (STP) in order to leverage on the efficiency of the RTGS system and be more competitive in the products on offer.

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APPENDICES

APPENDIX I: STUDENT INTRODUCTION LETTER

ROGONY GEOFFREY KIPNG'ENO
University of Nairobi,
School of Business
P. O. Box P.O Box 30197 – 00100 GPO
Lower Kabete Campus - Lower Kabete Road
Nairobi.

Dear Sir/Madam.

I am a Masters student at the University of Nairobi, School of Business. In partial fulfilment of the requirement for Master of Business Administration, I am conducting a study on the Effect of Adoption of Real-Time Gross Settlement system (RTGS) on Inter-bank Settlement Efficiency in the Kenyan Banking Industry.

I am glad to inform you that your bank has been selected to form part of the study. I would therefore kindly request you for assistance in completing the attached questionnaire which forms a major input of the research process. The information and data will be strictly be used for academic purposes only and strict confidence shall be observed on the same.

You cooperation will go a long way in ensuring success of this project.

I would like to thank you in advance for your time.

Yours Sincerely.

Rogony Geoffrey Kipng'eno,
University of Nairobi

APPENDIX II: UNIVERSITY INTRODUCTION LETTER

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
MBA PROGRAMME

Telephone: 020-2059162
Telegrams: "Varsity", Nairobi
Telex: 22095 Varsity

P.O. Box 30197
Nairobi, Kenya

DATE 5/8/2012

TO WHOM IT MAY CONCERN

The bearer of this letter ...GEOFFREY [illegible]...

Registration No...D61/8775/2006...

is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS
16 OCT 2012
MBA OFFICE
P.O. Box 30197 - 00100, NAIROBI

IMMACULATE OMANO
MBA ADMINISTRATOR
MBA OFFICE, AMBANK HOUSE

APPENDIX III: QUESTIONNAIRE

Name of the Bank _____

Designation of Respondent _____

1. The Central Bank recently launched the RTGS system. On average what proportion of your payments are now processed via the following systems?

System	% of payments by value
RTGS	
Clearing House	

2. (a) With specific reference to the clearing house. what has been the trend in your clearing volumes of the following since the implementation of RTGS?

	1	2	3
Cheques			
EFT			

Where 1: No change 2. Declining 3. Increasing

(b) Please provide reasons for the above trends

Cheque

_____

EFTS

_____

3. (a) On average, how long did it take to settle a single inter-bank payment to be initiated, processed and completed before the advent of the RTGS environment? _____ (minutes).

(b) On average, how long does it take to initiate, process and complete a single inter-bank transaction in the RTGS environment? _____ (minutes)

(c) What would you attribute the difference in 3(a) and 3(b) above

_____

_____

_____

4. (a) Would you say there is a marked improvement in inter-bank settlement efficiency from the time the RTGS system was rolled out? _____

(b) Please estimate the efficiency improvement/decline that can be attributed to the RTGS system?

(Please tick one) Declined ☐ Improved ☐

By	0%-19%	20%-39%	40%-59%	60%-79%	Over 80%

5. (a) Has the introduction of the RTGS system reduced or increased the average inter-bank transaction cost?

Reduced ☐ Increased ☐

(b) Based on your answer above, please provide an estimate of margin of the cost reduction/increase

By:	0%-19%	20%-39%	40%-59%	60%-79%	Over 80%

6. One of the most significant objectives of payment systems reform is to ensure their safety, smoothness and efficiency with which funds (money) is transmitted among payment system participants. How would you rate Kenya's payment systems against each of the attributes below

	1	2	3	4	5
Safe					
Smooth					
Efficient					

Where 1: Not important 5. Highly Important

7. If any of the attributes in 1 above is rated as 1, please highlight the reasons for the answer

Safety

_____

Smoothness

Efficiency

APPENDIX IV: MONTHLY FLOW OF TRANSACTIONS

Table 1: Monthly flow of transactions in both volumes and value for the period January 2008 to April 2010

	Total value moved per month (bn)	Of which indirect (NSI Ksh bn)	No. of transactions	Average value per transaction (bn)	Days worked	Per Day	
						Value (bn)	Transactions
Jan-08	1,256	78	23,773	0.05	22	57	1,081
Feb-08	985	62	23,278	0.04	21	47	1,108
Mar-08	891	60	20,920	0.04	18	49	1,162
Apr-08	1,220	107	24,684	0.05	22	55	1,122
May-08	1,895	94	19,730	0.1	21	90	940
Jun-08	2,601	115	22,387	0.12	20	130	1,119
Jul-08	1,864	75	24,599	0.08	23	81	1,070
Aug-08	1,327	59	20,593	0.06	21	63	981
Sep-08	1,367	76	23,494	0.06	22	62	1,068
Oct-08	1,344	85	23,635	0.05	20	67	1,182
Nov-08	1,225	57	22,718	0.05	21	58	1,082
Dec-08	1,293	94	24,131	0.05	20	65	1,207
Jan-09	1,376	68	25,330	0.05	21	66	1,206
Feb-09	1,236	64	20,710	0.06	19	65	1,090
Mar-09	1,235	82	23,752	0.05	22	56	1,080
Apr-09	1,077	80	22,485	0.05	20	54	1,124
May-09	1,064	70	24,024	0.04	20	53	1,201
Jun-09	1,032	80	21,977	0.05	21	49	1,047
Jul-09	1,185	75	25,650	0.05	23	52	1,115
Aug-09	1,127	69	23,001	0.05	21	54	1,095

Sep-09	1,198	90	24,552	0.05	21	57	1,169
Oct-09	1,481	27	55,440	0.03	21	71	2,640
Nov-09	1,430	21	56,900	0.03	21	68	2,710
Dec-09	1,454	29	66,916	0.02	22	66	3,042
Jan-10	1,254	18	56,862	0.02	20	63	2,843
Feb-10	1,458	22	65,010	0.02	20	73	3,251
Mar-10	1,694	26	77,058	0.02	23	74	3,350
Apr-10	1,435	23	69,634	0.02	30	48	2,321

(Source: CBK Monthly Economic Review, April 2010)

Table 2: Monthly flow of transactions in both volumes and value for the period January 2006 to Dec 2007

Month	Total value of KEPSS transactions (bn)	Settlement proportions			
		Direct (bn)	%	Indirect (NSI (bn))	%
Jan-06	625.0	573.0	91.7	52.0	8.3
Feb-06	620.0	582.0	93.8	39.0	6.2
Mar-06	743.0	690.0	92.8	53.0	7.2
Apr-06	633.0	575.0	90.9	58.0	9.1
May-06	1,115.0	1,041.0	93.3	74.0	6.7
Jun-06	839.0	784.0	93.5	55.0	6.5
Jul-06	820.0	769.0	93.7	51.0	6.3
Aug-06	576.0	523.0	90.8	53.0	9.2
Sep-06	571.0	515.0	90.0	57.0	10.0
Oct-06	606.0	541.0	89.2	66.0	10.8
Nov-06	716.0	657.0	91.9	58.0	8.1
Dec-06	699.0	640.0	91.6	59.0	8.4
Jan-07	604.0	550.0	91.1	54.0	8.9
Feb-07	621.0	567.0	91.3	54.0	8.7
Mar-07	668.0	614.0	92.0	54.0	8.0
Apr-07	673.0	611.0	90.8	62.0	9.2
May-07	693.0	634.0	91.5	59.0	8.5
Jun-07	682.0	622.0	91.1	61.0	8.9
Jul-07	844.0	785.0	93.0	59.0	7.0
Aug-07	928.0	860.0	92.7	68.0	7.3
Sep-07	851.0	778.0	91.4	73.0	8.6
Oct-07	930.0	868.0	93.3	62.0	6.7
Nov-07	1,161.0	1,087.0	93.6	74.0	6.4
Dec-07	945.0	897.0	94.9	48.0	5.1

(Source: CBK Monthly Economic Review, Dec 2007)