

**UNIVERSITY OF NAIROBI
SCHOOL OF BUSINESS**

ORSEA 2011 PROCEEDINGS

**THE 7TH OPERATIONS RESEARCH OF EASTERN AFRICA CONFERENCE,
13TH AND 14TH OCTOBER 2011
K.I.C.C, NAIROBI, KENYA,**

THEME

**THE ROLE OF OPERATIONS RESEARCH
IN THE NATIONAL VISIONS WITHIN THE
EAST AFRICAN COMMUNITY AND REGIONAL
INTEGRATION.**

ICT INNOVATIONS AND APPLICATIONS

**CRITICAL LITERATURE REVIEW ON MOBILE BANKING REGULATORY
OVERLAP AND GAP IN KENYA**

**Research Paper Submitted To The Operation Research Society Of Eastern Africa
(ORSEA) Conference**

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ABSTRACT

The field of m-payments and m-banking is not only new and fast evolving but also sits at the overlap of several regulatory domains—those of banking, telecommunication and payment system supervisors, and anti-money laundering agencies. The overlap substantially raises the risk of coordination failure, where legislation or regulatory approaches are inconsistent or contradictory. In such environments, it is likely that m-banking may simply be an added channel for already banked customers.

A comprehensive vision for market development between policy makers, regulators and industry players can help to define obstacles and calibrate proportionate responses to risk at appropriate times.

1.0 INTRODUCTION

1.1 Background

Mobile banking offers the prospect of increasing efficiency of the payments system; and potentially, expanding access to financial services. However, these objectives may be in tension with existing approaches which target other objectives, such as financial integrity or consumer protection. While market enablement is often understood as the process of simply identifying and removing regulatory and legal barriers to growth, in fact, it requires the managing these complex trade-offs over time (Cray 2005).

In any new market, enablement requires a blend of legal & regulatory *openness*, which creates the opportunity to startup and experiment, with sufficient legal & regulatory *certainty* that there will not be arbitrary or negative changes to the regulatory framework, so that providers have the confidence to invest the resources necessary. Countries with low levels of effective regulation may be very open but highly uncertain, since regulatory discretion may lead to arbitrary action. Conversely, countries with greater certainty may be less open, in that the types of entity and approach allowed to start up are restricted. Especially in a new market sector like mobile banking, where business models are not yet stabilized, enablement in the policy and regulatory sector means a move towards greater certainty and greater openness (Allen 2003).

The dynamic nature of Payment systems in Kenya has seen an increase in non-bank participants in payment systems to the extent that the risks associated with their operations requires a sound legal basis to provide for formal oversight and regulations in order to boost confidence among end users of payment systems. Attaining such an enabling legal and regulatory framework (that would not stifle innovation or competition while providing channels for non-bank participants to engage with the Bank and other stakeholders in a fair and transparent way) is a milestone to be realized. The current regulatory regime not only focuses on banking institutions but also carries insolvency provisions that may undermine finality and irrevocability of settlement. Finality and irrevocability of settlement are attributes of a modern payment, clearing and settlement system.

The payment needs of the un-banked community is a goal national payment system seeks to fulfil through sound programmes to increase the accessibility of the payment system by, inter alia, providing for new types of participants and products, while maintaining the safety and efficiency of the payment systems by adhering to sound internationally accepted payment system risk principles (Kenya ministry of finance, draft medium term plan, 2008).

The increasing adoption of technological advancement in National Payment System (NPS) has seen the collapse of national boundaries and the emergence of efficient cross-border payment systems in Kenya with attendant legal regulatory questions. This phenomenon however promotes regional financial stability and regional economic development. Oversight over these payment systems as tool for risk management necessitates the development of oversight standards and common regional approach to payment systems oversight.

1.2 Conceptual Perspective

According to Porteous (2006), an enabling environment is a set of conditions which promote a sustainable trajectory of market development in such a way as to promote socially desirable outcomes. These conditions are forged by larger macro-political and economic forces, as well as sector specific policy and laws.

Mobile banking (m-banking) is a subset of e-banking in which customers access a range of banking products, such variety of savings and credit instruments, via electronic channels. M-banking requires the customer to hold a deposit account to and from which payments or transfers may be made.

An enabling environment is one which is sufficiently open and sufficiently certain; but in reality, there may well be trade-offs between these two dimensions. It is often the case for new markets that one or other dimension is neglected: for example, countries with few laws or regulations and with limited regulatory capacity may be very open to new developments, but, if there is a high level of uncertainty, for example, as result of the possibility of arbitrary action in vague areas of the law, there still may be little market development.

M-banking sits at the intersection of a number of important policy issues. Each issue is complex in its own right, and is often associated with a different regulatory domain: as many as five regulators (bank supervisor, payment regulator, telco regulator, competition regulator, anti-money laundering authority) may be involved in crafting policy and regulations which affect this sector.

The complex overlap of issues creates the very real risk of coordination failure across regulators. This failure may be one of the biggest impediments to the growth of m-banking, at least of the transformational sort. However, even without the additional complexity introduced by m-banking, many of these issues require coordinated attention anyway in order to expand access. It is possible, however, that m-banking may be useful because the prospect of leapfrogging may help to galvanize the energy required among policy makers for the necessary coordination to happen.

1.3 Problem Statement

Despite the appreciation of fast nature of m-banking, the regulatory regime have not kept phase with growth of mobile banking. The field of m-payments and m-banking is not only new and fast evolving but also sits at the overlap of several regulatory domains—those of banking, telecommunications and payment system supervisors, and anti-money laundering agencies. The overlap substantially raises the risk of coordination failure, where legislation or regulatory approaches are inconsistent or contradictory. In such environments, it is likely that m-banking may simply be an added channel for already banked customers. A comprehensive vision for market

development between policy makers, regulators and industry players can help to define obstacles and calibrate proportionate responses to risk at appropriate times.

Thus this study seeks to answer three main pertinent questions:

- 1) What are the regulatory overlap and gap of mobile banking?
- 2) What are the risk associated with mobile banking overlap and gap?
- 3) What measures are required to address mobile banking regulatory overlap and gaps?
- 4) What measures are required to manage the risk associated with mobile banking overlap and gaps?

1.4 Significance of the Study

This study will be useful to the following parties;

The policy makers

The findings would be important in the issue of prudential guideline on mobile banking that can be used in policy formulation. Central Bank of Kenya could employ the findings of this study in formulating guidelines that will enhance mobile banking in the banking sector, while protecting those who rely on deposit withdrawals and bank credit.

Academic researchers

The findings will add to the existing body of knowledge in area of business finance and banking.

Commercial Banks

The study will enrich the field of the study in mobile banking especially bring out the factors that influence the services accessibility of commercial banks. The bank will get to know of the factors that influence their coverage and liquidity.

Development Agencies

The public value that mobile money creates in terms of financial inclusion and all its attendant benefits, opens up the space for development agencies.

1.5 Organization of the Paper

The paper is structured as follows: In chapter one the paper looks at the background and the conceptual perspectives of the enabling environment for mobile banking. The chapter two looks at general and theoretical literature reviews and enabling environment for mobile banking. Chapter three discusses the empirical literature

review on forms of enabling environment for mobile banking is required and the impacts of enabling environment for mobile banking. and finally chapter four gives the summary and conclusions of the findings.

2.0 GENERAL AND THEORETICAL LITERATURE REVIEW

2.1 Origins and Knowledge Developments on the enabling environment for mobile banking

Mobile Commerce is any transaction, involving the transfer of ownership or rights to use goods and services, which is initiated and/or completed by using mobile access to computer-mediated networks with the help of an electronic device.

Mobile commerce was born in 1997 when the first two mobile phone enabled Coca Cola vending machines were installed in the Helsinki area in Finland. They used SMS text messages to send the payment to the vending machines. In 1997 also the first mobile phone based banking service was launched by Merita bank of Finland also using SMS.

In 1998, the first digital content sales were made possible as downloads to mobile phones when the first commercial downloadable ringing tones were launched in Finland by Radionlinja (now part of Elisa)

In 1999, two major national commercial platforms for m-commerce were launched with the introduction of a national m-payments system by Smart as Smart Money in the Philippines and the launch of the first mobile internet platform by NTT DoCoMo in Japan, called i-Mode. i-Mode was revolutionary also in offering a revenue-sharing deal where NTT DoCoMo only kept 9% of the content payment and returned 91% to the content owner.

Mobile commerce related services spread rapidly in early 2000 from Norway launching mobile parking, Austria offering mobile tickets to trains, and Japan offering mobile purchases of airline tickets.

The first conference dedicated to mobile commerce was held in London in July 2001 and the first book to cover m-commerce was Tomi Ahonen's M-profits in 2002. The first university short course to discuss m-commerce was held at the University of Oxford in 2003 with Tomi Ahonen and Steve Jones lecturing.

2.2 Theories/Models on enabling environment for mobile banking

2.2.1 Systemic Risk

The term *Systemic Risk* belongs to the standard rhetoric of economic policy discussions related to the banking industry. Besides the goal of protecting small depositors, control of systemic risk is given as one of the main arguments for banking regulation. Various recent financial crises have increasingly focused the regulatory debate on issues of systemic risk and financial stability. There is, however, no generally accepted definition of

systemic risk and the effectiveness and the economic consequences of various instruments of banking regulation that are intended to attenuate it are still only partially understood both theoretically and empirically.

2.2.2 The Economic-libertarian perspective - (sometimes known also as the private interest perspective).

This perspective tends to see the market as the best mechanism for maximizing social and economic welfare, to treat with suspect the motives politicians and bureaucrats and to be skeptical as to their capabilities even in those cases that politicians and bureaucrats really are pursuing the public interest. The preferences for markets (even imperfect one) are accompanied by a strong argument that regulation is unnecessary and/or useless in most cases. Such economists as George Stigler have offered a theory to explain why, as a rule, "regulation is acquired by the industry and is designed and operated primarily for its benefit" (Stigler, 1971). All firms seek to maximize profits, and profits can be increased if competition is reduced or governmental subsidies are obtained. Though firms will not refuse subsidies if they are offered, subsidies have the disadvantage of increasing profitability without necessarily restricting entry into the industry. The prospect of these benefits will encourage new companies to form, increase competition, and thus reduce each firms share of the subsidies.

2.2.3 The Normative-positive perspective

This perspective tends to see regulation as an outcome of sustained political effort to overcome market failures. The normative theory of market-failure predicts that regulation will be instituted to improve economic efficiency and protect social values by correction market imperfections. Six types of market-failures are explained here: Natural monopoly, Externalities, Public Goods, Asymmetric information, Moral hazard, Transaction costs. Anyone of these six failures legitimates regulation.

2.2.4 The Radical/Marxist anti-capitalist perspective

This perspective tends to see regulation as one of the systems of control that attest to the defects of markets (as capitalism invention) and capitalist governments (which are highly depends on capitalists). To understand Marxists perceptions of regulation, one should study their perceptions of the State. In principle three views of the state can be found in the works of Marx and Engels. Regulation, according to the *instrumentalist model* serves the interest of capitalist (paradoxically here Marxist are following the same logic of ultra-right or right wing thinkers). The *arbiter model* is temporary one and holds best in crisis situation and therefore less useful for understanding regulation. It is only through the *functionalist approach* that the Marxist can conceptualize regulation as a common rather than private activity. It is only here that state policy follows the impersonal logic which drives government in a capitalist society to develop the economic base and coercively maintain social stability (Macmillan, 1987).

2.2.5 Pragmatic-administrative perspective

This perspective tends to see both markets and governments as the best of all possible options. Instead of dealing with the normative and philosophical questions that are involved in regulation, the proponents of this

perspective are concentrating on the study of the empirical, day-to-day problems of regulation as a system of governance.

One example of this approach may be demonstrated by Marver Bernstein's analysis of the Life Cycle of Regulatory Commissions. I'll use [Barry Mitnick's discussion](#) in order to present this approach.

Marver H. Bernstein ([1955](#)) has argued that although there are "unique elements" in the experience of each agency, "the history of commissions reveals a general pattern of evolution more or less characteristic of all" with "roughly similar periods of growth, maturity, and decline". The length of periods may vary across commissions, and periods may sometimes be skipped, but there is yet a "rhythm of regulation" that suggests a "natural life style" ([Bernstein 1955:74](#)). Of note is Bernstein's argument that the cycle can repeat in the same agency. Four periods are identified: gestation, youth, maturity, and old age.

2.3 Emergent Knowledge and Theoretical Perspectives

Since m-banking has progressed furthest among developing countries in the Philippines, how has the regulatory regime there evolved? Much is not yet known about the overall approach there, but Lyman et al (2006) provide useful insights.

Clearly, there was sufficient openness to enable the two major mobile operators to start their m-banking and m-payment models, in 2000 and 2004 respectively. Specifically, there was no e-money regulation which prohibited Globe from issuing G-Cash. However, there has apparently been close cooperation between the two major providers and the financial regulators to address their key concerns, such as anti-money laundering. The bilateral agreement between each telco and the Central Bank to limit the maximum size of wallet and transaction has clearly helped: not only to limit the risk of money laundering to acceptable levels, but also to reduce possible systemic risks. It is likely that the large size of the mobile operators, with the associated high brand visibility and high solvency, also allayed fears that customers would not be adequately protected or that account balances were at more risk in Globe than in a much smaller bank.

However, because of the significance of the Philippino models, closer examination of how the regulatory approach has evolved, and its options for future evolution would be well worthwhile to guide other developing countries.

In the domain of telecommunication regulation, there are precedents for achieving transformational enablement. For example, in the OECD paper on "Regulatory reform as a tool for bridging the digital divide" shows how the timing of various enabling actions by the Indian telecommunication regulator has led to a sharp fall in the effective mobile tariff since 1999, and a related large increase in Indian cellular subscribers since 2001. This presents a picture of what may be achieved through a suitable enabling environment.

As Kumar et al (2006) show, Brazil provides a leading example of the possible effect of suitable enabling regulations. India has recently followed suit with the publication in January 2006 of guidance which permits the

creation of agency relationships for small deposits, as part of an explicit move to increase access to financial services. Note, however, that the passage of regulations may be necessary but not sufficient for growth in this area: Kumar et al point out that other regulations, for example, setting high standards of branch security and even labor laws, helped to make expansion through non-branch agencies more attractive than otherwise to Brazilian banks.

3.0 EMPIRICAL LITERATURE REVIEW

3.1 Studies on forms of enabling environment for mobile banking

- Porteous (2006) in his paper, “enabling environment for mobile banking” collected information on existing and intended legislation and regulations which impinge on mobile banking in Kenya and South Africa. The study found that both countries are at an early, pioneering stage of market development, with several models although none yet with critical mass. But in general, South Africa has a well developed legislative and regulatory environment, which creates relatively high certainty. Areas such as e-commerce, Ant Money Laundering / Combating the Financing of Terrorism(AML/CFT) and even consumer protection are fully covered.
- In Kenya, by contrast, much important legislation in areas like e-commerce, AML/CFT and payment systems is still at the draft or bill stage. The state of legislative and regulatory uncertainty is therefore relatively higher than South Africa, although uncertainty is reduced somewhat by the fact that there is at least draft legislation and accepted policies in areas such as the national payment system. The lack of specific legislation in various areas has left the Kenyan environment relatively more open. Kenya now has the opportunity to coordinate and integrate its approach to the m-banking sector within and across all the planned new laws before they are passed, thereby avoiding the confusion of any conflict or ambiguity.

In both countries, high level strategy and policy documents have been developed and released for the development of the National Payment Systems(NPS).

3.2 Studies on impacts of enabling environment for mobile banking

- Many financial regulators in developed countries have formed specialist internal groups to monitor developments, such as the Payment Studies Resource Centre at the Chicago Federal Reserve Bank or the Emerging Payments Research Group at the Boston Federal Reserve Bank. These groups host regular conferences which gather industry players with regulators and analysts to discuss latest trends.
- The EU has adopted the approach that introducing legislation early can and should enable markets to develop, whereas the US has avoided passing federal legislation in favor of an incremental state-based approach which has evolved over time. However, the uncertainty over possible future regulation may have been an impediment to innovation.

- While the passage of e-money legislation in Europe did bring certainty, the recent review of the directive found that it did not fully enable innovation, and has not led to take-off of issuance or usage. In part, this was because legislation passed six years ago could not fully anticipate some of the developments which have enabled new e-money forms today. The case of European e-money issuance is not an argument against introducing or delaying legislation *per se*, however: rather, it is an argument in favour of carefully assessing the need for certainty with the need for openness; and judging carefully both the scope of any legislation and the timing of its introduction (Allen 2003).

3.4 Current Empirical Research Focus

The four direct providers who participated in Porteous (2006) study, completed a questionnaire which asked them to identify barriers to the development of their business models. Three IT providers who provide m-banking systems to providers in Africa were also polled.

The study found that biggest barriers reported by these providers are not primarily regulatory or legislative. Rather they were customer adoption issues typical for a new product or service, such as:

- How to educate customers in the use of the mobile phone for transactions;
- How to build trust in and awareness of a new financial brand.

These are little different from the general obstacles to m-commerce becoming pervasive ('u-commerce' or ubiquitous commerce) identified by Schapp and Cornelius (2002):

- Security (which generates user trust, essential in financial mechanisms)
- Simplicity (or user friendliness).

They also include the need for common standards, which allow interoperability, and therefore greater utility to clients and greater scale.

These barriers are also similar to those reported by respondents (mainly in developed countries) to the 2006 Mobile Payments study undertaken by consultancy Edgar Dunn: merchant adoption, customer adoption, agreement on common mobile platforms and security and fraud issues tied as the most commonly reported barriers.

4.0 ANTICIPATED OUTCOMES / FINDINGS

- There should be sufficient legal certainty around the status of electronic contracting. This principle can be fully effected only through the passage of suitable legislation which provides the necessary clarity. In Africa, Egypt is the only country other than South Africa to have drafted electronic signature legislation, while Kenya has not.
- Customers should be adequately protected against fraud and abuse. Early self-regulation may help to promote customer trust in m-banking. The principles may over time be amended to allow for market evolution and eventually, become codified. While voluntary codes of practice may be sufficient in the early stages of market development, they will not be sufficient to discipline or stop reckless operators who do not subscribe. Less reputable providers may enter an industry which has benefited from

establishing an early trusted reputation and undermine it. Therefore, at some stage, probably during or after the breakout phase when new providers are attracted to the market, legislation or regulations will be necessary which compels adherence to a common standard.

- Customers should at least be able to make deposits and withdraw cash through agents and remote points outside of bank branches
Where banks are prohibited from appointing agent for deposit taking, this prohibition should be revoked in favor of an enabling framework which regulates the bank-agent relationship appropriately. Where there is no prohibition, banks could proceed to experiment with such relationships on a commercial basis. However, they may be reluctant to do so without clarity from the regulators. In addition, if agency relationships become as pervasive as in Brazil, regulators may require powers of greater oversight of agents than existing law gives to them. Therefore, in either case, it is recommended that specific regulations or guidance be promulgated to address the creation of bank agency relationships for withdrawals and deposit at least.
- If m-banking is to realize the potential of massively extending access to safe, convenient and affordable financial services to those who today lack it, then enablement is likely to be required. In its absence, m-banking may simply amount to adding another convenient channel for already banked customers. The consequence will be a market trajectory with much lower ultimate levels of usage and access.
- The regulatory and policy environment for m-banking is complex and often ill-defined since it cuts across various regulatory domains. In some countries, the policy regime may not be sufficiently open to allow a range of models to startup and develop; and in others, sufficiently certain to encourage the investment necessary. Of the two countries reviewed, in which m-banking is still in the early or pioneer stage, South Africa falls more into certain but less open and Kenya more open but less certain.
- Enablement is not only about clearing regulatory space for the entry of new m-banking models. To be sure, low income countries with limited financial legislation and regulatory capacity may not need much space to be cleared—entry may be easy there and a successful model, likely telco driven, may well emerge; but uncertainty will affect the development of the market, not least by limiting competition over time. This will affect the pattern of future development. Rather, enablement is about managing the delicate balance between sufficient openness and sufficient certainty, not least in the mind of customers who must entrust money to the entity involved, whether bank, telco or other. Applied at the early stages of market development, enablement means creating conditions favourable to the emergence of sufficient appropriate models to be tried and to the successful ones being scaled up. Applied at later stages, enablement means continuing to ensure openness, while increasing certainty for stable growth.

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M-PESA UTILITY, OPERATION AND ENTREPRENEURIAL INNOVATIONS BY SMALL ENTERPRISES IN KENYA

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Abstract

The introduction of the M-pesa in Kenya has been recognized as a key strategy for economic development and poverty reduction particularly in developing countries. Since their independence, most economies have been promoting the development of small enterprises as a means for economic growth. More recently, due to the increase of unemployment and poverty, there has been a renewed focus on the promotion of small businesses not merely as an engine for growth, but more importantly as the key to job creation and poverty reduction. M-pesa services and innovative transfer has transformed the push and pull technology greatly enhancing business development in Kenya. Small enterprises have high failure rates which are enormous for most economies with limited capital and other resources. The combined failure rates for businesses and barriers increases unemployment rates and perpetuate poverty. In the light of the above, it seems necessary to call for a special issue to address the problem surrounding small business development with the hope of encouraging more innovativeness on M-pesa service by small entrepreneurs. This research study was therefore motivated to determine whether the speed of service delivery, cost effectiveness, efficiency affect the demand for innovations of the services of the small enterprises and how innovations on speed of service delivery, cost effectiveness and efficiency affect the performance of the small enterprises.

A survey was conducted randomly within Nairobi town and the residential places in the other eight parts of Kenya. A questionnaire was provided to the selected samples of the micro enterprises in the selected places. In the survey a total of 409 respondents completed the questionnaires out of the 2000 distributed originally. The total number of those who returned well answered questionnaires and which were indeed used in this study was 381.

This study found that there exist a positive correlation between M-peas services and the level of their perceived low costs, ease of their operations, efficiency and the speed of transaction. Further it is evident most of the constructs and a major impact on the demand and the desire to use the M-peas services. This indicates that those small enterprise owners who use the m-payment services also acknowledge the existence of all the perceived variables used in this study and the positive attributes with the use of m-payment services in Kenya. However, there exist a low degree of correlation between the perceived support from the government and the actual use of the M-payment services in Kenya. The study revealed that M-payment in Kenya is rapidly penetrating within the country especially in the small enterprises and the micro business.

From the findings of this study, the government and the mobile service providers can promote the growth of the small enterprises especially those which deal with M-payment by providing means of decongesting the lines, increasing the maximum daily amount of money in the m-pesa accounts from the current amounts to facilitate more transactions by the people and providing enough security to the services and creating awareness to the public on how to keep their accounts secure and their PIN codes.

Key words: M-pesa; utility; entrepreneurial services; innovations; small enterprises

1 INTRODUCTION AND RESEARCH OBJECTIVES

Small enterprises have been known to play very crucial role in the development of economies and improvement of the entrepreneurial skills of the people. The above contribute immensely towards creation of sustainable development in the third world countries. However, these micro enterprises suffer the challenge of limited technology and poor infrastructure which leads to loss in competitive advantage in the global scene.

Small enterprises mainly employ less than 50 workers. These, have been known to be the backbone of many countries economic growth (Liedholm and Mead, 1999). Sustainable development implies the ability to meet current needs and seeking ways for the future generations to own their living also. In less developed countries sustainable development aims at eradicating poverty through the associated benefits of industrial and economic development to the less privileged in these cities.

African economies have been seeking ways of growing the small enterprise businesses through improving the skills and technology in this very seemingly vital sector. The projected growth and upgrading of the small enterprises into medium and large enterprises has not yet been achieved (Lukac, 2005). Such transition would have been so important towards the growth of many African economies.

In Kenya, small enterprises have embarked on the use of m-payments in their transactions because they are cheap and affordable to them. Many transactions are carried out by the use of mobiles such as payment of bills, sending cash, withdrawals, payment of goods and services. Today, the services have been made cheaper by the lowering of the value of calling cards to as low as twenty shillings. This has made many small enterprise owners to access the services (cck, 2008/2009). In 2007 a study by Arunga and Kahora found that sole proprietors and small enterprise businesses reaped more benefits by using the mobile payments as they could make savings or access many customers and do more services than before.

This research therefore seeks to find out the relationships that exist in the operations of the small enterprises especially the entrepreneurial services and innovations. The survey is centered on one case of these innovations by the small enterprises: M-pesa utility services in Kenya. The study seeks to establish the factors which influence the small enterprises to come up with new innovations in their operations. These factors are assumed to be related to the demand for innovations by the small enterprises.

Conceptual framework

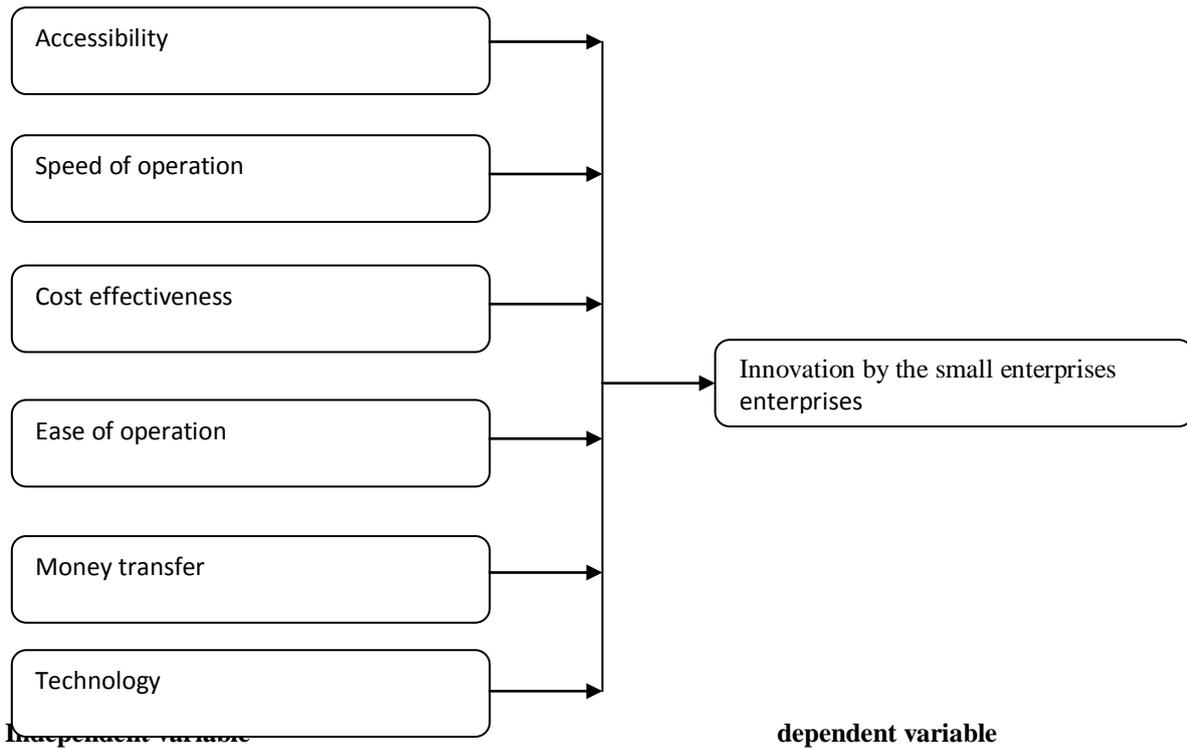


Figure 1: Hypothesized relationship between operations of small enterprises and innovativeness in entrepreneurial services of the small enterprises.

The factors above are hypothesized to influence the level of innovations in the small enterprises in Kenya. This is because they represent the general objects of most of these small enterprises which form the basis of the operations of their activities. The study will focus on how each affects the level of innovation in these small enterprises in their operations.

This study undertook an analysis on the two constructs of innovation and efficiency of the small enterprises motivated by the following objectives:

1. To determine whether speed of service delivery, cost effectiveness, efficiency affect the demand for innovations of the services of the small enterprises.
2. To establish how the innovations on speed of service delivery, cost effectiveness and efficiency affect the performance of the small enterprises.

This study therefore seeks to establish those challenges affecting the operations of the small enterprises. The paper also provides an analysis of how the need for speedy operations, cost effective, accessibility and ease of operation leads to the highly innovated ideas of the small enterprises.

2 THEORETICAL BACKGROUNDS AND INFORMING LITERATURE

According to Schmitz, (1995) the desire to remain efficient is what has been the major drive for many small enterprises in Kenya. Being efficient is brought by cluster of varied factors ranging from the emergence of suppliers, marketing agents, new service providers, specialized products, forming consortia, gathering of skilled labour and associations which are specified by services and continued lobbying.

Infrastructural developments are very crucial in developing successful links within the clustered SMEs. Planning for the infrastructure therefore starts when location choices are made and eventually spark spatial distribution of industry compared to other aspects of the society. Planning for spatial distribution will ensure that efficient utilization of the available land is achieved by balancing the competing factors in the scene of sustainable development (Roze, 2003). It is a continuing business of managing dynamics of nature by a range of factors in the context of sustainable development (Tewdwr, 2004). This network based system in planning for the infrastructure combines mechanisms of competition and the rules of behavior. This eventually takes advantage of differentiation and learning (Ombura, 1997). It concentrates on attracting infrastructural facilities for use in networking economies. Small enterprises on manufacturing sector reflect systems of high interactions between technology and the advancement in infrastructure which determines the trends in the collective and networking environment. The above underscores the importance of infrastructural planning to consider promotion and development of requisite technologies.

In addition to creation of jobs small enterprise also are known to be avenues of innovation and entrepreneurial growth. Indeed, in majority of the third world countries the micro enterprises have greatly contributed to establishment of self-employment (Lukacs, 2005). In Europe for example a study done by (Eurostat, 2008) indicated that two thirds of employment came from the small enterprises while a similar study in Pakistan in done by scholar Bashir, (2008) indicated that 80 percent of the of non-agricultural employment came from the small enterprises which contributed to nearly 40 percent of annual Gross domestic product(GDP). In the countries where majority of the people are low income earners a study done by Luckas (2005) indicated that micro enterprises account for about 60 percent of the GDP and more than 70 percent of employment opportunities. According to luckas most of these micro enterprises faced the challenge of poor production methods leading to low quality of products, low levels of production, local and narrow markets for their products among other challenges. He highlighted the lack of technological advancement as the major block towards the advancement of the small and large enterprises into medium or even large enterprises. Small enterprises in less developed countries can be divided into two main categories: a) geographically segmented enterprises which mostly concentrate on agricultural activities and are found in the rural areas and, b) clusters of small enterprises mainly found in the urban and sub urban areas (Nadvi, 1999)

In Kenya today, the manufacturing micro enterprises are mainly found in *jua kali* sheds. *Jua kali* is Swahili word which means hot sun, since small enterprises mainly operate under the sun and in the open (Nadvi, 1999; Schmitz, 1995). The advantage of these clusters is that they enjoy the efficiency and flexibility which individual producers may lack. Cluster model deals with growth processes of local firms. Hence, it is of great importance to explore how these small and medium enterprises can be transformed into medium and large enterprises in Kenya. This could be achieved better by assisting the clustered firms and not the individual ones (Schmitz, 1995)

2.1: Technological Change

Information systems brought by the small enterprises was a big booster to the dissemination of information in the market for the small enterprises in Kenya. This is because they are more efficient and thorough compared to other methods. Today, many small and medium enterprises who invest in information system and information technology focus on cost. According to Hagman and McCahon (1993) the adoption of IS by the small enterprises as having brought competitive advantage. Recently Powell and Levy did a study on the small enterprises operations' and reported that micro enterprises align their information systems in accordance to the strategies so as to realize the cost advantages and value added benefits.

Advancement in technology has also created a very big challenge to small business on adoption basis since it is sometimes costly and the small enterprises lack the know how of the technologies. According to Powell (2000), even with the improvements in technology, little has been achieved as very few were able to use the new upcoming technologies. He pointed out that some were unaware of new technologies and if they knew the technology was either unavailable or unaffordable to them or away from their local settings. This meant that foreigners still remained on the fore front in accessing technology and enjoyed the efficiency gains associated with it, creating a gap in production between local and foreign small enterprises.

2.2 Small entrepreneurial services: A case of m-pesa services

Most small enterprises have embarked on the use of mobile methods of payments this is because it is cheap for them in delivering cash to their creditors and business partners, could be used anywhere and any time (Anurang, Tyagi and Raddi, 2009). By the year 2006 there were 183 banking and mobile services of making payments in Kenya (Porteous, 2006). He even suggested that there could be more people with mobile handsets than those who had bank accounts.

Mobile payment services have made the small enterprises to make direct transactions with their customers without going to the banks and even going to their services premises (Anuradi, Tyagi and Raddi, 2009). They suggested that the services were beneficial since it only required one to possess a phone and have the basics of literacy in operating the phones. Similarly, the system did not require any physical infrastructure like the wires and was accessible to very large portions of the population (Elder and Rashid, 2009); lastly the services could be done in a speedy manner than before. The above features have made the operations of the small enterprises to be so fast to operate with ease. The mobile payment agents are well distributed in the country such that there is ready accessibility of the payment services to the small enterprises and also they are able to access their accounts any time.

2.2.1 Transaction Costs

The costs associated with the sending of money using the mobile payment services is also very low as compared to those from the commercial banks and other money transferring companies (Omwansa, 2009). This is true since the cost of a transaction has a direct influence to the consumer if it is passed to them (Mallat, 2007). Transaction costs are supposed to be low if the transactions have to remain competitive. The cost of the mobile payment services should be low than those of the banks and affordable to the micro enterprises. Recently there are many mobile handsets which are easy to operate and have the same functions as those of the banks.

2.2.2 Speed and usability

According to the findings of a study done by Pagani (2004) most people described the current technology as user friendly, he also suggested that it is the usability, usefulness, ease of service operation and speed that people considered as bringing efficiency in the use of the mobile payment services. By the end of 2009, there were more than 6.175 million known and registered m-pesa customers. The rate of registration per day stood at 11,580 (Annual report Safaricom, 2008/2009) the above figures indicate the wide use of the mobile payments in Kenya and the satisfaction.

2.2.3 Easy accessibility

Accessibility is the ability to reach people. It is one of the main benefits of the mobile payment services (Pagan (2004)). Small and the medium enterprises form the biggest number of those most benefiting from the use of the m-payment services. According to an Annual report from Safaricom (2008/2009) by march, 2009 there were 8,650 M-pesa agents through out Kenya. These services have made the micro enterprises to save more time and go to the bank less often. The saved time is spending in their businesses. Similarly, the unbanked in Kenya now can send and receive money (Omwansa, 2009). The use of the m-payment services is also attributable to the fact that most of the Kenyans are familiar with the technology of the phones and require no formal training.

2.2.4 Actual Usage of the Mobile Payment and business performance

The high rate of use of the mobile phones and the transactions of the m-pesa in Kenya points to the fact that there are more Kenyans with the m-pesa accounts than those with the bank accounts. This could be due to the low transaction costs of sending and receiving money compared to the olden means and the banks. Secondly, they are quicker than the rest of the methods. Person to person transactions had the value of Kshs. 120.61 billion for the financial year 2008/2009 and the same had risen up to Kshs. 135.38 billion by the end of march 2010 (Annual report from Safaricom, 2009/2010). According to Vaughn (2009) this was reflecting how fast and deep the services were reaching the unbanked in the society. The benefits accruing from the use of the services were so huge that those who tried to frustrate the use of the services felt the guilty of it (Omwansa, 2009).

However, the degree of influence of the mobile payment to the operation performances of the small enterprises largely depends on how conducive the environment is (Porteous, 2006). According to porteous an environment is conducive if it has a set of conditions which enhanced a trajectory of developments in the market. This is particularly on the environments where wide spread access could be rampant. M-pesa in Kenya is spread wide but requires an enabling environment to improve the welfare of its consumers. In Kenya the small enterprise are mostly clustered around the markets and the shopping centers providing the micro enterprises the ability to register and transact with the other traders or their clients more effectively and efficiently as they are widely distributed in Kenyan markets and places which receive huge gatherings.

Table 1 Trend of Mobile Payment Service M-Pesa

	2008 march	2009 march	Growth rate of the mobile payment service
Number of registered customers	2.075 million	6.175 million	198%
Number of retail outlets	2,262	8,650	282%
Number of person to person transactions	14.74 billion	120.61 billion	718%
Average registrations per day	9,965	11,580	19%

Source: Safaricom Annual Report, 2008/2009

3 RESEARCH QUESTIONS

- i. Does the speed of service delivery, cost effectiveness, efficiency affect the demand for innovations of the services of the small enterprises?
- ii. How do the innovations on speed of service delivery, cost effectiveness and efficiency affect the performance of the small enterprises?

4 RESEARCH DESIGN

A survey was conducted randomly within Nairobi town and the residential places in the other eight parts of Kenya. The reason for using the survey method was that it provides a quantitative data of the experiences, views and even attitudes of the population chosen as the sample (Creswell, 2003; Viehland and Leong, 2007). A questionnaire was provided to he selected samples of the micro enterprises in the selected places. The research questionnaires included the factors from other previous studies (Davis, 1989; Venkatesh and Balla, 2008). The respondents completed and provided the answers voluntarily. In the survey a total of 409 completed the questionnaires out of the 2000 distributed originally. The total number of those who returned well answered questionnaires and which were indeed used in this study was 381. This was after a rigorous process of checking for completeness, plausibility and integrity for the purposes of ensuring quality of the study was high and remained reflective.

In the study four independent variables were used after identifying their factors. They were subjected into a measuring scale of likert using the five-point scale. The scale had anchors from the 5 (very great extent) to 1

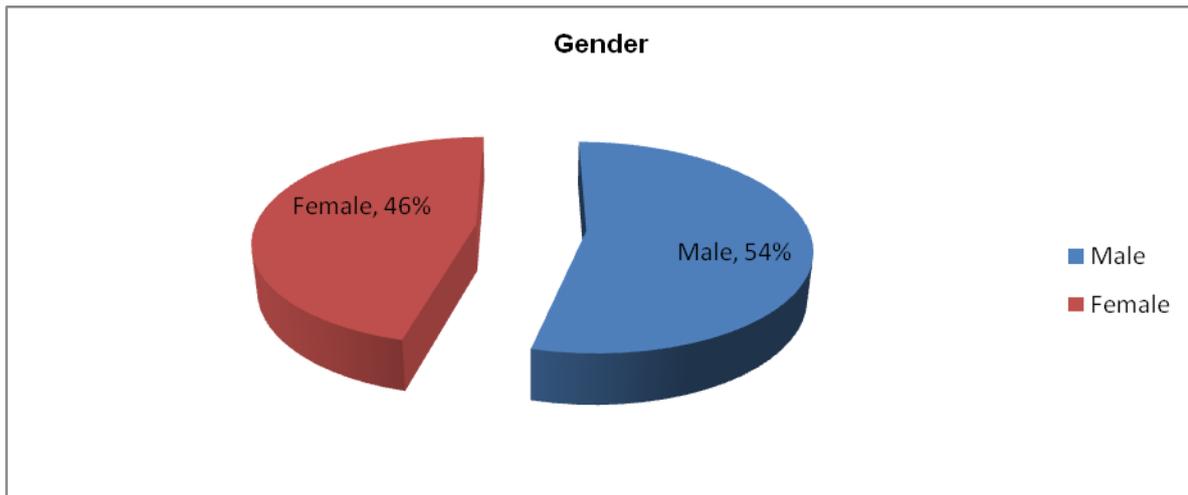
(not at all). These were low cost, accessibility, ease of operation and efficiency. The respondents' data on their demographics were collected using the single item structured questions. These were gender, years of business, age of the agents and the period of use of the mobile payment services.

5 DATA ANALYSIS

From the original number of questionnaires distributed four hundred and nine questionnaires were returned. This represented a response rate of ninety one percent. The questionnaires were thoroughly checked for plausibility and completeness leading to a remainder of three hundred and eighty one questionnaires.

Gender of the respondents

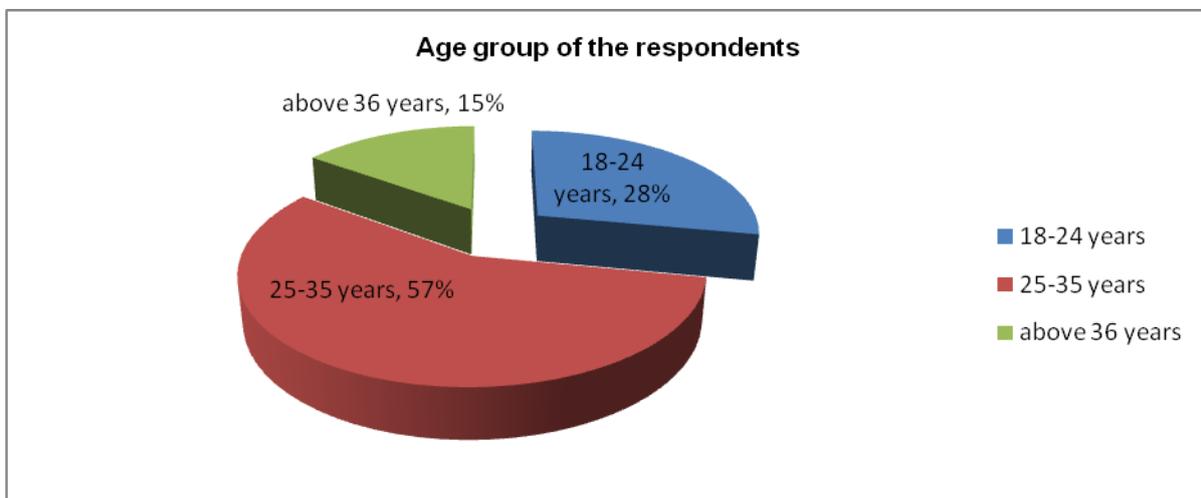
The researcher requested to know the gender of the respondents. Figure 1.0 below shows the results in a pie chart.



From the findings of the study there were more male (54%) than female (46%) respondents.

Age group of the respondents

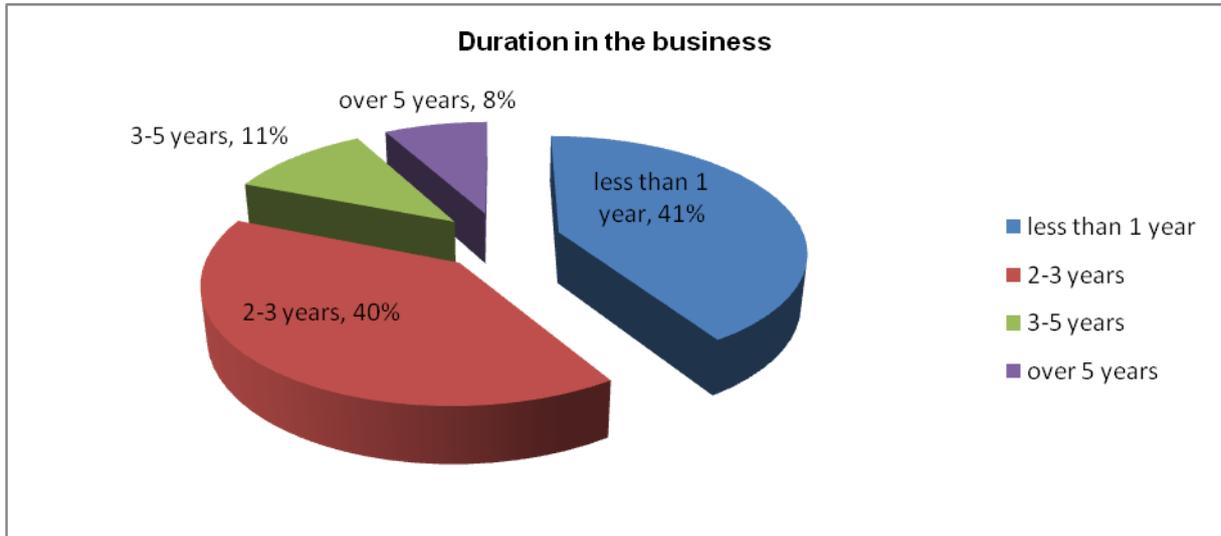
The researcher requested to know the age group of the respondents. The results are in figure 2.0 below.



From the findings of the study there were 107 aged between the ages of 18-24, 217 aged between 25-35 years and 57 respondents had the age of 36 years and above. The results shows that there were more (57%) youths (25-35 years), followed by the junior youths (18-25) with 28% percent and lastly the seniors (above 36 years) youth (15%).

Duration of the respondents in the business

The researcher requested to know the number of years the respondents had spent in the business. The results are given in figure 3.0 below.



From the findings, 41% percent of the respondents had worked in the business for less than a year, 40% percent had worked in the business for a period between (2-3 years), and 11% had worked in the business for a period ranging from (3-5 years) while 8% percent had worked in the business for more than five years. The findings indicate that majority of the respondents had been in the business for a period below three years.

The bivariate relationship of the factors

Pearson’s correlation coefficient was used to determine the bivariate correlation of the variables (factors being studied). Pearson’s correlation gives the degree to which two variables are correlated and the direction of the correlation. Table 2 below presents the findings of the Bivariate Correlation analysis. It shows the extent of correlation between the variables and also highlights the direction of the correlations. The variables showed correlations ranging from 0.25 to 0.75. These are moderate correlations. The study revealed no negative correlation of the variables.

Table 1: Factors which necessitate the use of M-pesa in Kenya

	Not at all	Low Extent	Moderate Extent	Great Extent	Very Great Extent	Mean	Std. Dev.
Ease of operation	3	9	19	13	11	3.4	1.1
Lower cost (of doing business)	1	5	23	18	8	3.5	0.9
Accessibility	3	8	22	13	9	3.4	1.1
Efficiency	2	10	19	13	11	3.4	1.1
Higher Profit	1	7	23	15	9	3.3	1.0

Table 3 shows the response on the usage of M-pesa service outcomes as a result of the benefits associated with. A five-point Likert scale was used to interpret the respondent’s extent. According to the scale those factors which were not considered at all were awarded 1 while those which were considered to a very great extent were awarded 5. Within the continuum are 2 for low extent, 3 for moderate extent and 4 for great extent. Mean and standard deviation were used to analyze the data. According to the researcher those factors with a mean close to 3.5 were rated as to a very great extent while those with a mean close to 3.0 were rated to a low extent or even not considered at all. On the same note the higher the standard deviation the higher the level of variations or dispersion among the respondents.

6 DISCUSSIONS OF THE RESULTS

From the findings in table 2 above there exist a positive correlation between M-peas services and the the level of their perceived low costs, ease of their operations, efficiency and the speed of transaction. Further it is evident most of the constructs and a major impact on the demand and the desire to use the M-peas services. This indicates that those small enterprise owners who use the m-payment services also acknowledge the existence of all the perceived variables used in this study and the positive attributes with the use of m-payment services in Kenya.

However, there exist a low degree of correlation between the perceived support from the government and the actual use of the M-payment services in Kenya at 0.170. This indicates that small enterprise users of the m-pesa business look forward to getting support from the government and the service providers. This could be informing of the decongestion of the lines or even regulation of the services by he government. The other factors however, show that the use of the m-pesa services is beneficial to them with reference to cost of transaction, ease of operation and efficiency.

From the research findings, the effect of M-pesa on lowering the cost of doing business was regarded to a very great extent with a mean of 3.5 and a standard deviation of 0.9, the effect of M-pesa and the ease of operation

was regarded with a great extent mean of 3.4 and standard deviation of 1.1, accessibility was regarded with a great extent with a mean of 3.4 and standard deviation of 1.1 .while efficiency in operations was regarded to a great extent with a mean of 3.4 and standard deviations of 1.1 for the first two aspects and 1.0 for the last two. The effect of M-pesa usage on profitability was regarded to a moderate extent with a mean of 3.3 and a standard deviation of 1.1.

The research findings especially as interpreted by the standard deviation, clearly demonstrated the correlation between the use of m-pesa in business and key strategic performance outcomes (building blocks to sustainable competitive advantage) against which sustainable competitive advantage is achieved. As such, there is a linear relationship between the invention of M-pesa services in Kenya and the performance outcomes.

7 RESEARCH LIMITATIONS

Although this study is highly useful, it suffers some notable limitations. Firstly, the study did not differentiate between the informal and the formal small businesses hence a further study is recommended on this area. Secondly, small enterprises operate in all forms of activities. This study did not differentiate the various activities and the results should be treated with caution. This provides an avenue for further research.

Thirdly, no studies in the past have considered the success and growth factor in the micro business as a result of using the mobile payment. Further research covering a wider scope of the small enterprises to refine these results is needed.

Finally, the study did not look at gender in micro-business vis-à-vis the use of mobile payments. Further study in this area remains an avenue to be explored in the future.

8 CONCLUSION AND IMPLICATIONS

The findings of this study compliments to the pool of the existing literature in various ways. The findings indicate that perceived ease of operation, efficiency in the use, cost effectiveness and speed of operations were all positively correlated. Some previous study highlighted the ease of operation as one of the major aspects that motivated the use of m-pesa services in Kenya (pousttchi, 2003). These findings reflect the associated benefits with the use of the m-pesa services in Kenya. Further most of those who returned the questionnaires were of the opinion that the services were easily accessible to most people than the banks

M-payment in Kenya is rapidly penetrating within the country especially in the small enterprises and the micro business. The findings of this study confirm the earlier hypothesis of the study that the desire to operate easily, less costly, speedily and with efficiency influences the rate of innovational adoption of the m-pesa services in Kenya. The results of the study are useful to the Kenyan small enterprises M-pesa agents in particular they provide greater support and enhance the customer's ease of operation to use the technology.

From the findings of this study, the government and the mobile service providers can promote the growth of the small enterprises especially those which deal with M-payment by:

- 1) providing means of decongesting the lines
- 2) Increasing the maximum daily amount of money in the m-pesa accounts from the current amounts to facilitate more transactions by the people.
- 3) Providing enough security to the services and creating awareness to the public on how to keep their accounts secure and their PIN codes.

These measures will go along way in motivating the mobile payment users and even enhance the growth of the small enterprises in Kenya.

The study has identified very significant factors which influence the success of the small enterprises that is M-pesa operators in Kenya. These factors which include: reduced cost of transactions, easily and widely accessible services, easiness of operations of the m-payment services and the user friendliness (efficiency in the use) come

with the use of the M-pesa services. They represent the innovations which have been useful to the small enterprises in Kenya.

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APPENDIX 1

Table 2: Pearson correlation

	paccess	pcost	pconvenience	psupport	actualusage	biu
paccess	1					
pcost	.562(**)	1				
pconvenience	.541(**)	.379(* *)	1			
psupport	.330(**)	.321(* *)	.430(**)	1		
actualusage	.265(**)	.240(* *)	.322(**)	.170(**)	1	
biu	.398(**)	.303(* *)	.657(**)	.528(**)	.208(**)	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

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**CHALLENGES OF E-BANKING ADOPTION AMONG THE COMMERCIAL
BANKS IN KENYA**

BY

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and

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**Paper submitted for presentation at the 7th ORSEA Conference to be held in Nairobi in
October 2011**

ABSTRACT

The objective of this study was to investigate the factors influencing e-banking adoption among commercial banks in Kenya, and the challenges faced by commercial banks in the adoption of E-banking. Descriptive research design was adopted for the study. The study population comprised of all the 44 commercial banks in existence at the time of study. The study was conducted by use of questionnaires which were distributed to all commercial banks in Kenya

The results showed that banks had only partially adopted e-banking as a strategy. The issue of security was found to be the most critical factor influencing e-banking adoption. Other major inhibitors were inadequate regulatory support, lack of in-house it professionals and quality of infrastructure.

Key words: e-banking, adoption,

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Introduction

A strong banking industry is important in every country and can have a significant effect in supporting economic development through efficient financial services. In Kenya the role of the banking industry needs to change to keep up with the globalization movement, both at the procedural level and at the informational level. This change will include moving from traditional distribution channel banking to electronic distribution channel banking. Given the almost complete adoption of e-banking in developed countries, the reason for the lack of such adoption in developing countries like Kenya is an important research that will be addressed by this paper.

Environmental changes create pressure for change in the organization and this means that they have to respond to relevant central change to ensure that they survive (Ansoff and Mc Donnell 1990). Technology which is a constituent of the environment has facilitated electronic commerce, which has in turn relied heavily on the presence of a stable and secure means of payment. The banking industry has taken advantage of the opportunities presented by electronic commerce. Electronic Banking is a complimentary to, and a manifestation of electronic commerce, for the simple reason that electronic commerce requires a payment system that is easily and readily processed.

As the internet becomes more important for commerce, internet websites will take on a more central role in most companies' strategic plans. The success of electronic banking is determined not only by banks or government support, but also by customers' acceptance of it. Electronic banking acceptance has gained special attention in academic studies during the past several years as banks move towards implementing electronic banking as part of their overall strategy. The business benefit of the electronic banking is to generate additional revenue, improve customer service, extend marketing, and increase cost saving.

Continuous technology development, particularly information technology revolution of the last two decades of the 20th century has forced the banks to embrace e-banking as a strategy for their sustainable growth in an expanded competitive environment. E-banking has made the financial transactions easier for the participants and has introduced wide range of financial products and services. The internet has changed the operations of many businesses, and has been becoming a powerful channel for business marketing and communication (American Banker, 2000). The banking has followed this trend in recent years, and sometimes called E-Banking referring to all banking transactions now completing through Internet applications (Fugazy 2000).

Electronic banking is defined by Barron's Dictionary (2006) as a form of banking where funds are transferred through an exchange of electronic signals between financial institutions, rather than an exchange of cash, checks, or other negotiable instruments. Electronic banking has changed the way the banking industry does business by forcing the industry to consider non-traditional channels of delivering services to customers. No doubt in the future, the banking environment will be more paperless and will overcome traditional barriers of distance and geographic boundaries.

While e-banking has grown rapidly, there is not enough evidence of its acceptance amongst customers. Robinson (2000) reported that half of the people that have tried online banking services will not become active users.

The Kenyan banking industry has been expanding branch networking amid the introduction of branchless banking system, which include the use of EFTs, ATM cards, SMS banking etc. The annual reports of CBK clearly indicate that, branch network has been slowly expanding since 2002. By the end of December 2006, Kenya had a total branch network of 575, as compared to 486 branches in the period ended December 2002.

Banks in Kenya have exponentially embraced the use of information and communication technology both in their service provision and as a strategy to ensure their survival. They have invested huge amounts of money in implementing the self and virtual banking services with the objective of improving the quality of customer service. Some of the ICT-based products and services include the introduction of SMS banking, ATMs, Anywhere banking software's, Core banking solution, Electronic clearing systems and direct debit among others.

The banking industry has also over years continued to introduce a wide range of new products, prompted by increased competition, embracing ICT and enhanced customer needs. As a marketing strategy, the new products offered in this segment of market, continue to assume local development brand names to suit the domestic environment and targeting the larger segment of local customer base. All the above clearly indicate that, Kenya's banking Industry has great developments like any other banking market in the world.

Despite its importance in the economy, e-banking remains largely unexplored, with an exception of a few studies. The objective of this study was to investigate the factors influencing e-banking adoption among commercial banks in Kenya, and the challenges faced by commercial banks in the adoption of E-banking

The definition of e-banking varies amongst researchers partially because electronic banking refers to several types of services through which a bank customer can request information and carry out most retail banking services via computer, television or mobile phone (Daniel 1999; Sathye, 1999). Burr (1996) describes e-banking as an electronic connection between the bank and customer in order to prepare, manage and control financial transactions. On the other hand, Leow, Hock Bee (1999) state that the terms PC banking, online banking, internet banking, telephone banking or mobile banking refer to a number of ways in which customer can access their banks without having to be physically present at the bank branch.

E-Banking is therefore a generic term which can be separated into two categories; electronic money products mainly in the form of stored value cards, and electronic delivery channel products. Electronic money products are issued in exchange for cash or deposit or credit. Electronic delivery channel products are arrangements for giving instructions for funds transfers, electronically.

Organizations will continue to invest in IT in the hope that it will improve their business process and increase their productivity. However, for technologies to improve productivity, they must be accepted by intended users (Venkatesh et al., 2003). Venkatesh et al., (2003) note that research in understanding user acceptance of new technology has resulted in several theoretical models with roots in information systems, psychology and sociology.

Theoretical Framework

Daniel (1999) in his study on provision of electronic banking in UK described electronic banking as the provision of banking services to customers through Internet technology.

Other authors (Daniel, 1999; Karjaluoto, 2002a) found out that banks have the choice to offer their banking services through various electronic distribution channels technologies

such as Internet technology, video banking technology, telephone banking technology, and WAP technology. The study of Karjaluoto (2002a) further found that Internet technology is the main electronic distribution channel in the banking industry.

Factors affecting customer acceptance and adoption of internet banking have been investigated in many parts of the world(Williamson, 2006, Daniel 1999). On the other hand,not much has been done on this area concerning electronic banking among commercial banks in Kenya.

Electronic banking acceptance has gained special attention in academic studies during the past five years as, for instance, banking journals have devoted special issues on the topic (e.g. Karjaluoto et al., 2002) There are two fundamental reasons underlying electronic banking development and diffusion. First, banks get notable cost savings by offering electronic banking services. It has been proved that electronic banking channel is the cheapest delivery channel for banking products once established (Sathye, 1999; Robinson, 2000). Second, banks have reduced their branch networks and downsized the number of service staff, which has paved the way to self-service channels as quite many customers felt that branch banking took too much time and effort (Karjaluoto et al., 2003). Therefore, time and cost savings and freedom from place have been found the main reasons underlying electronic banking acceptance

Several studies indicate that online bankers are the most profitable and wealthiest segment to banks (Robinson, 2000, Nyangosi, 2006). Electronic banking thus offers many benefits to banks as well as to customers. However, in global terms the majority of private bankers are still not using electronic banking channel. There exist multiple reasons for this. Foremost, customers need to have an access to the internet in order to utilize the service. Furthermore, new online users need first to learn how to use the service .Secondly, nonusers often complain that electronic banking has no social dimension, i.e. you are not served in the way you are in a face-to-face situation at branch (Mattila et al., 2003). Finally, customers have been afraid of security issues (Sathye, 1999). However, this situation is changing as the electronic banking channel has proven to be safe to use and no misuse has been reported by the media in Finland.

Many factors influence the adoption of electronic banking and it is important to take these factors into account when studying consumer attitudes towards electronic banking. These include:

- i.** Effect of perceived ease of use on intention to adopt and use E-Banking. Consumers will seek out those financial products and suppliers which offer the best value for money and they are educated about it. Hence, for adoption of electronic banking, it is necessary that the banks offering this service make the consumers aware about the availability of such a product and explain how it adds value relative to other products of its own or that of the competitors. An important characteristic for any adoption of innovative service or product is creating awareness among the consumers about the service/product (Sathye, 1999)
- ii.** Awareness Of services and its benefits. The amount of information a customer has about electronic banking and its benefits may have a critical effect on its adoption. Moreover, Sathye (1999) notes that low awareness of Internet Banking is a critical factor in causing customers not to adopt internet banking
- iii.** Perceived risk. Perceptions of risk are a powerful explanatory factor in consumer behavior as individuals appear to be more motivated to avoid mistakes than to maximize purchasing benefits .The construct Perceived Risk reflects an individual's subjective belief about the possible negative consequences of some type of planned action or behavior due to inherent uncertainty.

- iv. **Quality of Infrastructure.** Quality of the internet connection is seen to be an essential component of any internet-based application. Sathye (1999) used internet access as one of the factors affecting the adoption of Internet Banking. Without a proper internet connection the use of electronic banking is not possible.
- v. **Trust.** Customer attitudes towards electronic banking are driven by trust, which plays an important role in increasing usability within the electronic banking environment. The issue of trust is more important in online as opposed to offline banking because transactions of this nature contain sensitive information and parties involved in the financial transactions are concerned about access to critical files and information transferred via the internet.
- vi. **Demographic Characteristics.** Many studies have investigated the effects of customers' demographic characteristics such as age gender, income and educational level on their attitude towards different banking technologies and individual acceptance of new technology. Literature shows that there is a strong relationship between age and the acceptance of new technologies. Older customers tend to have negative attitude towards technology and innovations. On the other hand, younger adults are seen to be more interested in using new technologies, like the internet to conduct activities such as looking for new products and product information to compare and evaluate their options.

Another demographic factor of interest is income. Income has been shown to potentially exert a strong effect on the adoption and diffusion of technology. Older individuals between 26 and 45 are over-represented in categories of higher income, higher occupational positions, and higher educational qualifications (Venkatesh and Morris, 2000). studies have found that there is a difference between the males and females in using various types of technology (Burke, 2002; Li et al., 1999). Venkatesh and Morris (2000) investigated gender differences in the context of individual adoption and sustained usage of technology in the workplace, and found gender an important determinant of short-term usage, and can be used to predict sustained usage behavior in individual adoption and continued usage of technology in work places.

Education also plays a significant role with regards to attitude toward technology use. Higher educated customers such as university graduates are more comfortable in using technology, like the internet or internet banking. A reason for this is that education is often positively correlated with an individual's level of Internet literacy (Burke, 2002).

Research methodology

This study adopted a descriptive survey design which. The study was cross-sectional in nature in that the respondents were only interviewed once. The study population comprised of the 44 commercial banks in Kenya in existence at the time of study. Since the population was relatively small and manageable, it was a census study hence no sampling was done. Information was sought from the managers of the various commercial banks in Kenya. Managers responsible for electronic banking per bank were selected for the data collection.

Data was analyzed using SPSS and presented using frequency tables and charts. The data analysis involved the initial steps of coding, editing and tabulation as a basis for further analysis. The data was then analyzed by use of descriptive statistics such as mean, variance and standard deviation.

DATA ANALYSIS AND PRESENTATION

A total of 300 questionnaires were distributed to the individuals working in the 44 commercial banks identified. Of these 161 questionnaires were successfully completed and returned by respondents from 27 commercial banks, giving a response rate of 54%. The respondents were asked to indicate the number of years their bank had been operation. The results are shown in table 1.

Table 1: Years of Operation

No Of Years In Operation	Frequency	Percentage	cumulative percentage
0- 10	15	56%	56%
11-20	9	33%	89%
Above 20	3	11%	100%
Totals	27	100%	

The results in table 1 show that 56.0% of the banks had been in operation for less than 10 years, while only 10% have been in operation for 20 years and above. This indicates that majority of the banks have not operated more a decade and their macroeconomic experience in the financial sector is in cycles of three years.

The respondents were asked to indicate the e-banking services that their banks offered. The available e-banking services offered by the various commercial banks are listed in table 2

Table 2: E-Banking Services Offered

E-Banking Services Offered	Frequency	Percentage
SMS Banking/ Mobile Banking	21	78%
Internet Banking	13	48%
Electronic Funds transfer	27	100%

The study found that all the banks utilized EFT as one of the e-banking services to its customers. SMS banking was adopted by 78% while internet banking was being adopted by 48% of the banks.

Respondents were asked to estimate, the proportion utility of e-banking services by their customers as presented in Table 3

Table 3: Customer E-Service Utility

Customer E-Service Utility	Frequency	Percentage	cumulative percentage
Less than 20%	4	15%	15%
21%- 40%	13	48%	63%
41%- 60%	7	27%	90%
61%-80%	2	7%	97%
Over 80%	1	3%	100%
Totals	27	100%	

As indicated in table 3, 48% of the respondents indicated an e-banking customer utility level of 21% to 40%, while 27% of the respondents indicated an e-banking customer utility level of 41% to 60%. Only 10 % of the

respondents indicated an e-banking customer utility level of more than 60%. This means that customer utility levels of e-banking services is just moderate.

Factors affecting the adoption of E-banking by commercial banks in Kenya

The respondents were asked to rate, on a five-point scale, the extent to which they agreed or disagreed with statements describing why e-banking was not being adopted by their clients. The points ranged from 1 for strongly disagree to 5 for strongly agree. The results are given in Table 4

Table 4: Factors affecting the adoption of E-banking by commercial banks in Kenya

	Statement	Theme	Mean	Std Deviation
1	Security positively influences the perceived ease of use of electronic banking.	Security	4.7431	0.25437
2	Quality of electronic connection and infrastructure has a positive impact on customer’s perceived ease of use.	Quality of ICT	4.6634	0.27986
3	Awareness of electronic banking services and its benefits has a positive impact on customer’s perceived usefulness.	Awareness programs	4.5673	0.25497
4	Electronic banking adoption has been slow since its introduction in the bank.	Slow Adoption	4.5437	0.22239
5	Customer’s attitude towards using electronic banking has a significant impact on his/her intention to use it.	Customer intention drivers	4.1875	0.26987
6	Customer’s perceived usefulness has a positive impact on his/her attitudes towards using electronic banking.	Customer attitude	4.1413	0.42333
7	Customer’s perceived ease of use has a positive impact on his/her attitude towards using electronic banking.	Ease of usage by customer	4.1191	0.25569
8	Customer’s perceived ease of use has a significant impact on his/her perceived usefulness of electronic banking.	Usefulness of e-service to customer	4.1095	0.25415
9	Customer’s trust has a positive impact on his/her attitude towards using electronic banking.	Customer Trust	4.0924	0.26392
10	Age has a significant impact on customer’s attitude towards electronic banking. Young customers are more likely to adopt electronic banking.	Age of customer	4.0923	0.47821

11	Income has a significant impact on customer's attitude towards using electronic banking.	Income levels	4.0404	0.48291
12	Education has a positive impact on customer's attitude towards using electronic banking	Level of education	4.0238	0.28349
13	Gender has a significant impact on customer's attitude towards electronic banking. Males are more likely to adopt electronic banking.	Gender	4.0024	0.27396

The mean value of security was (4.7431) and a standard deviation of (0.25437). This indicates that the ICT security is the highest factor affecting the adoption of E-banking by commercial banks in Kenya. Conversely, gender is the lowest factor in consideration with mean of (4.0024). Quality of ICT (4.6634), Awareness programs (4.5673) and slow adoption (4.5437) has high means that show a higher significant influence of the adoption of E-banking in Kenya by commercial banks. Customer driven factors such as customer intention drivers, customer attitude, ease of usage by customer, usefulness of e- service to customer and customer trust respectively in the analysis were also rated highly. Age of customer, income levels and level of education had lower means signifying lesser impact. Income levels, age and customer's perceived usefulness had a significant standard deviation of 0.48291, 0.47821 and 0.42333 respectively indicating that the banks did not consider it as a determining factor in e-banking adoption. The standard deviation for slow e-banking adoption was the lowest indicating that the respondents agreed that e-banking adoption has been slow.

Challenges faced by banks in employing electronic banking as a strategy

The respondents were asked to rate, on a five-point scale, the extent to which they agreed or disagreed with statements describing the challenges faced in implementing ICT related service in the banking main stream, with respect to ICT industry readiness, inadequate regulatory support, Quality of ICT infrastructure and lack of in-house IT professionals. The ratings ranged from 1 (strongly disagree) to 5 (strongly agree). Responses to various statements were collapsed and a composite index (mean score) computed for each function. The results are presented in Tables 5.

Table 5: The challenges faced by banks in employing electronic banking as a strategy

<i>Theme Statement</i>	<i>Mean</i>	<i>Std Deviation</i>
Inadequate regulatory support	4.13	0.80
Lack of in-house IT professional	3.99	0.96
Quality of ICT infrastructure	3.59	0.78

ICT industry Readiness	3.23	0.78
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The results in Table 5 indicate that inadequate regulatory support was rated highest on average with a mean of 4.13 with responses deviating from this mean by a standard margin of 0.80. This is followed closely by lack of in-house IT professional with the mean of 3.99, with standard deviation (STD DEV) of 0.96, Quality of ICT infrastructure (mean = 3.59, STD DEV = 0.78) and ICT industry Readiness (mean = 3.23, STD DEV = 0.78) in that order.

These findings indicate that inadequate regulatory support and lack of in-house IT professional are the greatest challenges facing commercial banks towards the provision of e-banking services. ICT industry readiness was lowest on the scale of effect, although it was still well above the average (mid-point), implying it is a factor imprinting challenges to bank ICT strategy.

When asked what strategies had their banks put in place to respond to the challenges they had discussed, all the respondents stated that they had outsourced IT support. 70% had resulted to advertising so as to create customer awareness so as to change their perception.

60% of the banks had partnered with other players in the telecommunication industry so as to come up with innovative e-banking products and services hence increase the number of e-banking users. One good example given by the respondents is where banks had partnered with mobile operators to offer a money transfer service to their customers.

Summary and Discussion

The study revealed that e-banking is a relatively new banking distribution channel in Kenya

and it is at the early stages of growth and development. The study identified critical issues that stood out as being inhibitors to e-banking adoption, among them being security, quality of ICT, awareness programs, slow adoption, customer intention drivers, customer attitude, ease of usage by customer, usefulness of e-service to customer, customer trust, Age of customer, level of education and gender. These findings were all in line with previous studies that were earlier mentioned in this paper with authors like Sathye, (1999).

The study revealed that security was the most important attribute that could drive attitudes towards the adoption of e-banking. Quality of infrastructure and awareness of electronic banking services were also a major inhibitor on the adoption of e-banking.

There are also indicators that there are magnificent efforts on the part of the banks to create greater usage of the e-banking, its benefits are also quite crucial for the success of the commercial banks competitive advantage. This was observed on the demographic analysis. Responses indicated that there was a perceived risk element and high cost in electronic banking investment besides other limiting factors identified in the study such as inadequate regulatory support, Lack of in-house IT professional, Quality of ICT infrastructure and ICT industry Readiness.

Recommendations

This study came up with several recommendations which have both policy as well as academic implications. Foremost, it is evident that one major challenge of e-banking adoption is the issue of security. It is perceived that these channels do not provide guaranteed security. It is therefore important that banks constantly improve and upgrade their e-banking system's security. In order to change the perception, the bank will be required to post security provisions on their websites so as to increase confidence and improve trustworthiness of the e-banking systems. In Electronic transactions, which utilize the PIN, the PIN must be recognized by the Court as being key and crucial to such transaction and there must be a method of upholding its validity in a transaction. The issue of digital signatures must also be addressed.

Secondly, the study showed that awareness of electronic banking services and its benefits has a positive impact on customer's perceived usefulness. Banks should therefore continually train their employees who will in turn pass the knowledge to their customers hence the issue of perception is dealt with. Training will help improve confidence as well as improve innovation. By training its employees they will realize the benefits of e-banking services both to them and to their customers hence improve on the adoption of e-banking services.

Thirdly, banks need to carry out marketing research to identify the factors inhibiting e-banking adoption. Very limited research has been carried out in this area. In this regard, banks need to regularly carry out customer surveys so as to understand what their customer's needs are and as they develop their e-banking strategy then they will formulate consumer driven strategies.

Fourthly, banks should seek to collaborate with internet service providers so as to gain high quality internet infrastructure to enable the banks offer better quality services and at the same time enhance internet accessibility.

Finally, this study was based on the challenges commercial banks in Kenya face during e-banking adoption. It is therefore recommended that further study be conducted based on the customer's perspective.

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An Analysis of E-learning Information System Adoption in Ugandan Universities; Case of MUBS

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September, 2011

Abstract

This study examined e-learning failures and adoption problems in Ugandan universities based on Rogers & Shoemaker's Diffusion of Technological Innovation Theory. Makerere University Business School (MUBS) was used as a case study, where two systems i.e. KWEL and eMUBS System were surveyed. A self-administered questionnaire was given to 200 respondents who comprised of MUBS academic staff, administrative staff and students. The results were analyzed using SPSS and findings indicated that while the Assistant Lecturers and Lecturers have adapted to the technology, Professors were reluctant to adopt. On the students' side, the results indicated that although students are aware of the technology, many of them are not comfortable using it citing issues of accessibility and availability of the required resources to use the technology. From the findings, a number of recommendations have been made for faster adoption and use of e-learning at MUBS and other universities.

Key words: e-learning, adoption, sustainability, information systems

Introduction

In a bid to improve literacy levels in the country, the government of Uganda introduced Universal Primary Education (UPE) and Universal Secondary Education (USE), whereby all children of school-going age are facilitated to study for free. However, this development has led to a surging increase in the number of students enrolling to study (Kisubi, 2008). This pressure is currently being felt in higher institutions of learning where there is limited space and other resources such as facilitators (MoES, 2009). As a result, many Ugandans remained illiterate with literacy rates standing at only 65% (Aguti, 2002). The government of Uganda is now encouraging alternative means of meeting the demand, particularly of higher education, one of these being e-learning, especially in higher institutions of learning. Subsequently, universities have tried to develop and implement e-learning systems (Mugaba, 2002). Makerere University, the biggest and oldest university in the country, was the first to start e-learning using the Blackboard platform, although currently they have moved to Makerere University Electronic Learning Environment (MUELE) based on the Moodle platform. Other universities such as Nkozi and MUBS have since followed suit.

The advent of e-learning at Makerere University Business School was pioneered by NettelAfrica, a forum of universities promoting ICT usage and policy on the African continent. NettelAfrica introduced the Knowledge Environment for Web-based Learning (KEWL) system of education, which targeted students pursuing postgraduate programmes in ICT Policy and regulation. The system had most of e-learning requirements with a lot of course content, materials and online discussion forums. The introduction of the KEWL system excited and attracted quite a good number of students initially until recently when the school failed to enrol students on the programme in the academic year 2010/2012. In the early 2010s, the International Center for Information Technology and Development (ICITD) introduced another e-learning system that runs the Moodle platform but the system has failed to pick up to date.

This paper uses the terms e-learning and e-learning information systems interchangeably. E-learning encompasses all teaching activities carried electronically over distant locations. It may include all technologies such as teleconferencing, online discussion forums, chatrooms and boards, television, radio, to mention but a few. On the other hand, adoption of new technologies is the acceptance and use of new innovations in a given discipline by a given group of people or community. Adoption and implementation of new technologies can be done in three phases including technology, pedagogy and presentation style (Johnson, 2001). Goktalay (2006) urges that an individual contemplates adopting online technology for their course instruction, three important factors influence their decision: (1) the adoption of the technology, (2) the adoption of a new or modified pedagogy, and (3) the adoption of a new or modified presentation style.

The failure of universities to adopt e-learning has been studied by a number of scholars. For example, Goktalay (2006) carried out a qualitative study on faculty adoption of online technology in higher education, in which he identified staff development as a key factor for successfully implementing any technological innovation in education. In his study, Lynch (2002) found out that although 80% of public colleges provided e-learning facilities to their professors, they used those facilities in only 20% of their courses. These findings positively correlate with Goktalay (2006); HERI (1998; 1999) who urge that 67% of university lecturers find using ICTs to be a stressful process.

According to CERI (2005) there are numerous barriers encountered in the implementation and use of e-learning, i.e. the initial outlay and running costs of providing flexible pedagogy and personalized materials to students, hardware and software limitations and maintenance problems, connectivity and the lack of reliable internet and data centers. These are so prevalent especially in developing countries like Uganda. A number of e-learning systems have failed even before implementation. For instance, the adoption and use of the KEWL system at MUBS has largely failed and the recently introduced Moodle has not even seen the light.

Notwithstanding the challenges, however, Holloway and ICWE (2009) urge that eLearning, if well implemented, can significantly improve student motivation, understanding and the increased value of education amongst the community. Broadley (2007) carried out a study and established that e-learning enabled teachers to attend to individual students' needs more effectively and that it enables students to learn from a global perspective.

Diffusion of Technological Innovation Theory

After a careful consideration, this study adapted Rogers and Shoemaker's (1973) *Diffusion of Technological Innovation Theory* in trying to understand the process through which new technological innovations are implemented. Rogers and Shoemaker's theory gives 5 stages through which adoption takes place. These include knowledge, persuasion, decision, implementation and confirmation. Knowledge is the process of enlightening and provision of relevant information about the new technology, while persuasion involves performing activities

that convince the users to take-up the innovation. Decision stage is when the users chose to actually adopt or reject the technology, thereby resulting into two opposing groups (adopters and rejecters). During the implementation phase however, some adopters stop using the technology while the rejecters may change and start using the technology. These are called late adopters. The last stage, confirmation presents 4 user groups at the end of the process i.e. 1) continued adopters (those who have continued using the technology), 2) later adopters (those who adopt late), 3) discontinuance (those early adopters who drop out), and 4) continued rejecters (those who maintain their rejections). The five phases of Rogers and Shoemaker (1973) *Diffusion of Technological Innovation Theory* are in figure 1.

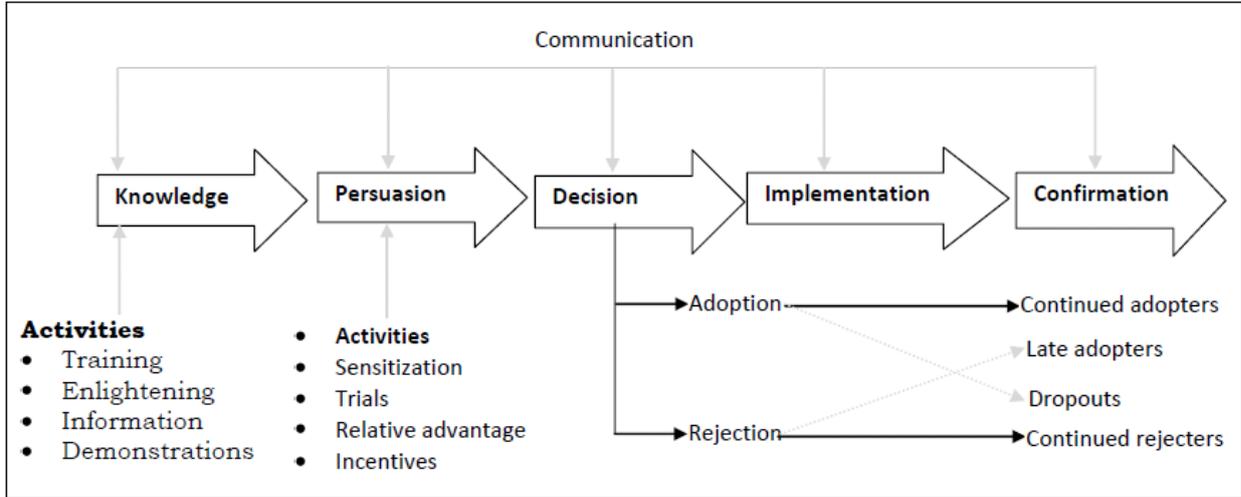


Figure 1: Diffusion of Technological Innovation Theory (Source: Rogers & Shoemaker, 1973)

Methodology

A survey research design was used, in which two e-learning systems at MUBS were surveyed. The study used quantitative research methods to study e-learning systems at the business school. The study population covered students, academic staff, administrative staff and IT personnel of Makerere University Business School. A target sample of 200 respondents was used in line with Roscoe’s (1970) rule of thumb that sample size between 30 and 500 is sufficient. Purposive sampling method was used to ensure multivariate respondents and diversity of opinions from all the selected study groups i.e. students, academic staff, administrative staff and IT personnel of Makerere University Business School. We collected data from two sources i.e. primary and secondary. Primary sources included students and staff of MUBS while secondary data was gathered from published material both within and outside Makerere University Business School. A self-administered questionnaire was given to the selected respondents to fill-in. A total of 170 (85%) questionnaires were returned. However, we removed 66 questionnaires that were incomplete and inconsistent during data cleaning before we performed analysis on the 104 fully filled in questionnaires.

Content validity index was used to test for validity of the questionnaire (CVI > 0.50 for both experts) and cronbach alpha coefficient was used to test for reliability (Cronbach alpha >0.60 for all variables). Using SPSS’ descriptive statistics and means analysis methods we extracted the most important factors influencing the success and/or failure of e-learning adoption in Ugandan universities. These factors were then fitted on Rogers and Shoemakers *Diffusion of Technological Innovation Theory*, in order to help improve e-learning adoption in Ugandan universities.

Findings

Challenges impeding e-learning IS adoption in Ugandan universities

A number of factors were put to the respondents suggesting the challenges to e-learning IS adoption in Ugandan universities. Using a likert scale of 1-5 (1= Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree). Out of the 14 factors suggested, on average, the respondents strongly agreed that Students have no knowledge about e-learning (MEAN=4.44), Lack of top management support and leadership in e-learning (MEAN=4.43), Resistance to change by members of staff (MEAN=4.36), Lack of resources for implementing e-learning projects (MEAN=4.35) significantly explained why Ugandan universities have failed to adopt to e-learning IS. However, some factors such as Students cannot afford using e-learning (MEAN=2.22), High cost of

telecommunication services (MEAN=3.17) were weak in explaining e-learning IS adoption failures in Ugandan universities as seen in table 1:

Table 1: E-learning adoption challenges in Ugandan (Source: Primary data)

	Minimum	Maximum	Mean	Std. Deviation
Resistance to change by members of staff	1	5	4.36	.637
Lack of staff training on e-learning	2	5	3.70	.725
Lack of computers and software for implementing e-learning	2	5	3.79	.997
Lack of e-learning skilled staff in universities	1	5	4.08	.915
Lack of policy and guidelines for using e-learning in universities	3	5	4.17	.663
Lack of government support for e-learning projects	1	5	3.26	1.343
Lack of private sector support for e-learning	1	5	3.33	1.465
High cost of telecommunication services	1	5	3.17	1.147
Lack of laws protecting e-learning practitioners in the country	1	5	4.25	.827
e-learning system are not secure enough to uphold academic integrity	1	5	3.23	.931
Students have no knowledge about e-learning	1	5	4.44	.709
Students cannot afford using e-learning	1	5	2.22	1.084
Lack of resources for implementing e-learning projects	2	5	4.35	.882
Lack of top management support and leadership in e-learning	3	5	4.43	.516
Valid N (list wise)				

State of e-learning IS adoption at MUBS

A number of parameters were used to understand the current state of e-learning IS adoption at MUBS. These included knowledge of e-learning, level of experience with e-learning IS and user characteristics. We applied these parameters on both staff and students in isolation. The findings indicated that majority of MUBS staff (62.5%) were knowledgeable about e-learning, while majority of MUBS students were not knowledgeable (40.5%). On the level of experience with e-learning usage, majority of MUBS staff (62.5%) indicated that they used e-learning for a period of 2-5 years while majority of students (78.5%) had experienced e-learning usage for period less than 2 years and only 18% had used e-learning for a period of 2-5 years. Thirdly, we looked at user characteristics such as age, title and level of education in terms influencing e-learning adoption. Our findings on the staff side show that Assistant Lecturers comprised majority users of e-learning scoring 35.6% followed by Lectures with 24%. The Senior Lectures, Associate Professors and Professors score poorly in this regard (12.5%, 12.5% and 2.9% respectively. While on the student’s side, the results were centrally i.e. master’s students comprised of majority users of e-learning followed by PhD students with scores 52.5% and 22.8% respectively. Results indicate that diploma and undergraduate students were the list users of e-learning with scores 0.6% and 11.6% respectively as seen table 2.

Table 2: Staff knowledge of e-learning (Source: Primary data)

	Percent
Not knowledgeable	5.0
Somewhat knowledgeable	12.5

Neutral	20.0
Knowledgeable	62.5
Total	100.0

Table 3: Student knowledge of e-learning (Source: Primary data)

	Percent
Not knowledgeable	40.5
Somewhat knowledgeable	27.0
Neutral	12.0
knowledgeable	20.5
Total	100.0

Table 4: Staff experience with e-learning IS (Source: Primary data)

	Percent
Less than 2 years	25.0
2-5 years	62.5
5 and above years	12.5
Total	100.0

Table 5: Students experience with e-learning IS (Source: Primary data)

	Percent
Less than 2 years	78.5
2-5 years	18.0
5 and above years	3.5
Total	100.0

Table 6: Staff who use e-learning IS

	Percent
Professors	2.9
Ass. Professors	12.5
Sen. Lecturers	12.5
Lecturers	24.0
Assistant Lecturers	35.6

Total	87.5
System	12.5
Total	100.0

Table 7: Students who use e-learning IS

	Percent
PhD students	22.8
Masters students	52.5
Undergraduate students	11.6
Diploma students	0.6
Total	87.5
System	12.5
Total	100.0

Factors influencing the use of e-learning

Guided by Rogers and Shoemakers’ theory, we asked both students and staff to state their reasons for using e-learning. Our findings indicate that 56.7% of staff used e-learning because of its relative advantage or need and ease of use with that scored 21%. On the other hand, majority of students used e-learning out of curiosity (42.6%) this was closely followed by relative advantage/need at 42% as seen in tables 8 and 9.

Table 8: Factors influencing staff use of e-learning (Source: Primary data)

	Percent
Relative advantage/need	56.7
Compatibility	10.0
Ease of use	21.0
Curiosity	12.3
Total	100.0

Table 9: Factors influencing students use of e-learning (Source: Primary data)

	Percent
Relative advantage/need	42.0
Compatibility	0.8
Ease of use	14.6
Curiosity	42.6
Total	100.0

Success factors for the adoption of e-learning in Ugandan universities

Based on Rogers and Shoemaker’s theory of diffusion of technological innovation, and also based on the suggested challenges impeding the adoption of e-learning, the respondents were asked to suggest that would influence successful adoption to e-learning IS by both staff and students in Ugandan universities. We used a likert scale of 1-5 (1= Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree). SPSS means were analyzed and findings indicated that Availability of computer hardware and software (MEAN=4.53),

Sensitization of staff to embrace changes in technology (MEAN=4.5), Sensitization students about e-learning benefits (MEAN=4.46) significantly influence the success of e-learning adoption in Ugandan universities. Respondents were however in disagreement that Security and confidentiality of students and lectures data in e-learning affected the successful adoption to e-learning as seen in table 9.

Table 9: Factors influencing successful adoption of e-learning IS (Source: Primary data)

	Min	Max	Mean	Std. Deviation
Sensitize staff to embrace changes in technology	3	5	4.50	.592
Staff training in ICTs and e-learning	2	5	4.31	.929
Availability of computer hardware and software	2	5	4.53	.826
Existence of e-learning policy and guidelines in universities	2	5	4.12	.973
Government support for e-learning projects in universities	2	5	4.35	.936
Private sector support for e-learning projects	2	5	4.23	1.050
Affordable telecom rates /prices	2	5	4.08	.926
Existence of laws governing the use of e-learning	2	5	4.23	.888
Security and confidentiality of students and lectures data in e-learning	1	5	3.77	1.173
Sensitize students about e-learning benefits	2	5	4.46	.764
Free e-learning equipments for students	1	5	4.06	1.008
Strong Top management support for e-learning	2	5	4.30	.906

Summary of findings in relation to Rogers and Shoemaker’s theory

Rogers and Shoemaker (1973) outlined the factors influencing adoption of new technologies as knowledgeable, top mgt leadership, incentives through persuasion, relative advantage, implementation resources and perceived ease of use. The findings in this study to a greater extent agree with Rogers and Shoemaker on these factors. For example, majority of e-learning users and those who were willing to use e-learning were staff who were most knowledgeable about the technology. The staff, PhD and masters students used e-learning because they had been persuaded about the relative advantage of e-learning, while diploma and undergraduate students shunned it because they did not know its benefits, instead they used the technology out of curiosity. The fact that resistance to change is mainly manifested in older groups of community explains why only 2.9% of professors, the most senior and elderly category used e-learning systems.

From the findings therefore, we identified lower level academic staff (Assistant Lecturers and Lecturers) as early adopters to e-learning. On the other hand, findings indicate that medium level and senior academic staff including Senior Lecturers, Associate Professors and Professors were the rejecters/late adopters of the e-learning technology. On the students’ side postgraduate students i.e. Masters and PhD students are early adopters of e-learning while diploma and undergraduates students were the rejecters/late adopters of e-learning.

Recommendations and Conclusion

The challenges to e-learning adoption were found to be both *knowledge* and *Usability based*. On the knowledge based challenges, we recommend that universities should work towards improving knowledge and skills of students and staff through training in order to increase chances of technology acceptability by users as had been suggested by Rogers and Shoemaker. Training will also improve on perceived ease of use which directly translates into early adoption. On *Usability factors*, we recommend that the government and university management should address resistance to change through persuasion and sensitization programmes, lack of e-learning laws through enactment of laws to guide e-learning usage and above all top management support through resource mobilization, monitoring and establishment of internal mechanisms that foster e-learning usage.

Since lower level academic staff a postgraduate students have shown significant interest in the e-learning technology, they should be supported and encouraged so that they do not drop out through a discontinuation process of Rogers & Shoemakers model, while the senior academic staff and undergraduate students have been

identified to be rejecters/late adopters, management should sensitized on the benefits of e-learning technology in order improve their acceptance. Management can setup a mechanism that provides incentives to these categories directly aimed at persuading them into becoming later adopters through the process of late adoption according to Roger and Shoemaker (1973).

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**THE INFLUENCE OF ICT INFRASTRUCTURE ON READINESS TO ADOPT
E-LEARNING IN SECONDARY SCHOOLS IN KITUI DISTRICT, KENYA**

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ABSTRACT

This article advocates for speedy provision of ICT infrastructure in all secondary schools to make it possible for the teachers and learners to adopt e-learning to accelerate development and economic growth of our Nation. The article explores the relationship between ICT infrastructure and readiness to adopt e-learning in secondary schools. It is based on literature review and field research by employing cross-sectional survey research design to determine the extent to which Information Communication Technology (ICT) infrastructure influences readiness to adopt e-learning in secondary schools in Kitui district. A single questionnaire coupled with observation schedule were used to collect data from 15 provincial and 36 District schools selected through stratified random sampling. Null hypotheses were tested by using two way ANOVA at 0.05 and regression analysis. The results established that institutional factors such as infrastructure (connectivity, sources of energy and e-equipment) have a significant influence on readiness to adopt e-learning. However, most schools in Kitui district did not have adequate infrastructure to support the adoption of e-learning. It was recommended that the government should seek to address the issue of e-learning infrastructure in secondary schools in Kitui district and indeed all other districts before embarking on full scale implementation of e-learning in schools.

Key Words= Connectivity, Power/Energy, Equipment

INTRODUCTION

Information and Communication Technology (ICT) plays a key role in promoting economic development of a country. Many of the economic gains in the developed world economies over the past two decades could be to a great extent attributed to the impact of ICT, (UNESCO 2004)

There is no doubt that the advances in information and communication technology have enabled people all over the world to share ideas faster and more effectively at far distances. Many countries both in developed and developing economies have adopted the modern electronic communication technology for different operations in their economies. However, the extent to which a country is able to participate and benefit from the electronic communication technology depends on the country's digital divide as well as availability of e-infrastructure and technical knowhow in the country, (UNESCO, 2004).

ICT infrastructure is a basic requirement for adoption of e-learning in learning institutions and indeed any organization. The concept of ICT infrastructure denotes all the facilities necessary for effective e-learning in schools. Such facilities include equipment, connectivity and sources of energy. ICT infrastructure is a basic requirement for adoption of e-learning. The concept of ICT infrastructure denotes all the facilities necessary for effective e-learning in schools. Such facilities include equipment, connectivity and sources of energy. Furthermore, the question of availability of e-infrastructure needs to be dealt with at institutional level in order to give a true picture of the specific operational environment. Such infrastructure includes connectivity to various networks (internet, intranet, and mobile-telephone); sources and reliability of energy (UPS, electricity, standby generators); equipment (computers, radios, videos, television, LCD projectors and software, e-learning laboratories furniture and stores and information storage facilities such as flash disks, CD-ROMs, DVDs).

The Ministry's Policy Framework indicates that there are a number of challenges concerning access to and use of ICT in Kenya. This includes high levels of poverty, limited rural electrification and frequent energy disruptions as well as lack of computers and adequate connectivity, (National ICT policy, 2006).

Successful e-pedagogy depends on effective e-facilitation, which can be made difficult or possible by various factors depending on how prepared the implementers are. Lumumba (2007), in his study on the challenges facing e-learning at public secondary schools, based on the NEPAD pilot project schools in Kenya established that the e-learning project was faced by many challenges. He singled out lack of adequate e-learning facilities (infrastructure), as key obstacles to the success of the e-learning project. He attributed such challenges to lack of preparedness among the institutions and implementers before the implementation process began. The study recommended that, for successful implementation of e-learning in educational institutions to be enhanced, the factors determining the readiness to adopt e-learning be established and dealt with adequately before the implementation process commences. However, the extent to which availability of ICT infrastructure influences readiness to adopt e-learning in Secondary Schools was not addressed. .

It is worth noting that studies that have been carried out on the area of e-learning (ICT) adoption and diffusion were based on the developed countries and therefore the findings can be generalized especially in developing country like Kenya with a lot of caution. Literature on e-learning in secondary schools is scanty but they all point out that there is a big gap between policy and practice when it comes to readiness of secondary schools to adopt e-learning. The few studies that have been carried out on use of ICT in curriculum implementation at Secondary schools in Kenya (Lumumba, 2007; Ayere at-el, 2010 and Keiyoro, 2010) were based on NEPAD and CSTS e-schools which were set up as Centres of excellence in e-learning integration, so that other schools could copy their model. For this reason the schools were provided with computers, e-materials, internet

appliances and trained personnel. Such studies do not reflect the real situation of readiness to adopt e-learning in normal Kenyan Secondary Schools This article examines the concept of e-learning, followed by a brief discussion on the influence of ICT infrastructure on readiness to adopt e-learning. The rest of the article describes the methodology used, data analysis, interpretation and discussion of findings and finally outlines the recommendations to improve the speed to which the government and the secondary schools are moving towards the installation of ICT infrastructure as the basic requirement for sustainable adoption of e- learning in secondary schools.

THE CONCEPT OF E-READINESS

Mcconnel Intl, (2001) describes e-readiness as the measure of the extent to which nations are capable to participate in the networked world. He clarifies that e-readiness measures the capacity of a nation to participate in the digital economy by judging the relative advancement of the key important applications. E-readiness originated with the attempt to provide a unified framework to evaluate the breadth and depth of the digital divide between the less developed and the developed countries (Arce and Hopman, 2002). Today there is no doubt that there is a wide gap between the developed and the developing world in terms of e-readiness. It is therefore agreeable that e-readiness is a critical area that must be assessed and prudently addressed before adoption of e-learning in Kenyan learning institutions and indeed all other developing countries.

Gakuu (2006) observes that information is now viewed as a basic raw material that is being consumed at an enormous scale in the socio-economic processes and thus having competitive importance. Sadly, neither competitive value accrues evenly across countries nor technological diffusion limits the difference in national, political, economic, social and cultural structures. Thus Carlsson, (2004) claims that, it is very likely that digitization of information will only benefit a few countries which have the capacity to harness the required resources. It is also true to say that even within a country only some few well endowed regions will be able to benefit from the digitization of information due to different levels of development.

Various international agencies have focused their attention on the phenomenon of the digital divide; The UN, UNESCO, OECD, UNDP, the World Bank and many others. In particular, UNESCO was the first international body who focused on the issue of digital divide which it considered as one of the most pressing ethical and social challenges of our time. In a recent document named “Towards the knowledge Society”, (UNESCO World Report (2005), it is claimed that bridging the digital divide is a priority of UNESCO mission.

Focus is placed on the need to develop a culture of knowledge enabling not only “formal” but also “effective” access for all to information and communication technologies (ICT). It is pointed out in the UNESCO (2005) that new technologies cannot be implanted from the top in deprived and disadvantaged contexts. In order to be effective; they need to come as specific local needs by means of a “bottom- up” process. It is therefore paramount to start from local practices and involve all the actors concerned (at institutional and non institutional levels) in the specific contexts where such projects and policies are implemented. It is for this reason that the current study focused on specific institutional and human factors that influence readiness to adopt e- learning in secondary schools.

THE INFLUENCE OF ICT INFRASTRUCTURE ON READINESS TO ADOPT E-LEARNING

E-learning is new in many developing countries and is somewhat being practiced on a trial and error method. It is actually at infancy stage. A number of African countries have just completed the pilot stage with the NEPAD e-schools e-learning project. The experience of these schools in the pilot study indicate that successful implementation of e-learning in secondary schools needs careful planning as there are many challenges that need to be addressed.

The Kenya Internet Usage and Marketing Report (2006) indicate that only a few people in Kenya have a computer at home. Radio and television access is much better while mobile phone are common place and the number of internet users is increasing rapidly due to the number of internet cafes, shops and access centres that are available, particularly in urban areas. However, it is feared that, due to wide use of English in Kenya usage of internet may be congested since most sites on the internet are in English (Kenya Internet Usage and Marketing Report, 2006). Table 2.1 below provides a statistical overview of the ICT infrastructure that is available to the general population in Kenya.

Table 1: ICT Infrastructure in Kenya

Type of Infrastructure	No. Of subscribers
Telephone lines(2005)	281,800 (2005)
Mobile telephones (2006)	4,612,000 (2006)
Internet users (3.1% of the population)	200,000 and 1,054,900 (2000 & 2006)
Internet hosts	13,274 (2006)
Television Broadcast stations	8 (2002)
Radio stations	24 AM; 18FM (2001)

Source: The world Fact Book, (2007)

As shown in Table 1, only a small percentage of the Kenyan population has access to ICT infrastructure (only 3.1% internet users). However, given the high rate at which the use of ICT is spreading especially the mobile phones and the internet, there is hope that in few years time many Kenyans will have access to ICT.

Kenya data profile (2006) indicates that most secondary schools have some computer equipment. However, this could consist of one computer in the office of the Head teacher. The profile also points out that very few secondary schools have sufficient ICT tools for teachers and students. Further, it was observed that even in

schools that have computers, the student-computer ratio is 150:1 (Kenya data profile, 2006). Notably, given that the conditions above are described as they were in 2006, it is likely that with the effort made by the government toward preparation for introduction of e-learning in schools, things have improved and hence the need for a study to establish the current situation at the grassroots.

The major problem pointed out by the Data and Statistics (2006) was that Kenya lacked adequate connectivity and network infrastructure. It was pointed out that, although a small number of schools had direct access to high speed connectivity through an internet service provider, generally there was limited penetration of the national physical telecommunication infrastructure into rural and low-income areas. This fact raised a greater need for investigating the role played by ICT infrastructure in determining readiness to adopt e-learning in secondary schools against the ministry's plan to leverage the e-government initiative of networking public institutions countrywide to facilitate the educational sector.

METHODOLOGY

The study adopted cross-sectional descriptive survey design. The design was chosen for this study due to its ability to ensure minimization of bias and maximization of reliability of evidence collected. Furthermore descriptive survey design raises concern for the economical completion of the research study. The method is rigid and focuses on the objectives of the study. The study used ex-post-facto design, which is a systematic empirical inquiry in which the researcher does not have direct control of independent variables because their manifestation have already occurred or they are inherently not manipulable, (Emory,1985).

The study further adopted a combination of both qualitative and quantitative techniques which according to Emory (1985) and Kothari (2004) supplement each other in that qualitative technique provides the in-depth explanations while quantitative technique provides the hard data needed to meet the requirements of objectives and to test hypotheses. The philosophical foundation of this study is positivism which stresses that the social world exists externally, and that its properties should be measured through objective methods, rather than being inferred subjectively through such approaches as intuition, sensation and reflection, (Easterby-Smith, Thorpe and Lowe, 2002)

The population for this study included 51 out of 80 Public Secondary Schools in Kitui District. The sample was selected through stratified random sampling. Data were collected by means of a questionnaire and observation schedules. To ensure reliability of the research instrument self-administration approach was applied in data collection and Cronbach's co-efficient Alpha was determined in order to measure internal consistency of the research instruments.

Data analysis was done following the four phases normally used in many research projects, namely, data clean up, data reduction, data differentiation and explanation. Factor analysis was done to identify the most important infrastructure factors in influencing readiness to adopt e-learning by computing factor loadings for each factor. These are the factors that were used in further analysis of the variables. In this study, parametric tests were used since they are more powerful due to their ability to reduce chances of committing type II error, less likely to not reject a null hypothesis which should be rejected. The main approaches used were the Analysis of Variance ANOVA, Pearson's coefficient of correlation and Regression analysis.

Operationalization of the dependent and independent variables

Operational definition of the dependent and independent variables is provided here. In this study the dependent variable for is readiness to adopt e-learning, while the independent variable is ICT infrastructure whose key indicators include connectivity, sources of power and equipment.

Table 2: Summary of Variables and Indicators

VARIABLE	INDICATORS	MEASUREMENT SCALE
Infrastructure	Connectivity <ul style="list-style-type: none"> • Internet connectivity • mobile network coverage • Intranet connectivity 	Ratio scale
	Sources of power/energy <ul style="list-style-type: none"> • Electricity • Standing generators • Uninterruptible energy supply (UPS) 	
	Equipment <ul style="list-style-type: none"> • Computers (hard software) • Radios • Televisions • Mobile phones • LCD projectors • Software • Computer laboratories • Furniture • Equipment stores • Flash disks • CD-ROMs • Diskettes • CDS 	
Readiness to adopt e-learning	<ul style="list-style-type: none"> • Reliable sources of energy. • Variety of network connections • Sufficient internet connectivity • Sufficient electronic learning equipment • Relevant skills in handling e-learning • Access to e-learning facilities in school • operationalize the e-learning machines • Teachers' and students' Interest in the use of e-learning. • Readiness to devote extra time for- e-learning • Provision of the time e-learning in the time table 	Interval scale

FINDINGS AND DISCUSSION

The study set out to establish the significance of infrastructure in influencing readiness to adopt e-learning in curriculum implementation. ICT infrastructure was studied under three indicators, namely; connectivity, source of power/energy and equipment, from which three hypotheses were formulated to guide the study. Readiness was measured using two key indicators, namely; availability of sufficient electronic-learning equipment and availability of relevant skills in handling e-learning.

Principals’ Evaluation of the Schools’ Readiness to adopt e-learning based on e- Infrastructure

The principals were requested to indicate the extent to which their schools were ready to adopt e-learning in relation to availability of various facilities essential for e-learning which were listed in the questionnaire. They were required to indicate in a 5 point Likert scale within the range described below.

Very great extent = 5

Great extent = 4

Minimal extent = 3

Very minimal extent = 2

No extent at all = 1

The results are summarized in Table 3.

Table 3: Principals opinion on the extent to which their schools’ are ready with e-infrastructure

<i>Facilities</i>	<i>Very great extent</i>	<i>Great extent</i>	<i>No extent at all</i>	<i>Minimal extent</i>	<i>Very minimal extent</i>
CONNECTIVITY					
Internet connectivity	15.7	33.3	27.5	7.8	15.7
Mobile network coverage	41.2	15.7	21.6	15.7	5.9
Intranet connectivity	25.5	23.5	41.2	2.0	7.8
EQUIPMENT					
Computers	21.6	35.3	19.6	13.7	9.8
Mobile telephones	39.2	11.8	15.7	29.4	3.9
LCD Projectors	7.8	27.5	51.0	3.9	9.8
SOURCES OF POWER/ENERGY					

Electricity supply	60.8	19.6	9.8	7.8	2.0
Uninterruptible Power Supply (UPS)	23.5	25.5	39.2	7.8	3.9
Standby generators	27.5	23.5	31.4	7.8	9.8

The findings shown in Table 3 indicate that over half of the schools enjoyed reliable mobile network coverage as reported by 56.9% of the principals, though some 21.6% complained of total lack of network coverage in their schools while another 21.6% suffered unreliable network coverage. This shows that, though mobile network coverage was spread over many areas in the district some areas were still either not covered or the network was not reliable. According to the findings, the schools were found to be at varied levels of readiness in relation to internet connectivity. Schools that had very great access to internet constituted 15.7% while those with great access were 33.3%. Twenty seven percent (27%) of the schools had no access to internet at all, while the extent of access to internet of the remaining 7.8% and 15.7% of the schools had minimal to very minimal extent of access to internet probably, because they could only access the internet from the cyber cafes in Kitui town. With regard to intranet connectivity, only 49% of the schools were reportedly ready with this facility, while 10% had minimal to very minimal intranet connectivity. The remaining 41% had no intranet connectivity at all.

Most Principals felt that their schools were ready with electricity supply. For example 60.8% were ready to a very great extent while 19.6% were ready to great extent. Those whose schools were ready to minimal and very minimal extent constituted a combined percentage of 9.8% while those not ready at all were 9.8%. Electricity seemed to have spread out to many schools thanks to government policy of Rural Electrification. The study reveals that almost half of the schools had either Uninterruptible Power Supply (UPS) or standby generators. Some 49% had UPS and 51% had standby generators while 51% and 49% respectively do not have. This indicates that such sources of power/energy were not as widespread as electricity. The availability of electricity could have been made through the implementation of rural electrification programme.

LCD Projectors were rare equipment in many of the schools. For example 51% of the schools were not ready with LCD projectors, 3.9% and 9.8% were ready to a minimal and very minimal extent respectively. However, 27.5% were ready to a great extent and only 7.8% of the schools was ready to very great extent. This could be due to the high cost and skill requirement for the equipment. With regard to availability of computers in schools, 21.6% were ready to adopt e-learning to a very great extent while 35.3% ready to a great extent as they had enough computers. However, 13.7% were ready to a minimal extent while 9.8% were ready to a very minimal extent and only 19.6 were not ready at all. This is an indication that with some government subsidy on computers, the schools could easily attain the required level of readiness to adopt e-learning. Furthermore, the findings indicate that a combined percentage of 51% of the principals felt that their schools had enough mobile phones which could facilitate e-learning, while 33.3% felt that their schools did not have adequate mobile phones to support adoption of e-learning while 15.7% were not ready at all. This implies that a lot of investment needed to be committed to equipping the schools with e-facilities so as to improve on the school's readiness to adopt e-learning as they were found to be very poorly equipped. The findings of the study were scientifically validated through testing of the following three hypotheses.

Hypothesis H₁ Information Communication Technology (ICT) connectivity has no significant influence on readiness to adopt e-learning in Secondary Schools

ICT connectivity was measured in terms of internet connectivity, intranet connectivity and mobile telephone network connectivity/coverage. A summary of the findings is provided in Table 4.

Table 4: The influence of Information Communication Technology Connectivity on Readiness to adopt e-learning.

		Schools' readiness to adopt e-learning subject to availability of sufficient electronic learning equipment	Schools' readiness to adopt e-learning subject to availability of relevant skills in handling e-learning
Internet connectivity	Pearson Correlation	.330(*)	.313(*)
	Sig. (2-tailed)	.018	.025
	N	51	51
Intranet connectivity	Pearson Correlation	.233	.254
	Sig. (2-tailed)	.100	.072
	N	51	51
Mobile network coverage	Pearson Correlation	.245	.256
	Sig. (2-tailed)	.083	.070
	N	51	51

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

The first finding on hypothesis H₁ indicated that ICT connectivity has positive influence on readiness to adopt e-learning. Internet connectivity had a significantly positive influence on readiness to adopt e-learning while intranet and mobile telephone network connectivity/coverage had insignificantly positive influence on readiness to adopt e-learning.

Table 5 Regression Prediction Model for Connectivity and Readiness to Adopt e-Learning subject to Availability of Relevant Skills in Handling e-Learning

Model summary	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df 1	df2	Sig. F Change
	.344(a)	.118	.062	1.20961	.118	2.103	3	47	.113
Model ANOVA		Sum of Squares		df	Mean Square	F	Sig.		
	Regression	9.231		3	3.077	2.103	.113(a)		
	Residual	68.769		47	1.463				
	Total	78.000		50					
Model Coefficients		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		
		B	Std. Error	Beta			Lower Bound	Upper Bound	
	(Constant)	2.937	.463		6.348	.000	2.006	3.868	
	internet connectivity	.198	.170	.202	1.163	.251	-.144	.540	
	Mobile network coverage	.109	.152	.115	.718	.477	-.197	.416	
	intranet	.111	.181	.101	.612	.54	-.253	.474	

	connectivity					3		
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a Dependent Variable: Readiness to adopt e-learning subject to availability of relevant skills in handling e-learning

Table 6: Regression model for Connectivity and Readiness to Adopt e-learning subject to availability of Adequate Electronic Learning Equipment

Model Summary		R	R ²	Adjusted R ²		Std. Error of the Estimate	
1		.347(a)	.120	.064		1.60110	
Model ANOVA			Sum of Squares	df	Mean Square	F	Sig.
		Regression	16.495	3	5.498	2.145	.107(a)
		Residual	120.485	47	2.564		
		Total	136.980	50			
Model Coefficients		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
		B	Std. Error	Beta			
	(Constant)	2.301	.612		3.757	.000	
	internet connectivity	.322	.225	.249	1.431	.159	
	mobile network coverage	.122	.202	.097	.604	.549	
	intranet connectivity	.091	.239	.062	.380	.705	

a Dependent Variable: School’s readiness to adopt e-learning subject to availability of sufficient electronic learning equipment

The findings of the regression prediction model for ICT connectivity and readiness to adopt e-learning based on the two indicators of readiness (availability of relevant skill in handling e-learning and availability of sufficient electronic learning equipment) indicated that ICT connectivity could be used to predict a schools’ readiness to adopt e-learning, with the connectivity accounting for up to 12% of the change in a school’s level of readiness to adopt e-learning.

It was further discovered that internet connectivity is the most important type of connectivity since it accounted for almost half (1/2) of the ICT connectivity as it is evidenced by the beta values of the connectivity indicators. The beta values for the three connectivity indicators (internet connectivity, intranet connectivity and mobile telephone connectivity) were 0.202, 0.101, and 0.115 respectively, when readiness is measured in terms of the availability of relevant skills in handling e-learning and 0.249, 0.062 and 0.097 respectively when readiness is measured in terms of the availability of sufficient electronic learning equipment. This implies that without sufficient and reliable internet connectivity in the schools successful adoption of e-learning in the implementation of secondary school curriculum will be impossible. In fact unless the government plans and ensures that schools especially in the rural areas are connected to internet the benefits associated with e-learning may end up being enjoyed by only a few urban schools which are capable of acquiring internet connectivity on their own. Based on these findings therefore, the null hypothesis which stated that the ICT connectivity has no significant influence on readiness to adopt e-learning in secondary schools was rejected and it was concluded that readiness to adopt e-learning in secondary school is significantly influenced by the level of ICT connectivity in the schools.

Hypothesis H0₂ Sources of energy do not significantly influence Secondary Schools’ readiness to adopt e-learning.

The indicators for sources of energy/power included electricity supply, uninterruptible power Supply (UPS) and stay-by generators. The findings indicated that the source energy/power has a Positive influence on readiness to adopt e-learning which was tested as shown on Table 5.

Table 7: The Correlation between Sources of Energy/Power and Readiness to adopt e-learning

Schools’ readiness to adopt e-learning based on;		Electricity supply	Uninterruptible power supply (UPS)	Standby generators
Availability of relevant skills in handling e-learning	Pearson Correlation	.316(*)	.256	.255
	Sig. (2-tailed)	.024	.070	.071
	N	51	51	51
Availability of sufficient electronic learning equipment	Pearson Correlation	.378(**)	.374(**)	.364(**)
	Sig. (2-tailed)	.006	.007	.009

	N	51	51	51
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** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

It is evident in table 5 that electricity supply, uninterruptible power supply (UPS) and standby generators (indicators of sources of energy) correlated significantly and positively with the availability of sufficient electronic learning equipment (which was an indicator of readiness to adopt e-learning) with correlation coefficient of $r = 0.378, 0.374$ and 0.364 respectively, while $P = 0.01$.

This implies that, availability of e-learning equipment will be a sufficient measure of schools' readiness to adopt e-learning only if reliable sources of energy are available. It is also common sense that electronic equipment cannot be practically useful unless there is reliable source of power/energy. For example equipping a school with computers without providing the school with reliable sources of power will be of no use since the computers cannot be utilized unless they are connected to power.

Hypothesis H0₃ (ICT) equipment does not have significant influence on Secondary Schools' readiness to adopt e-learning.

The findings on this hypothesis indicated that information and communication technology (ICT) equipment had significantly positive influence on readiness to adopt e-learning in secondary schools as shown in Table 6.

Table 8: The influence of ICT Equipment on Readiness to Adopt e-learning

Schools' readiness to adopt e-learning based on;		LCD projectors availability	Mobile telephone availability	Computers availability
Availability of sufficient electronic learning equipment	Pearson Correlation	.385(**)	.347(*)	.287(*)
	Sig. (2-tailed)	.005	.013	.041
	N	51	51	51
Availability of relevant skills in handling e-learning	Pearson Correlation	.256	.303(*)	.243
	Sig. (2-tailed)	.070	.031	.086

	N	51	51	51
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** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

For example, availability of LCD projectors, mobile telephones and computers in schools (indicators of ICT equipment) correlated significantly positively with availability of sufficient e-learning equipment which was an indicator of readiness to adopt e-learning with a correlation coefficient of $r = 0.385$, $P < 0.01$; $r = 0.347$, $P < 0.05$ and $r = 0.387$, $P < 0.05$ respectively. Availability of relevant skills in handling e-learning, which was the other indicator of readiness to adopt e-learning was significantly and positively influenced by the availability of mobile telephones in schools. To further ascertain the importance of ICT equipment in determining readiness to adopt e-learning, a regression prediction model was developed. The findings of the model are summarized in Table 7.

Table 9: Regression Model for ICT Equipment and Readiness to Adopt

E-learning subject to availability of Relevant Skills in Handling e-learning

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate				
1	.367(a)	.135	.080	1.19823				
Model ANOVA		Sum of Squares	Df	Mean Square	F	Sig.		
1	Regression	10.520	3	3.507	2.442	.076(a)		
	Residual	67.480	47	1.436				
	Total	78.000	50					
Model Coefficients		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
	(Constant)	2.672	.557		4.800	.000	1.552	3.792
	Mobile telephone	.239	.129	.263	1.851	.070	-.021	.498

Computers	.023	.208	.023	.110	.913	-.395	.440
LCD projectors	.243	.253	.194	.960	.342	-.266	.752

a Dependent Variable: Schools’ readiness to adopt e-learning subject to availability of relevant skills in handling e-learning

Regression analysis produced a prediction model which could be used to estimate a schools level of readiness to adopt e-learning using ICT equipment. From the findings on the model, a schools readiness to adopt e-learning in terms of availability of relevant skills in handling e-learning could be estimated well on the basis of the extent to which the school has acquired ICT equipment. The model has an r^2 value of 0.135, meaning that 13.5% of change in a schools readiness with relevant skills in handling e-learning is accounted for by availability of ICT equipment in the school.

When ICT equipment is used to predict a schools’ readiness to adopt e-learning based on the availability of sufficient e-learning equipment, the findings show that such a model is strong for estimating readiness to adopt e-learning for a given level of ICT equipment could account for approximately 31% of the change in a schools’ readiness to adopt e-learning with a standard error of 1.2.

The findings therefore indicate that ICT equipment is crucial requirement for readiness to adopt e-learning in curriculum delivery. For the schools to be able to utilize this modern technology meaningfully, they must acquire the necessary ICT equipment. These would include computers, LCD projectors and mobile telephones among others. However, lack of adequate ICT equipment was reported in almost half of the schools in Kitui district, meaning that the schools were inadequately prepared to adopt e-learning hence an issue that the government needs to address be implementation of e-learning commences.

As it is evident from the study, readiness to adopt e-learning was positively and significantly influenced by ICT infrastructure. This means that successful adoption of e-learning is determined to a large extent by the extent to which schools have acquired the necessary ICT infrastructure including adequate connectivity, reliable sources of energy and ICT equipment. However, most schools in Kitui District were found to lack adequate ICT infrastructure, hence not adequately ready to adopt e-learning.

Discussion of the study findings

The study established that all the three ICT connectivity indicators had some influence on readiness to adopt e-learning in secondary schools. However, only internet connectivity had significant influence on readiness to adopt e-learning. The findings of this study also revealed that sources of power/energy such as electricity supply, uninterruptible power supply (UPS) and stand-by generators have significant influence on readiness to adopt e-learning in secondary schools. The study further showed that, ICT equipment has significantly positive influence on readiness to adopt e-learning. The study also revealed that ICT equipment was inadequate in almost half of the schools in Kitui district.

The findings of this study are in agreement with the existing literature which indicates that ICT infrastructure such as connectivity, sources of energy/power and equipment are positive influence on readiness to adopt e-learning. However, this study is different in that, while such studies did not show the magnitude of the influence of ICT equipment on readiness to adopt e-learning in secondary schools. neither the extent to which ICT equipment were available in secondary schools in Kitui district- Kenya, this current study has addressed the issue of the extent to which ICT infrastructure influences readiness to adopt e-learning in secondary schools and the level of availability of ICT equipment in the secondary schools in Kitui district. Such studies include Lumumba (2007) Shetty (2007) Nyaki, Oyelaran and Oyeyinka (2002) and Keiyoro (2010).

Conclusions of the Study

First, it was concluded that internet connectivity is very crucial in determining readiness to adopt e-learning. It should also be noted that intranet connectivity and mobile network coverage will enhance a school's readiness to adopt e-learning especially because internet services could be accessed via mobile phones, hence mobile telephone network connectivity could suffice for internet connectivity particularly in the remotely located schools. We therefore reject the null hypothesis which stated that there ICT connectivity has no significant influence on readiness to adopt e-learning in secondary schools and conclude that readiness to adopt e-learning in secondary school is significantly influenced by the level of ICT connectivity in the schools.

Second it was concluded that availability of e-learning equipment will be a sufficient measure of schools readiness to adopt e-learning only if reliable sources of energy are available. Hence we reject the hypothesis and conclude that sources of energy/power have significant influence on readiness to adopt e-learning.

Third, it could be concluded that ICT equipment are a crucial requirement for readiness to adopt e-learning in curriculum delivery. For the schools to be able to utilize this modern technology meaningfully, they must acquire the necessary ICT equipment, including computers, LCD projectors and mobile telephones among others. Hence the null hypothesis and conclude that ICT equipment has significant influence on readiness to adopt e-learning in secondary schools. However, lack of adequate ICT equipment was reported in almost half of the schools in Kitui district, meaning that the schools were inadequately prepared to adopt e-learning hence an issue that the government needs to address before implementation of e-learning commences.

As it is evident from the study findings, infrastructure positively and significantly influenced readiness to adopt e-learning. This means that successful adoption of e-learning is determined to a large extent by the extent to which schools have acquired the necessary ICT infrastructure including adequate connectivity, reliable sources of energy and ICT equipment. However, most schools in Kitui District were found to lack adequate ICT infrastructure, hence not adequately ready to adopt e-learning.

Recommendations of the Study

Based on the discussions and findings of this study, the researchers find it in order to make a few recommendations which she considers important to guide other readers, researchers and policy makers. The recommendations have been divided into those with policy implications and those meant for other researchers for further reading.

Policy Implications

Based on the results of the study, the following recommendations are made:

The government should embark on equipping the schools with the necessary ICT infrastructure before the process of full scale implementation of e-learning commences. Specifically the government should ensure that all the schools are provided with electricity power supply, connected to internet services and equipped with adequate and up-to-date computers and LCD Projectors.

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ENVIRONMENT AND CLIMATE CHANGE

**APPLICATION OF GOAL ALGORITHM IN QUANTIFYING THE EFFECT OF
TILLAGE AND EQUIPMENT ON SMALLHOLDER FARM PRODUCTIVITY**

Name of author?

ABSTRACT

This study addressed the problem of inadequate utilization of farm equipment for conservation tillage production in Kenya. It aimed at analyzing the effect of tested farm equipment on optimum maize production subject to available labour, land, power and specified crop residue recycle. After selecting and testing available tools and equipment it was found that land breaking, furrow making, timely planting and weeding are possible. It was also found that innovative animal draft power (ADP) tillage equipment could significantly minimize runoff. A single objective linear programming (LP) model was formulated to estimate optimum production with input data drawn from technical test performance. The input parameters used were available farm labour, land, schedule of maize production tillage operations and expected yield for various levels of timeliness of planting and weeding. The output production was kilograms of maize grain dry matter available per farm. LP models suffer serious limitations due to assumptions of linearity, certainty and use of single goal whereas reality is non-linear, is risky and multiple goaled. Multiple goal models impose serious complexities in data collection, analysis and interpretation. Goal programming was therefore recommended because of its simplicity. Goal programming was carried out to determine optimum energy use subject to specified crop residue recycles. The energy consumption for various timeliness combinations was substituted for yield as the coefficient of the objective function to minimize energy use. Results show that farmers who own ADP do not require tractor powered (TP) mechanization for seasonal operations unless more than 4 ha per farmer cultivated land is available. For farmers who do not own ADP, it is more beneficial to switch to new ADP equipment than to supplement their capacity with hired tractors. It is recommended that researchers consider long term quantifiable productivity attributable to farm equipment for smallholders as one of the prerequisite for mechanization selection.

1. INTRODUCTION

The optimum time period for farm operations depends on crop growth requirements on one hand, and on the other, on the machine workable time limited by the weather and soil conditions, as well as crop conditions in case of harvesting, Van Elderen (1977 & 1978); Portiek (1975); Tulu (1973); Cervinka & Chancellor (1972). If the farmer wants to be 90% sure to get the job done, then the number of hours must be assumed likely at 90% probability. This then becomes the basis for acquiring labour and machines with the relevant capacities to get the operations done on time with that level of confidence.

Available farm operation scheduling models have been developed to select machines for specific timeliness requirements. Except in certain harvesting and sometimes planting situations, Cervinka & Chancellor (1972); Van Elderen (1977), few timeliness functions relating loss in yield or revenue to the time of a particular operation have been developed. In other words, the actual physical effect on crop growth of the particular delayed operation has not been explicitly stated. Consequently, the timeliness requirements have been unduly rigid. For this reason, the machine selection and scheduling models have in many cases been designed to meet these exact timeliness requirements at minimum cost. The fact that allowing some degree of delay may be optimum has not received sufficient attention since neither power nor energy requirements were considered

limiting. The other possible reason for not considering less than timely alternatives is that, in developed countries farming is already very profitable and generally timely. The problem is usually to select and schedule farm machinery to guarantee timeliness at the time of very adverse weather. Models are therefore used to optimize the selection minimizing investment on machinery and increasing profit.

The situation is different in the Less Developed Countries (LDCs) especially in semi arid small-holder agriculture where operations are generally untimely and farming is generally unprofitable. The main reasons for this are that soil conditions in these areas are too difficult for the available human and animal power and the implements may be inappropriate, Muchiri (1984). Furthermore labour bottlenecks are experienced not only during land preparation and planting but also during the subsequent weeding and even harvesting. Thus early land preparation of a relatively large area to take advantage of limited rainfall may create labour bottlenecks during early weeding and may nullify the benefits of early planting, Muchiri (1976). Spread-out planting, i.e., allowing some late planting deliberately, may make it possible for the farmer to take care of early germinating weeds while planting and delay the weeding operation to a time when there is no labour bottleneck, Nadar (1984). In this way, better labour utilization may be achieved. The problem arises when early weeding requirements coincide with late planting and the farmer cannot easily determine the optimum labour allocation, Muchiri (1976). However due to weather uncertainties and inadequate soil moisture conservation, late planting takes precedence over early weeding.

The other important point is that increased yield does not arise from one operation but a set of operations such as land preparation, planting and weeding. The opportunity cost for carrying out a single operation is meaningless in this case. What is required is an optimization model in which timeliness requirements are included as constraints over the cropping season. This is the approach adopted for this study. The main objective was therefore to develop a model for quantifying the effect of tillage and equipment on maize production and energy consumption subject to available labour, land, power and specified crop residue recycle.

2. LITERATURE REVIEW

1.1 Various Small-holder Modelling Techniques

The need to incorporate several interacting factors that affect technological impact on small-holder farm business has led many researchers to use various modelling techniques. Linear programming (LP) techniques have been used to examine the effect of technological innovations, Low (1975); Heyer (1971); Hardaker (1979); Kinsey (1980); Mutebwa (1979); Mc Carl and Nuthall (1982); Mc Rota (1997). Low (1975) for example used a farm level LP model to test the effect of new technologies including tractor mechanisation, improved cropping system, storage and credit on small Ghanaian farms. While observing that the farmers' resource allocation was near optimum, Low (1975) conceded that there is a need for technological interventions. Neither tractor mechanization which solves the labour problem during land preparation only to create another at weeding time nor high yielding but drought evading, hence risky maize variety were appropriate. However, incorporating storage facilities to guarantee subsistence in adverse years improved cost benefit ratio considerably.

Hadarker (1979) identified three general criticisms against linear programming applications to farm level problems: assumption of certainty when the pervasiveness of risk is widely appreciated assumption of linearity whereas reality is invariably non-linear, and use of single goal instead of multiple goal objective functions which are closer to reality. Anderson et al. (1977) observed that the problems of non-linearity and programming under risk are connected with the additional computational burden. The extra effort is therefore likely to be ignored in project development. Anderson and Hadarker (1979) in their comprehensive review of economic analysis in design of new technologies for small farmers have recognized the general complexity of small farm

enterprise and that any attempt to include all the possible activities and constraints would soon lead to computational problems. It was suggested that a new technology could be classified into one of the following three categories, i.e., notional technologies which are analyzed through models only, preliminary technologies which are analyzed for certain target groups, and developed technologies which are well tested and require communication to the target group for adoption.

A multi-criteria approach to the choice of technology for farmers in semi-arid smallholder agriculture proposed an attempt to develop a simple farm equipment selection model that can integrate available information that affects production. By using single criterion objective functions the models are unable to examine other equally important objectives, which may be conflicting, or having different units of measurements. Alocilia and Ritchie (1993) have observed that existence of multiple objectives in agriculture is a rule rather than an exception – profitability being only a part of the overall concern for agricultural sustainability.

Van Latesteijn (1993) discussed *A Methodological Framework to Explore Long Term Options for Land Use*. The framework showed how quantitative relations between a number of self-contained technical development processes in agriculture, socio-economic and environmental policy objectives can be modelled. A dynamic crop simulation model and a geographical information system that comprise soil characteristics, climatic conditions and crop properties were used to calculate regional yield potentials for indicator crops. Next, a linear programming model that contains several policy derived objective functions is applied to calculate optimal regional allocation of land use. Different restrictions can be put to the objective functions. The model proposed by Van Latesteijn (1993) is simply a mathematical instrument to explain the relationship between policy objectives and technical performance at farm level. Thus, the model assists the policy makers to understand and select strategies that can achieve policy objectives, subject to the potential limits fixed by socio-economic and physical environment.

In this study consideration is given to technologies, which are well developed and require communication to farmers. A linear programming (LP) model is used in conjunction with ‘Interactive Multiple Goal Programming’ (IMGP). An LP-Model is generally used to optimize a single objective function. The IMGP procedure makes it possible to optimize a set of objective functions in an interactive process.

1.2 Goal Programming

Bhattacharya (2005) developed a goal programming model to predict the yield of sugarcane three months before harvest. The biometric characteristics used were plant height, girth of the cane, number of canes per plot and width of third leaf from the top. Goal programming was compared with the conventional multivariable regression analysis. Although some of the characteristics are correlated, regression analysis is based on the assumptions of normality, independence and homoscedasticity. After demonstrating that both have equal level of accuracy, goal programming was recommended for predicting sugarcane yield three months before harvesting in situations where the assumptions of conventional regression analysis are violated.

Sharma et al. (2007) developed ‘Fuzzy’ goal programming for optimum allocation of land under cultivation and proposes an annual plan for different crops. Goals such as crop production, net profit, and machine requirements are modelled as fuzzy. The fuzzy goals are transformed to linear constraints by introducing tolerance variables. He showed that the model allows tolerances in the allocation of resources in order to fit the prevailing circumstance of the analysis.

Taha (1997) explained that there are situations where it is impossible to find a single solution that optimizes the conflicting objectives. In such situations, a compromise solution based on the relative importance of each objective is all that can be achieved. The principal idea in goal programming is to convert the original multiple objectives into a single goal. The resulting model yields what is usually referred to as an efficient solution because it may not be optimum with respect to all the conflicting objectives of the problem. This is the mathematical modelling adopted for this study.

3. METHODOLOGY

3.1 Effect of Tested Conservation Tillage and Equipment on Farm Production

Linear and goal programming techniques are appropriate for quantifying the effect of technologies on small farm production which focused on linear and goal programming, Taha (1997).

3.1.1 *The Conceptual Model*

The purpose of the model illustrated in Figure 3.1 below is to show how the analysis was carried out including secondary sources of data. From Figure 3.1 it is clear that reliable yield data estimates are required. This will combine with data on available land, available labour and equipment field test data on capacity (ha/hr) to generate production at individual farm or a group of farmers. Linear programming model was used for quantifying expected production of a single farm or a group of small farms in case innovative farm equipment is successfully adopted.

Figure 3.1 illustrates input data and the expected outputs. The data required include (i) expected yield (ii) available labour (iii) available land for cultivation (iv) field capacity of available equipment innovations and (v) specified crop residue recycle. Figure 3.2 illustrates input data and the expected outputs. The data required include (i) expected energy consumption per ha (ii) available labour (iii) available land for cultivation (iv) equipment field capacity (v) optimum productivity (LP solution) and (vi) specified crop residue recycle. The highlights of data sources are given below.

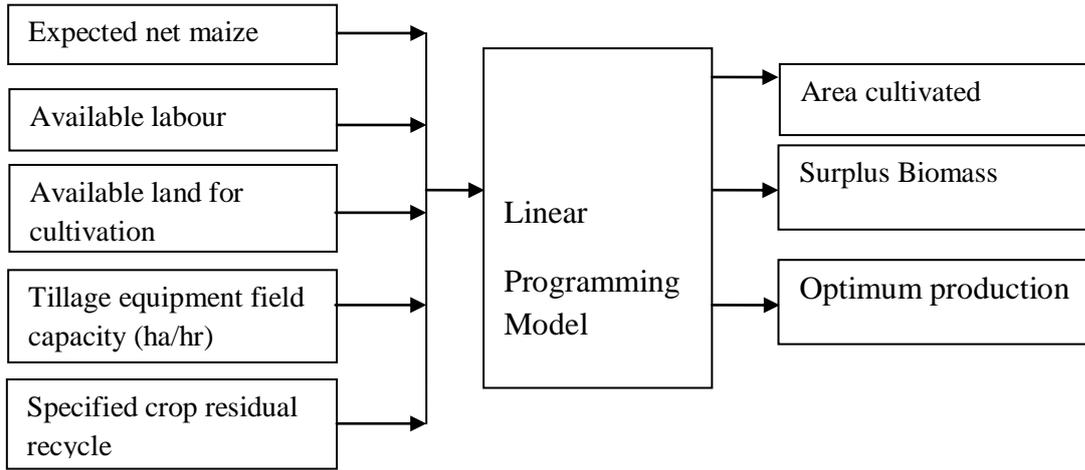
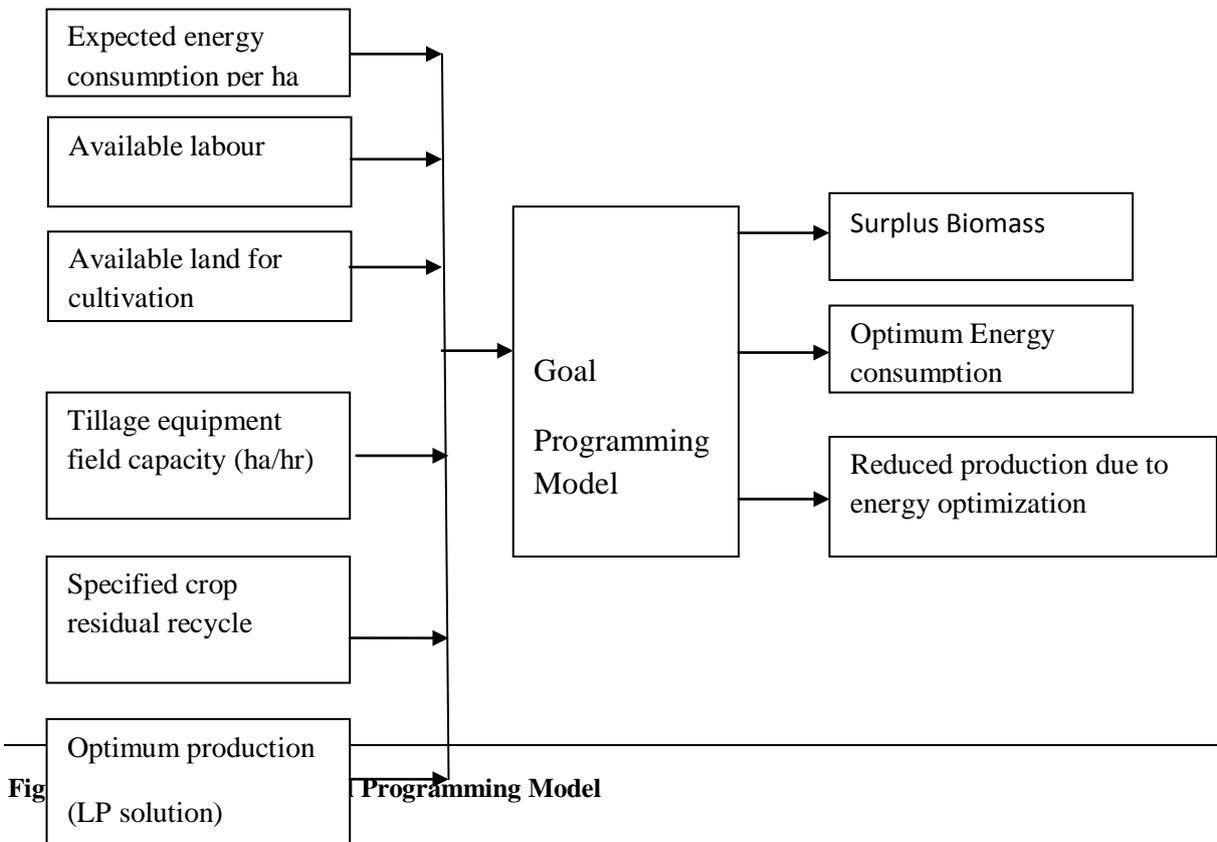


Figure 3.1 Input/Output Linear Programming Model



3.1.1.1 Labour

Mutebwa (1979) determined the levels of mechanisation with respect to farmland size and labour in semi arid Kenya. He surveyed 56 farmers over two seasons. From the survey data he categorized farm equipment subsets

into five alternatives depending on whether the farmers use one of various combinations of: hand tools, ox equipment or tractor for land preparation, planting or weeding, thus:

HHH = land preparation, planting and weeding by hand.

OHH = land preparation by oxen, planting and weeding by hand.

OHO = all operations by oxen except planting.

THH = land preparation by tractor, the rest by hand

THO = land preparation by tractor, planting by hand and weeding by oxen.

These farm equipment alternatives are practiced by the farmers whose land size falls into three categories: 0.2 – 2.99 ha (Small); 3.0 – 5.99 ha (Medium); and over 6 ha (Large). Virtually all the farmers had access to traditional hand tools and ox- drawn plough; a few (16%) had access to hired tractors. Labour utilisation by farmers at various levels of mechanisation including human power, ADP and tractor power (TP) in lower Kirinyaga District as shown in Table 3.1.

3.1.1.2 Land

Available information shows the range of land accessible to farmers for crop production but it does not take into account non arable land devoted to grazing. Mutebwa (1979) found that the range of arable land per household was 0.2 to 6.0 ha in lower Kirinyaga. This is similar to 1.0 to 6.0 ha found by Audi (1996) in lower Machakos.

3.1.1.3 Power

Performance of ADP equipment innovations was generated under controlled field experiments discussed in paper two. Some areas have access to Tractor Hire Service (THS) whereas other areas do not have access to any form of tractor power (TP). Mutebwa (1979) found that 16% of farmers in the lower parts of Kirinyaga district had access to tractors for general land preparation but not necessarily for sub soiling. Access to THS is subject to farmers' ability to pay. The actual performance is shown in Table 3.1. The model formulation is shown below.

Table 3.1 Labour (by hand, oxen or tractor equipment) used in hours per hectare for maize as a function of different mechanization levels

<i>Activities</i>		<i>Levels of Mechanisation</i>			
		<i>THH</i>	<i>THO</i>	<i>OHH</i>	<i>OHO</i>
		<i>Hand</i> <i>Tractor</i>	<i>Hand</i> <i>Hand oxen</i> <i>Tractor</i>	<i>Hand</i> <i>Oxen</i>	<i>Hand</i> <i>Oxen</i>
<i>Ploughing</i>	<i>Low</i>	5	4	42	43
	<i>Average</i>	6	377	51	49
	<i>High</i>	7	8	60	55
<i>Planting</i>	<i>Low</i>	74	79	34	32
	<i>Average</i>	80	84	49	88
	<i>High</i>	102	89	66	66
<i>Weeding</i>	<i>Low</i>	224	20	200	22
	<i>Average</i>	25	234	230	25
	<i>High</i>	228	30	260	28
<i>Harvesting</i>	<i>Low</i>	210	220	150	208
	<i>Average</i>	221	220	222	218
	<i>High</i>	238	222	294	228

Source: Mutebwa (1979). Lower Kirinyagah District

Key:

<i>HHH</i>	<i>Ploughing</i> hand	<i>Planting</i> hand	<i>Weeding</i> hand
<i>OHH</i>	<i>oxen</i>	<i>hand</i>	<i>hand</i>
<i>OHO</i>	<i>oxen</i>	<i>hand</i>	<i>oxen</i>
<i>THH</i>	<i>tractor</i>	<i>hand</i>	<i>hand</i>
<i>THO</i>	<i>tractor</i>	<i>hand</i>	<i>oxen</i>

3.1.2 Linear Optimization Rationale

The linear optimization model considered for the analysis of farm production attempts to maximize the area of land planted and weeded as early as possible utilizing all the available resources. Therefore the model selects area units of land planted and weeded at specified timeliness subject to available labour, land and power during the critical cropping season. For each of the area units (variables) there is a corresponding expected yield. Farm production is therefore the sum of selected area units (ha) times the corresponding yield (kg. of maize grain).

For each variable there is a specified number of operations that must be carried out according to a given time schedule in order to attract the corresponding yield. The tillage subsystem is defined by the nature of operations that are specified. Each operation is carried out by a tillage equipment subset which consists of operation schedule, equipment hardware, field capacity, and number of men.

Therefore for each variable the number of subsets in the subsystem defines the tillage that is applied. The purpose of this model is not to optimize the allocation of resources in a particular farm unit but rather to quantify the optimum production of typical farm size units for the purposes of corporate planning of a mechanization scheme. Therefore actual labour or land resources in a particular farm setting are not necessary.

For these reasons, family specific socio-economic and cultural factors, which affect access to labour, land and power, are not considered. The model considers a range of labour, land and power utilization and computes the corresponding farm production. In addition to farm production, the model attempts to minimize energy consumption. The model also recycles a specified amount of crop residue to contribute to building up of organic matter content.

3.1.2.1 Single Objective Linear Programming

Farmer's production is the sum of the product of the cultivated area units and associated expected yield of each of the selected timeliness crop production schedules (variables).

The general Linear Program (LP) is;
Maximise

$$z = \sum_{j=1}^n c_j x_j \quad 3.1$$

Such that

$$\sum_{j=1}^n a_{ij} x_j \leq b_{ij}, \quad 3.2$$

And $x_j \leq b_i, i = 1, 2, \dots, m$ $x_j \leq b_i, i = 1, 2, \dots, m$

$$x_j \geq 0, j = 1, 2, \dots, n \quad x_j \geq 0, j = 1, 2, \dots, n$$

Farmers' gross production is the sum of the product of the cultivated area units multiplied by the corresponding crop yield to the selected timelines crop production schedules.

The variables are defined as

x_{nm} = Area of the maize activity planted n weeks late and weeded m weeks late for $n, m = 0, 1, 2, 3$.

y_{nm} = the expected yield corresponding to the timeless schedule nm .

Therefore the objective function becomes

$$z = \sum_{n=0}^3 \sum_{m=0}^3 x_{nm} y_{nm}$$

3.3

The problem has four constraints

1. The number of hours available from each power unit during the critical (week) period cannot be exceeded. Given that $b_{(i,j,t)}$ is the number of hours available for i^{th} crop operated by the power unit j during working period t .
Given that $H_{(i,j,k,t)}$ = hours per ha required for i^{th} crop in k^{th} operation powered by j^{th} power unit in the week period t , then the constraint becomes

$$\sum_{n=0}^3 \sum_{m=0}^3 x_{nm} \sum_{k=1}^k H(i, j, k, t) \leq b_{(i,j,t)} \quad 3.4$$

For $i=1; j=1, 2, 3; t=1, 2 \dots 10$.

For animal draft power (ADP), $j=1$; tractor power (TP), $j=2$;

2. The number of man hours available during the critical (week) period cannot be exceeded. Where $M_{(i,j,k,t)}$ is the man hours per ha required for i^{th} crop in the k^{th} operation by j^{th} power unit during working period t .
So the second constraint becomes

$$\sum_{n=0}^3 \sum_{m=0}^3 x_{nm} \sum_{k=1}^k M(i, j, k, t) \leq b_{(i,j,t)} \quad 3.5$$

3. The model recycles a predetermined quantity of crop residue regardless of the quantity produced. If necessary the model draws from uncultivated land. The constraint equation to ensure residue recycle is given by

$$\sum_{n=0}^3 \sum_{m=0}^3 x_{nm} (B - C_r Y_{nm}) \leq 0 \quad 3.6$$

B is the specified crop residue recycle in kg per ha and C_r is crop residue / maize grain ratio.

The accessible land for cultivation ranges from 2 ha to 4 ha per farmer. So the fourth constraint becomes

$$\sum_{n=0}^3 \sum_{m=0}^3 x_{nm} \leq h \quad 3.7$$

4. The non-negativity constraint where x_{nm} cannot assume negative values.
 $x_{nm} \geq 0, n = 0, 1, 2, 3; m=0, 1, 2, 3$.

Thus the whole LP becomes

Maximise equation 3.3 subject to equations 3.4-3.7

With $x_{nm} \geq 0$, $n=0, 1, 2, 3$; $m = 0, 1, 2, 3$.

For the purpose of maximizing net production the net crop yield can be substituted for the gross crop yield where the net crop yield is given by

$$\Delta y_{nm} = y_{nm} - y'_{nm}$$

and y'_{nm} is the break even yield

The LP model formulated above was used to carry out estimates of net production per farm unit.

$$H_{(i,j,k,t)} = \frac{10(np \times r)_{(i,j,k,t)}}{(v \times e \times w)_{(i,j,k,t)}} = \frac{(np \times r)_{(i,j,k,t)}}{C_a(i,j,k,t)} \quad 3.8$$

$$M_{(i,j,k,t)} = \frac{10(np \times nm \times r)_{(i,j,k,t)}}{(v \times e \times w)_{(i,j,k,t)}} = \frac{(np \times nm \times r)_{(i,j,k,t)}}{C_a(i,j,k,t)} \quad 3.9$$

Where: np is the number of power units operating together, nm the number of men per power unit, r the number of replications per operation, v the speed in km/h, e efficiency, w = width in meters and

$$C_a = \frac{v \times e \times w}{10} \quad 3.10$$

3.1.3 Goal Programming

The purpose for agricultural development is to achieve high but sustainable profit. Therefore the following goals must be achieved concurrently namely:

- Increased production
- Optimum energy consumption
- Residue bio-mass recycle

Goal formulation was as follows:

Maximize net production expressed in equation 3.3

Since high priority goal values of Z were determined by the single objective LP formulation discussed above, energy goal was optimized as follows:

Minimize energy requirements

$$EIG = \sum_{n=0}^3 \sum_{m=0}^3 X_{nm} (EIP)_{nm} \quad 3.11$$

Where $(EIP)_q$ is the energy requirement per hectare and EIG is the gross energy requirement.

Subject to

$$\sum_{n=0}^3 \sum_{m=0}^3 x_{nm} \Delta y_{nm} + S_1^+ - S_1^- = Z \text{ (Production Goal)} \quad 3.12$$

$$\sum_{n=0}^3 \sum_{m=0}^3 x_{nm} (B - C_r Y_{nm}) + S_1^+ - S_1^- = 0 \text{ (Residue recycle goal)} \quad 3.13$$

Equations 3.4, 3.5 and 3.7

$$x_1, x_2, \dots, x_q, S_1^+, S_1^-, S_2^+, S_2^- \geq 0 \quad 3.14$$

The optimum solution was obtained by TORA, Taha (1997). The single objective LP model, equation 3.3 above, defined optimum production subject to the constraints of the farming system also defined by equations 3.4-3.7 as shown above. In goal programming, the optimum production (already determined above) was set as the priority goal, which is achievable. The corresponding objective function was then formulated as a constraint equation 3.12 to ensure that the production goal already achieved is not violated when energy consumption is being optimized. If the system produced less than the previous optimum, this was considered a violation of production goal and the model estimated the degree to which this goal was violated. Biomass for recycling was set as an achievable goal. A corresponding constraint equation 3.13 was formulated with a restriction that a certain amount of the biomass must be recycled as shown above. The model quantified any surplus biomass after recycling specified amount. In short the same objective function for single goal was maintained for optimization of energy use. The coefficients now became the energy consumption instead of maize yield equivalent; other constraints remaining the same.

3.2 Energy Use for Crop Production Activities

3.2.1 Tractor power

According to Panesar (1993), total energy (EI) consumption for a soil-working tool is given by:

$$EI = \frac{(D + MRP)v \times e \times T}{\eta_c \times \eta_t \times (1 - s)} + \frac{MRP \times K_1 \times v \times (1 - e)}{\eta_c \times \eta_t \times (1 - s)} + \frac{RP \times T + PLP \times T}{\eta_c \times \eta_t} \quad 3.15$$

Where

D	= draft;	k_1	= constant;
v	= speed;	MRP	= rolling resistance;
T	= total time;	e	= field efficiency;
η_t	= traction efficiency;	s	= wheel slip;
RP	= rotary power requirement at P.T.O.;	η_c	= engine efficiency;
PLP	= power requirement for accessories;		

In a heavy non-rotary tillage operation $RP=0$ and PLP is negligible. The second of the two remaining components is the energy consumption during non-working period. The fuel consumption during time T is given by:

$$FC = \frac{EI}{\lambda} = \frac{(D + MRP)v \times T \times e}{\lambda \times \eta_c \times \eta_t \times (1 - s)} + \frac{MRP \times v \times T \times (1 - e)}{\lambda \times \eta_c \times \eta_t \times (1 - s)} \quad 3.16$$

Where λ = fuel calorific value

For simplicity it can be assumed that the energy requirement during non-working period is the same as that during working period considering the following factors: stops and starts, turns out and back in the field, and engine speed increases as soon as load is reduced and lowers as the load is applied. Under these circumstances the field efficiency, e , can be assumed to be equal to unity. Thus both the energy used when the implement is in the soil and that used when it is out of the soil (turning etc.) is accounted for equally. Accordingly it is assumed that fuel used and traction efficiencies stay the same and that energy used per unit time is the same during total time T . The above equation can therefore be reduced to the form:

$$FC = \frac{(D + MRP)v \times T}{\lambda \times \eta_c \times \eta_t \times (1 - s)} \quad 3.17$$

Therefore the rate of fuel consumption is given by

$$RFC = \frac{FC}{T} = \frac{(D + MRP)v \times T}{\lambda \times \eta_c \times \eta_t \times (1 - s)} \quad 3.18$$

Alternatively the rate of fuel consumption is given by

$$RFC = SFC \times BP \times \frac{Area}{v \times w \times e} \times Loading\ factor \quad 3.19$$

Where RFC is the rate of fuel consumption, SFC is specific fuel consumption and BP is brake power.

The alternative method of calculating the F.C. is convenient because SFC and BP for common tractors are published periodically. The relevant loading factors are also published periodically. The calorific value of the diesel fuel was taken from Liljedahl et al. (1989). Diesel number 2-D with density of 0.847kg/l has high heating value of 39020 kJ per litre. A 60 Hp or 45 kW tractor was assumed.

3.2.2 Animate Energy Consumption

Energy consumption from human beings and animals depends on several factors including: body weight, physical condition, type of work, motivation and experience. It is normally estimated by oxygen consumption and pause rate. Binning, Pathak and Panesar (1984) published Energy Audit of Crop Production Systems in which they have standardised methods of analysis using data from various researchers in India. They found that energy for labour varied from 0.18 to 2.04 MJ/man-hour. For the purpose of this study an average figure of 1.96 MJ/man-hour undertaking heavy agricultural tasks such as tillage is assumed. In a similar manner, they analysed data on energy output from draft animals. They found that the range for oxen varies from 2.68 to 31.40 MJ per bullock hour. For the purpose of this study an average of 10.1MJ per bullock hour has been used as recommended by Binning et al (1984) referred to above.

3.3 Machinery Performance

When a group of farmers have adopted a form of farm power and equipment, the degree of adoption is measured for example in the form of how many hectares are being ploughed per season. The gross benefits associated with the selected schedule of planting and weeding are estimated from the list of alternative production schedules. The seasonal cost of ploughing per ha is estimated in terms of owning costs and variable costs. Custom hire service rates are good indicators of the cost of mechanization of the relevant operations.

In order to estimate the cost of machine hours or man-hours, accurate measurements of machine hours and/ or labour inputs per season for each of the operations were carried out. Alternatively available secondary data on machine utilization were used in estimating the relevant field capacity, field efficiency, labour requirement, and associated costs. Definitions used here are based on ASAE standards namely: S495 on uniform terminology, EP496 on machinery management and D497 on machinery management data, Srivastava, Goering and Rohrbach, *Engineering Principles of Agricultural Machines and Efficiency* ASAE (1995).

3.3.1 Field Capacity

On an area basis field capacity is given by:

$$Ca = \frac{VWe}{10} \quad 3.20$$

Where, C_a is the field capacity, V is the actual travel speed (km/h), W is the machine working width (m) and e is the field efficiency.

3.3.2 Field Efficiency

Theoretically, time required to perform a given operation varies inversely with the theoretical field capacity and can be calculated with equation 3.21, where T_t is the time theoretically required to perform an operation (h), C_{at} is the theoretical field capacity (ha/h) and A is the area to be processed (ha).

$$T_t = \frac{A}{C_{at}} \quad 3.21$$

The actual time required to perform the operation will be increased due to overlap, time required for turning on the ends of the field, time required for loading or unloading materials etc. Such time losses lower the field efficiency below 100%. Equation 3.22 can be used to calculate the field efficiency. In this equation, $T_e = T_t / K_w$ is effective operating time (h), K_w is fraction of implement width actually used, T_a is time losses that are proportional to area (h) and T_h equals time losses that are not proportional to area.

$$\eta = \frac{T_t}{T_e + T_h + T_a} \quad 3.22$$

3.3.3 Machinery Costs

Machinery cost consists of ownership and operations including penalties for lack of timeliness.

Ownership Costs

The total annual ownership costs can be expressed in the following equation:

$$C_{os} = \frac{C_{oa}}{P_u} (1 - S_v) \left(\frac{I_r (1 + I_r)^{\tau_L}}{(1 + I_r)^{\tau_L} - 1} \right) + \frac{K_{tis}}{100} \quad 3.23$$

Where, C_{os} is specific annual ownership costs (1/yr), C_{oa} is total annual ownership costs (Kshs/yr), P_u is purchase price machine (Kshs), τ_L is economic life of the machine, S_v is salvage value as fraction of purchase price, I_r is real annual interest rate (decimal) and K_{tis} is annual cost of taxes, insurance and shelter as percentage of purchase price.

The real interest rate, as defined by Bartholomew (1981) is given by equation 3.24, where I_p is the prevailing annual interest rate and I_g is the general inflation rate.

$$I_r = \frac{I_p - I_g}{1 + I_g} \quad 3.24$$

Operating Costs

Operating costs are associated with use of machine, and they include the costs of labour, fuel and oil, repair and maintenance.

3.4 Workable Time

Kijne (1980) showed that the basic infiltration rate for Katumani Alfisols is 20 mm rainfall per hr. Therefore 40 mm would take over 2 hrs. It was therefore considered prudent to allow unworkable time as follows: **one day** was considered unworkable if 20-40 mm rainfall was received within 24 hours and **two days** were considered unworkable if more than 40mm rainfall was received within 24 hours.

The linear programming model was run for each of the 19 years using actually available workable days per week assuming a maximum of 5 working days per week. For instance, for 2 AME whose weekly labour input is 50 man-hours, only 40 hours were taken if one working day was lost.

From these runs, it was determined that the difference between the average output of the 19 year runs the output of one run using the average workable time for each week over the season was negligible. Therefore, all subsequent runs were done using 19-year averages of workable time during the season.

4. RESULTS AND DISCUSSION

4.1 Effect of Tillage and Equipment on Production

4.1.1 Maize Grain Production

It is apparent from Table 3.1 that at 2 adult labour equivalent (AME) the traditional hired ADP for land preparation does not increase production when more land is made available unless labour is increased at the same time. When labour constraints are addressed by hiring traditional ADP for weeding, production is increased 26% (9.4 to 11.9) at all the three levels (2, 3 and 4ha) of access to land for cultivation. If one AME was available instead, production would have increased by 46% (9.4 to 13.7). When THS is made available for land preparation to replace ADP, production is increased 33% (11.9 to 15.8) at all the three levels (2, 3 and 4ha) of access to land for cultivation; less than 51% (11.9 to 18.0) had labour access been increased from 2 to 3 AME instead of THS replacing ADP for land preparation. The obvious reason is that labour and not land is a constraint at these levels of mechanization. Moreover access to additional labour has a hire marginal return than either ADP weeding or THS.

However when labour constraints are addressed by introducing hired traditional ADP for weeding combined with additional labour, farmers realize a 31% (13.7-18.0) increase in production at all the three levels (2, 3 and 4ha) of access to land for cultivation. This figure is doubled from 18.0 to 35.5 quintals (qu) when hired tractor is made available for timely land preparation to replace hired ADP. If the farmer hires innovative equipment for land preparation and weed control (NCOHO) there is a substantial increase of 107% (18.0 to 37.4 qu) in production. Therefore tractor hire service (THS) is slightly less profitable than hired innovative ADP equipment.

The impact of THS on farmers, who own ADP equipment (OHO), is negligible at 3.5% (43 to 44.5qu). However if both land and labour are increased at the same time the THS impact is significant at 24% (43.0 to 53.4). This impact would be doubled at 47% (43.0 to 63.3) if the farmers adopted equipment innovations instead of THS for

land preparation. This again underscores the superiority of innovative ADP equipment compared to THS. The following conclusions can be made:

- i. For a farmer with 3ha cultivated land and 3 AME but does not own ADP, it makes little difference whether he uses THS or hired innovative ADP equipment for land preparation and weeding. However if the farmer who owns ADP equipment replaced them with innovative ADP equipment he would have extra capacity to increase cultivated land of his own or offer custom hire service to his neighbour who does not own ADP. An increase of up 47% can be realized at 4ha cultivated land.
- ii. For the purpose of policy prescription it is apparent that adoption of innovative ADP equipment can cater for both ADP owners and non owners. The need for tractors can therefore be restricted to reclamation of badly compacted soils through sub soiling.

Adoption of innovative ADP equipment and THS for sub soiling has implications for investments in the relevant agricultural sector. It means improved rural access roads, development of agro-service centres with repair workshops and distribution centres for fuel and other inputs. It also means better harvesting and post- harvest processing, preservation and storage facilities as well as marketing.

4.2 Access to Land

Table 3.2 gives production increases in quintals of maize grain per farm unit as access to land increases from 2 to 3 ha and 3 to 4 ha with access to labour remaining the same at 3 AME. On the one hand for farmer who do not own traditional animal draft power (OHO) there is little to be gained from more land above 2 ha until they adopt tractors (COHOTH) or equipment innovations (NCOHO) to improve timeliness of planting. Hiring of traditional equipment alone will not improve the situation because it has low rate of work and farmers get it late. This implies that labour is the main constraint. On the other hand farmers who own traditional animal draft power can increase production by 27.6% by adding one more ha to reach 3 ha but not beyond that. Benefits of additional land are associated with increased rate of work implied in NCOHO, NCOHOTH and NOHO reaching 25%, 39% and 44% respectively. The new animal draft power equipment has high rate of work for land preparation, planting and weed control (see chapters three, four and five). The benefits diminish as access to land increase beyond 3 ha even if more labour is available. The tractor hire service which is available for one full day (8 hrs) per season is unlikely to make an impact.

Table 3.1 Model Results: Farm Unit Net Production in Quintals (100kg D.M) of Maize

		Land , Ha		
		2	3	4
COHH	2	9.4	9.4	9.4
	3	13.7	13.7	13.7
	4	17.8	17.8	17.8
COHO	2	11.9	11.9	11.9
	3	18.0	18.0	18.0
	4	20.5	20.5	20.5

COHHTHH	2	15.8	15.8	15.8
	3	22.8	22.8	22.8
	4	27.0	28.4	28.4
COHOTH0	2	28.0	28.0	28.0
	3	29.1	35.5	35.5
	4	29.6	38.4	38.4
OHO	2	30.2	33.9	33.9
	3	33.7	43.0	43.0
	4	33.7	44.7	46.4
OHOTH0	2	33.2	33.9	33.9
	3	33.7	44.5	47.5
	4	35.0	48.0	53.4
NCOHO	2	24.8	27.6	27.6
	3	26.5	37.4	41.8
	4	28.3	39.2	50.1
NCOHOTH0	2	30.5	41.4	48.7
	3	31.1	43.1	54.0
	4	31.1	44.9	55.8
NOHO	2	31.6	42.6	48.8
	3	33.0	47.5	59.3
	4	33.2	48.8	63.3

Note: AME = Adult Men Equivalent Price in 1990: KShs. 3/- per kg

Table 3.1(a) Model results: Farm Unit Net Income in Ksh. worth Maize Grain

		Land , Ha		
Labour ,AME		2	3	4
COHH	2	2820	2820	2820
	3	4110	4110	4110
	4	5340	5340	5340
COHO	2	3570	3570	3570
	3	5400	5400	5400
	4	6150	6150	6150
COHHTHH	2	4740	4740	4740
	3	6840	6840	6840
	4	8100	8520	8520
COHOTHO	2	8400	8400	8400
	3	8730	1065	10650
	4	8880	11520	11520
OHO	2	9060	10170	10170
	3	10110	12900	12900
	4	8880	11520	11520
OHOTHO	2	9960	10170	10170
	3	10110	13350	14250
	4	10500	14400	16020
NCOHO	2	7440	8280	8280
	3	7950	11220	12540
	4	8490	11760	15030
NCOHOTHO	2	9150	12420	14610
	3	9330	12930	16200
	4	9330	13470	16740
NOHO	2	9480	12780	14640
	3	9900	14250	17790

4	9960	14640	18990
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Note: AME = Adult Men Equivalent price in 1990: Ksh. 3/- per kg.

Table 3.2 Increases in Net Maize Production in Quintals per Farm Unit as access to Land Increases

Farm Equipment	Changes in cultivated lands for AME=3 Adult labour			
	2-3 ha	%	3-4 ha	%
COHO	0		0	
OHO	9.3	28	0	
COHOTH0	6.4	22	0	
OHOTH0	10.8	32	3.0	7
NCONHO	10.9	41	4.4	12
NCOHOTH0	12.0	37	10.9	25
NOHO	14.5	44	11.8	25

4.3 Is It Animal Draft Power (ADP) or Tractor Power (TP)?

From Tables 3.1 and 3.2, it is evident that access to animal draft power at COHO and OHO makes a big difference for the latter. When the two farmers moved to new ADP equipment namely: from COHO to NCOHO and from OHO to NOHO, the corresponding increases were 108% and 12% respectively. However, when tractor power is added to both the increase in production at 3x3 (3 AME and 3 ha) farm unit for both COHOTH0 and OHOTH0 are 56% and 5% respectively. When access to combined new animal draft power equipment and tractor hire services were allowed for farmers who do not own oxen namely: COHO to NCOHOTH0 production increased by a total of 139% (18.0 to 43.1 qu/3 ha farm). Clearly it is the farmers who do not own oxen who stand to benefit more by access to animal draft power equipment innovations and tractor power albeit by custom hire services. This has implications for common infrastructure not only to facilitate easy movement of farm power and equipment from farm to farm, but to carry out R & D, local manufacture and support services as well.

On long-term economic grounds a choice has to be made between moving from OHO to OHOTH0 or OHO to NOHO. The latter requires an investment of sh. 50,000 to cater for two households. The former requires an infrastructure to cater for tractor hire services among several farmers. Due to the fact that more than half of the farmers do not own oxen, NCOHO and NCOHOTH0 are good propositions. In other words changes can take place as follows:

<i>COHO to NCOHO</i>	<i>108% increase</i>
<i>(18.0 to 37.4)</i>	
<i>NCOHO to NCOHOTH0</i>	<i>15.0% increase</i>
<i>(37.4 to 43.1)</i>	

The combined increase from COHO to NCOHOTH0 (18.0 to 43.1) is 139%. A case can be made for support infrastructure of R & D training and local manufacture of animal draft power innovations. Given the massive infrastructure for access and support services for tractor hire service 15% increase in production

cannot justify such an investment. However, it should be noted that the tractor will be needed for deep tillage once in three to four years as discussed in chapter 2C. The merits of investment on infrastructure can be determined after benefit ratio is calculated. Biomass recycle implications are discussed below.

Table 3.3 Surplus Crop Residue after Recycling 25 qu per ha per Season on 3 x 3 ha Farms

	Biomass	Production , qu
COHO	0.0	18.0
COHOTH0	10.5	35.5
OHO*,	18.2	43.0
OHOTH0	19.0	44.5
OHOTH0,	19.0	44.5
NCOHOTH0	20.5	43.1
NOHO	27.6	47.5

Note: - 3x3 farms = 3 AME by 3ha farms

*- *FPE assumes corresponding values respectively i.e. biomass surplus for OHO = 18.2 qu/farm.*

4.4 Biomass Recycle Implications

From Table 3.3 it can be seen that the higher the production the greater is the surplus biomass. However the rate of increase of surplus biomass is greater than the rate of increase of production. Consider one alternative namely COHO and COHOTH0. In other words, tractor power increases surplus biomass at a much higher rate than it increases production. The extra feed can if necessary support more livestock including draft animals. New equipment even on hire basis also achieved higher yields because the farmer is able to complete planting by the first week due to dry land chiselling and high rate of furrow opening and planting.

It is important to note that the reason why biomass surplus increases at a higher rate than productivity is because biomass differences are based on gross production while productivity differences are based on gross margins. The gross biomass production is equal to 1.77 times the grain yield. The corollary to this is that better timeliness, which directly increases biomass production, enhances organic matter and associated soil fertility, which is sine qua non to agricultural sustainability. In other words, environmental conservation is achieved.

The same reasoning can explain why NOHO is in its own class at a higher level of both biomass production and productivity. That is timeliness is the answer to both yield increase as well as biomass production. Thus indirectly, the problem of feed for livestock and draft animals in particular is addressed. It should be noted that if the TP was employed to carry out deep ploughing and ridge and furrow forming, soil structure improvement can be carried over three to four years. Thus the additional cost can be amortized over that time.

It is evident that lack of access to adequate farm power and equipment has a direct effect not only on productivity but also on biomass production. Sustainability therefore demands introduction of tractor hire services and new animal draft power equipment. There is a need to work out the benefit cost analysis for the necessary investment.

4.5 Energy Use Implications

Basing energy analysis on economic and biomass recycle implications two farm power and equipment subsets deserve to be analyzed namely OHOTH0 and NCOHOTH0. Energy optimization was the basis for tractor power and animal draft power selections. It also indicated the optimum combination of tractor and animal draft power in terms of cultivated land in hectares.

From Table 3.4 it is evident that farmers need to apply both animal draft power and tractor power in order to realize the production potential. The main constraints are labour available during land preparation and weeding in the 6th and 7th week. The former occurs when there is competition for labour between late planting and early weeding while the latter occurs when demands for weeding are excessive. Important observation was that the farmer can achieve both optimum productivity as well as energy use with negligible violation of the former. This is a small price to pay to remain close to optimum energy consumption.

Table 3.4 Goal programming with energy objective function and productivity and biomass recycle as constraints

		OBJ.	Variables in ha					Constraints			Biom ass	Productivity	Productivity qu		
		MJ.	1	5	9	12	13	1,2,3,17			Land	qu	Set level qu	Surplus	Actual
NCOHOTH0e1	2*2	1.106	0.038	0.83	1.13							3.2	25	7.78	
NCOHOTH0e1	2*2	3.99	0.56	0.82	0.61							9.9	28	3.4	
NCOHOTH0e1	2*2	5.91	0.91	0.83	0.25							14.4	30	0.68	
NCOHOTH0e1	2*3	1.172	0.061	0.83	1.19	0.37				0.59	0	28	7.87		
NCOHOTH0e1	2*3	2.13	0.16	0.83	1.19	0.59				0.23	0	32	6.7		
NCOHOTH0e1	2*3	5.96	0.87	0.83	1.19	0.13					0	40	1.25		
NCOHOTH0e1	2*3	6.56	0.95	0.83	1.19	0.028					13.4	41			
NCOHOTH0e1	2*4	6.96	0.94	0.83	1.19	0.9401	0.1				5.13	48	0.46		
NCOHOTH0e2	3*3	4.77	0.62	1.32	1.06						12.5	41	3		
NCOHOTH0e2	3*3	5.73	0.7997	1.32	0.88						14.8	42	1.6		
NCOHOTH0e2	3*3	6.69	0.97	1.32	0.71							43			
NCOHOTH0e3	4*3	5.967	0.84	1.8	0.35						18.4	44	1.26		
NCOHOTH0e3	4*4	1.589		1.8	1.73					0.46	6.95	45	8		
NCOHOTH0e3	4*4	5.55	0.68	1.8	1.51						15.1	54	2.5		
NCOHOTH0e3	4*4	6.51	0.86	1.8	1.34						17.4	55	1.1		
NCOHOTH0e3	4*2	6.11	0.95	1.05							16.3	31	0.38		

NCOHOTHOe3	4*3	3.7		0.98	0.67		0.84	0.45			0.06	10.12	39		
NCOHOTHOe2	3*4	4.1	0.167	0.79	0.53		0.84	0.37			1.29	9.79	36	6.6	
NCOHOTHOe2	3*3	4.1									0.29	9.79			
NF	3*2														
NCOHOTHOe2	3*3	5.3	0.4155	0.79	0.53		0.84	0.21			0.2	13.88	39		
NCOHOTHOe2	3*3	5.7	0.498	0.79	0.53		0.84	0.16			0.17	15.25	40		
NCOHOTHOe2	3*3	6.5	0.66	0.79	0.53		0.84	0.053			0.11	17.96	42		
NCOHOTHOe2	3*3	6.9	0.74	0.79	0.53		0.84	0.0001			0.08	19.3	43		
NF	3*3												44		

Table 3.5 Linear Programming Objective Function Value, Activities in the Solution and the Limiting Constraints

Variables									OBJ	Labour constraints.				Land	Biomass surplus
FPE	1	(2-4)	5	(6-8)	9	(10-11)	12	13		1	5	6	16	18	19
NCOHOTHO2*2	16.6		12.02		1.86				30.5	0		0		0	15.5
2*3	16.6		12.02		12.76				41.4	0		0		0	14.2
2*4	16.6		12.02		13		5.89	0.86	48.4	0		0	0	0	5.9
NCOHOTHO3*3	16.6		14.5						31.1	0				0	16.6
3*3	16.6		19.6		7.44				43.14	0		0		0	17.3

3*4	16.6		19.1		18.34				54.04	0		0		0	16.03
NCOHO2*2			12.02		12.76				24.78			0		0	2.71
2*3			=do=		13		2.54		27.6			0		0.63	0
2*4			=do=		=do=		=do=		0			0		1.6	0
NCOHO3*2			19.1		7.44				26.54			0		0	5.8
3*3			19.1		18.34				37.44			0		0	4.53
3*4			19.1		18.44		4.28		41.8			0		0.4	0
NCOHOTH04*2	16.6		14.5						31.1	0				0	16.6
4*3	16.6		26.2		2.13				44.9	0	0	0		0	20.45
4*4	16.6		26.2		13.01				55.8	0	0	0		0	19.15
NCOHO4*2			26.2		23.9		0.02		50.1		0	0		0	6.3
4*3			26.2		13.02				39.2		0	0		0	7.6
4*4			26.2		2.13				28.3		0	0		0	8.9

0 ≡ means the slack is zero or near zero.

The variables selected are 1, 5, 9 & 12.

3×3 mean 3 adult men equivalent by 3ha cultivated land.

Table 3.6 L.P Model Output showing the Variables in the Solution and the Limiting Constraints

File	Obj valu e	Variables											Labour constraints																	Lan d	Biom as
		1	2	4	5	7	8	10	11	13	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
OHO22	30.2			19.2		4.9		6.2		2.6			✓	✓		✓		✓											0.0	13.3	
OHO23	33.9			14.9		4.9		6.3					✓	✓		✓		✓		✓									0.6	11.8	
OHO24	33.9			14.9		4.9		6.3					✓	✓		✓		✓		✓									1.6	11.8	
OHO22	30.2			19.2		4.9		6.2					✓	✓		✓		✓											0.0	13.3	
OHO23	33.9	0.02		14.8	8.0	4.9		6.3					✓	✓		✓		✓		✓									0.6	11.8	
OHO24	33.9	0.02		14.8	8.0	4.9		6.3					✓	✓		✓		✓		✓									1.6	11.8	
OHO32	33.7			26.2		7.5							✓	✓		✓				✓									0.0	19.6	
OHO33	43.0			26.2		7.6		8.92		0.30			✓	✓	✓	✓	✓	✓		✓									0.1	18.2	
OHO34	43.0			26.2		7.6		8.9		0.31			✓	✓	✓	✓	✓	✓		✓									1.1	18.2	
OHO22	33.9	1.13		26.2		6.6							✓	✓		✓				✓									0.0	20.0	
OHO23	44.5	2.5		23.7	1.7	7.6							✓	✓	✓	✓	✓	✓	✓	✓									0.0	19.0	
OHO24	47.3	8.7		12.8	9.4	7.6							✓	✓	✓	✓	✓	✓	✓	✓									0.6	17.6	

ОНО42	33.7		26.2	7.5							✓	✓	✓		✓								0.0	19.6
ОНО43	44.7		26.2	9.5	8.9	0.14					✓	✓	✓	✓	✓	✓							0.0	19.1
ОНО44	46.4		26.2	9.5	8.9	1.8					✓	✓	✓	✓	✓	✓	✓						0.76	17.2
ОНОТНО4 2	35.0	8.8	26.2								✓	✓			✓	✓	✓						0.0	23.0
ОНОТНО4 3	48.0	8.8	26.2	9.5	3.5						✓	✓	✓	✓		✓	✓	✓					0.0	26.0
ОНОТНО4 4	53.4	8.8	26.2	9.5	8.9						✓	✓	✓	✓	✓	✓	✓	✓					0.49	25.3
НСОНОТ4* 4	50.1		26.2	23.9	0.02							✓	✓								✓		0.0	6.3
НСОНОТ4* 3	39.2		26.2	13.0								✓	✓										0.0	7.65
НСОНОТ4* 2	28.3		26.2	2.10								✓	✓										0.0	8.95
НСОНОТ3* 4	55.8	16.6	26.2	13.02				✓				✓	✓										0.0	19.15
НСОНОТ3* 3	44.9	16.6	26.2	2.1				✓				✓	✓										0.0	20.45
НСОНОТ3* 2	31.1	16.6	14.5					✓															0.0	16.6
НСОНОТ2* 4	48.7	16.6	12.0	13.0	7.0	0.1		✓				✓									✓	✓	0.0	6.54

5. CONCLUSION AND RECOMMENDATIONS

The study was prompted by the need to inform policy on the development of tillage and equipment for semi-arid smallholder agriculture. The purpose of the study was to develop a specific methodology for predicting the effect of tillage and equipment on farm production.

5.1 Conclusion

- i. Access to 3 ha cultivated land and 3 adult labour equivalent can be implemented and sustain conservation tillage with hired new ADP at an estimated increase in income which can be paid for by the increased production in one season.
- ii. However, the innovative ADP equipment has no capacity for land reclamation involving sub-soiling 20-30 cm deep and associated land development.

5.2 Recommendations

- i. It is recommended that further controlled tests be carried out in other semi-arid areas in order to identify location specific requirements for ADP equipment.
- ii. It is recommended that estimates of the cost benefit ratio and associated rate of return on investment be made in order to inform policy for investment on infrastructure.
- iii. It is also recommended that researchers consider long-term quantifiable productivity attributable to farm equipment for smallholders as one of the prerequisite for mechanization selection (as is the case with irrigation technology).

This is an academically inspired scientific paper, it ought to have selected bibliography or references; the author has cited some works in this study and this ought to be reflected in the references.

Microfinance and Enterprises Performance in Tanzania: Does Gender Matter?

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Abstract

The purpose of this paper was to examine whether there is a difference in performance among the female owned enterprises and male owned enterprises. The analysis centred on the clients of microfinance institutions with premises that Microfinance institutions enable enterprises owner to develop their micro and small enterprises, which enhance their income earning capacity, and hence enjoy an improved living standard. The comparison between these two groups was important in identifying the motivational and individual characteristics that exist between females and males. Following the discussion in this paper, the female owned enterprises demonstrated a slightly lower level of growth compared to enterprises owned by male. In fact the results of t-test revealed that male owned enterprises have higher level of assets, sales revenue and number of employees compared to female owned enterprises.

Key words: Gender, Microfinance, and Enterprises Performance

Introduction

In developing countries, there are a big number of individuals who are financially underserved. In response to the widespread financial exclusion, microfinance programmes and institutions have been established globally as a prospective component of strategies of development organisations, governments, and societies to promote enterprises in developing countries (Hulme, 2000).

They are organisations with a goal to serve the needs of underserved markets as a means of meeting development objectives (Ledgerwood, 1998). It is postulated that owners of micro and small enterprises (MSEs) can through the services of micro finance institutions in particular credit accumulate wealth and attain firms' growth after some time. Specifically, microfinance institutions provide a broad range of services including deposits, loans, payment services, money transfer and insurance to the poor/low income households and their enterprises (Chijoriga, 2000; Conford, 2001 and Pilipinas, 2002). In addition, some of microfinance institutions provide non-financial services such as training, business advice, market assistance and business counselling to their clients (Hishigsuren, 2004 and CIDA, 1999). Microfinance institutions are thus seen as a critical element in enhancing the lives of the poor and low income earners in developing economies because their services target the clients who have been excluded from conventional formal institutions.

Microfinance institutions enable MSE's owners to develop their enterprises, which enhance their income earning capacity, and hence enable them enjoy an improved living standard (Mosley, 2001; ADB, 2000).

For instance, over the last twenty years, microfinance providers in developing economies have shown impressive results as tools for delivery of financial services to the poor and their enterprises (Bastelaer, 2000). Access to micro finance services give the clients an opportunity to improve working capital in MSEs thus expand economic activities as well as their meet household financial management and consumption needs (URT, 2000). Along this line of thinking micro-credit has proved to be an important liberating force in societies where disadvantaged groups, women in particular have to struggle against repressive social and economic conditions. This is achieved because microfinance enables these disadvantaged groups to accumulate capital for their enterprises. These enterprises are expected to grow and generate income to these groups which will have positive effect to the social and economic conditions.

The principal providers of microfinance services to the low income households and MSEs in Tanzania consist of licensed commercial banks, regional and rural community banks, savings and credit cooperative societies (SACCOS), and non-governmental organizations (NGOs) (Randhawa and Gallardo, 2003. Micro finance service delivery operations of the financial NGOs in Tanzania are mainly funded and supported with technical assistance of international donors (Randhawa and Gallardo, 2003). Although these institutions charge interest rates which are relatively the same as the market rates, they provide loans with affordable collaterals and most of the time without collaterals. Microfinance institutions mainly focus on low income earners and MSEs as most of them have small size liquidity and capital needs, contrary to the needs of most of the high-income earners in developing countries, whose capital needs are higher and for larger projects (Mosley and Hulme, 1998).

Impact assessment studies in microfinance have since 1990s become increasingly popular worldwide. The focus has been on measuring MFI programs' success by considering the changes brought about by their interventions on clients (borrower) and their enterprises. (Woller and Parsons, 2002, Mosley, 2001), have become increasingly popular worldwide. Most of the impact assessment studies revealed that microfinance interventions specifically microcredit have had beneficial economic and social impacts (e.g. Mosley, 2001). While the results of these studies suggest positive impacts, little has been done about the impact on female owned enterprises compared to male owned enterprises. The objective of this paper is therefore to compare the performance of female owned enterprises against male owned enterprises that have received micro finance services. The comparison between these two groups is inevitable because it enables the researchers to identify the motivational and individual characteristics that exist between females and males recipients of microfinance services. The research question that guided the study was: "Does the performance of enterprises owned by microfinance clients differ gender-wise?"

Gender Differences and Theories of Growth

Female entrepreneurs are behind a substantial proportion of micro-enterprises (World Bank 2004). Studies carried out on comparison on gender differences in enterprises have revealed that enterprises owned by women, experience the same constraints as those owned by men. At the same time, it is often argued that female entrepreneurs face certain gender-specific challenges, and may be affected differently by policies to promote private sector development

(Buvinic 1993; Ellis 2003) such as micro finance interventions. Liedholm and Mead (1999) find, however, that the principal problems facing female and male entrepreneurs are fairly similar.

Others argue that certain characteristics are typical for female owned enterprises when compared to male owned enterprises. These characteristics include small sized firms, limited prospects for profitability and failure to provide collateral for obtaining loans (Coleman, 2002 and Fielden et al, 2003). Female owners are somewhat more constrained by market size than male owners, and men more often cite regulations and taxes as a problem, but the differences are small. In Tanzania specifically, women are constrained by education/training, business experience, discrimination, socialization/networking capacity and lower

propensity to risk taking (Nchimbi, 2002; Coleman, 2002 and Fielden et al, 2003). Also the overall negative attitudes towards the business owned by women (particularly by men) and inadequate and affordable business premises also limit the overall performance of female owned enterprises.

It is further agreed that there is a significant variation between male and female especially when considering sources of funds for start up and running their businesses. For example, Katwalo (2007) established that female entrepreneurs relied more on family funds than male entrepreneurs. In this case it is difficult for female owned enterprises to take advantage of external finance opportunities. This is against the internal finance theory of growth (see for example Carpenter and Petersen, 2002; Binks and Ennew, 1996 and Reid, 1996), which argues that firms whose financial needs exceed their internal resources may be constrained to pursue potential opportunities for growth (Demirgüç-Kunt and Maksimovic, 1998).

The insufficient internally generated liquidity is frequently cited one of the factors which causes business failure in MSEs in developing countries (Chijoriga and Cassimon, 1999). It is from this perspective, the micro credits are considered to be an appropriate solution because the amount of money needed to start a micro or small business is generally quite minimal (Sonfield and Barbato, 1999). Access to credit enables the MSEs' owners to acquire working tools and equipment expands their business activities or renovates working premises and buildings (ILO/UNDP, 2000). Credit also assists the small business owners with working capital to cover cash flow shortage, to purchase inventories, to invest in new technology, expanding the market and being able to take advantages of suppliers' discount. Without sufficient capital therefore, micro and small firms are unable to develop new products and services or grow to meet demand of their customers (Coleman, 2000).

Despite the importance of funds to finance start up and existing business enterprises, there are other factors that can explain differences between male and female owned enterprises. These other factors can be explained by human motivation view of growth. The human motivation view of growth holds that the social and psychological motives can significantly influence growth seeking behaviour and therefore growth itself (Shane et al, 2003; Olomi, 2001 and Nchimbi, 2002). The view sees growth as resulting from personal needs of the owner-managers and these needs are socially generated, socially sustained and socially changed (Shane et al, 2003). The theories under this view of growth can be categorised into two types. The explanatory models which relate growth to motivations and antecedents, and the second is the theories which attempt to categorise owner managers into unique typologies on the basis of the meaning they attach to business activity, which in turn imply different levels of growth motivation (Olomi, 2001). In developing countries, gender differences are very high, Tanzania not exclusive. The way men are groomed is quite different compared to women. The level of labour division in different social and economic activities is very high, and therefore the extent of adopting and doing things differ gender wise.

There are different characteristic features between women and men resulting from division of labour some of which may explain the differences in business performance. It is for instance argued under human motivation view that the characteristic features of firm owners are motivators that can trigger MSEs Owners to start and run business for growth motives. The argument here is based on the assumption that growth would be realized when completing a job, solving problems, seeing the results of one's efforts, being recognized for a job well done and performing interesting work (Apospori et al, 2005 and Shane et al, 2003). Other prerequisites include successful completion of a (difficult, demanding or challenging) task,

having control over one's own job, upward movement of enterprises activities, creating more opportunities for enterprises, learning new skills by working in challenging environments and sometimes poverty reduction motive (Davidsson and Wiklund, 1999; Shane et al, 2003; Olomi, 2001 and Apospori et al, 2005). It is from these beliefs, the realization of these features create the possibility of MSEs to grow. As mentioned above, different features can be built from previous experiences and sometimes by using role models, in such a case the labour division in developing countries dictate different characteristic features between women and men. It is therefore expected that performance differentials would be observed when comparing the business performance for enterprises owned by women and men.

Another theory that has been used by researchers who subscribe on human motivation view is McClelland's (1961) achievement motivation theory (for example: Davidsson and Wiklund, 1999; Olomi, 2001 and Nchimbi, 2002). The underlying logic in this theory is that someone's choice of work-tasks and the time and energy devoted to these work-tasks, is dependent on the individual's motivation to perform different tasks. The theory argues that running a business requires people to take moderate risks, assume personal responsibility for their own performance, pay close attention to feedback in terms of costs and profits, and find new or innovative ways to make a new product (Davidsson and Wiklund, 1999). This view purports that most of the growing MSEs are managed and operated by the owners with a need to achieve growth of their enterprises. In this respect, the theory predicts that people with a high need for achievement, value particular work-task situations and perform well in these, while their counterparts will perform poorly. Consequently the high need for achievement should make people particularly interested in, and able to perform well as entrepreneurs. In developing countries women are considered to be risk averse compared to their men (Coleman, 2002 and Fielden et al, 2003). In this regard their businesses are not expected to perform better compared to men owned enterprises because it is postulated that higher risk businesses are associated with higher returns than less risky businesses (Mosley, 2001). From this discussion it can be hypothesised that men owned enterprises have higher growth potentials than women owned enterprises.

Materials and Methods

In addition to the foregoing theoretical explanations an empirical study was carried out to test whether differences on business performance between women owned enterprises against men owned enterprises exist. To achieve the test, a survey was conducted in August to October 2007 to different MSEs supported by MFIs in Tanzania. Specifically the survey covered a total of 225 respondents from four different regions; Dar es Salaam (92), Mwanza (52), Arusha (47) and Mbeya (34). These were selected as being major urban centres in the country and with the highest concentration of micro finance services (Bank of Tanzania, 2004). A total of 225 MSE owner/managers were involved in the survey. The profile of the respondents shows that the composition of sample size was 53.8 percent and 46.2 percent for women and men respectively.

In assessing the performance of MSEs, three different measures i.e. sales revenue, number of employees and asset levels were used for comparison. In this regard, independent t-test was used to perform the analysis. Before testing, we applied natural logarithm to all data in order to maintain linearity because some of observations were highly skewed either to the right or left .

Findings

The profile of the respondents shows that the composition of sample size was 53.8 percent and 46.2 percent for women and men respectively. Independent samples t-test was used and the output produced presented in tables 1 and 3. The table of group statistics revealed that all averages (mean) of men owned enterprises were higher than those of women owned enterprises in all indicators of growth. That is the men owned enterprises had higher assets, average revenue and more number of employees than their counterparts. Despite these results, this sounds as a tentative conclusion that cannot be statistically accepted without the interpretation of independent samples table.

Table 1: Group Statistics

Indicators	SEX	N	Mean	Std. Deviation	Std. Error
					Mean
Number of Employees	Male	104	1.5702	.69323	.06798
	Female	121	1.2799	.53667	.04879
Average Revenue	Male	104	12.3084	6.35368	.62303
	Female	121	11.7709	1.36825	.12439
Asset	Male	104	15.1648	3.20824	.31459
	Female	121	13.3028	4.28054	.38914

In interpreting the independent samples table, we referred to one important assumption of independent samples t-test. This assumption states that the two groups that are compared by independent samples t-test should have approximately equal variance on the dependent variable. In order to use the results in table 1 for a meaningful statistical conclusion, the Levene's test (O'Neill and Mathews, 2002) was used to evaluate the homogeneity of variance assumption. The null hypothesis for this test is that the variances are homogeneous. Therefore, if the Levene's test is significant (i.e. less than 0.05), then the variances of the two groups are significantly different. However if the value is not significant then the null hypothesis is rejected and conclusion that they are not different (i.e. they are homogeneous). The output of our t-statistic revealed that the Levene's test for equality of variance for all indicators of growth were greater than 0.05 (table 2). It is therefore concluded that the variances of these two groups were approximately equal.

Table 2: Levene's Test for Equality of Variance

Indicator	F	Sig.
Asset	2.576	.110
Average Revenue	1.399	.238
No of Employees	2.185	.141

Because the Levene's test provides an assurance of homogeneity variances, the next step was to use the values of t-statistics in the rows of "equal variances assumed" to test and make conclusion on whether there is a significant difference among the growth indicators of micro finance beneficiary MSEs owned by women against those owned by men.

By using the column of sig. (2-tailed), the values of assets accumulated and number of employees were significant at 0.05 level of significance (table 3). These results led to the conclusion that there were significant differences among these two growth indicators (number of employees and assets) of enterprises owned by men against the enterprises owned by women. The fact that the averages of these two growth indicators of enterprises owned by men were greater than the averages of women owned MSEs after micro finance interventions, we can conclude that the men owned enterprises had demonstrated higher growth performance than the women owned enterprises in the two performance indicators; namely employment creation and growth in assets value. When considering average revenue among these two groups, the values were not statistically different. This conclusion was made following the results obtained from the column of sig. (2-tailed) in table 3, which is 0.366. At the level of 0.05 of significance; the value obtained is insignificant. Although the average sales revenue of men owned enterprises is higher than that of women owned enterprises, there is no statistical evidence of making such conclusion.

Table 3: Independent Samples Test

Indicators		Levene's Test for Equality of Var.		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Dif.	Std. Error Diff.	95% C.I. of the Difference	
									Lower	Upper
No. of	Equal variances	6.301	.063	3.536	223	.000	.290	.0821	.12849	.4520

Emp.	assumed									6
	Equal variances not assumed			3.469	192.58	.001	.290	.0836	.12524	.4553 1
Av. Rev.	Equal variances assumed	112.60	.071	.907	223	.366	.537	.5927	- .63073	1.705 6
	Equal variances not assumed			.846	111.22	.399	.537	.6353	- .72145	1.796 3
Asset	Equal variances assumed	1.991	.160	3.643	223	.000	1.86	.5111	.85465	2.869 3
	Equal variances not assumed			3.721	219.08	.000	1.86	.5004	.87579	2.848 2

Following the fact t-test results did not support all three indicators of measuring performance/growth that have been used for comparison, further analysis was done on some motivational factors that influenced the owners of these enterprises to engage in their business. Different factors like motives of starting the businesses, prospects of the businesses and future plan were assessed by comparing the groups. In this analysis, the findings revealed that most of the women owning MSEs started their business to meet the basic needs whereas the male entrepreneur's counterpart perceived that particular objective as of no importance. Furthermore, while men MSEs owners (80%) admitted that they do business because they do not like to work under others' control, women entrepreneurs only slightly value this objective of starting business as of no importance. On assessing the motive of owning a growing and big business enterprise in the two groups, it was highly agreed (96%) among the male MSEs owners that they opened their business with intention of having very big organisation while females owners were not willing to own very big enterprise because they believe that management of big organisations is tedious and consume a lot of time that can be used to care their families. Furthermore, most (about 65%) of the women entrepreneurs who were involved in the survey expressed preference to opening multiple small businesses rather than dealing with only one and big organisation. Other motives among the MSEs respondents included supplementing the businesses owners' normal income, security to the family, and exploiting business opportunities and these were rated similar by the two groups of respondents. These factors seem to be common for both women and men engage in MSEs and who have benefited from micro finance services.

Conclusion and Implication of the Findings

The findings of this study revealed that women and men owned MSEs that have received services from micro finance institutions have experienced differences in performance of their enterprises. The results show that despite the similar level of external support from MFI, female MSEs have experienced slower growth compared to male owned enterprises. Although the results did not provide evidence statistical differences on average sales revenue between male owned enterprises and female owned enterprises, the average assets value and number of employees after the micro finance interventions were different among these two groups. Different motives of owning and running businesses were also observed among the groups. Consistent to prior studies women entrepreneurs were observed to be more risk averse compared to men. Due to risk evasiveness, it is clear that the returns of female owned enterprises were also expected to be low. The low level of growth of women owned enterprises also recounts to our theoretical base which

sees females in developing countries as a disadvantaged group which are not groomed for opening and running business. Here we concur with theoretical explanation that the growth which resulting from personal needs of the owner managers are socially generated, socially sustained and socially changed. In this regard, the social relationship explains growth motives of the business owners. This point further underscores that the social environment where the women both young and elderly are groomed up in developing countries partly explains the differences in performance/growth of their enterprises. Despite the fact that both female owned enterprises and male owned enterprises experienced microfinance interventions; males owned enterprises demonstrated higher level of growth than female owned enterprises.

The above results call for special action and attention that can address the limited motivations that surrounding women in business and those who wish to venture into it. In particular the women who have benefited from microfinance services need to undergo special training that will build their capacity in doing business with growth prospects. Through training the women entrepreneurs are expected to change their perceptions about future prospects of their business and acquire additional skills that will enable them grow their business in paricture creation of additional assets and also contribute more significantly to employment creation.. Additionally, they will be endowed with motivational characteristics discussed under human motivation view, training helps small business owners, managers and potential entrepreneurs to meet the challenges of today's business environment, manage the ever-changing world and plan for future of their business. This would be achievable because it is argued that in order to effectively pursue growth strategies an entrepreneur requires business management skills to to manage enterprise growth effectively and attain market efficiencies (Fisher, 1998). Furthermore, skills obtained from training become an embedded asset in the entrepreneurs which can help to tap into unfolding opportunities and overcome uncertainties in the ever changing business environment. It is from this argument that different other have found that training has significant impact on participant characteristics and final participant outcomes (Edgcomb, 2002; Bratton and Gold, 2003 and Grizzell, 2003).

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FACTORS PREDISPOSING BOYS RISKY BEHAVIOURS IN BOYS' DAY SECONDARY SCHOOLS IN KISUMU MUNICIPALITY

By

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ABSTRACT

This study sought to explore the extent to which the factors are dominant in urban secondary schools with focus clearly on boys' day secondary schools in Kisumu municipality. The research targeted male day school students between 14-21 years of age. From a sample of 192 day students in two boys' day secondary schools in Kisumu municipality, the study endeavoured to ascertain the parameters of their school life and how such factors affect their lives. The study involved the analysis of secondary information and primary data collected in the study area with the help of questionnaires.

The study established that unprotected sex was the main risky behaviour students involved in mostly during school holidays, and that peer influence alongside access to pornographic material had great influence on their behaviour. The availability of money through adult female friends and also their peers, and watching television late in the night influenced the students to engaging in risky behaviours.

The study recommended that learning institutions ought to participate in enlightening students on the consequences of risky behaviours such as engaging in unprotected sex in order to mitigate spread of sexually transmitted diseases Human Immunodeficiency Virus. Further, the study also suggested parental guidance to ensure their children desist from engaging in risky behaviours.

Keywords: Predispose, Risky Behaviour, Adolescence, Day Schools

INTRODUCTION

As boys grow, parents always prescribe to them a particular way of life. This determines their cognitive abilities and the general development in early childhood and may even extend to early adolescence. Nonetheless, the impact is usually perceived as authoritarian and limiting their freedom. It is this perception that provokes the boys to develop some sort of rebellion, Kathleen (2003). When the idea to explore other ways of life and purported freedom sets in, boys will more often than not seek the opinion, approval and company of their peers to test the variability of self-identity as observed by Prinstein & Dodge (2008). Reasons for flourishing of risky behaviors include poor parenting, curiosity, enabling environment, carelessness by teenagers, peer pressure, modern technology, and legal regulations such as the famous Children's Act Cap 586, 2001, Valsiner (2007).

Globally, a handful of studies have been conducted on the factors influencing the youth to engage in risky behaviours. Cunningham and Bagby (2010) sought to determine factors that predispose youth to risky behaviours and found that relationships with parents and institutions, household behaviours and social exclusion influences adolescents' to risky behaviour. Danjin and Onajole (2010) conducted a cross sectional survey of HIV/AIDS risky behavioural tendencies among secondary school students in Nigeria. They found that the students had multiple sex partners, low rate of condom use, sex in exchange for money or favours and some had been diagnosed with Sexually Transmitted Infections (STI).

In Kenya, few studies have been done on the same leaving a knowledge gap as the factors predisposing students to risky behavior is not a one situation describe all. The adolescent boy needs to be helped to become more responsible in matters affecting his sexuality and self-identity development. In almost all countries, the majority of men 20-24 report having had sexual intercourse before their 20th birthday. Similarly, 35% of males aged 16-24 first had sex before their 15th birthday. In sub-Saharan Africa, less than half of the sexually active men between 15-24 years use protective contraceptives or rely on their partner's method, compared with 63-93% in industrialized countries and parts of Latin America and the Caribbean, World Health Organization, (2005).

Notwithstanding, there was little literature on interventions targeting male adolescents. More emphasis was placed on girls who were considered to be at risk. Lodiaga, et al. (2007) observed that the most fundamental issue of main concern thereto revolves around the biological makeup of girls and the fact that they are the victims of teenage pregnancy. The question is: what about other risks that have nothing to do with biological makeup? When it comes to the risk of HIV/AIDS infection, drug abuse, casual sex, school dropout, peer influence – the issue of biology does not really hold. The effects cut across all sexes regardless of the gender relations.

Survey data in Kenya over the last 5 years indicate that 14% HIV/AIDS prevalence is highest among the youth in the range of 10-25 years. This include 0.71 million students in the 3,080 secondary schools as observed by Lodiaga et al. (2007), thereby revealing the danger secondary school students are faced with. The urban setting also avails the accessibility to drugs, and other unhealthy socio-economic factors that affect day school students. While such factors are greatly controlled in boarding schools by a well structured school program, day scholars are left with more room and freedom for exploration.

Peer pressure was deemed as the most profound factor that influences the modalities of young people, Prinstein & Dodge (2008). Several other factors interplay alongside peer pressure to determine the character and behaviour of adolescents such as the advent of new technology, parenting and school life, adolescents seek to develop their own identity, opinions, and values, Mwiti (2005). Given the freedom to experiment, this stage also entails taking some risks.

Day school refers to a system of education where students attend classes from their homes every day. As the population continues to grow the cost of living escalates each day. The government therefore introduced a kitty for secondary school developments stimulus advanced to reduce the burden of unaffordable fees. This initiative enhanced cheaper mode of secondary education especially for day schooling program (CIA, Factbook, 2010). Consequently, it became a little bit affordable for middle income earners to access day schools for their children.

Life in day schools for boys is very dynamic and prone to several challenges. This includes the influence of peers, and need to afford average lifestyle of a city dweller even though their family resources do not allow. They start to explore other opportunities to bridge the financial gap thereof and experiment the fascinating phenomenon of observed adult lifestyle, Miller (1994).

On the other hand, technology has played a big role in promoting moral deviation among adolescents. As day scholars leave school at around 4.30 p.m. daily, they have ample time to access the internet in the urban settings. They are exposed to pornographic sites which have great negative impacts like addiction and casual sex. Besides this, day scholars are relatively susceptible to drugs and substance abuse especially when such consumables are easily available in the vicinity. When a person is under the influence of intoxicating substances, he loses control of his cognitive ability. Drugs are associated with crime and in most cases, dealers utilize the loyalty of children and level headed teenagers who cannot be easily suspected. The participation in selling and/or distributing the drugs is risky in its own capacity.

These students have access to various television programs some of which are not suitable for persons under the age of 18 years. As a result, the teenagers gather a lot of information that manipulates their psychology. This easily leads to high chances of the teenager engaging in risky behaviour.

This study sought to address the challenges in day secondary schools that predispose boys to risky behaviours within Kisumu municipality with the aim of developing relevant information gathering systems from which health players and the school management can institute appropriate intervention programs for the boy child.

RESEARCH DESIGN

The study used descriptive survey design approach since it was relevant in finding out the factors predisposing adolescents to risky behaviours in boys' day secondary schools. The study's target population was 2100 students who were male students at Kisumu Boys' High School and Kisumu Day High School in Kisumu municipality. Stratified random sampling technique was used such that 24 streams were selected and 4 students from each stream were picked. This resulted to 96 students from each school and 24 for each form making an aggregate sample size of 192. The data was collected by use of semi-structured questionnaires and the analysis was by both descriptive and inferential techniques.

Correlation analysis was used to describe the association between the variables in this study in terms of magnitude and eventually their direction. Multiple regression analysis was also used in the prediction of the variables:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Whereby:

Y = Indulgence in Risky Behaviour

β_0 = Model's Constant/Y-Intercept

$\beta_1 - \beta_3$ = Beta coefficients of the regression model

X_1 = Internet

X_2 = Peer Pressure

X_3 = Access to Drugs

ε = error term

The study also used narrative analysis where the findings were presented in a detailed description of the observations.

RESULTS

The Following Results were obtained.

The study revealed that 98.2% of the respondents were very much aware of the risky behaviours and only 1.8% was not aware. Many of the boys interviewed considered casual and unprotected sex, viewing pornographic material, drug and substance abuse as risky behaviours.

The study further established that most of the respondents involved themselves in risky behaviour during school holidays, weekends and after school. Among the boys interviewed 42.3% involved themselves in risky behaviour which constitutes a high percentage of the teenagers' involvement in risky behaviours.

The students stated that family practices influenced them the most into risky behaviours, followed by influence of friends, watching television, accessing pornography on internet, and availability of money. The findings also showed that 46.8% percent of the students had been involved in sexual intercourse of which 55.8% did not use condoms.

On factors that hindered the students from not getting involved in sexual intercourse, attitude ranked the highest (42.3%) followed by, religion (28.2%), ignorance ranked third (14.1%), then shyness (8.5%) and lastly peer influence (7%).

The findings show that the students came from diverse socio-economic background with majority having just sufficient money (64.8%). However, 29.6% had insufficient amount of money and 5.6% had excess amount of money. The findings showed that the excess amount was used for internet (50%) followed by airtime (32.1%), going out for bash and clubs (14.3%) and even to buy hard drugs (1%).

The findings show that 63.6% of the students had watched pornographic materials. On the factors that influenced such behaviour, curiosity ranked highest (40.6%), friends (22.6%), desire to acquire sexual skills (16%) and availability of the materials (DVDs, VCDs), (15.1%). Minority of the students (28.2%) had abused some sort of drug or substances with the drugs abused ranging from alcohol, marijuana and tobacco in that reducing order.

Using correlation, the study found that there was a weak but positive linear association between organizational indulgence in risky behaviour and internet $R=0.256$ ($p=0.001$). Indulgence in risky behaviour had a moderate linear dependence on peer pressure given a correlation coefficient of 0.493 at a p -value < 0.001 . Access (availability) to drugs had a moderately linear association with indulgence in risky behaviour at a Pearson correlation coefficient of 0.495 ($p<0.001$).

		Risky Behaviour	Internet	Peer Pressure	Access to Drugs
Risky Behaviour Indulgence	Pearson Correlation	1			
	Sig. (2-tailed)				
Internet	Pearson Correlation	.256**	1		
	Sig. (2-tailed)	.001			
Peer Pressure	Pearson Correlation	.493**	.224	1	
	Sig. (2-tailed)	.000	.104		
Access to drugs	Pearson Correlation	.495**	.462	.361	1
	Sig. (2-tailed)	.000	.121	.096	
	N	164	164	164	164

Established regression equation was:

$$Y = 0.776 - 0.016X_1 + 0.168X_2 + 0.269X_3 + 0.341X_4 + 0.082X_5 \quad p = 0.007$$

Y-intercept was established at 0.776. A unit increase in peer pressure, holding other factors constant, would yield 0.168 increases in risky behaviour. A unit increase in access to drugs would lead to a 0.269 increase in risky behaviour. However, internet does not have a statistically significant level on indulgence in risky behavior given a coefficient of -0.016. This clearly shows that peer pressure and access to drugs would

lead to rise in risky behaviour indulgency among students. However, internet had the lowest effect on risky behaviour.

DISCUSSION

From the findings, the study concluded that unprotected sex was the main risky behaviour most of the respondents had involved in mostly during school holidays where those who did not involve in those behaviours did so with reference to their conscience.

The study also concluded that friends had a great influence on respondents' behaviour since friends and adult female friends provided them with money. Access to social information on internet such as pornographic materials influenced respondents by arousing their curiosity, and television greatly influenced students behaviour in engaging in risky behaviour.

The study, in line with the objectives, recommended that learning institutions ought to participate in enlightening students on the consequences of risky behaviour. Further the study recommended that parents and guardians advised their children during the holidays to dissuade them from risky behaviour.

The study also recommended that access to internet and pornographic material to students should be limited. It was recommended that school administration should ensure there is thorough inspection to ensure students do not carry with them illegal and harmful substances such as drugs.

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ATTITUDE TOWARDS GOING PUBLIC AMONG UGANDAN FIRMS
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BACKGROUND TO THE STUDY

Going public is the process of offering securities, generally shares and bonds of a privately owned company for sale to the general public (Cohn and Zake, 1999; PricewaterhouseCoopers, 2001). The first time the securities are offered is referred to as an “*Initial Public Offering*”, (IPO).

Companies and their shareholders benefit a lot from a *public flotation*. A share issue for instance, allows companies to increase the equity base of the company and raise more capital without bearing the burden of interest payments associated with borrowed funds from financial institutions. In addition, the public profile of the company is improved, attracting greater business opportunities. Also, full disclosure requirements of a listing on the exchange encourage companies to observe good business and management practices and ensure better corporate governance. An investor also gains from investing in securities. He/she can gain returns in terms of dividends; the securities certificate can be used as collateral to secure loans and interest income can be earned on fixed income securities. Also investors are given an opportunity to buy and sell shares in the companies of their choice (London Stock Exchange, 2003).

The setting up and licensing of the Stock Exchange in Uganda (USE) in 1997 has been one of the most significant developments in building a capital markets industry in Uganda. Capital markets refer to all facilities and the institutional arrangements for the borrowing and loaning of long-term funds (Cohn & Zake, 1999). A typical capital market comprises of several institutions, namely: banks, insurance companies, mortgage firms, finance companies and stock markets. Capital markets are an essential part of the financial sectors of modern economies (Wagacha, 2001). Providing alternative savings tools to savers and non-bank sources of financing for enterprises, the markets promote economic growth through improved efficiency in savings mobilization (Schmidt-Hebbal.K, L.Serven and A. Solimano, 1996; USE-Guide 1999).

Much as the benefits of capital markets are generally acknowledged, the Uganda Securities Exchange (USE) market is still very slow in that it has failed to attract a significant number of industries for listing. This is evidenced by the fact that on the USE, only five companies are listed: Uganda Clays Ltd, British American Tobacco Ltd (BATU), East African Breweries, Bank of Baroda and Kenya Airways. Interestingly, Uganda Clays is the only indigenous listed company on USE. Thus there is no doubt that more stimuli is needed to induce more private firms in Uganda to go public and thus list on the stock exchange.

STATEMENT OF THE PROBLEM

Despite the many benefits that a firm gets by going public, the private sector in Uganda particularly is reluctant to make full use of this facility. The primary market is there but is dominated by institutional investors and individuals who typically buy and hold on to their securities (Cohn & Zake, 1999). This makes the securities on the USE quite illiquid as indicated by the outstanding offers and bids and low volume of trading during floor trading. The problem therefore is “why are potential private firms in Uganda reluctant to go public?”

The strength of securities markets that make them focal points of modern finance is their ability to mobilize long-term savings for financing long-term ventures, to improve efficiency of resource allocation through competitive pricing mechanisms, to providing risk capital (equity to entrepreneurs), and to encourage broader ownership of firms (Wagacha, 2001). These functions are jeopardized if there are few listings by eligible firms. As already argued above, this is the current scenario in Uganda.

Some seemingly plausible postulations are worth noting. It is argued that for unlisted companies, the question is not so much lack of knowledge but a concern that the risks associated with additional disclosure are not adequately compensated by additional returns. In addition, banks in their dual role of being investment advisors as well as lenders may tend to indirectly discourage the stock exchange as a means of raising capital. For the stock exchange, there is both inadequate marketing of itself as well as lack of a sufficient number of products to attract the investing public.

The study examines why companies qualified to go public and list, desist from doing so. A sample of 140 unlisted companies was identified and surveys carried out, using a questionnaire. Another sample of the 5 listed companies on the USE was surveyed as a control measure. Also another sample of 6 brokerage firms and regulatory bodies was also surveyed.

PURPOSE OF THE STUDY

The study sought to identify factors that affect a firm's intention to go public by examining and analyzing the relationship between perceived stock liquidity, perceived tax implications, rules regulations as well as capital market awareness & know - how and a firm's attitude towards going public.

OBJECTIVES OF THE STUDY

The following specific research objectives were adopted: To establish a firm's owners/manager attitude towards going public in Uganda; To establish a firm's perception of stock liquidity, tax, rules and regulations as well as their awareness and know-how of capital markets in Uganda, and, to establish the relationship between perceived stock liquidity, tax, rules and regulations, capital market awareness and know-how on one hand and a firm's attitude towards going public on the other hand.

RESEARCH QUESTIONS

The study focused on the following research questions for guidance:

- What is the firm's owners/managers attitude towards going public?
- How does a firm's perception of stock liquidity, tax, rules and regulations, capital market awareness and know-how, affect a firm's attitude towards going public?
- What is the relationship between perceived stock liquidity, tax implications, rules and regulations as well as capital market awareness & know- how and a firm's attitude towards going public?

SIGNIFICANCE OF THE STUDY

It is hoped that the findings of this study should be of use to the following:

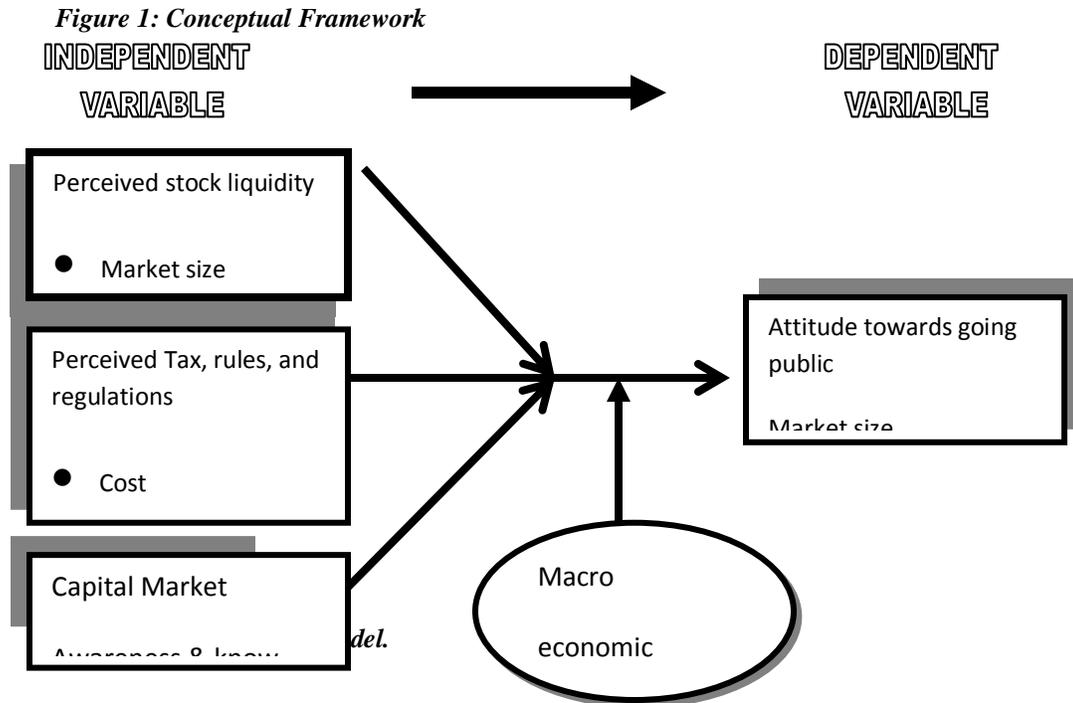
Regulatory bodies like CMA and Bank of Uganda in formulating effective rules, regulations and guidelines for proper and effective conduct of the USE activities, the USE will benefit by learning about the impediments to going public and listing and how to overcome them. The study will also benefit other researchers should find the research useful in further research of related areas.

SCOPE OF THE STUDY

The study was confined to measures of stock liquidity (market size, demand & supply of securities, volume of trading and bid-ask spread); tax, rules and regulations (costs, listing rules, disclosure effect and loss of autonomy; a firm’s capital market awareness & know-how (public campaigns and media publications) and a firm’s attitude towards going public (market size, market liquidity, stringent rules and costs of going public and stock market awareness).

THE CONCEPTUAL FRAMEWORK

This is an outline of the different variables used in the study. These were: attitude towards going public as the dependent variable; perceived stock liquidity, tax, rules and regulatory framework and firms’ capital market awareness and know-how as the independent variables. Firm’s attitude towards going public is said to be affected by the way it perceives stock liquidity, tax, rules and regulations as well as capital market awareness and its operations. However, macro-economic factors like inflation and interest rates also impact on a firm’s attitude towards going public and listing. This is shown as figure 1.8 below:



LITERATURE REVIEW

“Going Public” simply means that a private company relinquishes parts of its ownership to the general public by sale of part of or all its shares to the public (USE Guide, 2000; Cohen & Zake 1999;

Pandian, 2001; PricewaterhouseCoopers, 2000). Usually, a company begins to think of going public when the funding required to meet the demands of the business expansion is not enough (PWHC, 2000). Other objectives of a capital issue or going public may be to promote a new company, to diversify the production or to meet the regular working capital requirements of the company, (ibid).

Going public is one of the ways through which companies may raise funds to finance their projects. Other methods may be through borrowing from financial institutions, promoters bringing in their own money or using retained profits (Pandian, 2000).

In the current scenario, investing in stock markets is a major challenge even for seasoned professionals (Pandian, 2001). Investing in various types of assets is an activity that attracts people from all walks of life irrespective of their occupation, economic status, education and family background. What matters is that when a person has more money than he requires for current consumption, he should be taken as a potential investor. The investor who is having extra cash could invest it in securities.

The Initial Public Offer (IPO) is the first sale of stock/shares by a company that has gone public (Cohn & Zake 1999; USE Guide, 1999). A company can raise money by issuing either debt (bonds) or equity (Halstead, 2001; Oliveira, 2004). According to Lott, (2002) an IPO is the process by which a private company transforms itself into a public company. The company offers, for the first time, shares of its equity (ownership) to the investing public. These shares subsequently trade on a public stock exchange like the Uganda Securities Exchange (USE).

Nunes (2004) has noted that the most common method of going public is through an IPO. IPO is done on the *primary market* which is a situation where a company floats its shares for the first time to members of the general public (Pandian, 2001; USE, 1991; Cohn & Zake, 1999). The issuer may be of a new or an existing company. The issues may be of new type or the security issued in the past. Thus, the first question one may ask is why a company would want to go public, yet many private companies succeed remarkably well as privately owned enterprises.

For many entrepreneurs, taking their company public is the ultimate measure of success (Dawn, 2002). PricewaterhouseCoopers (2002) noted that it's one of the major decisions that a private firm has to make. Cohn & Zake (1999) concurs with this in that a lot is involved in terms of time, money and disclosure. Nevertheless, a private company, which has gone public, obtains the benefits of public trading of its securities namely:

Nearly all companies go public because they need money. Lott (2002) concurs with this in that the primary reason for going through the rigors of an IPO is to raise cash to fund the growth of a company. According to Halstead (2001), going public raises cash and also opens up many financial doors for a company. An *IPO* offers access to additional capital both through the IPO itself and through "*secondary*" offerings of securities, that is, a public company has direct access to the capital markets and can raise more

capital by issuing additional stock in a secondary offering. Public companies can also more easily raise funds privately (Dawn 2002).

The value of a public company is often substantially higher than a private company with the same structure in the same industry. The more money a company can attract, the higher its valuation. The higher its valuation, the more a personal net worth is as a large shareholder of the company (PricewaterhouseCoopers, 2002; Cohn & Zake 1999; Dawn 2002). Lott (2002) noted that the owners will sell shares in the IPO in order to diversify their net worth. Also, because of increased scrutiny, public companies can usually get better rates when they issue debts

Going public enhances the liquidity of a company's stock and it is one of the most common techniques for achieving liquidity for shares. Because the stock of a public company has market value, it can easily be traded, providing investors with a degree of liquidity (Dawn 2002; Lott, 2002; PricewaterhouseCoopers, 2002).

Going public leads to good business and management practices and ensures better corporate governance. Transparency is very relevant for listed companies as far as good governance is considered essential to the well being of the stock market (Levite, 1999).

While there are predictable benefits and drawbacks of becoming a public company, there are also many unknowns (Dawn 2002). The securities markets for instance are extremely *volatile* and focus on short-term performance, three years performance (Macey & O'Hara 2001). Hence it has been noted that the price of a company's stock is largely dependent on how the company performs against the expectations of financial analysts, not necessarily against its own past performance. Thus, if you conclude that the disadvantages of an IPO outweigh the advantages, and your company requires extra funding, then consider other alternatives.

It has been observed that there is a very strong relationship between the two markets vs the primary market and the secondary market. The new issue market (IPO) cannot function without the secondary market. The secondary market (stock exchange market) provides liquidity for the issued securities (Pandian, 2001; Watkins, 2004). The issued securities are traded in the secondary market offering liquidity to the stocks at a fair price. In addition, the stock exchanges through their listing requirements, exercise control over the primary market in that any company seeking for listing on the respective stock exchange has to comply with all the rules and regulations required by the stock exchange. Furthermore, the primary market provides a *direct link* between the prospective investors and the company. I.e. by providing liquidity and safety, the stock markets encourage the public to subscribe to the new issues (Pandian 2001; Cohn & Zake 1999). Thus, the health of the primary market depends on the secondary market and vice versa, concludes Levitte (1999).

CAPITAL MARKET AUTHORITY OF UGANDA AND THE USE

The CMA in Uganda was set up by enactment of the Capital Market Authority statute by the parliament of Uganda in 1996(Cohen & Zaake 1999). As the regulatory authority, CMA was charged with the responsibility of promoting and developing an orderly, fair and efficient capital market (Bohnstedt, et al

(2000). Under the statute, rules on licensing, prospectus requirements, establishment of stock exchanges, conduct of business by licensees, accounting and financial requirements were developed (IMF, 1999). CMA does not only regulate the USE, but also stock brokers/dealers or any other persons dealing in securities within the national territory. In addition, on all policy matters concerning capital market development, the CMA has an advisory and consultative role.

It has been observed that the key factors of the capital markets industry in Uganda is that it has a fully liberalized capital account, there are no restrictions to foreign investors, has a well regulated financial market and has access to regional markets. CMA signed a memorandum between the securities regulators in Kenya, Uganda and Tanzania. The objective is to harmonize the development of capital markets in the East African region (New Vision, 9th October, 2004; pp 27). Bohnstedt 2000, in their research, adds that the respective statute governing the Ugandan securities market, largely conforms to the disclosure and reporting standards applicable in Tanzania and Kenya. Both the CMA as well as the USE are members of East African member states Securities Regulatory Authority (EASRA). The objective of this is to harmonize securities laws and standards with a view towards integrating the individual markets, building up a regional exchange, and establishing cross-border investments and listings (IMF, 1999).

Tax, Regulatory and Legal framework and going public

Most countries worldwide rely on taxes as a means of raising revenue for the government. Various taxes are paid by companies such that a firm may find itself paying at least two or three different types of taxes to the government. Such taxes particularly, encroach on the operations of any business organization, thus affecting profits that would have been earned, (Pownall & Schipper, 2004). Such taxes among others include income tax, VAT, Excise duties and custom duties, Sales Tax and corporation tax (Katto, 2003). Dividends for instance distributed to shareholders are subject to a final *withholding tax*. To this issue, Onegi, (Chairman of the USE), 2004, argued that withholding tax is discouraging investment on the bourse/exchange. To this effect, during the DFCU Ltd listing on the USE, he recommended that taxes on dividends (withholding tax) should be scrapped.

Also, dividends not distributed (retained profits) out of after tax profits are subject to compensating tax at the company rate of tax (Pownall & Schipper, 2004; Katto, 2003). Capital gains tax is also another tax to be paid by public companies. Capital gains refer to the increase in value of shares of a company. Share prices move up and down. When the price of the shares you hold goes up then your investment appreciates in value. Such increment in value of shares is capital gain to the business and therefore is taxed. VAT is compulsory to any manufacturing company within the country and taxable services provided. The standard VAT rate has been 15% in East Africa. Excise duty is yet another tax on all goods manufactured within a country. In this case, the rates vary for different products; (wines, Spirits, Tobacco products, mineral water, biscuits, match boxes, etc). Customs duties are paid by all importing and exporting companies for goods imported to or exported out of a country. Such and many more other taxes impede the firm's operations.

Thus, tax incentives provided should improve the post tax returns for the companies, thereby encouraging them to invest more in the companies and therefore improve on their performance. In the long run the economy should benefit by having more competitive firms eligible to list. Conclusively tax regime

is considered problematic by many firms. This tax plus exchange rate fluctuations particularly, influence the manufacturing sectors, commerce and trade, (Bohnstedt et al, 2000). This influences their attitude towards listing as taxes are taken to be extra burden.

The Legal & Regulatory Framework

There is a plethora/excess of rules and regulations governing the public offering of securities (NewWest, 2004). In this context, the legal framework generally refers to the laws that govern trade in securities in an economy. It's made up of the Companies Act, which governs the general operation of businesses (company law) and specific laws enacted for the purpose of trade in securities. The Regulatory framework is therefore that set of specific rules and regulations governing the respective bodies involved in the operations of the market (USE, 1991; CMA, 2000; Wagacha 2001; Chege, 2003). The legal and regulations framework guide operators in the market (Alile, 1992). They provide rules and regulations and principles and procedures that guide the conduct of all participants in the market.

A great deal of empirical evidence suggests that a strong equity market requires strong investor protection laws measured by legal rules in play and quality of law enforcement, (Lelenx and Muzyk 1999). To Frost, et al, 2002, the major objectives of prudent regulations in an equity market are investor protection and market equity. To them, investor protection means that investors are provided with material information and are protected through monitoring and enforcement. High quality markets are fair, orderly, efficient and free from abuse and misconduct. In their research analysis, it was found out that higher levels of investor protection are associated with higher quality markets leading to higher liquidity resulting in increased returns and thus impacting on investor's decisions. Lelenx and Muzyk observed that French civil laws appear to have the weakest investor protections and consequently the least developed capital markets. Thus, they add that changing this state of things will require more than a few cosmetic changes to market regulations.

The major objectives of prudential regulations are to ensure: public confidence in the activities of financial markets, operational stability of the market, and operating efficiency of equity markets (Ibid). This view is shared by the Eastern Caribbean Central Bank (ECCB, 2004). To then, one of the primary concerns of investors is the security of their investments. They need positive assurance that their investments are protected and are safe. Therefore in acknowledgement of this, every effort has to be made to ensure that the market operates under secure conditions. They noted that a sound regulatory structure has to be put in place to ensure that all market activities are conducted with international standards of fairness, transparency, professionalism and integrity.

Chege (2003) emphasizes this point in that lack of vibrant financial sector regulations erodes confidence in the market and is a disincentive to investment in capital markets. She adds that regulators in this industry must literally exercise their functions as watch dogs and protect investors.

In Uganda, the two major players in the markets concerning rules and regulations are the CMA and the USE. The CMA of Uganda, as the regulator is a creature of statute, (CMA Act, Cap. 84), which provides the establishment of the CMA, charged with the dual duty of promoting and regulating the

development of the capital market. In some countries, it's known as the "*Securities Commission*", (SEC), (Chege 2003; CMA Digest, 1998; Cohn & Zake 1999). I.e. it's a body that regulates the capital markets industry. This is done through regulation, enforcement, monitoring, compliance, setting standards and licensing market players such as investment advisors and brokers, dealers, fund managers, collective investment schemes and approving prospectuses of issuers of securities. It's the overseer of all capital markets and stock market operations in the country. It also formulates rules and guidelines with regard to companies wishing to go public.

The USE is the actual market on which securities are traded. It is approved by the CMA. Its main function is to ensure orderly transactions in securities. It's self-regulatory and has its own rules that issuers of securities are expected to abide by such as the USE listing rules. There are three market segments on which securities may be traded on the securities exchange i.e. the main investments market segment (MIMS), the alternative investment market segment (AIMS) and the fixed income securities market segment (FIMS). These segments have different requirements, (See appendix).

Public disclosure is perhaps the most difficult matter for private companies to come to grips with, (Dawn, 2002). By law it must disclose the intimate details of their business operations, including financial information. Thus, listed companies are governed not only by company law but also by stock exchange regulations (ACCA). By law, all public companies must disclose all materials and relevant information about their performance, activities, operations and accounts (CMA, 1999). However, this reduces the firm's autonomy especially the family business. This disclosure requirement is put in place to ensure investor protection and to promote investor confidence in the market (ECCB, 2004; Cohn & Zake, 1999; USE, Quarterly Bulletin 2002).

Public companies benefit from increased opportunities for financing and growth by obtaining long term finance. For founders and management shareholders, going public provide enhanced liquidity for their stock ownership at a market based valuation. The costs of going public however, includes among others the burdens of complying with the ongoing disclosure requirements of the CMA (SME) and the Stock Exchange and increased potential liability management will also bear the burden of increased scrutiny of corporate conduct compared to owning and operating a privately held concern. In addition, an extensive publicity campaign is necessary so as to inform and educate the public about the capital markets and its role in order to change their attitude toward going public.

Research Design

The study was conducted as cross-sectional study i.e. different categories of subjects were studied at one point in time based on the results from self test questionnaires and interviews. It was cross sectional because of the need to overcome time and financial constraints.

Study Population

The targeted population for the study was 1434 organizations comprising of the following strata: - 16 – Commercial banks; 17 – Insurance companies; 1386 other private businesses; the 5 listed companies by then and 10 stakeholders (CMA, USE, BOU plus brokerage firms).

Unlike Bohlenstedt (2001) whose respondents included only private firms, this study preferred to include listed companies as well as stakeholders' views about the USE market.

Sample size

The targeted sample size was 151 organizations obtained from a population of 1434 using Krejcie & Morgan (1970 table). The 151 respondents were selected from the 151 organizations. The 151 organizations is big enough as confirmed by Bailey K.D. (1994). He regards 100 cases as the minimum.

The selected respondents included Chief Executive Officers (CEO), Chief financial managers/ Accountants, company secretaries and owners/ managers. The purpose of choosing these elements was to gather information data from persons who are in decision making positions.

Out of the 151 questionnaires administered, 131 were returned making a percentage of 86.7% which is more than half the sample size and therefore representative enough. The 10- Commercial banks in Kampala comprised the sampling frame of the respondents from the commercial banks. Source of the population got from Bank of Uganda Supervisory department as per December 2002. The 10 -Insurance companies in Kampala made the sampling frame of the respondents from the insurance industry. Source of population was got from Bank of Uganda supervisory Department as per December 2002.

The 120- private businesses formed the sampling frame of the respondents from other private businesses. Source of population was drawn from the Uganda Manufacturer's Directory 2003/2004.

All the 5 listed companies on the USE comprised the sample frame as well as the population of respondents for this category. This is because they are few thus it would not be fair to leave out any of them. Source population got from the USE investor's Guide and CMA website. The 10- other stake holders formed the sampling frame for this category. Source population got from USE investor's Guide and CMA Journal.

Sampling Design and Procedure

The population chosen for the study was first stratified into groups (strata): Commercial Banks, Insurance companies, other private businesses, listed companies and the stakeholders. Unproportionate stratified sampling was used to obtain the sample of 151 companies. Then simple random sampling was applied to the selected organizations from each stratum. This method was preferred because it gave each business organization an equal chance of being selected without bias. However, for other private businesses, purposive sampling was used because the aim was to choose the businesses with the highest potential of going public.

Perceived Stock Liquidity

Using the 4-point Likert Scale, Perceived stock liquidity variables measured included: market size measured in terms of capitalization and number of companies listed on the exchange; volume/number of shares traded on the exchange annually and the bid-ask spread.

Perceived Tax regime, rules and Regulations

Using the four point Likert scale, tax regime was measured in terms of the different taxes paid by companies and businesses generally. Still using the same scale, rules and regulations were measured using the cost variable, the disclosure effect and loss of autonomy by owners of the businesses. Statements regarding this variable were adopted and modified from various researchers such as Bohlenstedt (2000), and Wagacha (2001)'s surveys.

Perceived Capital Market Awareness and know-how

Still using the four point Likert scale this variable was measured in terms of public awareness, technical know-how and willingness to learn about capital markets. Some of the statements regarding this variable were drawn from Wagacha (2001) and Ngoma (1995).

Attitude towards Going Public

This variable was measured in terms of the personal feelings of the owners/managers of the businesses about going public, the size of the stock market, and volume of shares traded on the market, costs involved, and the disclosure effects. Most statements were self developed and similar scores were used as above.

Sources of Data

Data for the study was collected from both primary and secondary sources but with more emphasis being placed on the primary data since the study was about perception. The primary data was mainly derived from various respondents as specified in the sample to the questions in the questionnaires and interviews posed directly to them. In this case, the questionnaires formed the key data collection instrument. Secondary data was collected mainly from: company reports and prospectuses, company journals, research papers by various researchers down loaded from the internet and other publications. The purpose here was to compare the secondary data with the responses from primary data gathered from the field so as to derive a meaningful interpretation.

Data Processing and Analysis

Raw data collected through questionnaires was analyzed. First, qualitative data was summarized, categorized and then analyzed using percentages in tables and charts. In order to establish whether the relationships exist between stock liquidity, tax, rules and regulations, capital market knowledge and a firm's attitude towards going public, data was analyzed quantitatively using the correlation options of statistical package for social sciences (SPSS) computer programs with the aim of answering the questions. This package was considered because it is more user-friendly, quite available and powerful in data analysis.

Entering the data involved defining the variables in the variable view and inputting the data in the data view. Data was then analyzed to generate both descriptive and inferential statistics. Under descriptive statistics, information on demographic characteristics was generated, while under inferential statistics, correlations were done.

FINDINGS

The study found that stock liquidity has a significant positive relationship with attitude towards going public ($r = 0.414$, $p\text{-value} < 0.01$). This implies that stock market liquidity significantly influences firms' attitudes towards going public. These findings are consistent with the findings of Wagacha (2001), PWHC (2001) Cohen and Zaake (1999) and Bohenedt (2000).

Tax, rules and regulations had significant negative relationship with firm's attitude towards going public ($r = - 0.375$, $p = \text{value} < 0.01$) implying that taxes, rules and regulations negatively affect firms from going public. This confirms Wagacha's, Emily's and Bohenedt's findings that taxes are taken by many as a burden and that the stingy rules chases away eligible firms.

The study also found that market awareness had a significant positive relationship with attitude towards going public, ($r = 0.579$, $p \text{ value} < 0.01$). The implication here is that market awareness improves firms' attitude toward going public.

CONCLUSION

The findings revealed that quite a substantial number of private firms (58%) have a positive attitude towards going public. The results also indicated that firms attitude towards going public will be changed positively if the USE market becomes more liquid. Liquidity of a stock market is very important to firms going public and therefore should be addressed by the USE. It was also found that a large percentage of the unlisted firms (77.1%) revealed that if incentives such as tax holidays are given to firms going public, then many more firms would change their attitude towards going public as their costs would be reduced.

The study further found that if the costs for an IPO and listing were reduced, then the firm's attitude towards going public would be changed immediately. This is an eye opener that IPO costs should be reduced. Also, they revealed that if the disclosure requirements were made less stringent then their attitude towards going public could be changed immediately. Thus strict rules deter firms from going public. Respondents also indicated that public awareness is an important factor to firms going public.

Recommendations

Based on the survey of both listed companies and unlisted companies in Uganda and the findings above it is evident that the USE and the CMA need to address specific factors inimical to the growth of the stock market in Uganda. The market needs to pay attention to various aspects including the following: Enhancement of stock liquidity, increase in returns, international integration, and relaxing the stringent rules and regulations of listing.

It is can be concluded that if the Stock Exchange Market in Uganda is to be enhanced as a vehicle for mobilizing capital for development, then all players in the market must change their approaches. The USE must play an increasingly educational role; the CMA as the regulatory agency must alter its approach from the sometimes heavy-handed type of control to a more proactive, creative and supportive role in order to assist in the creation of a more vibrant and formal working capital environment. It can do this by seeing itself as a catalyst in development rather than as a traditional regulator of what is a very small market.

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ADMISSION REQUIREMENTS AND CLASS SIZE INFLUENCE ON STUDENTS' PERFORMANCE

BY

MOYA MUSA

BYARUGABA PONTIOUS

NASSUNA AGNES

BACKGROUND TO THE STUDY

Over time, the number of students admitted to public universities in Uganda has been increasing. This has had tremendous effects on the general performance of these universities and it has affected the ultimate product of these universities, which is the performance of the students. In addition to this, many new courses have been introduced in public universities, which have seen various changes in the admission and entry requirements. Various arguments have been advanced by a multiplicity of scholars on the effect of entry requirements on the ultimate performance of university students. (Geiger and Dangerfield 1996, Lawrence and Pharr, 2003, Ineson and Kempa ,2007).

Traditionally, specific key areas like Mathematics and Economics were essential requirements for pursuing Business courses, however, this has been relaxed such that currently at some universities, any two principal passes in any subjects, done at advanced certificate level can enable someone pursue a business related course. It has been noted that there are many students who though have not pursued, the essential courses, eventually excel at the university in terms of their overall cumulative grade points.

In a study done by Pharr (2006), it was established that while admission standards were effective for all students under the traditional business core curriculum for areas like accounting and statistics, it was not equally appropriate for the integrated business core curriculum in general areas like Business law, Business ethics and Economics. He highlights that a one size fit approach to business schools admission requirements may not be an appropriate policy given significant curricular redesigns.

Admission requirements are commonly employed as a means of matching the quality of an academic program and the student pool. As a result, they play an important role in ensuring the overall quality of the program and present a critical quality control design that allows the admitting of students with a high probability of succeeding in the specific program, while preventing those students who would likely perform poorly from enrolling.

Generally, smaller class sizes tend to be associated with better teaching and therefore better student's performance (Hooper and Page, 1986; Cohen, 1983; Aleamoni, 1989; Raval, 1991; Koh and Tan, 1997), although non-linear relationships have also been reported in the literature (Holtfreter, 1991).

In some research studies, students in smaller classes have realized achievement goals superior to those in larger classes (McConnell and Sosin, 1984; Liaw and Goh, 2003). Some research suggests that large classes are simply not as effective as small classes for retention of knowledge, critical thinking, and attitude change (McKeachie, 1978, p. 207; Siegfried and Fels, 1997, pp. 938-9; Glass et al., 1981; Toby, 1993; Cranton and Smith, 1986; Koh and Tan. 1997).

However, some studies found a negative relationship between teaching and class size (Marquardt et al., 1975), while other studies found a weak or insignificant relationship (Stumpf and Freedman, 1979; Marsh,

1984; Langbein, 1994). it is on this basis therefore, that an investigation has been carried out to assess the relationship between entry requirements, class size and university students performance.

STATEMENT OF THE PROBLEM

Over time students' performance has declined with a big number of students failing to complete their study program in the scheduled time characterized by failure of quantitative subjects like accounting, statistics, and quantitative methods (Faculty board reports, 2007-2009). This may be attributed to various factors including, the admission criteria and class sizes, which in turn influence the study environment thence affecting students' performance associated with lower CGPA and number of students graduating at particular year. This situation jeopardizes the overall mission of the university that aims at producing well-trained graduates with adequate skills to enable them perform efficiently out there in the job market.

PURPOSE OF THE STUDY

The purpose of the study therefore is to analyze the admission criteria and the changes in class sizes and to what extent these factors influence the overall performance of the students in terms of the Cumulative Grade Point Average (CGPA).

OBJECTIVES OF THE STUDY

- To find out the relationship between admission criteria and the study environment.
- To investigate the relationship between class size and the study environment.
- To examine the relationship between admission criteria, class size and students' performance.

RESEARCH QUESTIONS

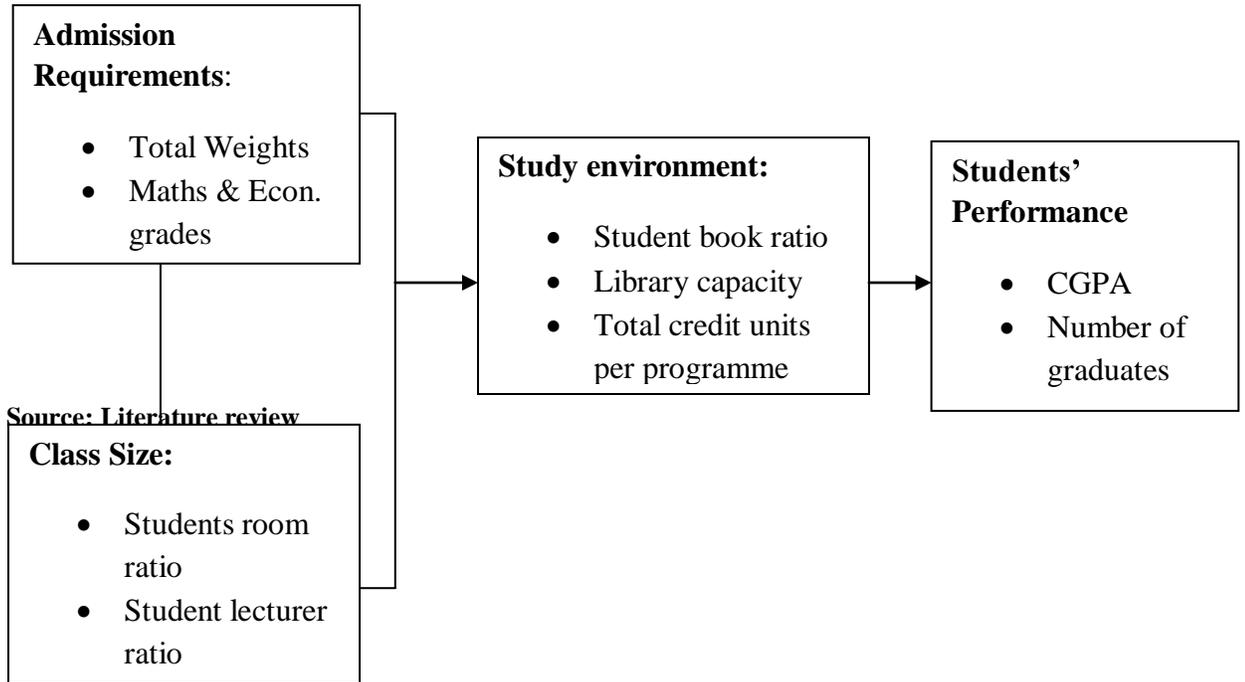
- What is the relationship between the admission criteria and study environment?
- What is the relationship between the class size and study environment?
- What is the relationship between admission criteria, class size and student's performance?

SCOPE OF THE STUDY

The research focused on admission requirements and the class size as the independent variables and review students' level of performance as the dependent variable.

It was limited to MUBS as the case study and reviewed programs of BBA, BCOM, BBC and BOIM and considered a period of 13 years from 1997 to 2009.

CONCEPTUAL FRAME WORK



It is assumed that the admission criteria in terms of the score of points and the essential subjects taken, together with the number of students admitted in relation to the room capacity and number of faculties present to deliver curriculum affect the output of the learning process at the university in terms of performance levels at the university. This study focuses on students admitted on direct entry. We are assuming that the study environment in terms of student book ratio, library capacity and total time in terms of credit units is constant and we limiting students' performance to the cumulative grade point attained by a student and the number of students who graduate compared to those admitted in 1st year.

LITERATURE REVIEW

Review of existing work on university performance, student's performance, study environment, admission requirements, class size and the relationships that exist between them in order to gain a deeper understanding of the study variables and appreciate the gaps that exist.

UNIVERSITY PERFORMANCE

Universities assist in the development of a country through developing innovative capacity and students transformation, (Chessman et al, 2006), therefore there is need to focus on improving its operations through research. Masmiliano, Abigali, Robin and Jeremy (2008), assert that demonstrating success and a high level of performance, helps any university to attract and retain resources, recruit quality faculty and students and maintain partnerships with other stakeholders like government and research facilities.

It should be appreciated that the university performance is highly indicated by the extent they are able to educate students who on learning are transformed into individuals capable of making a positive difference at regional, national and global levels, though sometimes it is not always the case. Identifying and analyzing student's performance is of great importance to educators, psychologists and the student's community at large.

According to Maria de Conceicao (2004), universities are centers of creativity, transmission, and propagation of culture, science and technology who through teaching and research enhance the life of society. In order to appreciate the performance of university students, let us first review the factors that influence the overall university performance.

Various factors determine the performance of universities. According to Srikanthan (2003), the essential drivers of university performance are the assertions of autonomy and accountability and this are embedded into the educational policy of the country. He explains that autonomy gives freedom to the academicians to develop curricula and conduct research. Therefore, university academic staff should not be treated like employees of corporate enterprises rather they should be treated like independent thinkers of future visions. Autonomy notwithstanding universities should be accountable to their funding authorities to ensure that the affairs of the institutions are being governed and managed properly. (Cannon, 1994)

Taking a big picture, overall university performance is a result of a diversity of factors as highlighted by Bratti, Mcknight, Naylor and Smith (2003). In their research on higher education outcomes, graduate employment and university performers indicators they identified factors like Matriculate academic preparation, ranking in top continental universities, diversity of students, number of international students, retention of students, transfer of students, graduation numbers, post baccalaureate enrollment, average class size, doctoral attainment of full time teaching faculty, financial strength and giving back to society. Building on this the university of Lancaster report (2006) noted that university performance can be analyzed basing on factors like quality of teaching and graduates produced in terms of degree awarded, student satisfaction, retention of students and graduate track employment. Other factors that were highlighted by the report included quality of research, financial viability, staff quality, estates quality, IT quality and availability of transformational projects. It should be appreciated that this report is line with earlier findings.

Maria de Conceicao (2004), on the other hand, looks at university performance in terms of customer orientation, level of competitiveness and accountability of the leaders. She argues that in order to assess their performance, universities should review internal performance indicators which are based on the internal information produced by the university such as the pass rate, graduate rate, number of dissertations produced, average duration of course, assessment of professors by students and indicators of operational performance which refer to activities of departments such as student/professor ratio, student/staff ratio, unit cost of programs, class size, ratio of employees and student computer ratio. Maria goes ahead to identify external performance indicators such as employability of graduates, reputation of the university in the work place and research performance indicators which aim at assessing the research activities at the university which may include number of publications, research contracts, dissertations accepted, consultations provided, inventions and patents, invitation to relevant scientific conferences and organization of such,

awards and distinctions. This paper helps and to understand university performance is because of a diversity of factors.

Having appreciated the big picture, the sections that follow review specifically students' performance, as it is the focus of this research paper.

STUDENTS PERFORMANCE AT THE UNIVERSITY

Student's performance at a particular university is a key predictor of the overall university performance. It can be looked at in terms of the course grades or grade point averages attained by individual students, skills attained and the level of employability (Nuttali, 1992). The higher the grades, and level of employability and the more the skills attained the higher the performance. For purposes of reliability, this paper is going to be limited to the grades in terms of cumulative grade point averages as measures of the students' performance.

Normally performance of university students is influenced by various factors including student's demographic profile, admission qualifications, subject taken by students in pre university level, gender, attendance, linguistic capacity, ethnicity, culture, age among others. (Ervina, 2005).

Recent research shows that an increase in students performance is associated with improvement in teaching that is linked with technology and the internet and the entrance examination scores especially in mathematics, science and research, gender differences and availability of appropriate supplemental instruction or technical assistance. (Waples & Daraysah, 2005, Cheesman, Simpson and Wint 2006 Sicat & Broncs, 2009). Analysis of these papers shows that large class size and heavy teaching load for the instruction may also affect the performance of the students.

According to Alfian, 2006, performance of the university student should be looked at in terms of the overall quality of the student as the final product of the institution released to the labor market. He goes on to explain that the overall performance of the university's products should have minimized drop outs at that level, as students who drop out would not only find it difficult to search for jobs, they could also hinder the development of the labor market.

Carpenter et al (1993) found out that student's performance could depend on his or her expectations and also on their race. In addition Bordes (1998), advances factors like gender, age, academic origin, grade point average, extra curriculum activities and employment influence as determinants of the grades obtained by a student.

Another key determinant of performance at the university is the performance at level prior to admission at the university. Ardila (2001) in his paper on predictors of university performance in Columbia discovered that scores at examinations that determine entry at the university, much as they are used as a major criterion for university admission, performance in such exams, has low correlation with the students GPAs and vary widely from one academic program to another.

In another research by Durr (2000), several factors were identified to affect students' performance at the university and these included students original attitude towards some courses, personality of the instructor, and performance in entrance exams, motivation and effort of the students, gender differences and student's age, in this study it was found that men performed better than ladies, students would perform better if they had similar learning styles with their professors or if they tried to model them, high scores in standardized entrance exams did not guarantee high students performance and that the determination to graduate also motivated to work hard and therefore score better grades.

According to Pharm (2008), key factors that affect students' performance include-

Academic Competence – this is the proficiency of students with respect to the content taught during the course and their ability to understand the course materials.

Test Competence- this reflects how students cope with the amount of study materials for examinations and tests. It refers to the difficulties associated with managing the amount of study materials for an examination and in preparing for them.

Strategic Studying- this is the knowledge and application of effective study skills or techniques by students. Key strategic studying techniques include - K-W-L (Know- Want- Learn), SQ3Rs (Survey- Question- Read- Recite –Review), summarizing and note taking, graphics usage, and self-questioning. Exclusive course loads at university level requires the use of such techniques for academic success.

Time Management Skills- This is the ability of students to balance leisure and study time to prepare for examinations. Such techniques include activities like planning, prioritizing work, test preparation and following schedules. It can be noted that that time management requires behavior skills that are important in organization of ones' study.

Test Anxiety- This affects the performance of students negatively. It refers to a set of responses like worry, depression, nervousness, and task relevance, cognitions from an individual's experience of assessing or testing. it therefore accompanies an individual students' reaction to stimuli that are associated with an individual's experience of testing and evaluating situations.

From Pham's research it should be observed that the above factors are within the control of students and they are related to students' performance during the course of study at the university.

Another key determinant of student's performance is the student's attitude and the lecturers' teaching methods according to Onn (1999). In another study done by Ho (2000), it was established that the academic achievement of students is related to the attitude of the students' towards the course, time, and perception of parental support, teacher's influence and socio economic status.

In another study by Manan and Mohammed (2003), it was still emphasized that a student's performance especially in quantitative courses depends highly on their performance in Mathematics and Economics at their high school. Recent literature shows that student's performance in universities is also affected by factors like contact hours allocated to a particular unit, passing of prerequisite courses, enrolment status, lecturer's abilities, on versus off campus residence, and availability of financial assistance (Cheesman, Simpson and Wint, 2006, Tho 2004).

In a study by Lambelet & Mihailov (2003), it was established that personal and family background, work and study discipline and the type of degree were significant determinants of student's. In another study by Betts & Morell (1998), it was found out that factors like gender, ethnicity, family income as well as socio economic environment of the campus have an important role in explaining why students obtain different Grade point average (CPA)

Vandamme and Superby (2002), assert that performance of a student in the university is determined by various factors, which can be grouped in three categories i.e. those factors that relate to the personal history of the student. i.e his identity, his socio-family past and his academic past. They then discusses the factors that are a result of the student's involvement in his studies at the university i.e. participation on class activities, interaction with the professors, asking of questions, ability to seek feedback on performance. lastly they highlight those factors relate to the students participation towards the program he or she is undertaking i.e. students confidence in his or her abilities and level of persistence, belief in how easy or difficult the course is, how good or bad the course is according to the student and students preference to group work or individual work.

Based on the review of literature above, where divergence of factors in influencing student's performance were advanced, this study is undertaken to examine the extent to which admission requirements and class size influence the students' performance, following therefore is a closer look at these two factors..

Admission Requirements and students performance

Admission requirements are commonly employed as a means of matching the quality of an academic program's student pool and as a result the program itself (Lawrence and Pharr, 2003). They therefore play an important role in ensuring the overall quality of the program and represent a critical quality control design that allows the admitting of students with a high probability of succeeding in the specific program, while preventing those students who would likely perform poorly from enrolling. They further argue that the admission standard used should be used as a predictor of students' future performance and thus help to enroll only those likely to succeed.

Geiger and Dangerfield (1996), explain that admission requirements are important because they help to ration the many applicants to fit limited capacities of the admitting college or school and also to screen out students with a low probability of success on the other hand.

Ineson and Kempa (2007) show that the selection of students on a course should focus on the competences that are required to succeed in the chosen career and not on succeeding in the course. On the other hand in an earlier study by Cheesman et al (2006), it was observed that performance in the earlier levels before coming to the university is an indicator of the students ability to cope with the matching studies at a higher level and the quality of secondary education obtained, and should therefore be given due consideration, this view is supported by another study by Sabot and Wakemann-Linn (1991), where it was noted that a student grade in studies prior to university is a measure of previous achievement and therefore a proxy measure of ability to pursue university education. It is also an indicator of the quality of students to be admitted and therefore it is expected to have a positive impact on the student's performance.

From the above analysis of literature, it can be seen that admission requirement is a key predictor of the performance of students, however there are cases where, students who qualify for specific cases at the university depending on the assumed relevant admission criteria end up performing below expectation. It is on this basis that it has been selected by the researchers as one of the key predictor variable to be analyzed in studying the students performance at Makerere University.

Class Size and Performance of University Students.

Class size simply refers to the number of students for whom a lecturer is responsible for during a specific semester (Lewit & Baker, 1997). Generally, smaller class sizes tend to be associated with better teaching and therefore better student's performance (Hooper and Page, 1986; Cohen, 1983; Aleamoni, 1989; Raval, 1991; Koh and Tan, 1997), although non-linear relationships have been reported in the literature (Holtfreter, 1991).

In various research works, it has been urged that the class sizes have no direct relationship with performance of students. (Hanushek, 1999), He argues that, the enormous research aimed at reducing class size to improve students' performance has failed to achieve results.

Various findings on the general ineffectiveness of reducing class size tend to be controversial. Some argue that there is little gain in reducing class size for example in the University of Rochester Report (1998), it is explained that the achievement for a typical student was unaffected by the size of the class.

In an earlier research by Nuttali (1992), it is argued that class size is a poor approximation of students' performance and that it is widely used because a number can easily be attached to it. Findings in this paper indicated that there is little or no relationship between course grades, standardized achievement scores, student's satisfaction and learning and that it is more important to look at what actually goes on in the classroom than focus on the size of the class.

However Baker and Lewi (2008) argue that with class size reductions, it's possible to teach more effectively because the class is more cohesive and dynamic, there is room for students to spread out and complete assignments without being distracted and it's possible to have a one to one interaction with the student, which ensures that learning actually takes place.

Conclusion to literature review

There are differing and contradicting views on the extent to which admission or entry requirements and class size, influence the overall student's performance, as seen from the analysis of literature. The purpose of this paper therefore is to establish the extent to which admission requirements and class size influences student's performance in a Ugandan setting.

METHODS AND MATERIALS

RESEARCH DESIGN

Longitudinal, descriptive, exploratory and analytical research designs were used to examine the admission requirements, class size and students performance.

STUDY POPULATION

A population comprised of all undergraduate degree graduates for 13 years ranging from years 1997 to 2009 were used. This was selected basing on commencement of MUBS to date. The unit of analysis was student.

SAMPLE SIZE

Sample size of 4173 graduates from the programmes of Bachelor of Business Administration, Bachelor of Commerce, Bachelor of Business Computing and Bachelor of Office and Information Management were used, because of the availability of student's records and need to broaden the program scope to include old and new programs of MUBS.

MEASUREMENT OF VARIABLES

Admission requirements were measured in terms of number of points scored at high school, number of principal passes, mathematics or economics taken at A-level (as dummy variable, 1 for math or Economics done at A-level and 0 otherwise).

Class size was measured in terms of number of students allocated / attended particular program vis a viz lecture room capacity (student lecture room ratio) and lecturer student ratio. The average number of students, average capacity, average number of lecturers for the 3 years of study per program, BCOM, BBA, BBC and BOIM.

Student's performance as dependent variable was measured in terms of student CGPA at end of third year number of graduates per year.

SOURCES OF DATA

Secondary source of data was used to extract secondary data from published examination results, graduation lists, admission records and lecture room/ size allocation records from school registrars' office.

METHODS OF DATA COLLECTION

Abstraction method was used to obtain data from published records.

QUALITY CONTROL

Academic Boards records dully and approved by Chairpersons and secretaries were used.

DATA ANALYSIS

Ms excel, E-views, SPSS were used to examine the admission requirements, Class size and students' performance by use of descriptive statistics.

Performance model was tested and fitted using ordinary least squares regression methods, this enabled determination of the various relationships between study variables.

LIMITATIONS OF THE STUDY

- Only four programs two old and two new programs were considered.
- The study considered only data on students who have completed and graduated.
- Student's performance was at end of third year, cumulative.
- Obtaining soft copies of each student record was not easy.
- Literature on study variables and their relationship may not be sufficient as few studies have previously been conducted on the same.

FINDINGS

DESCRIPTIVE ANALYSIS

Table 1: Number of Graduates

Year	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Total	Average	Standard deviation
Bachelor of Business Administration	331	216	449	764	838	595	3193	532.167	244.3664598
Bachelor of Office and Information Management					60	58	118	59	1.414213562
Bachelor of Business Computing					66	103	169	84.5	26.1629509
Bachelor of Commerce			121	115	136	131	503	125.75	9.5

Source: Primary data

Results in table 1 indicate that 532 students graduated every year with a BBA on average, 59 with BIOM, 85 with BBC and 126 with a B.COM degree. The average number of students admitted every year for BBA is over 1000, BBC, B.COM and BIOM over 200.

DIAGNOSTICS

Normality test using Jackiebera statistic was used as its good for time series data and all study variables were fairly normally distributed after natural log transformation (Sig>0.05). Multicollinearity was tested using VIF and condition index, all VIFs were relatively small less than 3 and condition index were less than 20 an indication that there was no severe multicollinearity among study variables. Linearity test was performed using scatter plots and tested with F statistic (Sig<0.05), implied that the variables were linearly related. There was no serial correlation as indicated by Durbin Watson statistic (DW= 2.4521> R²=0.414). Homogeneity test using Levens test Sig F >0.05 for all the study variables indicating equal variances and from same population. The parametric tests were therefore chosen for this study.

INFERENCEAL ANALYSIS

Parametric tests were used namely Pearson correlation and Ordinary least square regression analyses were used to determine the relationships between the study variables as shown in tables 2 and 3 below.

Table 2: Correlation Matrix

	Student room ratio	Student lecturer ratio	Total credit Units	Total weights	Dummy(Math or Econ)	CGPA
Student room ratio	1.000					
Student lecturer ratio	.420**	1.000				
Total credit Units	-.342**	-.392**	1.000			
Total weights	.312**	.273**	.453**	1.000		
Dummy(Math or Econ)	.260**	.279**	.313**	.097	1.000	
CGPA	-.349**	-.369**	.262*	.377**	.251*	1.000

Source: Primary data

Admission requirements, study environment and performance

There was a significant positive relationship between total weights of a student attained at High school with total credit units (r=.453, p-value<0.01). This implies that total weights for a student had a positive effect on the total credit earned by a student.

There was a significant positive relationship between math/economics and total credit scores (r=.313, p-value<0.01). This implies that economics and mathematics plays enhanced students total credit units.

Admission requirements in terms of total weights and math or economics taken at high school had a significant positive relationship with students CGPA (r=.377, .251, p-value< .01, .05) respectively. This implies that admission requirements for B.COM, BBA, BBC and BIOM students to have done math or economics and high total weights attained at high school enabled the student to perform well at University.

Class size, study environment and performance

There was a significant negative relationship between student room ratio and total credit units (r=-0.342, p-value<0.01). This implies that increase in student room ratio reduced on the total credit units of a student.

There was a significant negative relationship between student lecturer ratio and total credit units ($r=-0.392$, $p\text{-value}<0.01$). This implies that increase in student lecturer ratio reduced on the total credits earned by each student.

Class size in terms of student lecturer ratio, student class ratio had significant negative relationship with CGPA ($r=-.349$, $-.369$, $p\text{-value}<0.01$). This implies that increase in class size in terms more students and reduced lecture space and staff reduces the CGPA of a student.

Multiple regression analysis

Table 3: Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.997	1.251		.797	.042
Total weights	.238	.002	.312	3.215	.000
Student lecturer ratio	-.182	.008	-.217	-2.644	.008
Student room ratio	-.098	.018	-.203	-2.456	.022
Total credit Units	.087	.010	.187	1.652	.029
Dummy(Math or Econ)	.079	.046	.119	1.429	.042
R-Square=0.414, Adj R-Square=0.386, F=3.281, Sig=.000					
Durbin Watson statistic = 2.4521					

Source: Primary data

Model; $P=0.997+238T_W-182SL_R-.098SR_R+.087TC_U+.079D$.

Admission requirements and class size significantly predicted 38.6% students performance ($F=3.281$, $Sig=.000$). Total weights attained at High school, total credit units, mathematics and economics subjects at high school significantly and positively predicted student's performance.

Student lecturer and room ratios significantly and negatively predicted students' performance.

DISCUSSION OF FINDINGS

Admission criteria and the study environment.

Admission criteria in terms of total weights of a student attained at High school positively affected study environment in terms of total credit units. This implies that students with good total weights earned better total credits. Good total weights at high school are a prerequisite to good total credits.

Admission criteria in terms math/economics positively affected total credit scores. This implies that economics and mathematics plays enhanced role on students total credit units.

Class size and the study environment.

Class size in terms of student lecturer ratio and student room ratio negatively affected the study environment. Increasing number of students not matched with appropriate lecture room size and number of lecturers impact negatively on the students' scores of total credit units.

Admission criteria, class size and students' performance.

Admission criteria positively affected the students' performance as Mathematics and or Economics subjects at high school prepare a student to effectively study business and management courses of BBA, B.COM, BBC, BIOM programs.

Above findings are in conformity with literature, Normally performance of university students if influenced by various factors including student's demographic profile, admission qualifications, subject taken by students in pre university level, gender, attendance, linguistic capacity, ethnicity, culture, age among others. (Ervina, 2005).

Recent research shows that an increase in students performance is associated with improvement in teaching that is linked with technology and the internet and the entrance examination scores especially in mathematics, science and research, gender differences and availability of appropriate supplemental

instruction or technical assistance .(Waples & Daraysah, 2005, Cheesman, Simpson and Wint 2006 Sicat & Broncs, 2009).

Maria de Conceicao (2004), on the other hand, looks at university performance in terms of customer orientation, level of competitiveness and accountability of the leaders. She argues that in order to assess their performance , universities should review internal performance indicators which are based on the internal information produced by the university such as the pass rate, graduate rate, number of dissertations produced, average duration of course, assessment of professors by students and indicators of operational performance which refer to activities of departments such as student/professor ratio, student/staff ratio, unit cost of programs, class size, ratio of employees and student computer ratio. Maria goes ahead to identify external performance indicators such as employability of graduates, reputation of the university in the work place and research performance indicators which aim at assessing the research activities at the university which may include number of publications, research contracts, dissertations accepted, consultations provided, inventions and patents, invitation to relevant scientific conferences and organization of such, awards and distinctions.

Big numbers of students and few academic staff have reduced on the performance of students on BBA, BCOM, BBC and BIOM programs at MUBS. This is supported by literature that , smaller class sizes tend to be associated with better teaching and therefore better student's performance (Hooper and Page, 1986; Cohen, 1983; Aleamoni, 1989, Raval, 1991; Koh and Tan, 1997), although non-linear relationships have been reported in the literature (Holtfreter, 1991).

In various research works, it has been urged that the class sizes have no direct relationship with performance of students. (Hanushek, 1999), He argues that, the enormous research aimed at reducing class size to improve students' performance has failed to achieve results.

Some findings on the general ineffectiveness of reducing class size tend to be controversial. Some argue that there is little gain in reducing class size for example in the University of Rochester Report (1998), it is explained that the achievement for a typical student was unaffected by the size of the class.

Nuttali, (1992) indicates that Students performance at a particular university is a key predictor of the overall university performance. It can be looked at in terms of the course grades or grade point averages attained by individual students, skills attained and the level of employability.

CONCLUSION

Taking Economics or mathematics and Good principle passes of A, B and C attained by students at high school resulting in good total weights are a prerequisite for good performance of students doing BBA, BCOM, BBC and BIOM programmes at MUBS.

Class size and lecturers matching the student numbers enable students to study well and perform well with good CGPA.

RECOMMENDATIONS

Students with high total aggregate weights at high school should be the ones for selection of BBA, BCOM, BBC, and BIOM programs for better results. Mathematics or Economics should also be emphasized as one of the admission criteria.

MUBS should provide lecture rooms large enough to accommodate students undertaking these programs for enhanced performance. Admitted student numbers should match the existing lecture room infrastructure.

Academic staff numbers proportionately matching student numbers should be recruited to further improve on the performance of students.

AREAS OF FUTURE RESEARCH

Academic staffs work load, competence, teaching aids and related infrastructure with student performance.

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An Analysis of Accountants' Perceptions of the Effectiveness of Continued Professional Education (CPE) for Accountants in Tanzania

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ABSTRACT

In July 2001 the Governing Board of the National Board of Accountants and Auditors Tanzania (NBAA) introduced mandatory CPE scheme. The objective of the CPE scheme is to encourage all the Board's members to update and expand their knowledge and practical skills in order to maintain high standards of accounting in Tanzania. The underlying emphasis is that the members must receive value from the training and the training has some effect in changing the practice or way of working of the members.

The objectives of this research were to measure CPE effectiveness, identify deterrents to effective continued professional education experienced by Tanzania Chartered Public Accountants (CPAs) and the relationship between the identified deterrents and the perceptions of the CPAs on the CPE effectiveness. Using self-perceptions of the members as the reasonable procedure for measuring the value receivable from CPE participation, this study adopted the questionnaire developed and used in USA. The questionnaires were distributed to CPAs working in various public and private organizations located in Dar es Salaam. Dar es Salaam was picked because it absorbs nearly 77 per cent of all CPAs in Tanzania. About 200 questionnaires were distributed and 116 questionnaires were collected achieving a response rate of 58 per cent.

The result of the analysis showed that in general the CPAs are in agreement that the CPE Scheme is effective in transmitting the knowledge gained into real working place. It is also observed that the deterrents to CPE effectiveness are also experienced by Tanzanian CPAs in varying degrees. As regards the relationship between CPE effectiveness and the identified deterrents the study showed that there is significant negative relationship between CPE effectiveness and the dispositional deterrent. The situational and informational deterrents showed weak negative relationship with CPE effectiveness. Institutional deterrent showed significant positive relationship with CPE effectiveness. These results show little support to the study similar to this conducted in USA.

Introduction

In Tanzania the responsibility of regulating the Accounting profession is vested in the National Board of Accountants and Auditors (NBAA) which is under the Ministry of Finance. This body was established under the Auditors and Accountants (Registration) Act.No.33 of 1972, as amended by Act No. 2, of 1995. NBAA is a regulatory accountancy body committed to the continuous transformation of the accounting profession in Tanzania through development, promotion and good conduct. This is accomplished through setting high quality standards for the profession, regulating registration of members and students, monitoring accountancy training and conducting professional examinations, regulating the conduct of members and students and providing continued professional development programs to enhance members' professional knowledge and skills.

The NBAA Governing Board in its 112th meeting approved the establishment of a Quality Review Scheme and introduction of Mandatory CPE Scheme which became operational with effect from 1st July, 2001. The objective of CPE is to positively encourage all the Board's members to update and expand their knowledge in the face of changes and growth in the body of knowledge and skills required to maintain high standards demanded of a modern professional accountant. (NBAA web: www.nbaa-tz.org/cpepolicy.htm 29/08/2009).

Effective July 2001 NBAA made Continued Professional Education for accountants mandatory. It has been implementing the CPE program through organizing seminars, workshops and symposiums in different venues. Sometimes it conducts joint CPE program with other institutions such as the Bank of Tanzania using local and international facilitators. An effective CPE program should help the CPAs maintain competency, update their knowledge, improve professional practice and provide professional growth.

There is some reason to believe that the CPE program may not be as effective as it could be. For example, most current mandatory continuing professional education laws require CPAs to participate in CPE courses, but the regulations refer mainly to attendance. Evidence that CPE courses are not always effective is captured by comments made by many CPAs who view CPE as "hours I get to keep my license" (Wessels, 2005). Clyde (1998) states that CPAs are often "confronted with the necessity to meet regulatory measurements (how many hours?), classification (was it technical or nontechnical?), and appropriateness (what counts?)". The result may be that those taking CPE courses end up focusing on compliance rather than on real competence. If the hours and resources devoted to CPE courses are not being well utilized to enhance competency, then a key issue is why not?

Due to the need to conduct research which will highlight the effectiveness of CPEs in Tanzania and the availability of similar study conducted in USA. This study applied philosophical underpinning advocated by Manwa and Manwa (2007) where they applied models and theories developed in the west developed countries in Zimbabwe a developing country. They studied the applicability of Western mentoring in Zimbabwe. Contrary to possible expectations, Western concepts were not applicable. Similarly Masoud and Tim (2011) tested the model developed by Mitchell, Agle, and Wood (1997) and tested in USA by Agle, Mitchell, and Sonnenfeld, (1999) in Tanzania. Masoud and Tim (2011) results were in some cases similar to those of Agle et al (1999) and in some other cases they were different. In this research following similar philosophical underpinning Concepts used by Wessels (2005) in USA are applied in Tanzania to investigate the effectiveness of CPE for Accountants in Tanzania.

Problem Statement and Literature Review

It is also important to understand the reasons professionals do not participate in learning activities. The causes of non-participation are called deterrents to participation and are a key element of most theoretical models of participation (Cross, 1981; Darkenwald and Merriam, 1982). A deterrent is a reason or related group of reasons contributing to an individual's decision not to engage in organized learning activities (Wessels, 2005). Prior research on deterrents to participation in various types of adult education identified several categories of deterrents which include situational deterrents, dispositional deterrents institutional deterrents and informational deterrents.

Situational deterrents are constraints which inhibit participation and are external to the individual's control (Johnstone and Rivera, 1965). Scanlan and Darkenwald (1984) identified three distinct variables relating to situational deterrents: cost, work constraints, and family constraints. Work constraints, as identified by several researchers (Dao, 1975; Johnstone and Rivera, 1965; and Scanlan and Darkenwald, 1984), include conflicts between course offerings and work responsibilities and the difficulty of taking time off from work in order to participate. Family constraints involve the problems caused by child care issues and other family commitments and have been identified in several research studies (Cross, 1981; Darkenwald and Valentine 1985; Scanlan and Darkenwald, 1984).

Dispositional deterrents are factors that hinder participation and represent internal barriers based on personal attitudes toward continuing professional education (Johnstone and Rivera, 1965). One type of dispositional deterrent is the individual's perception about the lack of benefit from engaging in further learning activities (Darkenwald and Valentine, 1985; Scanlan and Darkenwald, 1984). Another type of dispositional deterrent is the individual's disengagement or apathy toward further education (Darkenwald and Valentine, 1985; Scanlan and Darkenwald, 1984).

Institutional deterrents are practices and procedures of the CPE provider that inhibit participation in continuing education (Cross, 1981). Some of the institutional deterrents identified in the literature include the quality of course offerings, location, scheduling, relevance, and ease of registration (Cross, 1981; Darkenwald and Merriam, 1982; Scanlan and Darkenwald, 1984).

Informational deterrents are barriers to participation relating to a lack of information about the available courses or a lack of information from which to judge the appropriateness of a CPE course (Darkenwald and Merriam, 1982).

Wessels, (2005) made a study similar to this in North Carolina where she identified deterrents to CPE programs and their relationship to perceptions of the effectiveness of the overall program. In her survey of North Carolina CPAs it was shown that deterrents identified in earlier participation studies are negatively and significantly related to the effectiveness of mandatory continuing professional education for the accounting profession. The study found that there was strong negative correlation between the institutional deterrent score and the CPE effectiveness score implying that institutional deterrents were the major predictor of CPE effectiveness (the more the institutional deterrents the lesser the CPE effectiveness). Remember institutional deterrents are those emanating from the CPE provider. The situational deterrents emerged as the second predictor of CPE effectiveness. Dispositional deterrents were the third predictor of CPE effectiveness while informational deterrents were the last predictor of CPE effectiveness as they showed weak negative relationship with CPE effectiveness.

Table 1: Wessels (2005) Correlation between Deterrent Scores and CPE Effectiveness (N = 1850)

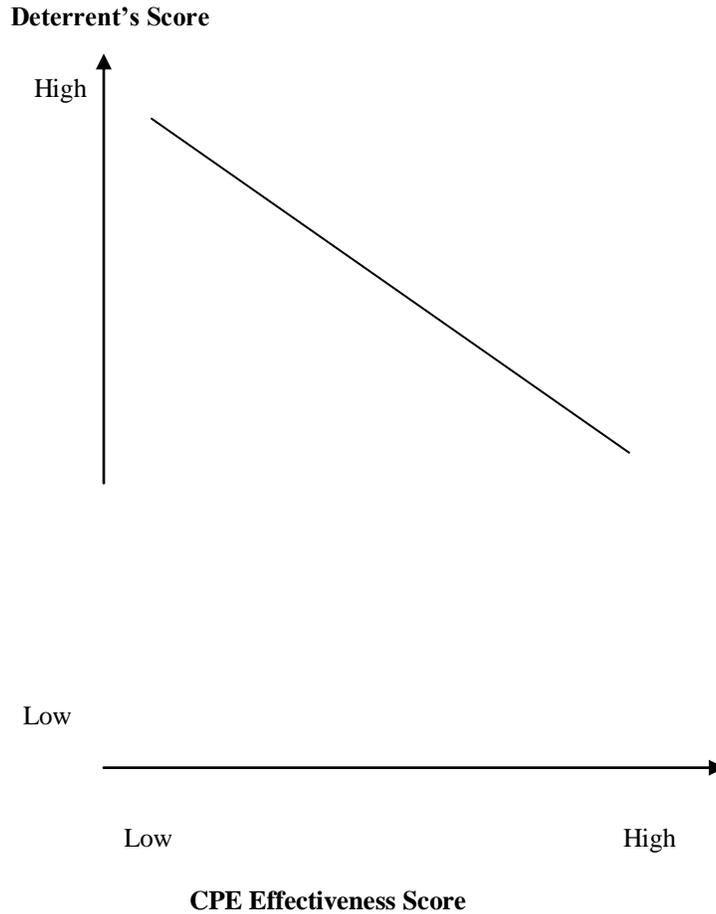
	Institutional deterrent score	Situational deterrent score	Dispositional deterrent score	Informational deterrent score
CPE effectiveness score				
Pearson Correlation	-.509**	-.347**	-.114**	-.054*
Sig (2-tailed)	<.0005	<.0005	<.0005	.020

** Correlation is significant at the .01 level (2-tailed) * Correlation is significant at the .05 level (2-tailed)

No specific research has been done in Tanzania to examine effectiveness of mandatory continuing education for the accountants in Tanzania. The objective of this research were; first to identify the perception of the CPA in Tanzania on the effectiveness of continuing professional education. Secondly to identify the level of deterrents to effective continued professional education experienced by Tanzania CPAs and the relationship between the identified deterrents and the perceptions of the CPAs on the CPE effectiveness.

The conceptual framework of this research (developed by the researchers) was built on the assumption that there is inverse relationship between CPE effectiveness and Deterrents meaning that as the Deterrents' Score increases the CPE effectiveness Score decreases and vice versa as depicted in the figure below:

Figure 1: Relationship between Deterrent and CPE Effectiveness Scores



Developed by the Researchers

Methods

This research used a questionnaire method. The items used in the survey instruments were developed based on review of the study conducted by Wessels, (2005). This questionnaire was adopted after being tested. The questionnaire was designed in two parts. Part I of the questionnaire was designed to collect demographic information on gender, years of experience, current position, type of the organization and size of the organization (based on number of employees). Part II contained 25 items where the respondents were required to answer using a five-point Likert-type response scale with response descriptors ranging from “strongly disagree” (value =1), “disagree” (Value = 2), “neutral” (Value = 3), “agree” (Value = 4) and “strongly agree” (value=5).

The analysis basically involved looking for means and standard deviations. The CPE effectiveness score involved the finding of the mean response on question 1. A mean score close to 5 (strongly agree) indicated that the respondent perceived the CPE program to be highly effective and a mean score close to 1 (strongly disagree) indicated that the respondent perceived the CPE program to be highly ineffective. The question on deterrents involved finding the mean response on question 2 (institutional deterrents), question 3 (situational deterrents), question 4 (dispositional deterrents) and question 5 (informational deterrents). The

mean score close to 5 indicated that institutional, situational, dispositional and informational deterrents were major predictors of CPE ineffectiveness.

Standard deviation was used to measure variation from the mean. In probability theory and statistics, the standard deviation of a statistical population, a data set, or a probability distribution is the square root of its variance. It is a widely used measure of the variability or dispersion. It shows how much variation there is from the “average” (mean or expected/budgeted value). A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data is spread over a large range of values (Hair, Black, Babin, Anderson, and Tatham, 2006)

The question on relationship between deterrents and CPE effectiveness involved finding the correlation between all four deterrents and CPE effectiveness by using two-tailed Pearson’s Product Moment Correlation Coefficient (PMCC). A correlation coefficient enabled us to quantify the strength of relationships between two ranked or quantifiable data (Hair et al, 2006). This coefficient (represented by the letter r) can take any value between -1 and +1. A value of +1 represents a perfect positive correlation. This means that the two variables are precisely related and that, as values of one variable increase, values of the other variable will increase. By contrast a value of -1 represents a perfect negative correlation. In this case, as the values of one variable increase those of the other decrease. Correlation coefficients between +1 and -1 represent weaker positive and negative correlations (Hair et al 2006).

Sampling Frame

The latest issue of the Directory of Members and Firms including the Board’s By-Laws as at 1st January, 2009 Tanzania was used as the sampling frame. The issue had 1,179 Certified Public Accountants distributed as follows;

Table 2: Distribution of CPAs in Tanzania.

Category	Dar es Salaam	Other Regions.	Total
Certified Public Accountants in Public Practice (Auditors).	285	83	368
Certified Public Accountants	625	186	811
Total	910	269	1,179
Percentage (%)	77	23	100

Source: Directory of Members and Firms including the NBAA By-Laws as at 1st January, 2009 Tanzania

Hair et al (2006) indicates that a population size of 1,000 attracts a sample size of 278 at 5% margin of error (or 95% level of certainty). Since this sampling frame contains 1,179 members the adjusted sample size is 328 Certified Public Accountants.

Pilot Study

A pilot test was conducted to detect weaknesses in design and instrumentation and provide proxy data for selection of a probability sample (Hair et al 2006).The purpose of the pilot test was to refine the questionnaire so that respondents would have no problems in answering the questions and in recording the

data. It also enabled us to obtain some assessment of the questions' validity and the likely validity of the data to be collected (Hair et al, 2006).

The researchers had adopted questionnaire of Wessel (2005) which she applied to North Carolina (USA) CPAs hence there was a need to conduct a pilot test to measure if it was appropriate for Tanzanian CPAs. To achieve this convenience sample of 10 CPAs working with University of Dar Es Salaam was used. Convenience sampling involves selecting haphazardly those cases that are easiest to obtain for your sample. The UDSM CPAs were easily accessible because they were the researchers' workmates. By conducting pilot test the researchers were able to assess validity and reliability.

Findings of the Pilot Study

Validity refers to the extent to which a test measures what we actually wish to measure (Schindler and Cooper, 2003). Content validity of a measuring instrument is the extent to which it provides adequate coverage of the topic under study (Schindler and Cooper, 2003). This pilot study also purported to test the content validity of the survey items. Litwin (2003) notes that content validity is not quantified with statistics. Rather it is presented as an overall opinion of a group of trained judges. During the pilot study process with the 10 respondents the researchers had accommodated three recommendations obtained from respondents on the survey items. First the item "gender" which was the fifth item on Part I of the instrument was changed to appear as the first item as is common for many questionnaires. Second, the third item on Part I which read "what is the primary type of accounting service that you provide in your current position?" was not clear to the respondents and therefore was revised to read "what is the type of organization in which you provide accounting service in your current position?" Lastly the numbering of the questionnaire was reviewed to easy references and coding in SPSS software. There were no unexpected responses and the respondents took reasonable time to complete the survey instrument.

Reliability of the Survey Items

A measure is reliable to the degree that it supplies consistent results. Reliability is concerned with estimates of the degree to which a measurement is free of random or unstable error (Schindler and Cooper, 2003). Internal consistency is one approach to reliability that uses only one administration of an instrument or test to assess consistency or homogeneity among the items. The researcher used Cronbach Alpha Coefficient to test for internal consistency reliability. The Alpha Coefficients range in value from 0 to 1. The higher the score, the more reliable the generated scale is. Nunally (1978) has indicated that a score of 0.70 is an acceptable reliability coefficient but lower thresholds are sometimes used. In the pilot study conducted the Cronbach's Alpha Coefficients were as shown in the table below;

Table 3: Cronbach's Alpha Coefficients

Variable	Number of items	Cronbach's Alpha Coefficient.
CPE Effectiveness Score	8	0.8571
Institutional Deterrent Score	7	0.7918
Situational Deterrent Score	3	0.8746
Dispositional Deterrent Score	4	0.7257

Informational Deterrent Score	2	0.6708
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Source: Field Data

From the results we can conclude according to Nunnally (1978) that the survey instrument is reliable (supplies internally consistent results).

Area of the study

This research was conducted in Dar es Salaam since 77 per cent of the Certified Public Accountants were in Dar es Salaam according to the Directory of Members and Firms including By-Laws as at 1st January 2009. Dar es Salaam is a city in the eastern part of Tanzania having more than 3 million people. It is also the biggest commercial and industrial area in Tanzania. Dar es Salaam also happened to be the most easily accessible place because the researchers work and had permanent residence in the city. The researchers selected 18 organizations of various orientations. The approach was mostly to target all organizations having a reasonable number of accountants. This is the reason why the sample contained most government institutions which due to their size are having more certified public accountants. The distribution and collection of the questionnaires are as shown on the table below;

Table 4: Distribution and collection of questionnaires.

Organization	Questionnaires Distributed	Questionnaires Collected
Ministry of Finance	30	21
PKF	8	5
Bank of Tanzania	20	9
PriceWaterhouse Coopers	12	7
TanESCO	16	11
BEST	3	0
TTCL	8	3
Zanzibar Telecom Company (Zantel)	18	15
University of Dar es Salaam	16	12
NBAA	5	3
International Commercial Bank	2	2
Tanzania Employment Agency	2	2
Tanzania Communication Regulatory Authority	4	3

Imara Consultants	7	5
Tanzania Postal Bank	5	3
Higher Education Students Loan Board	25	5
Tanzania Institute of Accountancy	3	2
Tanzania Revenue Authority	16	8
	200	116

Source: Field Data

Data Analysis

Data analysis involved steps such as coding the responses, cleaning, screening the data and selecting the appropriate data analysis strategy. Data in the questionnaire was coded and entered into the statistical analysis software package, SPSS ready for analysis. To meet the purposes of this study, the researcher used both descriptive and inferential analysis.

Results and Discussion

Discussion of the Results of Part I of the Questionnaire

Part I of the questionnaire was designed to collect demographic information of the respondents under five variables gender, years of experience, current position, type of organization and size of the organization. The following tables show the results followed by a brief discussion on each variable.

On gender the results show that 71 per cent of the respondents were male. The results further show that 66 per cent of the respondents had experience of less than 10 years. This explains the fact that most accountants of the old generation in Tanzania had no CPA qualifications and were therefore excluded in this study. As regarding current position the results show that 88 per cent of the respondents were employed while only 8 per cent were at the managerial level and only 1 per cent is self employed. The results further show that most respondents were working in Government (73 per cent). This is because, as explained above, the sample included most government institutions which usually employ a large number of accountants. The results also show that 50 per cent of the respondents were working in organization having over more than 500 employees. This is because, as explained above, the sample included most government institutions which usually employ a large number of employees.

Discussion of Results on the First Objective (CPE Effectiveness)

To determine how the CPAs perceive the effectiveness of CPE program for accountants was the first specific objective of this study. As previously explained transfer of knowledge gained through CPE participation into real working place was the major concern of this study. The findings of this objective are obtained by observing the means and standard deviations results of question one which contained 8 variables. The table below shows the result:

Table 5: Means and standard deviation for CPE effectiveness variables

Question	Description of variable	Mean	Std Deviation
1 (i) a	Enhancement of knowledge base	4.23	0.637
1 (i) b	Enhancement of employability	3.46	1.025
1 (i) c	Enhancement of income	2.77	1.167

1 (ii) a	Provision of networking opportunities with peers	4.05	0.708
1 (ii) b	Provision of valuable experts in the field	3.93	0.821
1 (iii) a	Helping in improving the profession	4.23	0.664
1 (iii) b	Helping in protecting the public from incompetent professionals	3.78	0.885
1 (iii) c	Making it more likely that CPAs are competent	3.63	0.840
	Overall mean	3.76	0.843

Source: Field Data

The overall mean score is 3.76 which imply that in general the CPAs agree that the CPE scheme is effective in transfusing the knowledge gained into real working place. The respondents are particularly in agreement with three variables enhancement of knowledge base, provision of networking opportunities with peers and helping in improving the accountancy profession. The results further show that most CPAs perceive that CPE scheme does not enhance their income with mean score of 2.77. This implies that employers do not consider CPE participation as a basis for increasing the earnings of the CPAs. This poses challenge to NBAA to educate employers that CPAs who participate in CPE program are more competent and knowledgeable. On the other hand the employers who usually provide financial and time support to the CPAs to participate in CPE program should receive value for the investment they are making. They should therefore demand training report. The employers have also the challenge of providing necessary support to the CPAs in order for them to practice the new skills and knowledge. Without the employers support the whole CPE program becomes futile. Another variable with small score is enhancement of employability 3.46. This is because participation in CPE scheme has not been regarded as one of the employment criteria by employers.

Using Schindler and Cooper, (2003) proposal to determine whether the reported standard deviations for CPE effectiveness variables are small or large it is found that all variables give the ratio of range to standard deviation between 2 and 6. The overall standard deviation also gives the ratio 4.74 (4/0.843) which falls between 2 and 6. These results imply that most respondents had homogeneous perceptions as to the agreement or disagreement with the CPE effectiveness variables.

Discussion of Results on the Second Objective (CPE deterrents)

To identify deterrents to CPE effectiveness and how they affect the CPAs in Tanzania was the second specific objective of this study. Literature identifies four types of deterrents for participation namely institutional, situational, dispositional and informational deterrents. These deterrents have the same effect whether participation is voluntary or mandatory (Wessels, 2005). The findings of this study for each deterrent are as follows;

Institutional Deterrents

Institutional deterrents were defined as the practices and procedures of the CPE providers that inhibit participation in continuing education (Cross, 1981). The table 6 below shows the results of the seven institutional deterrent variables;

Table 6: Means and Standard Deviations for Institutional Deterrent Variables

Question	Description of variable	Mean	Std Deviation
2 (a)	A good value in relation to cost	3.30	0.971
2 (b)	Time of the year	3.28	0.900
2 (c)	Quality	3.66	0.770

2 (d)	Right level	3.73	0.715
2 (e)	Relevance	3.84	0.871
2 (f)	Time length	3.32	0.891
2 (g)	Publicity	3.57	0.815
	Overall	3.53	0.848

Source: Field Data

The general observation is that most respondents are between neutral and agree regarding the institutional deterrents. Speaking it differently NBAA which is responsible for the implementation of CPE scheme is generally not doing fine to eliminate the identified institutional deterrents. The more good mean result should have been between 4 and 5. It is also revealed from the table that among the seven variables NBAA does relatively good in terms of relevance, right level and publicity with the mean score of 3.84, 3.73 and 3.66 respectively. The results show response approaching neutral on item b time of the year. This implies that on average the CPAs are no neutral with the time schedule of the CPE scheme. NBAA has therefore the challenge of eliminating all institutional deterrents so that CPE program if effective.

Using Schindler and Cooper, (2003) proposal to determine whether the reported standard deviations for institutional deterrent variables are small or large it is found that all variables give the ratio of range to standard deviation between 2 and 6. The overall standard deviation also gives the ratio 4.72 (4/0.848) which falls between 2 and 6. These results imply that most respondents had homogeneous perceptions as to the agreement or disagreement with the institutional deterrent variables.

Situational Deterrents

Johnston and Rivera, (1965) defined situational deterrents as constraints which inhibit participation and are external to the individual control. Situational deterrents include costs, work and family constraints. The study shows the result below;

Table 7: Means and Standard Deviations for Situational Deterrent Variables

Question	Description of variable	Mean	Std Deviation
3(a)	Cost	3.34	0.952
3(b)	Job demand leave little time for CPE courses	3.37	1.043
3(c)	Long distance travel	3.22	1.193
	Overall	3.31	0.810

Source: Field Data

Question 3 was designed to extract the responses on how situational deterrents affect the CPE effectiveness. The overall mean score is 3.31 implying that respondents were almost neutral as to whether situational deterrents affect CPE effectiveness. This is explained by the fact that participation costs are covered by employers and therefore are not directly born by the participants. With the improved transport infrastructure long travel is not a significant problem and usually NBAA selects convenient locations which are easily accessible by all participants.

Among the three situational deterrent variables the item on job demand seems to have more impact with the mean score of 3.37. This can have effect as follows: if the job leaves little time for CPE courses the

participants would tend to arrive late at the venue, vacate early and lack concentration. Their prime aim will be just to show that they have participated since it is mandatory. The second effect is that they will have insufficient time to internalize the knowledge gained and put it into practice. This poses challenges to the Board on how to address this finding. One way is to induce the employers to allow the CPAs ample time during CPE participation. The second possibility is to arrange for in-house training as directed by the Board especially for those firms having a reasonable number of CPAs. The changing life style where staffs are always busier may remain deterrent to CPE participation in long time to come. This happens because many firms employ fewer accountants and demand the most from them as a cost cutting measure. There is evidence of many accountants working in long hours and sometimes in holidays in order to balance their accounts and make reconciliations.

Using Schindler and Cooper , (2003) proposal to determine whether the reported standard deviations for situational deterrent variables are small or large it is found that all variables give the ratio of range to standard deviation between 2 and 6. The overall standard deviation also gives the ratio 4.94 (4/0.810) which falls between 2 and 6. These results imply further that most respondents had homogeneous perceptions as to the agreement or disagreement with the situational deterrent variables just as they had for institutional deterrent variables.

Dispositional Deterrents

Dispositional deterrents are factors that hinder participation and represent internal barriers based on personal attitudes toward continuing professional education (Johnstone & Rivera, 1965).

Table 8: Means and Standard Deviations for Dispositional Deterrent Variables

Question	Description	Mean	Std Deviation
4 (a)	Less useful as experience gained	2.01	0.982
4 (b)	If not required fewer CPE courses	2.50	1.161
4 (c)	Learn through on the job or in-house	2.72	1.102
4 (d)	Do not like lectures and formal schooling	2.09	1.084
	Overall	2.33	0.792

Source: Field Data

The overall mean for dispositional deterrent is 2.33 implying in general that most of the CPAs disagree with the items tested. This means that most CPAs have positive attitude towards the CPE scheme. The respondents are in disagreement with variable 4(a) "CPE courses are less useful to me as I gain experience" implying that the CPAs perceive that the CPE scheme is important regardless of the experience gained. They are also in disagreement with the item 4 (d) "I do not like lectures and formal schooling" implying that CPAs still view lectures and formal schooling as the best way of acquiring CPE knowledge. This is in line with the general attitude of many Tanzanians of not being used to self or informal schooling. This is dangerous because the organized learning programs are few and expensive. The Board has the challenge of promoting self study through internet, journals and other sources (books, reports etc).

Lectures are a common method which NBAA uses to deliver intended courses/training. Lectures are however not effective especially if the number of participants is large and if no evaluation test is performed at the end of the course. Most participants collect CDs and files containing materials and fix them in shelves. Since no evaluation test is performed there is no motivation for them to read the materials. Hence the best methods are to organize practical workshops in which there is hands-on learning and small group tutorial sessions that are interactive between the expert and the audience (Wessels, 2005). However, with the use of lecture method NBAA is able to attract many participants and collect significant amount of CPE

participation fees. The resulting challenge is to compromise between financial gains (participation fees) on one hand and the quality of delivery (effectiveness) on the other hand.

Again using Schindler and Cooper, (2003) proposal to determine whether the reported standard deviations for dispositional deterrent variables are small or large it is found that all variables give the ratio of range to standard deviation between 2 and 6. The overall standard deviation also gives the ratio 5.1 (4/0.792) which falls between 2 and 6. These results imply again that most respondents had homogeneous perceptions as to the agreement or disagreement with the dispositional deterrent variables just as they had for situational and institutional deterrent variables.

Informational Deterrents

Informational deterrents are barriers to participation (Darkenwald and Merriam, 1982) relating to a lack of information about the available courses or a lack of information from which to judge the appropriateness of a CPE course

Table 9: Means and Standard Deviations for Informational Deterrent Variables

Question	Description	Mean	Std Deviation
5 (a)	Previous ratings	3.41	1.087
5 (b)	Suitability of upcoming course	2.89	1.163
	Overall	3.15	0.909

Source: Field Data

As for informational deterrent the mean score is 3.15 implying that most CPAs were almost neutral on informational deterrents. This proposes that the dissemination of the information by NBAA as CPE organizer is not effective. The CPAs should be given specific information. On individual basis the CPAs are neutral on easiness for them to determine in advance if a course is right for them or if it would benefit them professionally. The decision as to the rightness or benefit is confronted with the challenge that even if the course is not right for the CPA there is no option because the CPA has to clock the annual hours required whether the course is right or not. This observation is crucial and should not be left out by NBAA. NBAA takes general approach in designing courses while the CPAs work in different nature. For example a CPA who works in a University will find a course on financial assets not so relevant as compared to the CPA working in a banking industry. It is difficult to structure a course which would be equally beneficial to all CPAs. The Board should therefore segment the CPAs and offer courses that specifically benefit a special segment instead of designing courses that are targeted to all CPAs.

Again using Schindler and Cooper , (2003) proposal to determine whether the reported standard deviations for informational deterrent variables are small or large it is found that all variables give the ratio of range to standard deviation between 2 and 6. The overall standard deviation also gives the ratio 4.4 (4/0.909) which falls between 2 and 6. These results imply again that most respondents had homogeneous perceptions as to the agreement or disagreement with the informational deterrent variables just as they had for dispositional, situational and institutional deterrent variables.

Discussion of Results on the Third Objective (CPE Effectiveness and Deterrents Relationship)

The third objective of this study was, to determine the relationship between each of the four categories of deterrents and perceived CPE effectiveness. Using two-tailed Pearson product-moment correlation, it was found that two deterrent scores were significantly correlated with the CPE effectiveness score as shown in the Table 10 below and the subsequent discussion.

Table 10: Correlation between Deterrent Scores and CPE Effectiveness (N = 116)

	Institutional deterrent score	Situational deterrent score	Dispositional deterrent score	Informational deterrent score
CPE effectiveness score				

Pearson Correlation	.456**	-.003	-.207*	-.064
Sig (2-tailed)	.000	.974	.026	.493

** Correlation is significant at the .01 level (2-tailed) * Correlation is significant at the .05 level (2-tailed)

Source: Field Data

Cohen (1988) suggests the following guidelines in evaluating the strength of correlations: ($r = +/- .10$ to $+/- .29$) is classified as small; ($r = +/- .30$ to $+/- .49$) is classified as medium; and ($r = +/- .50$ to $+/- 1.00$) is classified as large. Using this classification, the institutional deterrent score correlation would be classified as a medium correlation, the dispositional deterrent score as a small correlation, the situational deterrent score and the informational deterrent score are classified as less than small correlations. Institutional deterrent score was significantly positively correlated with the CPE effectiveness score. This is a strange situation and is contrary to the conceptual framework of this study. Dispositional deterrent score was significantly negatively correlated with the CPE effectiveness score. This position is in agreement with the conceptual framework of this study and consistent with the study of Wessels, (2005) as shown in table 1.

The dispositional deterrent items represent attitudes that the respondents have toward continuing professional education including perceptions relating to a lack of benefit (“one can learn on-the-job or through in-house training”) and attitudes of disengagement (“dislike formal schooling and lectures”). NBAA as the CPE provider may be able to address these attitudes by offering unique programs that are unlikely to be offered at the work site. For example, NBAA may want to consider offering CPE courses that lead to a specific credential such as Certified Financial Planner. While the survey showed a high degree (76 percent agreement) of overall satisfaction with CPE (Item 6 part II “Overall I am very satisfied with my CPE experience.”), it is troubling that 58 percent would take fewer courses if not required. This suggests that while most courses are useful, the marginal ones are not. The timing, level, and variety of courses may need to be examined so that all of the required credit hours are well spent.

Situational and informational deterrent scores showed weak negative relationship with CPE effectiveness score. Participation may be “reduced” by enrolling in inappropriate courses in convenient locations rather than selecting courses that actually enhance their professional competencies. Many of the deterrent items had low scores (less than 3 on a scale in which 5 is a high deterrent). This position is not in agreement with the study of Wessels (2005) where in her study she found that there was significant negative relationship between each deterrent score and the CPE effectiveness score and therefore all deterrents were statistically significant predictors of CPE effectiveness. In her study the institutional deterrent score was the most predictive of the CPE effectiveness with the correlation of -0.509 .

The informational deterrent score was the second weak predictor of effectiveness. One of the survey items that comprised this score had the highest mean (“Before selecting a CPE course, it would be useful to know the course satisfaction ratings given by previous participants”) with nearly 75 percent of respondents agreeing or strongly agreeing with the statement. The high mean indicates that most respondents view the lack of this kind of information to be a deterrent. CPE providers might want to consider whether this information might be made available in brochures and materials about CPE courses.

The situational deterrent score was the last weak predictor of effectiveness. Previous studies (Scanlan and Darkenwald, 1984) had identified three distinct types of situational factors; i.e., cost, family constraints, and work constraints. In the present study, when the means for these items were ranked, all were ranked in the top 35th percentile. This indicates that the respondents as a whole view the indirect costs, job demands, and travel burdens as important. However, these deterrents were less likely to be negatively related to perceptions of effectiveness compared with the institutional or dispositional deterrents.

Conclusions and Implications

Main Findings

As regards demographic information which had five variables the study showed that 71 per cent of the respondents were male, 66 per cent had working experience of less than 10 years and 88 per cent were employed. It was further shown that 23 per cent of the respondents were working in Government institutions while 50 per cent were working in organizations having more than 500 employees.

The study further showed that the CPAs are in agreement that the CPE scheme is effective in transfusing the knowledge gained into real working place. It has also been observed that the Tanzania CPAs experience the same institutional, situational, dispositional and informational deterrents in varying degrees. It has also been observed that most CPAs have homogeneous perceptions on how the deterrents affect the CPE effectiveness.

The study showed that there is relationship between the deterrents and the CPE effectiveness though the relationship is not as strong as that revealed by Wessels (2005) in her study of North Carolina CPAs. We have seen significant negative relationship between dispositional deterrent and CPE effectiveness. The situational and the informational deterrent showed weak negative relationship with CPE effectiveness. Institutional deterrents showed significantly positive relationship with CPE effectiveness. This position is totally contradicting with the study of Wessels (2005) in which institutional deterrent had strong negative relationship with the CPE effectiveness and therefore emerged as the major predictor of CPE effectiveness.

Whatever the case, NBAA should work hard to address those deterrents to CPE effectiveness identified in this study. The deterrents have varying degrees of impact and influence on CPE effectiveness. It is worth noting that the CPE scheme of Tanzania is just young which become mandatory only in 2001. In U.S.A the CPE scheme become mandatory in the late 60's. Therefore NBAA has to learn from the CPE schemes implemented in other countries in order to improve the CPE effectiveness and meet the public expectation of having improved accounting profession.

The first specific objective of this research was to determine how the certified public accountants in Tanzania perceive the effectiveness of continuing professional education for accountants. The research has shown that the Tanzania CPAs are in agreement that the CPE scheme conducted by NBAA is effective in transfusing the knowledge gained into real working place though a number of improvements have to be made at the institutional level.

The second specific objective was to identify the deterrents to effective continued professional education for certified public accountants in Tanzania. The research has shown that the Tanzania CPAs experience the same institutional, situational, dispositional and informational deterrents in varying degrees. It has also been observed that most CPAs have homogeneous perceptions on how the deterrents affect the CPE effectiveness.

The third specific objective was to determine the relationship between the identified deterrents and the perceived CPE effectiveness. The research has shown that there is relationship between the deterrents and the CPE effectiveness. There is significant negative relationship between dispositional deterrent and CPE effectiveness. The situational and the informational deterrent showed weak negative relationship with CPE effectiveness. Institutional deterrents showed significantly positive relationship with CPE effectiveness.

Recommendations

Recommendations to NBAA

There is a compelling public interest to require that CPAs maintain and improve their competency through continuing professional education. To ensure the best outcome, NBAA needs to address those factors that might be reducing the effectiveness of mandatory CPE.

To address institutional deterrent NBAA should examine the feasibility of publicizing course evaluations. Findings show that most CPAs would find it useful to know the course satisfaction rating given by previous participants. To the extent that CPAs select the “wrong” course because of a lack of information, CPE effectiveness will be impaired. All CPE courses currently conduct a brief course evaluation by the participants. NBAA needs also to better understand the needs of the learners and the things that limit the effectiveness of those programs. NBAA should also think of segmenting the courses so that direct link is created between what the CPA does and the CPE course he is attending. The current practice of designing generic courses does not promote CPE effectiveness.

NBAA should also apply course delivery methods which are effective. The research has shown that lecture method which is commonly used by the Board does not sufficiently promote CPE effectiveness. The researcher recommends practical workshops in which there is hands-on learning and small interactive tutorial sessions. NBAA should also start issuing certificates as a way of compelling participation and implementing other by-laws. The Board should also foster improved relationship with employers both public and private so that the public receives the best service from the accountants.

To address dispositional deterrents which reflect internal barriers based on personal attitudes toward continuing professional education NBAA may be able to allay concerns that job demands leave little time for CPE by offering on-site courses at firms that employ large numbers of accountants. To assure that all credit hours are well-utilized, NBAA should review whether the timing, level, and variety of course offerings are relevant to all types of CPAs including those in industry.

Barriers relating to situational deterrents such as long travel distances could be alleviated if NBAA would offer more internet or self-study options to ease travel burdens. Courses offered at resort locations would permit CPAs to combine additional education with a family vacation thereby easing the difficulty of being away from the family while completing CPE.

The informational deterrents reported by some respondents may be remedied if NBAA would investigate ways for CPAs to find out course satisfaction ratings given by previous participants. Perhaps these ratings could be posted on the website of the NBAA. In addition, NBAA needs to clearly describe the subject matter and level of course in informational literature to help practitioners more accurately determine if a course is right for them.

Recommendations for Future Research

This study was designed to seek responses from CPAs only. However the NBAA CPE scheme is also mandatory for other cadres of the accounting profession including the Accounting Technicians. Another study ought to be done which will incorporate all members of the Board to whom CPE scheme is mandatory.

The researcher is also recommending another study which will broaden the sample size. The sample size should not only be relatively large but should include all cadres of the accountants required to attend CPE program. Another study needs to be done to examine the effectiveness of the Board itself as the principal CPE provider for accountants.

There is also a need to find out the reasons which inhibit women to acquire CPA qualification as the current study showed that 71 per cent of the respondents were male. This is material gender imbalance for the accounting profession.

In order to know the reasons for the differences in results between this research and the one conducted by Wessels (2005) in USA there is a need to conduct a qualitative inquiry. The inquiry will investigate in detail through in depth interviews and discover the probable causes of the differences.

LIMITATIONS OF THE STUDY

This study suffered from several limitations. The first limitation was that a self-administered questionnaire was used to collect the responses. Any questions that were unclear or ambiguous to the respondents may have resulted in unusable or incorrect information. In a self-administered questionnaire there is no face to face interaction between the respondent and the researcher. Non presence of the researcher denies the respondent the chance to get clarification or explanations in areas not clear to the respondent while filling the questionnaire. However this method avoids the interviewer's bias.

The second limitation was that respondents were being asked to recall their CPE experiences over the past year. Consequently, the individuals' perceptions of CPE effectiveness or deterrents may be limited by faulty memory. It can be argued that the memory loss was minimized because the CPAs have been attending these courses frequently and they have been practicing the accounting profession.

The third limitation was that the questionnaire used structured questions only. Open ended questions would enable respondents to express their perceptions more freely. The structured question method was chosen because this study replicates the Wessels (2005) study.

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REWARD SYSTEM AND ORGANIZATIONAL CITIZENSHIP BEHAVIOUR IN UGANDA COLLEGES OF COMMERCE.

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ABSTRACT

The researcher was inspired to carry out the research because stakeholders often question why performance in Uganda Colleges of Commerce (UCCs) is low. The main aim of the research was to explain the relationship between reward system and organizational citizenship behavior (OCB) in UCCs.

The respondents of the study included lecturing staff and administrative staff of UCCs. The structured questionnaires were used to gather information on the relationships between variables under study. The library search was done through reading textbooks, dissertations, newspapers, policy instruments and internet and was used for compiling introduction of the study and literature review. The processed data was analyzed quantitatively through statistical package for social scientists (SPSS).

The Pearson correlation matrix indicates a positive and significant relationship reward system and organizational citizenship behavior in Uganda colleges of commerce.

The regression analysis results provide an adjusted R^2 of 0.535. This means that reward system explains 53.3% of the variance in Organizational Citizenship behavior in UCCs. Thus the remaining 46.5% is explained by other variables outside this study.

Reward system should be improved by making all staff access the government payroll. This would reduce relying on the meager colleges' collections and irregular Government grants. UCCs should streamline its

promotion practices so that staff could be promoted across the ladders regularly according to Government standing orders, as this will adjust salary scales accordingly. Organizational citizenship behavior should be inculcated in UCCs by encouraging team spirit so that members could be willing to go beyond what they are expected to do. A culture should be developed to make staff realize that mistakes/omissions by few people affect the survival of the entire organization. This will make staff to see assignments of their colleagues as theirs; and would come in to help when needs arise.

CHAPTER ONE

1.1 BACKGROUND TO THE STUDY

Organizations need employees with competence that directly or indirectly affect job performance, Woodruffe (1998). Reward system, (promotion, pay raises and other rewards), is equally important for most employees (Baron and Byrne, 1999). This leads to job satisfaction, which will be higher when individuals believe that rewards are fairly and impartially distributed than when they believe they are distributed unfairly. This enhances employees' willingness to maintain membership with the organization, that is, organizational commitment. Organ (1998) observed that when employees perceive that equity has obtained in the distribution of resources, they are more likely to be satisfied with their jobs and behave with a sense of citizenship.

The government of Uganda established Uganda College of Commerce (UCC) Nakawa to offer business – related courses. The increased demand for this kind of education led to the establishment of five (5) more colleges of commerce (UCCs) in 1982, whose curriculum was to be coordinated from UCC Nakawa, which later became National College of Business Studies, Apono (2002). The general problems associated with coordination of tertiary education include: lack of systematic planning in institutions of higher education resulting in their haphazard development, the poor state of physical facilities, the deteriorating quality of higher education, and the need to streamline development and management of tertiary education. There is poor and unattractive terms and conditions of service for the teaching professional in the country since the colonial times (Education Policy Review Report, 1992).

NCBS merged with Faculty of Commerce, Makerere University in 1997 to form Makerere University Business School (MUBS) which continued to coordinate UCCs. MUBS realized in February 2002 that over 60% of UCCs students failed their semester examinations and, so special examinations were set for them in August 2003. MUBS has restrained all UCCs Lecturers without degree qualifications and above from handling MUBS programs except Uganda National Examinations Board (UNEB) certificate courses until they upgrade to degree level. MUBS then came up with staff Development Program for UCCs where each college has to send two (2) staff members, one for undergraduate and one for Postgraduate course each year (Appendix E). Currently, only 50% are appointed and about 20% promoted out of those who have been in the service for the last ten years.

Promotion of teachers is no longer automatic even after upgrading due to the limited resources, Lubega W. Badru (2004), (Appendix D). Thus if one had joined with a diploma, s (he) would continue to earn the same salary even if one upgrades to a master's degree.

Survey of the staff list of UCCs indicates that about 20% have not accessed the payroll. They are paid from college collections, which are small, and Government grants which are irregular (Appendices F, G, H, & I). UCCs are characterized by high incidence of absenteeism, late-coming, inability to stand in for absent colleagues and numerous complaints.

1.2 STATEMENT OF THE PROBLEM

Performance in UCCs is low, as is reflected in poor academic results (MUBS academic board minutes, 2001-2). There is high incidence of absenteeism, late coming, inability to stand in for a colleague when absent (Minutes of Governing council, 2003), plus numerous complaints due to poor reward system administration which usually results into refusal to work until the dispute is resolved (UCC Aduku strike by lecturers in March 2003).

1.3 PURPOSE OF THE STUDY

The study seeks to explain the relationship between Reward system and organizational citizenship behavior in Uganda colleges of commerce.

1.4 OBJECTIVES OF THE STUDY

1. To explain the relationship between reward system and organizational citizenship behavior.
2. To explain the effect of reward system on organizational citizenship behavior.

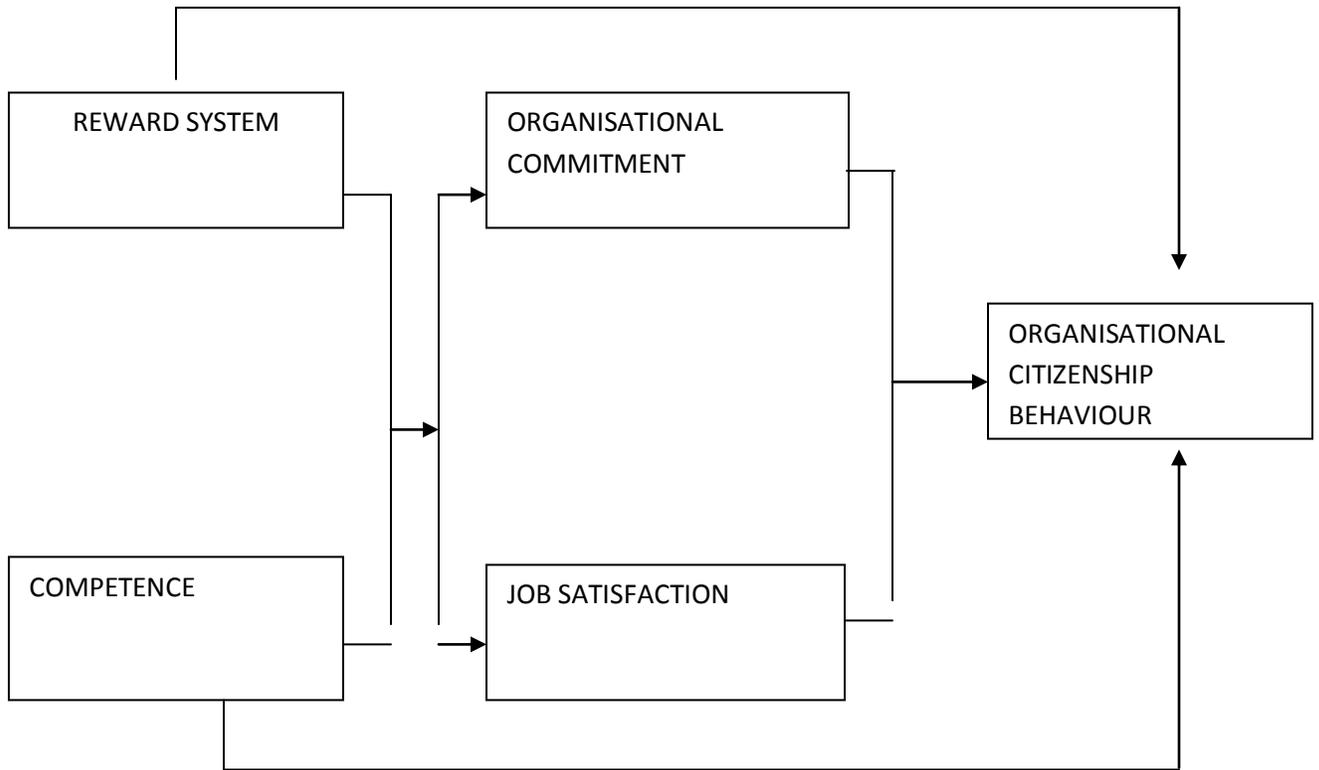
1.5 RESEARCH QUESTIONS

1. What is the relationship between reward system and organizational citizenship behavior?
2. What is the effect of reward system on organizational citizenship behavior (OCB)?

1.6 SIGNIFICANCE OF THE STUDY

The study will create knowledge about reward system and organizational citizenship behavior in UCCs and other organizations will use the findings to enhance their performance. The study will also add to the existing literature on reward system and organizational citizenship behavior.

1.7 CONCEPTUAL FRAMEWORK



EXPLANATION OF THE CONCEPTUAL FRAMEWORK

For employees to be recruited and successfully carry out their jobs, they should be competent. The organization should also have reward system that attracts and retains such employees. If this is done, the employees would have job satisfaction and organizational commitment. Satisfied and

committed work force usually exhibits organizational citizenship behavior. This study was based on this assumption (model).

1.8 SCOPE OF THE STUDY

The study is designed to cover all the five (5) Uganda Colleges of commerce in the country. It includes UCC Aduku, UCC Pakwach, UCC Soroti, UCC Tororo and UCC Kabale. The major areas to be treated in the research include issues concerned with the administration of reward system and how they affect organizational citizenship behavior.

CHAPTER TWO

LITERATURE REVIEW

This section reviews literature on the variables of the study.

REWARD SYSTEM

Reward system includes issues concerned with promotion, pay raises and other benefits, as observed by Baron and Bryne (1999). Roosso and Jasso (1997) cited in Nuwagaba (2003) pointed out that employees perceive reward system as fair when based on merit. This means that rewards would be commensurate to one's skills and productivity. Merit pay systems are rare in practice because it is difficult to measure performance. It requires having a formal or model, which encompasses all the variables of work performance that is practically difficult.

Once measurement of performance is based on some variable, those members disadvantaged by the base used will always feel unfairly appraised. Consequently, their performance will decline and this will result into low levels of organizational citizenship behavior.

Organizational citizenship behavior (OCB)

Organizational behavior refers to the willingness of employees to go beyond that, which is required of them by the formal structures, and usually unrewarded, Organ (1998). Individual's personality and his/her perception of organizational fairness influence OCB. OCB can easily be detected among lower cadres than higher ones because the higher the rank of an organization the more diffuse their role becomes. Organizations whose lower cadres lack OCB may suffer and ultimately collapse. However, for effectiveness, OCB should be exhibited at all levels in the organization. OCB is the expected members' behavior not related to contractually defined duties. Like citizens of a country, members are expected to defend and promote their organization. Exhibiting or omission is not punishable, as it does not result into breach of employment contractual obligation. However, OCB is essential, in that organizations cannot anticipate through formally stated role – jobs descriptions all the necessary behavior needed for achieving its goals.

Organ (1988) identified five dimensions of OCB which include: altruism aimed at a specific person; generalized compliance (conscientiousness) which is impersonal but includes faithful adherence to rules about work; courtesy aimed at preventing problems of fellow workers; sportsmanship (willingness to work with minor temporary personal inconveniences) and lastly; Civic Virtue which is the responsible participation and constructive involvement in the issues of governance of the organization. Waterman et al (1994) cited in Nuwagaba (2003) argues that individual contribution to the production of goods and services is measurement of work performance. However more important and what makes the organization move are the non – prescribed behaviors and gestures exhibited by members such as OCB. Altruism, also known as neighborliness or pro-social behavior is one category of OCB. It is the discretionary behaviors that have an effect of helping a specific other person with an organizationally relevant task or problem, Organ (1998). Such behavior when directed to an individual improves the individual's efficiency, Organ (1998). It can also increase the organizations' ability to import resources, Organ (1998). Organ argues that discretionary acts of kindness towards outsiders positively influence, at the very least, their sentiments about an organization. That

potentially, such sentiments in turn affect customer loyalty, community goodwill, the commitment of vendors and suppliers, and the interest of prospective employees.

Conscientiousness is another OCB category, Organ (1998). It captures the various instances in which organizational members carry out certain behaviors well beyond the minimum required levels. Conscientiousness permits the use of scarce resources and thus improves the efficiency and effectiveness of the organization, Organ (1998).

CHAPTER THREE

3.1 RESEARCH DESIGN

The research followed both qualitative and quantitative approach. This approach was chosen because it involves the measures of respondents' attitudes and opinion /feelings, and due to the large number of respondents involved in the study. The qualitative survey design was used because it involved the development of competency profile, which was primarily done through interview with the respondents. The quantitative survey design involved the administration of structured questionnaires developed in order to capture the behaviors and attitudes of the respondents.

3.2 Description of the Geographical Area

The study covered all the five (5) Uganda colleges of commerce of Pakwach, Aduku, Soroti, Tororo and Kabale.

3.3 Description of the Population

The study population composed of all the lecturing and Administrative staff in the five UCCs in the Country. It consists of thirty (30) from UCC Pakwach, thirty (30) from UCC Soroti , thirty five (35) from UCC Aduku, forty (40) from UCC Tororo and thirty five (35) from UCC Kabale making a population of 170 (One hundred seventy).

3.4 Sampling Procedures

This was purposive in that despite the fact that Uganda has five UCCs, four representative colleges were selected to represent all the regions namely Pakwach, Aduku, Soroti and Kabale.

The study sample comprised of 25 lecturing and five (5) administrative staff from each of the four colleges. It totaled up to a study sample of 120 out of a total study population of 170 in the five UCCs, giving 70% of representation (Appendix K). The colleges selected are controlled by the same government policies.

3.5 Data Collection Methods

Questionnaires and structured interviews were used to elicit primary data. Secondary data were got from Library search, internet surfing and related research.

3.6 Measurements Reward System

These were measured using the attitude statements of a 5- point likert type ranging from strongly disagree (1) to strongly agree (5) of Munene (2000) local measure.

Organizational citizenship behaviour

The study used Kagga's (2000) measure of 21 items.

3.7 Validity /Reliability

For validity and reliability of instruments, the structured Questionnaires were presented. A cross section of UCCs staff was selected to fill the Questionnaires so as to discover loopholes and refine the final Questionnaires. This was done by performing Crocbach's Alpha tests. The final Alpha values are shown in the table below:

Table 1. Crocbach's Alpha Measures of Variables.

Variable	Reward system	OCB
Alpha values	0.8326	0.8554

From the above table, the different section showed satisfactory Alpha values indicating that the instrument was good. Questions were carefully arranged according to the respective variables tested.

3.8Data Analysis

Raw data was collected from respondents and edited. They were organized to enable quantitative analysis like regression, correlation and factor analysis tests be done using computer software called Statistical Package for Social Scientists (SPSS).

3.9Limitations of the Study

Since my sponsorship did not include fund for research financial constraints affected the completion of the research on schedule.

Many respondents were of the view that they would not obtain any direct benefit from the research, which were only of value to the researcher. This implied that the time and effort involved in responding to the questionnaires have been correspondingly affected.

Unwillingness of the respondents to fill the long quantitative questionnaires. The researcher had to give the respondents a time frame within which to fill the questionnaires.

CHAPTER FOUR

DATA PRESENTATION AND INTERPRETATION OF RESULTS

4.0 INTRODUCTION

This Chapter comprises a presentation of results and their interpretation. The presentation and interpretation in this chapter show the results as tested according to the objectives of the study. Factor analysis, Pearson correlation and multiple regression analysis tests were used.

4.1 FACTOR ANALYSIS

Factor analysis was used to show the indices for the variables used in the study. The variables for which a factor analysis was computed are competence, reward system and commitment. The principle component analysis method was used. Only factors having eigen value greater than 1.0 were considered essential and retained.

Rotated Component Matrix for Reward System

1. The organization's vision is well communicated to employees	0.843	
2. Employees are often trained/prepared to perform well	0.826	
3. Development of skills and knowledge in employees is viewed as an investment in this organization	0.824	
	0.810	
4. Skills and knowledge development happens as an ongoing process in this organization	0.736	
	0.630	
5. In this organization employees are properly trained to perform their roles		0.717
6. Employees are rewarded for giving priority to work		0.690
7. Employees who provide excellent service are rewarded for their effort.		0.672
8. The reward system in this organization encourages employees to work together		0.669
9. Employee's salary is transferred to the new station if one is transferred		0.616
10. Reward system matches with the level of performance f staff of this organization		
11. Employees who provide service are rewarded for their effort		
Eigen value	4.455	1.99
% Variance	40.502	18.089
Cumulative %	4.502	58.580

Two indices identified from the measure of reward system are pay reward and unidentified reward. Pay reward has the higher eigen value (4.455) accounting for 40.5 percent variance in reward system and unidentified factor, a lower eigen of (1.990) accounting for 18.09% of the variance in reward system. Overall the indices make up 58.5% of reward system.

4.2 PEARSON CORRELATION MATRIX

This test was used to show the relationship between the variables of reward system and OCB.

Pearson Correlation Matrix

	Rewards	OCB
Rewards		
OCB	0.421**	

*Correlation is significant at the 0.05 level (1-tailed)

**Correlation is significant at the 0.01 level (1-tailed)

The table above indicates that there is a significant relationship between reward system and OCB with reward ($r=0.421$, ($p<0.01$) $p<0.01$).

4.3 MULTIPLE REGRESSION ANALYSIS

Multiple regression tests were used to show the effect of the independent and intervening variables on the dependent variable.

Multiple Regression Analysis

Model	Un standardized coefficient		Standardized coefficient						
	B	Standard error	BETA	T	Sig	R ²	Adjusted R ²	F	P
(Constant)	2.122	0.363		5.846	0.000				
Reward system	2.149E-02	0.091	0.031	0.237	0.814	0.693	0.535	10.00	0.000

Dependent variable: OCB

Results from the table above show that reward system has significant impact on OCB. The adjusted R² indicates that the independent variable positively predict 53.5% of the variance in OCB.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 INTRODUCTION

This chapter presents a discussion and conclusion of the results presented in the previous chapter, followed by the recommendations arising out of findings from the study. The presentation of the discussion follows the order in which the objectives of the study were stated (see chapter one). The first part discusses the relationship between reward system and organizational citizenship behavior. The second part discusses the effect of reward system on Organizational Citizenship Behavior. The chapter ends with a conclusion, recommendations and areas for further studies.

5.1 Discussion of the Findings.

5.1.1 The Relationship between Reward System and Organizational Citizenship Behaviour

The Pearson correlation matrix indicates a positive and significant relationship reward system and organizational citizenship behavior in Uganda colleges of commerce. This is in agreement with Organ's(1998)assertion that when employees perceive that equity has been obtained in the distribution of resources they are more likely to be satisfied with their jobs and behave with a sense of citizenship. Since OCB is unrewarded, for one to exhibit it, he/she should have been properly rewarded otherwise he/she will concentrate on the rewarded assignments only.

This is confirmed by Greene et al. (1994) that without an encouraging reward system, employee's commitment is bound to fail. When employees are rewarded, it will lead to employee's satisfaction.

5.1.2 The Effect of Reward System on Organizational Citizenship Behavior.

The regression analysis results provide an adjusted R^2 of 0.535. This means that reward system explains 53.3% of the variance in Organizational Citizenship behavior in UCCs. Thus the remaining 46.5% is explained by other variables outside this study.

5.2 Conclusion

The study was about reward system and organizational citizenship behavior in Uganda Colleges of Commerce. The various tests employed indicate positive and significant relationships between the variables under study. The study indicated that UCCs has to improve on the rewards of its staff. Reward system should be revisited to ensure that all staff access the Government payroll. Periodic promotion would satisfy staff and make them more committed to their work and exhibit organizational citizenship behavior.

5.3 RECOMMENDATIONS

Reward system should be improved by making all staff access the government payroll. This would reduce relying on the meager colleges' collections and irregular Government grants. UCCs should streamline its promotion practices so that staff could be promoted across the ladders regularly according to Government standing orders, as this will adjust salary scales accordingly. Organizational citizenship behavior should be inculcated in UCCs by encouraging team spirit so that members could be willing to go beyond what they are expected to do. A culture should be developed to make staff realize that mistakes/omissions by few people affect the survival of the entire organization. This will make staff to see assignments of their colleagues as theirs; and would come in to help when needs arise.

5.4 Areas for Further Research

The study should widen its scope to include more tertiary institutions especially National Teachers' colleges, Uganda Technical colleges. And Universities These have staff with similar qualifications and pay; and admit students with similar qualifications and are trained to get similar awards. This would increase the sample size to make it statistically more significant.

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**FACTORS THAT INFLUENCE CONSUMER PREFERENCE OF TELEVISION
STATIONS BY PUBLIC PRIMARY SCHOOL TEACHERS IN LANGATA
DIVISION, NAIROBI**

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**Paper submitted for presentation at the 7th ORSEA Conference to be held in
Nairobi in October 2011**

ABSTRACT

The urban viewer especially in Nairobi has an abundance of channel choice because of the number of new television stations and proliferation of alternative entertainment sources (such as the internet, video rentals, digital radio and the mobile phone).The viewer decision making process is influenced by both internal and external factors that can be measured by the viewer's choice of channels, programs and the number of repeat visits or the level of awareness. By measuring the factors that influence viewer's preferences, television stations can develop marketing strategies that are responsive to customer's needs and wants thus gaining a competitive advantage.

The purpose of the study was to determine the preferred television stations, and factors that influence consumer preference of television stations by public primary school teachers in Langata Division. This study was a cross sectional survey undertaken among the public primary school teachers in Langata Division. A sample size of 56 public primary school teachers was surveyed. A questionnaire was used to collect the data. Data was analyzed using descriptive statistics such as the frequencies, mean and the standard deviations.

The study found out that Citizen TV was preferred by majority of the teachers. The study further found that news coverage, the type of programs aired, TV station presenters, and clear reception of the TV station signals as the major factors that influence preference of Television stations by public primary school teachers in Langata Division. The study recommends that the government should encourage and reinforce production and airing of local programs by television stations and also reinforce and encourage media houses in News coverage. It further recommends that more vetting should be done for programs before airing them to determine the audience and to ensure their relevance in meeting the viewers' needs.

Key words: television stations, Public primary school, teacher, attitude

INTRODUCTION

The liberalization of airwaves in Kenya in the 1990s by the communication commission of Kenya has led to the emerging of many television stations that are competing for viewership. Consequently, the viewers (especially in Nairobi) are exposed to different stations ranging from free-to-air stations e.g. state owned Kenya Broadcasting Corporation (KBC) to Pay TV stations (e.g. DSTV) in addition to alternative sources of information and entertainment such as the internet.

The existence of alternatives demands preference and choice of television stations based on the viewers unique and diverse needs. Like all consumers of other products, the viewer decision making process is influenced by both internal and external factors that can be measured by the viewer's choice of channels, programs and the number of repeat visits or the level of awareness. By measuring the factors that influence viewer's preferences, television stations can develop marketing strategies that are responsive to customer's needs and wants thus gaining a competitive advantage.

Companies are interested in knowing about consumers attitudes toward their products because attitudes influence consumers' purchase and consumption intentions. Although a consumer may have a favorable attitude toward a product, it does not necessarily translate into purchase behavior. This is because liking one product does not preclude the possibility that another product is liked even more. For this reason attitudes are sometimes measured in form of preferences. Preferences represent attitude toward one object in relation to another. (Blackwell et al, 2006). The term "preferences" can be used in a variety ways. One could interpret the term "preference" to mean evaluative judgment in the sense of liking or disliking an object. When a person likes one of the alternatives more than the other, he has developed preference for the one liked and is more likely to choose it. Preference is also used primarily to mean an option that has the greatest value among a number of options (Blackwell, 2006). This refers to a choice between alternatives and the possibility of rank ordering of these alternatives, based on the degree of happiness, satisfaction, gratification, enjoyment, or utility they provide.

Kenya has diverse and lively mass media sector characterized by television, radio, print and a thriving new media such as internet and mobile telephones. The types of media can be classified broadly as private/independent media; the public state broadcaster; the private local language radio; community radio; the independent religious stations; the alternative press; international media and new media (Mshindi et al, 2008). They serve various and diverse information, education, religious, advertising and entertainment needs of various segments of the audiences. The television industry in Kenya has for a long time had a single organization in existence. According to the Kenya communication Act 2, 1998, Section 88, part 1 the dominance and the monopoly of Kenya Broadcasting Corporation (KBC) ended with the coming of airwaves liberalization (Mwaba, 2008).

The growth of Television industry has led to emergence of several private and public television stations, growing from a mere 2 Television Stations in 1990 to the current 54.

Past research can be questioned regarding their ability to determine those factors. For instance, Mwaba, (2008) sought to establish media consumer market segmentation practices used by television stations in Kenya but the study did not establish the factors that influence viewers' decision making in preference of a Television station. On the other hand, Mwabu (2009) surveyed viewers' perceived quality of Television stations in Kenya but apart from perceived quality there are other factors that influence preference of one television station to another. Surveys of factors that determine preference of products and services in other areas have been done; for example Muriuki, (2003) surveyed the factors that determine architects preference for roofing material in Nairobi but the researcher is not aware of any study that has been carried out to establish the factors that influence preference of television stations by public primary school teachers in Nairobi. This study therefore sought to determine the factors that influence consumer preference of television stations by public primary school teachers in Langata Division, Nairobi. The objectives of the study were:

- i. To determine the preferred television stations by public primary school teachers in Langata Division, Nairobi.

- ii. To determine the factors that influence consumer preference of television stations by public primary school teachers in Langata Division, Nairobi.

Theoretical Framework

Marketing theory suggests that understanding consumer behaviour is the first step in identifying those stimuli that affect the decision-making process. Solomon et al (2010), defines consumer behaviour as the study of the processes involved when individuals or groups select, purchase, use or dispose of products services ideas or experiences to satisfy needs and desires. It is therefore concerned with how individuals make their decisions to spend their available resources like time, money and effort on consumption related items. It includes of what they want to buy why they want to buy it, when they buy it, where they buy it and how often they buy. Consumer behavior provides a conceptual framework for carrying out consumer segmentation (Schiffman and Kanuk, 2009). By analyzing consumers' characteristics and decision processes, marketers develop strategies to influence the choices consumers make and thus gaining a competitive advantage in the market place.

The decision involved in the development of preference for and choice of an object will vary depending on the complexity of the needs and the alternative means of satisfying them. When the decision process is especially detailed and rigorous, extended problem solving then occurs. For instance when the consumer is faced with the problem of whether to buy a new colour television set or to send the old black and white set out for repair - regardless of the particular situation - the conflict may be considerable. Consumers are open to information from various sources and are motivated to undertake the effort required in making "the right choice". The process of analysis and reflection however does not cease after purchase and use (Blackwell, 2009).

On the other hand limited problem solving occurs when the decision is more straightforward and simple. In this case the consumer is not nearly as motivated to search for information or to evaluate each alternative rigorously. Instead the consumer uses simple decision rules to choose among alternatives (Solomon et al 2010). In most situations consumers have neither the time, the resources, nor the motivation to engage in extensive problem solving. For example, the decision to watch either Citizen Television or Nation-TV is a limited conflict situation. This is because the viewer is not under any obligation to watch any particular channel or any particular programme. He is on his own and, therefore, decides whether to watch channel 'A' or Channel "B" depending on his perceived instrumentality. This implies that any TV station that offers clear pictures and interesting programmes, other things being equal, is more likely to have more viewers. The above mentioned problem solving modes involve some degree of information search and deliberation. On the other hand habitual decision making choices are made with little or no conscious effort. (Solomon et al 2010). At this level consumers have experience with the product category and a well established set of criteria with which to evaluate brands they are considering. In some situation they may search for a small amount of additional information; in others they simply review what they already know (Schiffman and Kanuk 2009).

Human choice behavior is a complex and dynamic process. A consumer buying behavior is influenced by many factors. These may include cultural, social, personal and psychological ones (Kotler ,2003). Cultural factors include culture, subculture, and social class. Culture is the most determinant factor of a person's wants and behavior. Preferences, values, perceptions and behavior are acquired through a person's family and other key institutions. Each culture consists of smaller subcultures that provide more specific identification and socialization for their members. Subcultures include nationalities, religions racial groups and geographic regions. Social classes are divisions within the society that are composed of individuals sharing similar values, interests and behavior. Social economic status differences may lead to differing forms of consumer behavior.

In addition to cultural factors a consumer's behavior is influenced by such social factors as reference groups, family and social roles and statuses. A person's reference group consists of all groups that have a direct or indirect influence on the person's attitudes or behavior (Kotler, 2003). As consumers our behavior is often affected by those with whom we closely associate. This is referred to as personal influence. Consumers often respond to perceived pressure to conform to the norms and the expectations provided by others – seeking and taking their counsel on buying choices, observing what

others are doing, as information about consumption choices and comparing their decisions to those of others (Blackwell 2006). Another important social factor is the family. Its members constitute the most influential primary reference group. It is the primary decision making unit with a complex and varying pattern of roles and functions (Kotler 2003). The third social factors are an individual's position in each group can be defined in terms of roles and statuses. People choose products that communicate roles and statuses in society.

A buyer's decisions are also influenced by personal characteristics. They include the buyer's age and stage in life cycle. Tastes and preference for products including Television programmes is age related. Consumption is shaped by family life cycle. Different lifecycles have different financial situations and different product and services interests. Occupation and economic circumstances is another category of personal factors that influences a person's consumption (Kotler, 2003). Product choice is greatly affected by economic circumstances: spendable income (level, stability and time pattern) savings and assets debts, borrowing power and attitude towards borrowing and saving. Lifestyle is also another personal characteristic that influences a buyer's decision. People from the same subculture, social class and occupation may lead quite different lifestyle. A lifestyle is a person's pattern of living in the world as expressed in activities interests and opinions. Lifestyles portray the "whole person" interacting with his or her environment. (Kotler, 2003). In addition to the above mentioned factors, personality and self-concept also influences decision making. Each person has a distinct personality that influences his decision making. Strong correlation exists between certain personality types and products and or brand choices. Self concept, others self concept or ideal concept also influences decision making.

People's choices are also influenced by four major psychological factors - motivation perception, learning and beliefs and attitudes. Kanuk (2009) defines motivation as the driving force within individuals that that impels them to action. This driving force is produced by state of tension which exists as a result of unfulfilled need. Every individual has needs. Some are innate and others are acquired. The satisfiers of these needs will make a major difference as to which brands or services a consumer chooses or prefers. A motivated person is ready to act. How the motivated person actually acts is influenced by his or her perception of the situation. People have different perceptions of the same object and which also influences the choices and preferences that they make for products and services. The third psychological factor is learning. When people act they learn. Learning involves changes in an individual behavior arising from experience. Most human behavior including choice and preferences of products and services is learned. Through doing and learning, people acquire beliefs and attitudes. These are the fourth psychological factors that influence buying behavior. These beliefs make up product and brand images and people act on their images. Just as important as beliefs are attitudes. Attitudes lead people to behave in a fairly consistent way toward similar objects. Depending on the attitudes towards each of the brand, the consumer forms preferences. This may then lead to making a brand, vendor, quantity, timing and payment method decisions (Kotler, 2003).

Consumer decision making is also influenced by situational influences such as social and physical surroundings, temporal effect such as time of the day and the amount of time available and antecedent states which includes consumer's mood when a decision is being made. Marketing communication programs such as advertising, promotion, public relations publicity and direct marketing are used by marketers to reinforce choice and preference decisions of a consumer.

Gutman's (1978) mode of media exposure, presumes that persons select specific types of programmes to meet different specific needs. Entertainment may be associated with emotional and diversionary needs while public affairs programmes may be identified with information and activism needs however most programs overlap. A programme classified as information may at the same time be both educational and entertaining. Researchers in the past had dichotomized TV programmes into information and entertainment (Barwise, et al 1981). The information provided by television is obtained first and foremost through news programmes. All of the viewer categories in almost all of the Member States watch the television news. Indeed for some individuals, who do not read the press and do not listen to radio news, television is the only source of regular information on current affairs. In another study by Barwise et al (1981), information programmes had smaller audience but higher appreciation scores than entertainment programmes. They

interpreted this to mean that the more demanding a programme is the more interesting and/or enjoyable it has to be before people will watch it.

Research into program choice falls into two schools of thought: program choice is related to content, or program choice is related to program scheduling (Webster and Wakshlag, 1983). 'Models of choice' hold implicit assumption that program choice is a function of individual preferences as TV is a 'free-good' and is an 'active' decision by viewers. Other views suggest that, Channel choice is influenced by audience duplication: if two programs are of the same general type, people who like to watch a program genre are likely to watch both programs. Audience duplication is the theory that people who watch Program A will watch Program B regardless of channel or time (Webster, 1985). This presupposes that viewers who like a programme of a particular type must like all other programmes of the same type. This is not necessarily the case as shown by the studies of Webster (1985). The studies established that programme choice is affected by programme scheduling characteristics in terms of timing and duration.

Inheritance effects are important variables in programme scheduling. Also known as lead-in effects or simply audience flow they describe the tendency of people who watch one program on a given network to stay tuned to the next. "If the lead-in program has a big rating, it confers an advantage on the following program. Conversely, if the first show has a small audience, it handicaps its successor (Eastman & Ferguson, 2006; Webster 1985). Webster (1985) further argued that the general phenomenon of adjacent program audience duplication was, in the first instance, the result of audience availability. That is, programs scheduled back-to-back were likely to enjoy high levels of duplication simply because the same people tended to be available (i.e., watching TV) in adjacent time periods. Thus programming and scheduling are important variables for predicting choice and behaviour.

Preference for programs is also based on the language of programming. Media environments in non-English speaking societies mix both local and foreign productions and channels. Foreign programs require local viewers to negotiate the cultural differences between the texts produced abroad (predominantly in the U.S.) and their own lives. Local programs are also more likely to cater to local taste and touch on issues and themes more relevant to viewers' lives (Liebes and Katz, 1990). Thus, there is reason to believe that in a multicultural society like Kenya, language may play a pivotal role in the choices of television programs. Mwanzia (2009), notes that a lot of foreign content on Television (which is primarily English) is slowly losing relevance with the audiences in East Africa. Mwanzia (2009) further notes that local productions are having a positive impact on their audience level and stations that air local programs (drama, comedies, and reality shows) before and after prime time news have high viewership.

Channel loyalty is another factor that influences television station's choice. Goodhardt et al., (1987) defines channel loyalty as the extent to which viewers tend to view programs from one channel rather than distributing their viewing time equally among different channels. Investigations of overall television viewing patterns have found that viewers tend to be loyal to specific channels and programs (e.g., Webster & Washlag, 1983; Zubayr, 1999), and have come up with mixed results on the importance of content to viewers' choices. It has generally been assumed that viewers' loyalty to any single channel decreases with the availability of more channels and the availability of remote control devices (RCDs), which make channel switching easier. However, despite the large number of channels, viewers tend to limit their choices to a rather small number of channels ((Neuendorf, Jefferes, & Atkin, 1999). If channels succeed in appealing to the tastes of specific groups, this implies that a viewer watching a show on a given channel is more likely to view other programs on the same channel.

Weaver (1991) notes that there is a considerable correspondence between personality characteristics (extraversion, neuroticism, and psychoticism) and media preferences (prime-time television programs, contemporary movies, and popular music) in a study carried out on personality and individual differences. For example, respondents scoring high on neuroticism expressed a strong preference for information/news television programs and "downbeat" music while tending to avoid more lighthearted comedy and action/adventure fare. Those scoring high on psychoticism, on the other hand, evidenced significantly less interest in comedy offerings but displayed a strong preference for graphically violent

horror movies. Cohen (2002) in his study established that the viewer's mood towards the programme affects his attitude towards the commercials. He identified, happiness, presenter, timing, educational and spiritual – in order of importance as reason for programme preferences.

Research Methodology

This study adopted a descriptive survey research design. The population for this study comprised all public primary school teachers in Langata Division. A sample size of 56 public primary school teachers was surveyed, out of the total 329 primary school teachers in Langata Division. 4 teachers were selected from each school one of which was head teacher or a deputy head teacher and three other teachers randomly selected. A semi structured questionnaire was used to collect data. Data was analyzed using descriptive statistics such as the frequencies, mean and the standard deviations. 42 questionnaires were returned duly filled-in by the respondents, giving a response rate of 75%, of which 81% were female while 19% were male. Out of the 42 respondents, 74% were ordinary teachers while 26% were either head teachers or deputy head teachers.

Findings of the study

The study found that 36% of the respondents watched TV for 30 minutes to 1 hrs, 26% of the respondent watched TV for 1 to 2 hours, those who watched TV for 2 to 3 hour constituted for 19%, 10% watched for more than 3 hours while 9% watched TV for less than 30 minutes. This depicts that more than half of the respondents watched TV for more than 30 minutes.

The study sought to establish the factors that influence the respondents' preference of television stations. The data findings are presented in the Table 1.

Table 1: Factors that influence Respondents' Preference of TV Station

	No extent	Small extent	Moderate extent	Large extent	Very large extent	Mean	STDV
TV station overall image	0	1	9	28	4	3.8	.62
Clear reception of the TV station signals	0	3	11	16	12	3.9	.92
TV station History/Heritage	2	7	14	18	1	3.2	.92
News coverage	0	2	0	18	21	4.4	.74
Types of programmes aired	0	2	7	17	16	4.1	.86
TV station programme schedule	1	3	12	19	7	3.7	.93
TV station presenters	0	1	8	23	10	4.0	.73
Viewers' role and status in the society	1		10	21	3	3.4	.94
Family/friends/colleagues influence	2	12	10	18	0	3.0	.96

Need to get entertained	0	2	7	26	7	3.9	.73
Need to be informed	0	2	1	18	21	4.4	.76
TV stations marketing programmes e.g. advertisement, promotions public relations	3	4	8	16	11	3.7	1.18

As demonstrated in Table 1, news coverage had a mean of 4.4 with a standard deviation 0.74, types of programmes aired had a mean of 4.1 with a standard deviation of 0.86, TV station presenters had a mean of 4.0 with a standard deviation of 0.73, and clear reception of the TV station signals and need to get entertained both had a mean of 3.9 with a standard deviation of 0.92 and 0.73 respectively. This depicts that viewers are highly influenced by how well a station covers News, the type of program it airs as well as its presenters. How well viewers receive a stations' signal i.e. clear pictures and the need to get entertained also emerged as major factors that influence preference of Television stations.

The respondents were asked to indicate the perceived importance of the TV programs. The results are shown in table 2.

Table 2: Level of importance of TV Programs

	Least important	Less important	Important	More important	Most important	Mean	STDV
Entertainment programmes, Comedies, music and drama	0	4	4	15	19	4.2	0.96
Current affairs programmes, e.g News	3	2	4	11	22	4.1	1.21
Educational programmes e.g. documentaries	3	6	13	12	8	3.4	1.17
Sports programmes	9	4	10	12	7	3.1	1.39
Inspirational/ Spiritual programs	6	2	13	9	12	3.5	1.35

From the findings, entertainment programmes, had a mean of 4.2 with a standard deviation of 0.96 and Current affairs programmes, e.g. News had a mean of 4.1 with a standard deviation of 1.21. This can be interpreted to mean that viewers have a high appreciation for entertainment and information programs such as News. They may therefore prefer television stations that offer programs that meet their need of being informed and entertained.

The study sought to determine the TV station which aired the most important category of programs according to the respondents. The data findings were presented in Table 3.

Table 3: TV Station with most important Programs

TV Station	Frequency	Percent
Citizen	24	57.1

NTV	11	26.2
KTN	6	14.3
No response	1	2.4
Total	42	100.0

Basing on the factors in Table 3, we find that 57.1% of the respondents stated that Citizen TV aired their most important programs, 26.2% gave NTV, and 6% gave KTN as the station airing the most important category of programs while 2.4% of the respondents did not respond. This depicts that Citizen TV airs entertainment and current affairs programs which were identified as the most important types of programs to the viewers.

The study also sought to determine the factors that influence respondents' preferences of programs aired on TV Stations. Respondents were asked to state the extent to which selected factors influenced their preference of programs aired on the television stations on study. Likert-type scale was used in data collection and analysis on a scale of 1 to 5. Point 1 was assigned to No at all, indicating very low or no influence while 5 was assigned to very great extent, to indicate high level of influence by the factors on the choice of a TV Programs. The results are given in Table 4.

Table 4: Factor Influencing Choice of Aired Programs

	Not at all	Small Extent	Moderate Extent	Great extent	Very Great Extent	Means	STDV
Awareness of the programs	0	3	13	17	9	3.8	0.88
Language of the programs	0	1	5	26	10	4.1	0.68
Viewers interactivity with the channel during the program	3	4	13	15	7	3.5	1.11
Timing of the program	2	0	18	15	7	3.6	0.94
Duration of the program	0	7	10	21	4	3.5	0.89
Number of the commercial breaks in the program	8	13	7	10	4	3.9	0.91
presenter of the program	1	2	4	22	12	4.0	0.91
Content of the program	1	1	4	16	20	4.3	0.91
Quality of the program	1	0	5	17	19	4.3	0.86
Preference of the family/groups	2	5	8	22	5	3.5	1.02

According to the data findings in table 4, content of the program and quality of the program both had a mean of 4.3 with standard deviations of 0.91 and 0.86 respectively, language of the programs had a mean of 4.1 with a standard deviation of 0.68, and presenter of the program had a mean of 4.0 with a standard deviation of 0.91. This may be interpreted to mean that viewers' preference and choice of programs is highly influenced by the following factors: the content, quality, language and the presenter of the program in that order of reducing importance.

In this study the respondents were required to give their rating to the TV Stations based on various factors. The rating was as follows : least preferred (never likes) was given range of 1 – 1.75, slightly preferred (slightly likes) was given 1.76 – 2.5, preferred (likes) was assigned 2.51 – 3.25 while highly preferred (highly likes) was given range of 3.26 – 4.0. The results are given in Table 5.

Table 5: Rating of the TV Stations by the respondents

	Citizen	KTN	KBC	NTV
TV station overall image	2.9 (1)	2.7 (3)	1.4 (4)	2.9 (1)
Clear picture (reception of the TV station signals)	2.8 (2)	3.0 (1)	1.9 (4)	2.8 (2)
TV station presenters	3.1 (1)	3.0 (2)	1.7 (4)	3.0 (2)
News coverage and presentation	3.1 (1)	2.9 (3)	1.7 (4)	3.0 (2)
Viewers interactivity with the channel during the program	3.0 (1)	2.6 (3)	1.7 (4)	2.9 (2)
Program Schedule e.g. timing of the programs, programs line up	3.2 (1)	2.5 (3)	2.0 (4)	2.9 (2)
Variety of the programs	3.1 (1)	2.4 (3)	1.9 (4)	3.1 (1)
Local programs	3.4 (1)	2.1 (4)	2.4 (2)	2.2 (3)
Current affairs programs	3.0 (1)	2.5 (3)	2.1 (4)	3.0 (1)
Entertainment programs	3.2 (1)	2.1 (3)	1.9 (4)	2.7 (2)
Educational programs	3.1 (1)	2.3 (3)	2.2 (4)	2.6 (2)
Sports programs	2.6 (3)	2.7 (2)	2.3 (4)	2.8 (1)
Quality of the program	4.0 (1)	2.5 (3)	2.1 (4)	2.8 (2)
Corporate social responsibility (how the station gives back to the community)	2.9 (1)	2.5 (3)	2.1 (4)	2.9 (1)
Overall mean	3.1(1)	2.6 (3)	2.0 (4)	2.8 (2)

From the results in Table 5, Citizen TV was ranked as the overall preferred Televisionstation with a mean of 3.1 as well as on factors such as, it’s presenters, it’s News coverage, program schedule and in airing quality and Local Programs with a mean of 3.1,3.1, 3.2,4.0 and 3.4 respectively . NTV was ranked second overall preferred station with a mean of 2.8 but was rated first in sports programs which had a mean of 2.8. It shared the first position with Citizen TV on its overall image ,current affairs programs, variety of programs that it airs as well as in Corporate social responsibility with a mean of 2.9,3.0 3.1 and 2.9 respectively. KTN was ranked third overall preferred station and had a mean of 2.6 but was rated first in clear pictures with a mean of 3.0

The respondent were required to state why they preferred the channel they had chosen as favorite. They gave clear reception, clear and competent newscaster, bringing up to date news and having comprehensive news coverage, many local programs and having programs that are suitable for the whole family watching as reasons why these station are favorite to them. In addition, good color background, encouraging public views on some matters in their news, and educative and entertaining programs were also cited as their catching bait.

Discussion

This study has been able to establish very important aspects about TV viewing, some of the findings are discussed here below. It has shown that majority of the respondent watched TV for more than 30 minutes. It also shows that majority of the teachers who were respondents to these questions owned a TV set. This study also shows that majority of the

teachers preferred Citizen TV to other stations. For majority of teachers, the study has illustrated that their preferred stations had remained favorite to them for more than 3 years, indicating that the respondent were well conversant with their favorite stations and the factors that influenced their preferences had remained constant for a period of at least three years.

Some of the factors that this study has identified as being important in influencing teachers' preference of television stations include; News coverage, the types of programs that the station airs, the television station presenters as well as the needs of the viewers. The depth, width and presentation of news highly influence viewers' preference of television stations. The viewers identified current affairs programs which include news as their most important type of program as it meets the viewers' most important need of being informed. Citizen TV which was ranked first in news coverage also emerged as the most preferred station. This leads to a conclusion that news coverage by a station drive preference and choice of viewers.

The study also established that the programs that a station airs highly influence the choice and preference of television stations by public primary school teachers. This study established that program choice is related to content as opposed to programs scheduling. Majority of viewers watched programs of the same general type regardless of the station that they aired. The respondents preferred local Programs to foreign programs based on the language of programs, tastes and issues that are relevant to the viewers' lives. Quality and variety of programs were also established as important factors in choice of programs and stations to watch. Citizen TV was rated highly on the above mentioned factors in programming and it also emerged as the most preferred television station and thus a conclusion can be drawn that the type, content, quality and language of the programs aired on television are important factors that influence choice and preference of television stations.

Further, the study established that TV stations presenters also influence preference of viewers. Presenters' maturity, image, and competence also carry the image of a television station. This emerged as an important factor to public primary teachers in Langata division - majority of who are in the age category of between 40 – 50 years. The station that had presenters who were rated highly was also ranked as the most preferred station. Other factors that emerged as important in influencing preference television stations include; clear reception of TV station signal, television stations overall image, corporate social responsibilities of television stations as well as the viewers need to get entertained and informed

Conclusion

The study sought to establish the preferred television station by the public primary school teachers in Langata division, Nairobi. To this objective the study found out that Citizen TV was preferred by majority of the teachers. The study also aimed at determining factors that influence consumer preference of TV stations by the public primary school teachers in Langata division, Nairobi. In line with this the study determined that news coverage, types of programs aired, TV station presenters, and clear reception of the TV station signals influence preference of TV station. Also, the viewer's need to get entertained, TV station overall image, TV station programs schedule, and TV stations marketing programs are other factors that influence the same. The study also found out that role and status of the respondent in the society, TV station History/Heritage and family/friends/colleagues influences the choice of TV stations as well.

Recommendations with Policy Implications

From the finding and basing on the objectives, the study recommends the following; the government should encourage and reinforce production and airing of local programs by television stations in Kenya. For example policies need to be formulated on the ratio of local and foreign programs that should aired by television stations in a given period of time. The study further recommends that more vetting should be done for programs before airing them to determine the audience and to ensure their relevance in meeting the viewers' needs. The study also recommends that the Government reinforces and encourage media houses in News coverage as this has been identified as one of the most important need of the viewers. Television stations are also recommended to improve in their news coverage as this contributes to stations

gaining competitive advantage. They are further recommended to have TV presenters who communicate the TV station's image since choice and preference of Television stations is highly driven by TV stations presenters.

Suggestion for Further Studies

The research dealt with investigating the factors that influence preference of TV station by public primary school teachers in Langata division, Nairobi. The research recommends that a similar study be carried out to investigate whether the same factors would influence preference of TV Stations among other category of people e.g. the students, or people in other professions. On the same note, since the study was conducted on an urban population the study recommends that a similar study should be carried out on a rural population to establish whether the same factors would influence preference of TV channel in a rural setting.

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Naïve Reinforcement Learning As a Guide for Path Discovery

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Abstract

Usually, a problem arises given that one is at a point – call it A , and needs to reach a destination, let's say point G through several other intermediate points in a large space. In the absence of a viable tool to use in getting to the destination, it becomes very hard to get to it especially if the search space is large. Sometimes one may resort to trial and error and this method is normally very inefficient in a large space. The exhaustive search is also inefficient in a large space, especially where the resources are limited. Reinforcement learning can play the role that provides the necessary guide for the search process to successfully discover the destination. We demonstrate, using a concrete example of a map representation, that by only indicating that the action taken is 'right' (1) or 'wrong'(-1) the search process proceeds successfully to the destination. The 'right' and 'wrong' indications come from the environment. This is naïve reinforcement learning since it neither takes into account the cumulative reinforcement values nor insists on discovering a policy. The contribution of this technique is that there are little overheads and resource inputs, while the search problem is successfully solved. The challenge with this method is the need to model the environment.

Keywords: Naïve Reinforcement Learning, Machine Learning, Learning Agent

Introduction

In this paper we consider the problem that arises when a path from a given point A to a goal point G is to be found. Limited knowledge is assumed in which the environment can only supply a limited guide. The environment can only tell whether the direction taken is right or wrong. Such a problem can be solved using search techniques in which the search space is examined, Russel & Novig (2003). The difficulty is that when the search space is large it is hard to apply the usual search methods such as systematic exhaustive search. The required time may, also, be too long and impractical to get. It is, further, more challenging when there is limited knowledge of the space such that it is not easy to enumerate the search space elements. In case of the path finding the search space would consist of a set of all possible paths. The issue is that the path finder has no idea about the future intermediate points, nor where to proceed. The path seeker knows the destination, G but not how to get to it.

The reinforcement learning approach is adopted in solving the problem of finding a path when the available information is limited. Reinforcement learning is a machine learning technique in which the learner has a goal with no knowledge of how to attain it but takes some actions and gets some reward from the environment. The learner interprets this reward and seeks the actions that will maximize the cumulative reward, as observed by Sutton & Barto (1998); Kaelbling & Littman (1996).

The naïve reinforcement learning is a process in which the learner has a goal without any knowledge of how to get to it but gets the reward from the environment. The learner interprets the reward and avoids some actions and prefers others. The learner remembers the incremental progress made and actions taken at local points or states. The naïve reinforcement learning is demonstrated using a learner that is situated at a geographical point A, and seeks to reach another geographical point G. The learner, at some local point, chooses a direction and gets to a destination. The environment indicates to the learner that she is 'right' (1) or 'wrong'(-1). The search process then proceeds successfully to the destination provided the learner is given enough chances to choose directions. This naïve reinforcement learning does not take into account the cumulative reinforcement values nor insist on discovering a policy. A policy is guide at every state that tells the learner how to act. The advantage of this technique is that there are fewer overheads and the required resource inputs, while at the same time the search problem is successfully solved.

The rest of this paper considers the reinforcement learning model, the naïve reinforcement learning model, the experiments, results, the discussion and the conclusion.

The Reinforcement Learning Model and the Related Work

Learning in human beings is the process that results in the changes of attitudes and behaviors. These changes occur due to the acquisition of knowledge, skills and values. Learning in machines, is handled under machine learning that is a subfield of artificial intelligence, Mitchel (2005). In machine learning the algorithms are developed to model the learning processes. The learning processes in machines are categorized in some of the groups that include the supervised, unsupervised, semi-supervised and reinforcement learning processes. In supervised learning the learner is required to learn input-output pairs that are used as examples to enable the learner to subsequently perform the matching. In unsupervised learning the learner has only a set of inputs; the learner must discover how to match the inputs to the outputs. In semi-supervised learning, the learner has some examples with complete input-output pairs and some examples without the pairs. In reinforcement learning the learner has a goal with no knowledge of how to attain it but takes some actions and gets some reward from the environment. The learner needs to discover a policy that guides actions in given states of the environment. Reinforcement learning is a machine learning technique in which the learner has a goal with no knowledge of how to attain it but takes some actions and gets some reward from the environment. The learner interprets this reward and seeks the actions that will maximize the cumulative reward, Sutton & Barto (1998).

Consider the learner as an agent that is in some environment. The agent interacts with her environment so that a goal is achieved. According to Russel & Novig (2003), agents are objects in the environment that perceive and react to states in the environment. Examples of agents include anything for which an environment can be specified, and that acts and reacts such as humans, animals, ants, some Internet software or computational processes in operating systems context.

A model for reinforcement learning consists of the agent that is taken to be the learner. The agent interacts with the environment. The agent selects an action and the environment responds to the action by moving to a different state and gives a reward to the agent. The interactions of the agent and the environment occur in a sequence of discrete time steps, Sutton & Barto (1998); Kaelbling & Littman (1996). In the model there is a set of environment states, a set of actions that the agent can take, a set of rules of changing between the states, a set of rules that determine the reward of the transitions, and a set of rules that describe what the agent perceives.

Reinforcement learning has many applications. It has been used to solve problems in many areas including robot control, elevator scheduling, telecommunications, backgammon, chess, jobshop scheduling, project scheduling, robotic soccer, resource allocation, Sutton & Barto (1998); Wei and Dietterich (1995); Arai et al. (2000); Wauters et al. (2010); Kaelbling & Littman (1996); Maes et al. (2007); Maes (2003), Galstyan, et al. (2005).

The Naïve Reinforcement Learning Model

In the naïve reinforcement model, the agent is the learner. The agent has a locality, or her current state, in the environment. The agent has a set of allowed actions within her locality that is in her current state. The agent chooses one of the actions within the state at random. If there is only one allowed action, then it is the one that is taken. After the action, a new state occurs and the reward for the action is obtained. The agent remembers her actions and previous states and avoids the actions that resulted in poor reinforcement. The agent also remembers her progress towards the goal.

For the path finding example, an agent acts by moving in some directions that are possible at the given points or states. The agent can move to the left, the right, straight or reverse. Every state has one or more allowed moves. A terminus, for example, has only one allowed move that is ‘reverse’. In every state and for every allowed move the environment has some reinforcement. The reinforcement takes only two forms, ‘right’ or ‘wrong’. The right move is awarded 1 and the wrong move awarded -1. The agent knows what these rewarded mean. The agent drops all the immediate destinations that are rewarded -1 and maintains the immediate destinations that are rewarded 1. The agent keeps on trying the various actions at the local states. See figure 1 for the map that is used in the example. The agent needs to find a path from A to G.

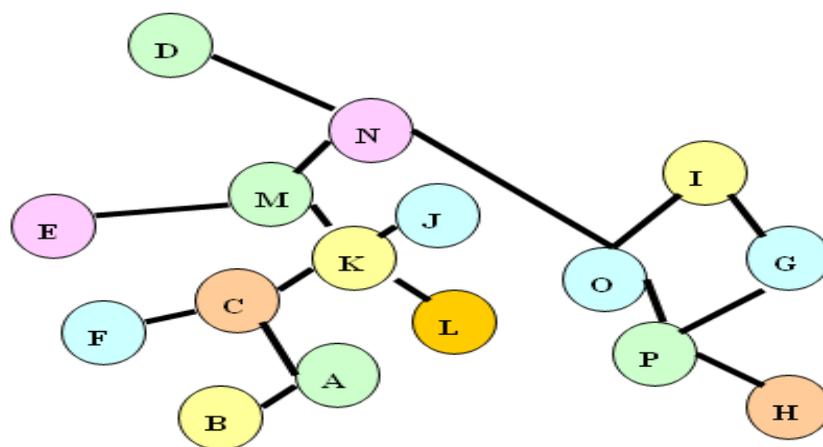


Figure 1. The Map showing the nodes (states)

The Naïve Reinforcement Learner’s Contextual Architecture

The naïve reinforcement learner is implemented using the agent-based approach. The learner is the agent. The agent is an object that can perceive and react in the various environmental states, Russel & Novig (2003). The agent acts by choosing a direction and moving in the direction chosen. In this way the agent can turn left and proceed, turn right and proceed, move straight and proceed or reverse and return to earlier place. The initial place the agent is in is A and the agent wants to be in place G since it is the agent’s goal. When the agent acts, the place where the agent is situated changes. The place changes from the current one to the next logical place according to the links of the places. These are depicted on Figure 1. For example, if the agent is situated at A, the agent can move straight or turn right. Suppose the agent chooses to move straight. The agent acts ‘move straight’. Then the next logical place is B. Since B is a terminus, the only option available is to reverse; this means that at B this action takes the agent back to A.

The agent can do several things; she has a basic knowledge that enables her to recognize the various directions, the place where she is and the allowed actions at the place where she is. She remembers the minimal path that leads to the right direction. She recognizes when the goal destination, G, is reached. She can show the right minimal path at any time. She can show the state of affairs at any time such as action taken and reward obtained. She recognizes the allowed actions at any place. She can take action. She can get and interpret the reinforcement value.

The environment is modeled using the basic elements that are related to each local place or decision point. For each local place such as K, see figure 1 for the places labeled A .. O, one or more tuples, is maintained. A basic tuple is:- <place, direction, destination, reinforcement score>. In this case the place is any one of A .. O, the direction is any one of left, right, straight, or reverse. Destination is any one of A .. O, and reinforcement score is right (-1) and wrong (1). Enough tuples are kept for each place according to the possible allowed actions at that place. At any one point when the agent takes an action at one place, the reinforcement score can be given using the appropriate tuple. The contextual architecture is as shown in Figure 2.

The overall agent control loop consists only of the agent taking an action each time. This activity of the agent is only constrained by the allowed number of chances or the discovery of the path.



Figure 2. Basic Contextual Architecture

The Experiment, Results and Discussion

The naïve reinforcement learner was implemented using an agent approach. The learner was implemented as an agent through an object oriented development environment. A base agent with the functionalities was implemented and then instantiated. The functionalities are the capabilities of the agent such as the ability to recognize where she is, the available options and take action. Out of possible actions at any place, the agent selects options at random and relies on the reinforcement for subsequent actions. The main objective of the experiment is to find out the empirical efficiency of the naïve reinforcement learning process. The learner is given a number of chances to try to find a path from A to G. The learner or the agent may find the path or not. Out of the number of chances that are given it was noted at which trial stage the learner discovered the path. The learner operated in a context with 16 places or nodes as shown on figure 1. Every time the learner starts at node or place A and gets a number of chances to find a path to G. The chances given were 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60 and 100. For every number of chances, say for example 15 chances, the experiment was repeated five (5) times and in each replication the following were noted: time taken in seconds, if the path was found and the number of trials before the path was found. In every case the mean value was computed and rounded. Efficiency of the search effort was computed to give an indication of the chances that were given and the number of chances used before the correct path is found.

The results that were obtained are shown on Figures 3, 4 and 5.

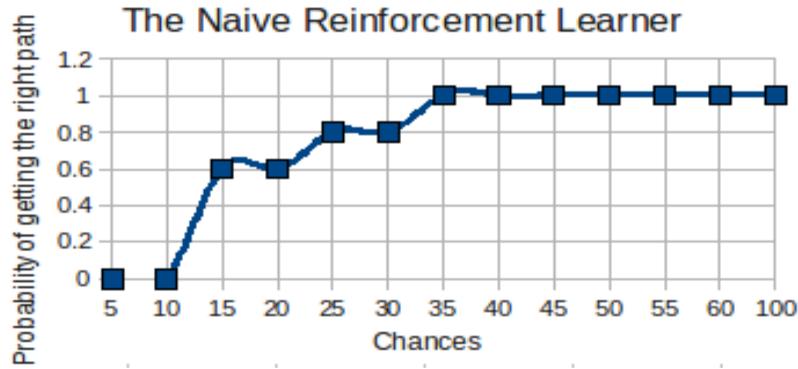


Figure 3. Getting the right path versus the chances given

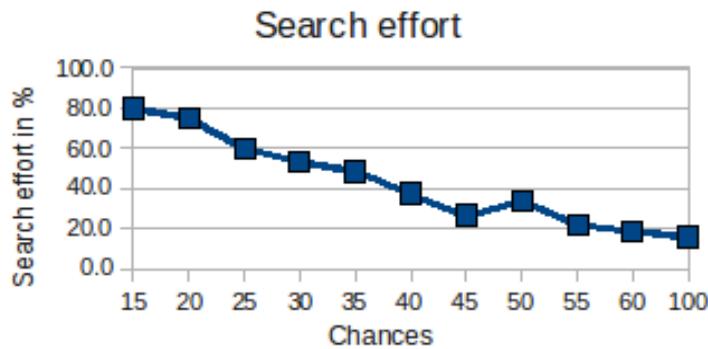


Figure 4. The search effort

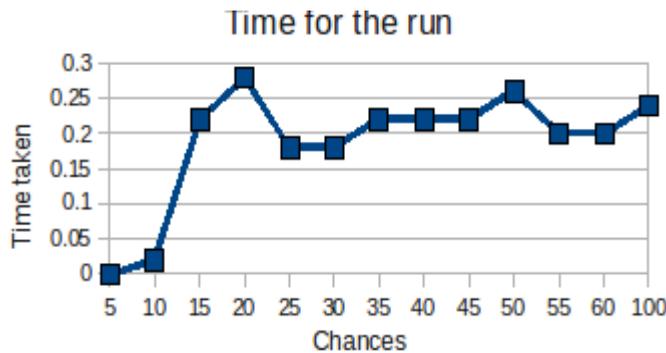


Figure 5. The time it takes for the run

We now discuss the results. In Figure 3, the results for getting the right path versus the chances that are given are shown. For all the replications when the chances were 5 and 10, no correct path was found. This can be explained by the fact that there were 16 places or nodes and the learner guesses most of the time. The chance of getting directions correctly and successively is low. For chances 15 to 30 the correct path is found most of the time with a probability ranging from 0.6 to 0.8. For the chances ranging from 35 and above, the correct path was found, every time. From figure 3 it is strongly indicated that beyond some number of chances, the correct path is certainly found. In this example the number is 35 changes. This works out to approximately 2 trials for every node or place. It may also be noted that under the same example, the possibility space is 20736 for exhaustive search. At 35 trials for a guaranteed correct path, the saving on the

search effort seems significant. Figure 4 shows the search effort. This is a measure of the number of trials taken against the total number of changes that are given. In all cases the after 15 chances and beyond, the learner did not exhaust the number of chances given. The learner took fewer numbers of trials to find the correct path compared to the total number of chances given. The implication of this is that the naïve reinforcement learning process can also be effective. Figure 5 shows the time it takes to end the run. A run is the time it takes to exhaust the chances or find the correct path. Either way the search process stops, when the chances are exhausted or the correct path is found. The run time is generally the same, varying from 0.03 seconds to 0.28 seconds. The most notable observation is that the number of chances does not affect the length of the run. This is explained by the fact that the run stops when the correct path is found. These results, though very limited in variation, indicate that the naïve reinforcement learning process can be useful. A typical use may be in the embedded control for robots, where a robot may have a range of actions and some environmental indicators that show him that the actions are right or wrong. There are some notable limitations of the naïve reinforcement learner. First, like reinforcement learning, it needs the environmental feedback without which it cannot work. Secondly, the local environmental elements or tuples may be too many if the learner has to cope with varying start places and goal places. The naïve reinforcement learner however, both explores and exploits in the sense of Sutton & Barto (1998). She explores since the actions are selected at random and exploits since the reinforcement is useful information that forms the basis for avoiding some places.

The Conclusion

This paper has considered the problem of finding a path from one place to another using the naïve reinforcement learning method. The naïve reinforcement model, unlike the usual reinforcement model, only considers providing the learner with a right and wrong indicators on their actions from the environment. This alone has been found to be sufficient to guide the learner in discovering the correct path. The empirical results with a single context show that out of a total of 20736 possible trials needed for the exhaustive search only 35 trials are needed to guarantee finding the correct path. Whereas this is not indicative of the actual savings ratio in other contexts that may be different, substantial savings on the search effort is expected where the naïve reinforcement method is used to guide in path finding where local knowledge and information is very limited. The most important strength of the method is the little overhead that it has, and the ease of implementation. The usual reinforcement model has been extensively relaxed yet the learner still manages to find a correct path. Its drawback is the need for environment and the many knowledge elements that may be needed for a generalized application.

Acknowledgment

We are grateful to the University of Nairobi and Free University of Brussels for the various types of support that we have received for our research work.

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UNIVERSITY OF DAR ES SALAAM

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Institute Department of Accounting

Proposed Degree: PhD in Business Administration

Title: The Determinants of Accounting Information Use by Political and Administrative Actors in Public Sector Decision making (The case of Local Government Authorities in Tanzania)

INTRODUCTION

Public Sector Decision Making and Use of Accounting Information

The public sector plays a crucial role for social and economic development of any state. Development of infrastructure and provision of basic services such as health, primary and secondary education and other public services and goods to the people lie in the public domain. The public sector is broadly synonymous with government sector (Schacter, 2000). The government sector operation includes Central Government and Local Government Authorities activities (LGAs) (Mohammed et al, 2008). Globally, since 1980's, public sector has been undergoing reforms which represent the aspects of New Public Management (NPM) (World Bank, 2008). The main motive of NPM is to achieve efficiency in operations and financial management processes of public sector entities (Watkins et al, 2004; Groot et al, 2008). Guthrie et al (2005) argue that NPM involves development of performance measurement systems and change of financial reporting systems including adoption of accrual basis accounting across government departments and sectors and reliance on professionally accounting body which set accounting standards.

Accrual basis accounting has been adopted and is being implemented by governments of developed and developing countries such as UK, New Zealand, Italia, Australia Norway, Sweden, India, Srilanka, Pakistan ,Tanzania and others (Groot and Budding, 2008; Newberry and Pallot, 2004; Caccia and Steccolini, 2006; Barton, 2009; SAARC, 2006; URT, 2010). The accrual basis accounting is based on the argument that it enhances the quality of accounting information by recognizing all cost of transactions or events regardless of the cash received or paid (Monsen, 2006). The accrual basis accounting provides more useful information than cash basis accounting which leads to poor quality information thus not useful to the users (Ouda, 2003). Essentially, this reform shows the importance of accounting information in public sector decision making and its role of facilitating the decision making process (Chalu, 2007). However, the facilitation role depends mainly on the use of accounting information in decision making (Assad, 2001).

Use of information is defined by Philemon (2008) as taking the research finding into account (Weiss and Bucuvalass, 1977), the conversion of data into ultimate actions (Barabba, 1983) or the extent to which interpreted data influence the user's decision making (Moorman et al, 1992). Chua (1998) point out that accounting information can be used in two main ways, which are for symbolical use and instrumental use. Symbolical use is characterized by interactions of actors on social constructed norms, values, identification and meaning about reality as presented by accounting numbers (Chua, 1988). Melia et al (2003), comment that, symbolic use is where accounting information is used for legitimating purposes. On other hand instrumental use is characterized for analysis, evaluation search for data and test for solution (Chua, 1988). It assumes a rational decision making process: decision makers have clear goals, seek direct attainment of these goals and have access to relevant information (Walle and Bovaird, 2007). Melia et al (2008) add conceptual use as a use of accounting information for general enlightenment.

The increased use of accounting information as social and institutional practice is among the proposed elements to improve efficiency of public sector decision making (Miller, 1994) which justifies the symbolic use of accounting information. The existence of different of professions in LGAs might make accounting information to be deployed in budgeting decision by shaping the conflicts between the professionals as legitimating device (Melia et at, 2008). The accounting information can be used to elaborate budget of next period based on the results of the previous period and of the real financial situation (Alijarde, 2002). Accounting information in LGAs' is communicating about source of fund, utilization of generated fund, and justification for their utilization (Chalu, 2007). The accounting information enables decision makers to determine the adequacy of tax policy and allows the assessment of future source and revenue needs. Thus, LGAs forecast the revenues for the next period and in consequence the expenditures that they might have to incur.

In fact LGAs' budgeting is revenue driven, in that the revenue constrain generally dominates decision making (Gianakis and McCUE, 1999).

Additionally, the accounting information can be used in cost and benefits analysis of contracting out decision. As a result, accounting information can be used by public sector actors to legitimize contracting out decisions at most efficiency manner (Scuill, 2008). Definitely, the uses of accounting information contribute to efficiency in decision making by insuring scarce resources are best used in provision of public services through clear determination of input and output basing on real financial situational (Assad, 2001;Alijarde, 2002).

Despite the role of accounting information in public sector decision making, factors influencing its use still remain unclear in government decision making irrespective of the adoption of accrual basis accounting system. The government decision making can be seen as a bureaucratic and political process involving multiple actors with inconsistent preferences, interest and motives that are discovered by acting rather than by being delivered upon in advance (Lawton et al., 2000: Pilcher, 2005). According to institutional theories, the best way to understand political behavior (seemingly both individual and collective) is through a "logic of appropriateness" that individuals acquire through their membership in institutions (Peter, 2000). Peter (2000) argues that people functioning within institutions behave as they do because of normative standards and institutions arranged as rules and incentives, and the members of the institutions behave in response to those basic components of institutional structure. In the democratic countries, the institutional set up of government decision making process involves the elected political actors who have legitimized power to make decision on behalf of the voters. Additionally, government decision making process includes permanent public officials as administrative actors who have the responsibilities of preparing and implementing decisions which are made by political actors.

The decision structure of LGAs is headed by full councils who make important financial and non financial decisions (Gomes, 2003). In these councils, political actors (councilors) and administrative actors meet, but councilors remain decision makers basing on their power to vote for all decisions which need their consent. The technical preparation for decision making is done by administrative actors and finally some of decisions such as budgeting approval are made by the political actors (Jalonen, 2006). Gerboth, (1997) pointed out that, when a decision-making process depends for its success on public confidence, the critical issues are not technical but they are political, which is inclined towards satisfying the constituents' interests. Utmost, the public sector decisions are resulted from compromising, bargaining and politics (Rainey, 2003). The complexities of the structure of public sector decision making do not ruin out the importance of using accounting information in decision making especially in African developing countries including Tanzania which are characterized with high needs of government services and limited resources (World Bank, 2006). LGAs of these countries are characterized with implementation of decentralization policy which gives mandate to LGAs' actors to make decision through transferring of functions and resources including financial resources from central government to local level (World Bank, 2006). In fact, in terms of expenditure responsibilities, Tanzania has achieved a significant amount of decentralization; approximately, 19% of the budget on recurrent government spending is done at the local level with central government transfers (Boex et al., 2003). Thus, more accounting information is expected to be produced in LGAs to inform actors for decision making.

Therefore, the enhancement of quality of accounting information as one of input in decision making by adoption of accrual accounting in public sector explains the importance of information in this sector. However the nature of decision

making process of public sector, calls for a study to investigate the factors that influence accounting information use by decision makers (political and administrative actors) in decision making.

6.2 Statement of the Problem

The pressure of public sector accounting not only changes to achieve efficiency but also to expand its sphere of influence in public sector decision making process which is characterized by compromise, bargaining and politics in order the dream of efficiency to be realized (Hopwood 1984). However, despite of the importance of accounting information in decision making and nature of public sector decision making process, little is known about the factors which influence accounting information use by political and administrative actors in public sector decision making. The studies which analysed the factors influencing accounting information use in decision making has been done in private sector (Heidhues and Patel, 2008). Moynihan et al (2004); Askim (2007); Proeller et al (2010) analysed the factors influencing performance information with limited focus on accounting information. Additionally, the studies were based on a single actor, political or administrative, in developed country contexts. The main argument of these studies however, is that there are several factors influencing the use of information in public sector which are associated with organization's institutional environment.

Factors identified in these studies cannot be generalized to this study because of gaps inherited in those studies. The studies lacked a clear research model for understanding the determinants of accounting information use by multiple actors involved in public sector decision making. Yet, there are models which have been developed by Luder (1992); Xu (2003); Chalu, (2007) concerning the government accounting. At most, these models provide understanding of the factors which determine the Accounting Information Systems (AISs), innovation or effectiveness in public sector but not the use of accounting information in decision making.

Miller (1994) argues that accounting practice as particular economic form of calculation, should be similar located as a social and institutional practice and its practice analysis should address the dispersed organization matrix within which it operates. The institutional theory has long been established as important perspective in accounting especially in public sector because it provides insight to institutional dynamics. The institutional theory considers social, regulative and cultural aspects on shaping the attitude of organization and its actors towards organization form and process such as decision making process (DiMaggio and Powell 1983). Assad (2001) argues that accounting information can be used by actors, if the accounting becomes part of the socio-cultural and regulative context; where external environmental cultural norms have implications on how organizational actors understood and interpreted accounting functions, processes and information. The contingency model of government innovation by Luder (1992) suggests that for understanding attitude of government actors' towards accounting practice, the factors which are associated with institutional environment of organization should be taken into consideration.

Accounting information as technical calculation in institutionalized environment still it should have the standards and characteristics to be useful as an instrumental and symbolic representation of accounting number in decision making in order to create efficient in decision making (Potter, 2005). Staubus, (1960) argues that the use of accounting information depend on accounting information itself. The accounting information should have relevance quality in order to be useful in decision making. Ultimately, the users (actors) are assumed to be able to interpret the information and use in decision making (IPSAS, 2010). Therefore, individual actors' characteristics as suggested by contingency model of government innovation by Luder, (1992) that Social and Economic Status (SES) such as education background and experience of using information shape attitude of actors in using information. Luder (1992) argues that individuals' actors do not have identical demands for information, as they are not identical in the socio-economic attributes relevant for predicting their

demand for government accounting information. Utara (2011) observed that public decision makers (actors) consist of various levels of knowledge, expertise, and experience. They are varied from experts to laymen. Other scholars such as Askim (2007) argues that demographic characteristics such as age of the individual actors have role in the shaping the actors to use information in public sector decision making.

Following the above discussion, the main problem to be addressed by this study is lack of knowledge on determinants of accounting information use by administrative and political as the key actors in public sector decision making process. Consequently the main question of the study is *'What are factors which determine accounting information use by political and administrative actors in public sector decision making process?'* Therefore the study investigates on the factors relate to organization institutional environment, factors related to individual actors' SES and demographic characteristics and factors related to accounting information quality. The study will focus on budgeting and contracting out decisions making. For the facts, that the budgeting decision process is required to deploy accounting information in order to achieve efficiency and it is emphasizing on future service delivery rather than the past; and it is associated with political, institutional systems and structures at large in LGAs (Goddard, 2005). On other hand, contracting out decision making has the potential not only to change the way government services are delivered and the ultimate structure of government itself, but also to affect the nature, extent and importance of accounting information for informed decision-making (Scuill, 2004).

Therefore, the study will develop a model by using institutional theory which is supported by Contingency model for government accounting innovation by Luder (1992) and decision usefulness concept and empirical studies. The model will be refined or affirmed by doing the explorative case study in LGAs of developing countries, in the case of Tanzania. Thereafter, the model will be tested by using survey methods, to establish the extent the factors identified determining the use of accounting information in decision making by political and administrative actors.

6.3 Research Objective

6.3.1 General objective

The main objective of this study is to investigate the determinants of accounting information use by political and administrative actors with the aim of contributing to the efficiency in decision making. The study will be done in Local Government Authorities (LGAs) of developing countries context in general and Tanzania in particular.

6.3.2 Specific Objectives

The study has the following specific research objectives:

1. To develop the model of determinant of accounting information use in decision making by political and administrative actors
2. To explore how accounting information is used by political and administrative actors in decision making such as budgeting and contracting out decisions
3. To identify factors associated with organization institutional environment
4. To identify factors associated with Social and Economic Status (SES) and demographic characteristics of individual actors
5. To identify factors associated with accounting information quality
6. To establish the extent identified factors determine the use of accounting information in decision making by political and administrative actors.

6.4 Significance of the study

The contribution of this research can be seen in different ways. The first is theoretical contribution. This study is expected to contribute more on Institutional theory; Institutional theory has been used by researchers in public sector to explain the changes made, through public sector accounting reforms such as adoption of accrual base financial reporting. This study is using the institutional theory to explain the influence of the organization internal institutions and external environmental pressures in the use of accounting information by actors in LGAs decision making process. Secondly, is empirical contribution whereby, the study findings are expected to establish empirical model which will show determinants of accounting information use by actors in LGAs decision making. The model will provide answer to the current question, and guide future research on understanding the determinants of accounting information use in public sector decision making. Thirdly, is practical contribution, the findings will help the reformers to select appropriate measures and actions to make sure accounting information produced in LGAs is used by political and administrative actors in decision making. This will lead to realize the promise of reforms and ensures that it contributes to greater efficiency in the performance of LGAs.

6.5 Literature Review

6.5.1 Definition of Key Terms

6.5.1.1 Decision making

Decision making can be regarded as the mental processes ([cognitive process](#)) resulting in the selection of a course of action among several alternative scenarios. Every decision making process produces a final [choice](#). The output can be an action or an opinion of choice. The decision making process can viewed in different perspectives. Cognitive perspective views decision making process as continuous process integrated in the interaction with the environment, while normative perspective views decision making as the analysis of individual decisions concerned with the rationality and [logic of decision making](#) process, where specialists apply their [knowledge](#) in a given area to making informed decisions. Rainey (2003) identifies the decision making four approaches from public management literature. (1) The rational decision-making approach view of decision making suggests that decision-makers follow a specific process where goals are decided upon, alternatives are developed in accordance with such goals, and then the most efficient alternative is implemented. (2) The contingency perspective decision-making approach as where the decision maker use judgment and intuition, undertake in bargaining and political maneuvering in their decision-making process because rational decision-making cannot occur under unstable, unclear or complicated conditions. (3) Incremental decision making approach, this is where decision-makers choose to make less controversial (the requirement for political consensus and compromise), intermediary decisions to ensure some degree of success of achieving vague goals presented instead of choosing an alternative that a rational decision-making process would predict. (4) The garbage decision making approach comes from the observation that decisions are made in organizations when particular decision-making opportunities or requirements arise and it is often unclear who has the authority to decide what and for whom. The developers of information (accounting information in this case) hope that their work will be utilized in some form of rational decision-making processes or that at the very least, their tools and information are used to help inform incremental decision-making processes (Rainey, 2003). For the matter of this study the decision making process is defined as continues process integrated in the interaction with the environment with combination incremental and rational decision approaches as explained by Rainey, (2003).

6.5.1.2 Accounting Information

Collier (2006) defines accounting as the process of identifying, measuring and communicating economic information to permit informed judgments and decisions by users of the information. Therefore, accounting information is defined as a means by which we measure and communicate economic events (Collier 2006). There are two type of accounting information; financial and management accounting information. Financial accounting information is information from financial statements such as statements of financial position, statement of financial performance, cash flow statement, statement of change in equity or net assets and accounting policies and notes to the financial statements. These

statements contain information about assets, liability, net assets/equity, revenue, expenses and cash inflows (IPSAS 1, 2006). Therefore, the financial statements describes information about sources, allocation and uses of the financial resources; ability of entity to finance activities and to meet its liabilities and how the entity financed its activities and met its cash requirements (IPSAS 1, 2006). The financial information is information designed primarily to assist external users in deciding where to place their scarce resources (collier, 2006).

Managerial accounting information on the other hand is the one specifically intended to aid management in the running of the organization (Drury, 1996). The information in the previous budgets shows that LGAs have been efficiency in raising as well as using financial resources for citizens' wellbeing (Chalu, 2007). Managers such as political actors (councilors) and administrative actors (public officials) can use the accounting information in setting up the organization overall goals, performance evaluation and in making all types of managerial decisions. For the purpose of this study, both types of accounting information are considered in the discussion.

6.5.1.3 The use of accounting information in decision making

Accounting Information is not an end by itself, but it is a means to an end (Collier, 2006). The end is a better-informed decision than would not have been the case without the information. Thus, accounting information use can be defined as taking accounting data and information into account; the conversion of accounting data into ultimate actions or the extent to which interpreted accounting data influence the user's decision making. Chua (1988) point out that, there is symbolic and instrumental use of accounting information in decision making. Chua (1988) further posits that symbolic use of accounting information refers to the use of information basis on symbolic meaning constructed from social action as the product of the actor's compliance with stable, shared norms or meaning and personal knowledge and experience. Symbolic use of information is seen in individual actor construction rather than organization perspective (Vyas and Souchon, 2003). Philemon (2008) point out that instrumental use refers as to the use of information to undertake a specific decision or action that can be clearly designated. The instrumental accounting information use involves official order of documents and basically hierarchical in nature with well defined areas of responsibility and accountability (Chua, 1988). Both uses are part of constructed reality that has been attributed particular levels of significant in decision making (Chua, 1998). Another way of using accounting information is conceptual use. Philemon (2008) argues that conceptual use refers as to thinking of an issue without putting information to any specific documentable use. Conceptual use is based on 'a gradual accumulation and synthesis of information' and a gradual incorporation 'into the user's overall frame of reference' (Walle and Bovaird, 2007).

The various decisions which LGA can make using accounting information are budget decision which include resources allocation decision and distribution decision for economic development (Richard and Schwartz, 2004), and borrowing decisions. Budgeting in function perspective is a very strategic perspective because it refers directly to the output of the entity and it plays important role in the goal of public sector of financial management and resources allocation (Bergmann, 2009). Thus decision may include increase or decreases in the provision of that output, the quality of the output, introduction or increase of fees, investing in improved facilities and others. Therefore, the prepared and approved budget in government sector form a law which guides all transactions on services delivered to the people. Goddard (2005) posits that enhancement of efficiency on budgeting practice in government sector might improve transparence and accountability and overall good governance.

The accounting information can also be used by decisions makers in the contracting out decision making process in public sector (Sciulli, 2004). The accounting information use in contracting out decision is used to identify the service to outsource, evaluate competing bidders thus justify the final awarding decisions (Sciulli, 2004). For the purpose of this

study, the use of accounting information will be assessed in budgeting and contract out decisions as symbolic, instrumental and conceptual use for the aim of making contribution to the efficiency in decision making (Budding and Groot, 2008).

6.5.2 Theoretical Review

In addressing the developing of the research model, the following theories will be reviewed: institutional theory and contingency model of government accounting innovation; and decision usefulness concept. The institutional theory will be applied to describe the factors which shape organization actors towards organization form and process such decision making process by using accounting information. The contingency model of government accounting innovation will be applied to support institutional theory to show specific institutional factors and individual factors (SES factors) which shape the actors of government in using accounting information in decision making. The decision making concept will be applied to explain the qualitative factors of accounting information useful in decision making.

6.5.2.1 Institutional Theory

The institutional theory, which can be traced back to 1966 (Gomes, 2003), is attending to the deeper and more resilient aspects of social structure. It is concerning with the process by which structure, including schemas, rules, norms and routines become established as authoritative guideline for social behavior (Scott, 2004). The main argument of this theory is emphasized on the importance of institutional factors which are associated with social, political, regulatory and cultural aspects in shaping organizational behavior in form and process (Meyer et al 1977: DiMaggio and Powell, 1983: Scott, 1998). Neo institutional theorists argue that, the organization behavior is resulted not only from intra institutional pressures but also the external environmental pressure (Meyer et al 1977: DiMaggio and Powell, 1983: Scott, 1998).

Scott (1998) argues that the environmental pressures that make an organization conform to the social and cultural worlds are central to the institutional theory. The organizations and their actors are responding to the environment pressure in order to retain their legitimacy and survival prospects (Meyer and Roman 1991). The institutional theory is associating pressure from outside as isomorphic. Isomorphism is a concept that best captures the process of homogenization (DiMaggio and Powell, 1983). There are three mechanisms through which institutional isomorphic changes occur, First is coercive isomorphism; which results from formal and informal pressures exerted on organizations by other organizations upon which they are dependent and by cultural expectations from society within which the organization functions. Some are regulations which are derived from contract law and financial reporting requirements that ensure eligibility for receipts of contracts or funds may shape organization in similar way. Second is mimetic isomorphism which involves the adoption of practices used by (supposedly) successful organizations and is likely to occur in contexts of ambiguity and uncertainty. The practices of NPM in public sector explain the mimetic isomorphism. Third is the normative isomorphism which stems from shared values and ideas about appropriate behavior, often circulated through professional networks and education.

The institutional theory has been applied in many disciplines, including accounting. However, institutional theory has been criticized on several grounds. The theory is unable to sufficiently recognize the disparities within the institutional environment, the relative power of different institutional actors, and the conflicts which can result from relations of power (Collier, 2001). Peter (2001) argues that one of the most important problems of the institutional theory is the difficulty of measuring the institutions; we know they exist but how do they vary?

Irrespective of its criticism, the institutional theory has been used in accounting discipline to explain the organization change, such as in public sectors accounting reforms see in (Frumkin et al, 2004, BOGT, 2008). Basing on the argument that institutions shape behavior of actors (organization and individuals) through socialization process without actors even to realize that their behavior is in fact partly controlled by an institution. This study applies institutional theory to identify the factors which might influence organization actors to use accounting information in decision making. Hopwood and Miller (2004) point out that accounting could not and should not be studied as an organization practices in isolation from the wider social and institutional context in which it operates. To support institutional theory in determining the institutional factors which influence the use of accounting information by political and administrative actors, the study use contingency model of government accounting innovation by Luder (1992); and decision making concept for explanation of the technical features of accounting information to be useful in decision making.

6.5.2.2 The Contingency Model of Governmental Accounting Innovation

A contingency model of governmental accounting was developed by Luder (1992) to specify the social-political administrative environment and its impact on governmental accounting innovations. The model provides four contextual variables associated with organization institutions which influence the government accounting innovation. The variables are stimuli, users of accounting information, producers of accounting information and implementation barriers. Luder (1992) argues that the situation of financial problems, financial scandal, capital markets, external standard setting and professional interest are factors associated with stimuli of innovation.

The factors associated with users of information are social structural variables such as Social Economic Status (SES) and political culture as political behavior which influence the basic attitude of the users thus the expectation change to the citizens, Member of Parliament and others. The factors which are associated by producers of accounting information are structure variable of the political-administrative system as such staff training and recruitment, administrative culture and political system. These factors influence the basic attitude of the user of information to politicians, managers and accountants. The last variable is the implementation barriers which are obstacles to innovation including organization system, legal systems, and qualification of accountants and size of jurisdiction (Ludea, 1992).

The model has been widely applied and tested through several studies such Luder (1992), Ludea (1993), Godfrey et al. (1996), El-Batanoni and Jones (1996), Monsen and Nasi (1998), Christensen (2001), Mark (2002), Carmen et al (2009). Through, testing of the model, the favorability and un-favorability of variables towards government innovation imaged in different environment.

This study applies the contingency model of government accounting to identify the institutional and individual actors' factors which can influence the attitudinal behavior of actors (users of accounting information) to use accounting information in decision making. Luder (1992) argues that, political actors are the users and producers of accounting information while the administrative actors such as accountants and managers are producers of accounting information only. This study argues that both actors are the users of accounting information, by regarding administrative actors as technical users of accounting information in preparation and implementation of decisions which are made by political actors (Jalonen, 2006).

6.5.2.3 Decision usefulness concept

'The objective of accounting is to provide financial information regarding an enterprise/organization for use in making decision making'. By George Staubus (1960)

This is focal point of decision making theory. The decision making theory was founded by George Staubus in mid of twentieth century, when he was doing the PhD study for examination of revenue concept with the objective of defining revenue. Further was followed with question, for what purpose? Eventually comes up with the objective of accounting. Through analysis of the users of accounting output and the uses the made of those outputs, the study concluded that all users sought information for decisions (Staubus, 1960). Decision usefulness is the main characteristic of accounting information quality as it captures value of accounting information for interested parties in making their decisions (Staubus, 1960; Shipper & Vincent 2003). Thus, for the accounting information to be useful in decision making, it should have relevance quality (IPSASB, 2010). Relevance and faithful representation are the primary qualities of accounting information for useful decision making. If either is missing completely from a piece of information, the information will not be useful (Obaidat, 2007). IPSASB, (2010) points out that, for accounting information to be useful and applied in decision making, it must be understandable by users. The understandability increase when information is classified characterized and presented clearly and concisely (Beest, Braam and Boelens, 2009). Generally, the technical characteristic of information (accounting information in this case) quality includes, accuracy, accessibility, timeliness, completeness, reliability, consistency, accuracy, relevance objective and understandability (Mbamba, 2003; Seddon, 1997; Chalu, 2007; XU, 2003).

However, some scholars, such as Philemon, (2008) view the quality of information on the way users perceive the information. The perceived usefulness is measured in terms of importance and usability (Lacker and Lessig, 1980). Perceived ease of use which refers to the degree to which a person believes that using particular system will be free from effort or free of difficulties (Davis, 1989). Perceived accessibility by users refers to the ease of access, availability and convenience of information (Jeong and Lambert, 2001). The perception on the information creates attitude of users towards information. Chalu, (2007) explains the quality of information as the product of the effectiveness of Accounting Information System (AIS) which satisfy users need and demand. The quality information is also defined in terms of the extent information successfully serves the purpose of the users, thus the extent information fits the users' needs (Kahn, et al, 2002; Walle and Bovaird, 2007). Houghton, (1998) views quality of information, as the way the producers and users communicate to make more informative meaning and enhance knowledge to the users, and hence users will be able to interpret information and use in decision making. In concluding, for accounting information to be useful and influence users (actors) to use it in decision making it should have the relevant quality.

6.5.3 Empirical Studies on the accounting information use in decision making

Since 1980, research on the public sector accounting has been dedicated either on the accounting reforms and accountability (see Cochrane, 1993; Goddan and Powell, 1994; Guthrie, 1998; Assad, 2001; Goddan, 2004; Newberry and Pallot, 2004; Goddan, 2005; Carnegie and West, 2005; Bidding et al, 2008; Steccolini, 2009; Hyndman and Connolly, 2011). Some of these studies utilized institutional theory with the view that accounting is a social and institutional practice, instead of merely a technical practice (Potter, 2005).

Some few studies have been made contribution empirical on the use of accounting information in decision making by actors such as Heidhues and Patel (2008). Heidhues and Patel (2008) provides evidence that contextual factors associated by political, social, cultural and regulatory setting together with manager's preferences strongly influence the utilization and interpretation of accounting information in decision-making strategies and processes. The case study of German Dairy Cooperative which applied the institutional theory cannot be generalized by the current study. However, the German Dairy Cooperative is operating as business oriented organization and its nature of decision making process is not similar with the public sector decision making.

The studies in information use no specifically to accounting information in public sector (Dull 2008, Moynihan and Ingraham 2004, Moynihan et al. 2009, Proeller et al 2010), identified the factors influencing actors to use information in public sector decisions, are external pressure, the individual characteristics of public managers (administrative actors) and the capacity of support units possess to help processing information. Furthermore, Askim (2007), observed that in the LGAs in Norway, the factors influence the use of information are existence of NPM practice, political climate, education level of councilors, and infrastructures which allow expenditure tracking by the central government and availability of AIS. Lastly, is the force from demand side of the voters such as citizens as they are being well educated. Moynihan et al (2009) further observed that, demographic characteristics (such as age and gender) shape actors to using performance information in public sectors. They (op cit) argue that more aged councilors are using performance information in LGAs dialogue than younger councilors.

The studies carried to investigate factors influencing accounting information and other information use by public sector actors in decision making, have shown that there are multiple factors influencing information use in decision making process. It is considered that the factors can be grouped into two; first is factors affecting attitude of actors in using information and second is information factors. However, the previous studies focused more on institutional and behavioral factors affecting attitude of single actors rather multiple actors (politician actors and administrative actors) and less or no consideration on information factors. General issues which remain unsolved by previous studies in relation to the research problem are specific model for determinants of accounting information use by political and administrative actors in public sector (LGA) decision making. In relation to the study objectives the study will the following questions:

- How accounting information is used by political and administrative actors in public sector decision making?
- Which are factors associated with institutional environment (external environmental pressures) influence attitude of political and administrative actors of using accounting information in public sector decision making?
- Which are factors associated with institutional environment (internal institutions conditions) affect attitude of political and administrative actors' of using accounting information, which are similar to both?
- What are individual characteristics influence behavior and attitude of multiple actors of using accounting information in decision making?
- Which are factors associated with quality of accounting information influence accounting information use in decision making in public sectors?
- To what extent identified factors determine the accounting information use in decision making?

6.5.4 Conceptualization of the Proposed Research Model

By using the theoretical and empirical frameworks, the study argues that institutional factors, individual actors' and information factors associated with the quality of accounting information can be the determinants of the use of accounting information by actors in decision making for the aim of increasing efficiency.

6.5.4.1 Factors Which are Associated with Institutional Environment (Institutional factors)

By applying institutional theory (Meyer and Roman et al 1977: DiMaggio and Powell, 1983: Scott, 1998 : Potter, 2005, Frumkin et al, 2004), the institutional factors are defined as institutional conditions which affect the attitude and behavior of actors in using accounting information in decision making. The institutional conditions are classified into two, environmental pressure (isomorphic) and organization internal institutions.

Environmental pressures are described by this study as stimulus form external environment which are associated by regulative, social and cultural aspects which initiates and create a force to the organization and actors to use accounting information for decision making. The pressures are expected to be associated with regulations from contracts, financial

reporting, professional interest, and socialization of professional education networking, financial distress and the practice of NPM (DiMaggio and Powell, 1983). The pressure are expected to influence actors attitude indirectly (formal influence) through internal organization institutions and directly influence (informal influence) to actors.

Organization Internal Institutions: Basis to (Meyer and Roman et al 1977: DiMaggio and Powell, 1983: Scott, 1998, Luder, 1992, Askim, 2007, Moynihan and Ingraham 2004, Moynihan et al. 2009), the study argues that internal institutions are regulative, social, and political and culture rules which shape structure of organization and attitude of actors which affect organization form and process. These internal institutions are expected to affect attitude of political and or administrative actors of using accounting information in decision making. The study categorizes these institutions into two; (1) Social political institution such which affect attitude of political actors (2) Social administrative institutions which affect attitude of administrative actors (Luder, 1992; Saleh, 2007).

6.5.4.2 Individual actor's factors

The individual actor's characteristics have been seen as important factors which shape attitude and behavior of actors of using information (Dull 2008, Moynihan and Ingraham 2004, Moynihan et al. 2009). The study argues that, individual characteristics differ across the political and administrative actors and across individuals (Luder, 1992). Therefore, the study groups the individual factors into two: personal political actors' factors and personal administrative actors' factors. Luder (1992) argues that individuals do not have identical demands for information because they are not identical in the socioeconomic (SES) attributes such education background and experience of using of accounting information relevant for predicting their demand of information. The study also considers individual actor's demographic characteristics such as age and gender as part of individual characteristics which will be assessed if they have contribution on shaping attitude of individual actors in using accounting information in decision making.

6.5.4.3 Information Factors

The information factors are defined as the factors which describe the quality of information as factor to influence the use of accounting information in decision making. The study classifies the information factors into four categories: (i) Quality derived from technical characteristics (Mbamba, 2003; Seddon, 1997; Chalu, 2007:XU, 2003): (ii) Quality of information derived from services of AIS to meet users information needs as suggested by Chalu, (2007):(iii) Quality of information derived from service of producers of information to the users as argued by Houghton, (1998) and Luder (1992) (iv) Quality of information derived from perception of the users as suggested by Philemon, (2008).

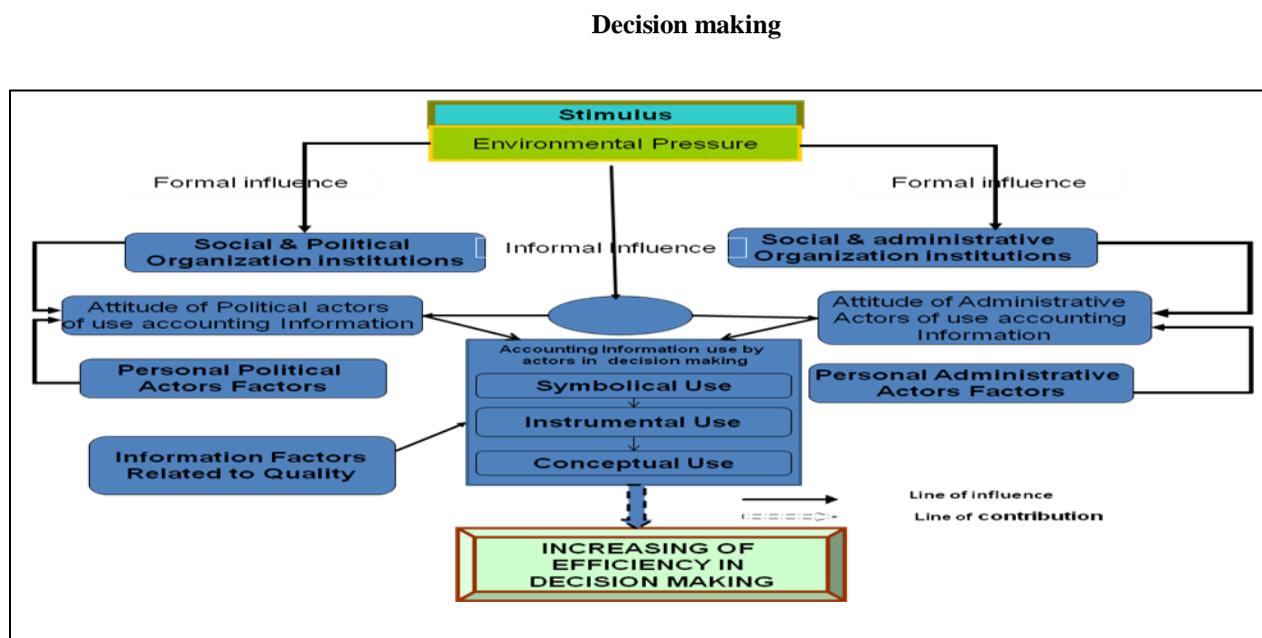
6.5.4.4 The use of Accounting Information by Actors in Decision making

The study defines the use of accounting information as dependent variables related to the institutional factors, individual actors' factors and information factors. The use of accounting information is explained by the accounting information is taken into account, in the conversion of accounting data into ultimate decision and the extent to which accounting data interpreted influence the actors in decision making (Philemon, 2008). The accounting information can be used in a symbolical, instrumental and conceptual manner (Chua, 1988; Philemon, 2008). The study assumes that if the actors use accounting information symbolic, it can lead to instrumental use hence conceptual use. Finally, the accounting information use will contribute to the efficiency in decision making (Alijarde, 2002).

6.5.4.5 Increase of Efficiency in Decision making

Efficiency in government is about the change in the relationship of inputs to outputs at current prices in specific areas of public service (Commonwealth of Australia, 2011). The increasing of efficiency in decision making means the best use of the resources available for the provision of public services to achieve: reduced numbers of inputs (e.g. people or assets) whilst maintaining the same level of service provision; lower prices for the resources needed to provide public services; creating additional outputs, such as enhanced quality or quantity of service, for the same level of inputs; improved ratios of output per unit cost of input; and changing the balance between different outputs aimed at delivering a similar. The accounting information as an input in financial decisions such as budgeting and contracting decisions plays important role of increasing efficiency in decision making process by reducing uncertainty in such process (Alijarde, 2002; Sciulli, 2004). Therefore, the study posits that the use of accounting information by political and administrative actors can be resulted to increase efficiency in public sector decision making.

Figure: Proposed model for Determinants of accounting Information Use by Actors in Public Sector



Source: Developed by this study from theoretical framework and empirical studies

RESEARCH METHODOLOGY

7.1 Research Paradigms

For any research work, there is a need of determining with justification appropriate research paradigm of study (XU, 2003). Research paradigm is defined by Assad (2001) as a set of beliefs and feelings which represent a worldview concerned with studying and understanding the world. The positivism and interpretive are the main research paradigms.

The study believes in both paradigms (Masoud, 2004), in order to get understanding of the factors influencing the accounting information use by actors in public sector decision making. The exploration of reality through interactive way of experiencing natural phenomenon will offer greater understanding of current practises of accounting information use in LGAs' decision making by political and administrative actors. Through interactive way, the study will be able to identify the institutional, individual actors' and information factors which influence accounting information use in LGAs' decision making. After a clear understanding of reality from natural phenomenon, the study needs to go beyond by testing the research model which will have been developed through interpretive way. The model will be tested in order to establish the extent to which identified factors determine the accounting information use by political and administrative actors in public sector decision making. Both interpretive and positivism paradigms will be adapted to gain understanding of phenomenon from reality and by assuming that reality can be objectively described and used for theory (model) testing (Xu, 2003) by using qualitative and quantitative techniques respectively.

7.2 Research strategies

The choice of research strategy depends on the nature of the research problem, questions and availability of researcher intellectual capacity (Assad, 2001; Yin, 2003). The main research question of this study is *'What are factors which determine accounting information use by political and administrative actors in public sector decision making process?'* To answer the research question, this study uses two research strategies. The study will use exploratory case study and analytical survey strategies.

7.2.1 Case study Strategy

The case study, as defined by Yin (1992), is empirical inquiry which investigates contemporary phenomenon within its real context when the boundaries between phenomenon and context are not clear evident and in which multiple sources of evidence are used. Descriptive, explorative and explanatory are the most types of case studies (Yin, 1994). The multiple explorative cases will be used to enhance validity (XU, 2003) on gaining deeper understanding of how accounting information is used by political and administrative actors in decision making and identification of the influencing factors. Eventually, six cases will be used to refine and modify a study model (Lee et al, 2003) through theoretical logical replication (Yin 1994: XU, 2003).

7.2.1.1 Case selection

The selection of six cases will be based on the following factors, first is the nature of study unit of analysis. The unit of analysis of the study is LGAs. Local Government Authority (LGA) is defined as part of government of a country operating in a local level, function through a representative organ known as Council, established by law to exercise specific power within defined area of jurisdiction (Warioba 1999: 2008). LGAs in Tanzania are categories in rural district authorities and urban authorities which were established by Local Government Act 1982, (Warioba, 2008). Rural district authorities include district councils, township councils and village councils which further are divided into wards each comprising a village. On other hand, urban authorities include town councils, municipal councils and city councils, which are further divided into wards each of which comprise several streets. The nature of LGAs in Tanzania creates differences between the LGAs. Urban authorities might differ with rural authority in terms of quality of infrastructures such as electricity, transport, communication facilities and modernized way of living which attract the educated people (Chalu, 2007). Thus, the study will have three rural district authorities (district, township and village councils) and three urban authorities (municipal and city and town councils) and by also considering the trends of local revenue collection; budget surplus and deficit; types of audited reports; political climate; age of the LGA; and the location of LGAs.

General factors are possibility of entry, presence of rich mixed of participant, interactions and credibility of assurance as suggested by Assad, (2001). The study expects difference and similarities of LGAs to portray different results about the accounting information use in decision making by political and administrative actors as well as the factors influencing the use. The data will be collected from the political actors (mayor, and councilors) and administrative actors (Director of

LGAs, Head of departments, accountants, planners, and economist and other employees) as key actors in Local Government decision making process.

7.2.1.2 Data Collection Methods

The data collection instruments of the study for case study will be semi structured interviews, observation which will be non-participatory observation. The researcher will attend some full council and council's committee meetings to observe how accounting information is used when decisions are made. The focus group will be used to confirm what will be collected in semi structured interviews and observation in order to reduce the biasness of researcher and respondents in data collection. The study will review documents such as audited financial statements, budget guidelines, budget documents, plan and strategies, contracts, minutes of full councils and councils' committees to assess kind of questions and arguments raised in relation with accounting information use and any documents concerning accounting matters. Therefore, the study is using triangulation method in order to reduce threats to validity (Modell, 2005, Yin 1994). To insure data are well captured, the researcher will use tape recorder, video camera, files, notebooks and flash disc on interviews, observation, focus group discussion and documenting (XU, 2003) .

7.2.1.3 Data Analysis

The first phase of data analysis is basing of data collection from the cases study. According to Melyoki (2005) data analysis of case study is concerned with case write-ups and reflection on descriptions for each case. Rowley (2002) argues that analysis of case study evidence is not easy because case study database will include a multitude of different evidence from different sources. The study, will analyses data by using systematical analytical protocols based on multiple of evidence in order to reduce interpretative bias and enhances confidence in the impartiality of qualitative analysis (Smith, 2003). The data will be coded by putting together all groups' of words, phrase, or events that appear similar. The data will base on the five categories of questions: *(1) Current use of accounting information by political and administrative actors in budgeting and contracting out decision making (2) Institutional factors associated with environmental pressure (Stimulus)(3)The institutional factors associated with internal institutions conditions such as social, culture, regulative and political (4) Individual factors associated with Social and Economic Status of actors (5) Information factors associated with quality of accounting information.* The analysis will be done in individual case followed by cross cases analysis bases on individual LGA as unit of analysis when comparing differences between cases and individual participants as the unit of analysis when comparing the views of different participants.

7.3 Survey Strategy

The phase two of study is all about model testing. The survey strategy will be used. Gomes, (2006) point out that survey is feasible strategy when researcher want cover large amount of opinions from different people about the same issues. Survey is more suitable to collect data that uses measurements such as quantity, value and magnitude (Yin, 1994). The survey can be analytical or descriptive surveys. The Analytical or explanatory survey attempts to test a theory by taking the logic out of laboratory and into the field (Masoud, 2004). The analytical survey aims to establish causal relationship between variables. Therefore, the study will use single analytical cross section survey to test the research model in order to establish determinants of accounting information use by actors in decision making. The data will be collected by using questionnaires to the political and administrative actors to establish the determinants of accounting information use in decision making.

7.3.1 Sampling and sample size

The population of survey research is a target group which will be investigated through which the sample is selected (Chalu, 2010). The population of this study is public sector (government sector) organizations. Local Government Authority has been selected as basis of data collection due to following reasons. According to ongoing reforms for

objective of achieving efficiency, such as the implementation of the Decentralization by Devolution Policy (D by D) this involved the transfer of functions and financial resources from central to local government levels. Thus the more power has been given to the local authorities' political and administrative actors to make decisions about allocation of the resources without central government interference. Other reforms, such as adoption of accrual based accounting which aim to increase the quality of accounting information produced for decision making. Therefore more financial decisions are expected to be made by political and administrative actors by using financial reports (accounting information) which most likely to be produced with relevant quality as result of reforms for achieving efficiency in scarce resources allocation.

The study uses cluster sampling techniques to determine LGAs which will be surveyed by divided the Tanzania into four zones then selected one region from each zone by using judgmental sampling techniques. Therefore the survey will be done in the all LGAs of Dar es Salaam, Dodoma, Kilimanjaro and Mbeya regions which make 21 LGAs. Dar es Salaam was selected because it represents the coastal zone regions, and also all of its' LGAs is in urban area. Dodoma is representing central zone regions and also is headquarter of Tanzania. Kilimanjaro is representing northern zone regions and. Mbeya is representing southern zone regions. The data will be collected from 10 political actors (councilors) and 20 administrative actors. The total sample size of councilors of 210 and administrative actors of 420, make the total sample size of 630 of total population. The administrative actors will compose the heads of all departments, directors of councils and the staff of each department.

7.3.2 Data Measurement

The independent variables are identified factors and dependent variables are the extent accounting information is used in budgeting and contracting decision making. The main measures in data collection both for independent and dependent variables will be is Likert Scale seven points from strongly agree to strongly disagree. The hypotheses to be tested will be developed on the basis of what will be found in the case study.

7.3.3 Data Analysis

In analyzing data three main phases will involved namely data preparation, presentation, descriptive analysis and hypothesis testing. This will include organizing and summarizing the data collected through statistical package for social scientists (SPSS) which will convey a good overall picture and facilitates the computations of some percentages and actual analysis on the answering the research questions as well testing the hypotheses by using multiple regression model to test the correlation between the variables.

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ENTREPRENEURSHIP AND BUSINESS MANAGEMENT

STRUCTURAL CHANGES IN THE SUPPLY MARKET AS A CHALLENGE IN THE APPLICATION OF COMPETITIVE TENDERING: LESSONS FROM THE NORWEGIAN FERRY SECTOR

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Abstract

Competitive tendering is highly advocated as a means for enhancing efficiency and effectiveness in public procurement. Studies report that competitive tendering is capable of reducing cost for about 20% to 30%, as shown in Hensher and Wallis (2005), Preston (2005), Domberger and Rimmer (1994). Because of its promising benefits, in 1980's and 1990's most governments worldwide started to apply competitive tendering in public procurement, Rimmer (1994). However, despite its celebrated benefits, the application of competitive tendering faces some challenges and limitations. In the current paper, we present structural changes in the supply market as a challenge that may threaten efficiency and quality prospects promised by competitive tendering. Real world lessons are drawn from the Norwegian ferry sector in which competitive tendering has been applied for fifteen years. Through mergers and acquisitions of ferry operating companies, the structure of the Norwegian ferry sector has changed from about 15 operating companies to 4 giant operators with strong bargaining power. An exploratory design has been employed to establish evidence from both, the case in point and scientific literature. Based on the analysis, we conclude that: by reducing competition among potential suppliers, market structural changes pose a serious challenge in applying competitive tendering.

Keywords: Competitive tendering; Market structural changes.

Introduction

The use of competitive tendering as a method for procurement of goods, civil works and services is highly applied in public procurement practice. Rimmer (1994) reports that, during the 1980's and early 1990's, all the governments surveyed had increased their use of competitive tendering. Literally, competitive tendering simply refers to the mechanism of purchasing goods or services by inviting bids and choosing the supplier with the best terms from among the bids received. The process is actually nothing but an auction in which the bidders (suppliers) compete for the exclusive right to sell their products or services, Krishna (2002). When applied by the government, competitive tendering is in effect an auction whereby a public authority awards monopoly franchise to the company that offers to supply the product on best terms, Hervik and Sunde (2000). The applause accorded to competitive tendering is due to the promising prospects of enhancing efficiency and effectiveness in acquisition of goods and services. It has been reported in several studies that competitive tendering is capable of reducing cost for an average of about 20% to 30%, Hensher and Wallis (2005), Preston (2005), Domberger and Rimmer (1994), Domberger and Farago (1994). In addition, competitive tendering is said to improve quality of the tendered services, Domberger and Jensen (1997). Further, Tadelis and Bajari (2006) reckon that open competitive tendering is known for transparency and providing equal opportunity among potential suppliers. It is also suggested that competitive tendering has the potential to improve accountability in service delivery (Australian Industry Commission 1996).

However, despite the potential benefits of the tendering practice, there are several challenges that need to be considered in order for the procuring entity to attain the desired results. These are the aspects that arise either from within or from the external environment of the procurement system. These aspects are very important as it has been widely argued that unless competitive tendering is properly designed and implemented, its potential benefits cannot be realized, Domberger and Jensen (1997), OECD (2008).

The major challenges of implementing competitive tendering are:

- i. Making the right choice and adequate specifications of the goods, services or works to be procured. The procuring entity has the obligation to provide adequate specifications and tell explicitly what is expected from the potential suppliers. It is a challenge to the procuring agency to gather adequate information about what and how the supplier should deliver. Failure to providing adequate information may mislead suppliers and eventually cause them to deliver wrong output.
- ii. Challenge in designing appropriate contractual obligations and methods of remuneration. The design of contractual obligations and methods of compensation have an influence on the results of the tendering practice. Different forms of contractual terms have different impact on influencing the willingness of potential bidders. For example, White and Tough (1995) conducted an empirical survey on public transport tendering and they concluded that, due to the difference in risk levels that the suppliers are required to bear, gross-cost contracts encourage more bids than net-subsidy contracts.
- iii. Challenge in ensuring sufficient competition among bidders. Existence of sufficient competition among potential suppliers is a key to achieving desired results in competitive tendering, Cambini and Filippini (2003). However, as Keisler and Buehring (2009) noted, often the government is the only buyer for certain products or services; therefore, in such cases the biggest challenge is to create an atmosphere that will steer enough competition among suppliers.

Having pointed out the challenges of implementing competitive tendering, the focus of this paper is to discuss the structural changes in the supply market as a challenge in the application of competitive tendering. Basically, structural changes affect the level of competition in a given industry/sector from which a good or service is procured and in turn it has an impact on competitive tendering. This is because, as mentioned earlier, competition among suppliers is the key to competitive tendering Cambini and Filippini (2003). The paper draws practical lessons from the Norwegian ferry sector that apparently has implemented competitive tendering for about 15 years since its introduction in 1996. An intensive exploratory study was undertaken to address the following key question: How is competitive tendering affected by structural changes the in the Norwegian ferry sector?

Competitive Tendering in the Norwegian Ferry Sector

Ferry services play a vital role in the Norwegian transport system as fjord crossings form an important part of the Norwegian trunk road network. The country has about 136 ferry links connecting between islands as well as the mainland. Owing to that fact, improvement in efficiency of such services is significant for social and economic prosperity of the country. Several measures have always been taken as part of improvement initiatives, these include deployment of new ferries, increasing capacity, increasing frequencies and extending opening hours. Of all the measures that have been taken, the most remarkable is the amendment of the transport act in 1991, which among other things, legalized the use competitive tendering in the Norwegian ferry sector to a limited extent from 1994 onwards. Following accomplishment of the relevant policy procedures, competitive tendering was implemented in the Norwegian ferry sector in 1996. Generally, the Norwegian government introduced competitive tendering in the ferry sector for two main reasons; first was to promote efficiency, and second was to improve the quality of ferry services.

The history of competitive tendering implementation in this sector can be divided into three phases. The phases are categorized based on the structural changes that have taken place in this sector; this is done mostly as reflection of the central focus of this paper. The first phase was the experimental implementation that begun in 1996 when tendering was introduced for the first time. Six (6) ferry links were subjected to tendering for the trial purpose. During this phase, there were about 15 major operating companies in the sector. Out of the 6 contracts, 5 contracts were won by incumbent companies and only one was won by a “new operator”. The tender participation was very promising, the number of

bidders ranged between 6 and 9 for a given contract. An evaluation study to measure the efficiency consequences of the experimental phase reported that the results were very promising, Hervik and Sunde (2000). Since the results of the experimental phase were so promising, in 2003, the Norwegian Parliament ordered that tendering should be applied to all domestic ferry services, within 7 to 10 year period, Bråthen et al. (2004).

The second phase lasted between 2001 and 2005. In this phase, significant structural changes started to take place in the sector. Operating companies began to pursue mergers and acquisitions and thus reducing the number of ferry companies in the sector. Out of the 7 contracts that were tendered out, only two contracts were won by incumbents while the remaining 5 contracts were won by “new operators”. On average, the number of bidders ranged between 3 and 6 for a given contract. Odeck and Bråthen (2009) undertook efficiency measurement of the Norwegian ferry sector for the data covering 2003 to 2005, their results indicated that there was a large potential for efficiency improvements in the sector as whole. The last phase began 2006 to date. In this phase the effect of structural changes became vivid. Mergers and acquisitions continued to prevail in this phase as well. As a result most of the contracts tendered during this period have suffered small number of bidders due to structural changes. Once again as in the beginning, more of the contracts have been won by incumbent companies.

In this paper we make an argument that the introduction of competitive tendering stimulated mergers and acquisitions in the Norwegian ferry sector and as a result, the number of operating companies in the sector has declined. The decline in the number of operators implies the reduction of competition which obviously jeopardizes the application of competitive tendering. The figure below portrays the scenario surrounding the implementation of competitive tendering in the Norwegian ferry sector.

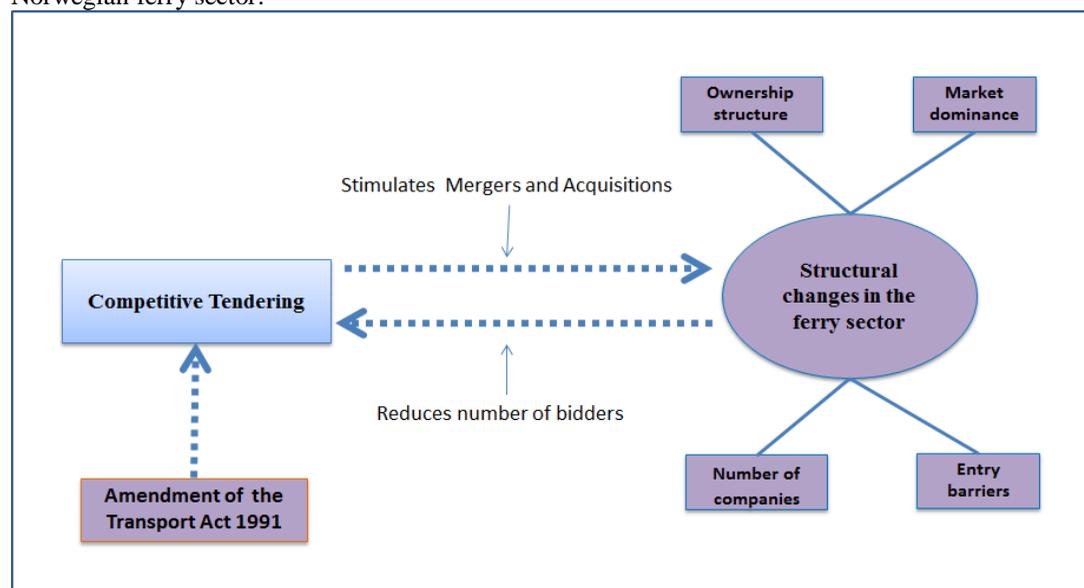


Figure 1: A model portraying the scenario surrounding the implementation competitive tendering in the Norwegian ferry sector (Own construction).

Theoretical Perspectives

The Auction Theory

Competitive Tendering as an Auction

Competitive tendering applied in procurement is a typical example of an auction. Hervik and Sunde (2000) note that, competitive tendering is in effect an auction where a public agency awards a monopoly franchise to the company that offers to supply the product on best terms. Price has been often emphasized as the main selection criterion, that is, the company which can produce a pre-specified output at the lowest possible cost is in most cases appointed as the winner of the tender. It is this kind of competitive tendering that has been implemented in the Norwegian ferry sector. According to Demsetz (1968) the selection of the lowest price bidder should induce both internal and allocative efficiency; nevertheless, Hervik and Sunde (2000) argue that in practice, tender competitions have usually been limited to induce

internal efficiency only. Along all these scientific contentions, it is widely accepted that competitive bidding is a method which can best achieve efficiency, quality improvement, equal treatment and transparency, Soudry (2004). Since auctions promise some benefits (efficiency, effectiveness, etc.), it makes a lot of sense to undertake evaluations and assess their performance. There are two main grounds commonly used to evaluate auctions; these are the *revenue* basis and the *efficiency* basis, Krishna (2002). Under the *revenue* basis, the auctioneer is more concerned about the auction format that will yield the possible maximum revenue for the object, whereas, under the *efficiency* basis, an auction is successful if the bidder that *ex-post* values the item most, actually gets it. In the case of procurement of services, efficiency means that the contract is won by the lowest possible price bidder and the service is delivered at a high level. It is the efficiency criterion that has been the unit of analysis in several studies undertaken on the competitive tendering in the Norwegian ferry sector, see Hervik and Sunde (2000), Bråthen et al. (2004), Odeck and Bråthen (2009).

Auctions and the Number of Bidders

The general proposition presented in the auction theory is that, the larger the number of bidders, the higher the competition and therefore, the more it benefits the buyer, Gomez-Lobo and Szymanski (2001). That is to say, there will be lower selling winning bids (or higher buying winning bids) as the number of bidders increases and vice-versa, as noted by Brannman et al. (1987). Mathisen and Solvoll (2008) note that, when competitive tendering is applied, a profit-increasing strategy for a company is to reduce the number of actual competitors in order to capture market power (example, through cross-ownership or mergers) so that bids can be raised and increase producer surplus. In the case of 3G auctions in Europe, it happened that after the first successful auction in 2000 by the UK government, the next auction was held in Netherlands, due to formation of alliances between the incumbents and the potential new entrants, competition was poor and the Dutch government collected only €2.7 billion far less than £22.5 billion that was collected by UK government, Douma and Schreuder (2005). In their study, Gomez-Lobo and Szymanski (2001), have established that a higher number of bids is associated with the lower cost of service. Therefore, the auction theory proclaims that the benefits from an auction, among other things, depend on the number of participating bidders. Specifically it is argued that, the higher the number of bidders in an auction, the more likelihood that the buyer will receive lower quoted prices (bids), Waterson (1988), Hensher and Stanley (2008).

Market Structure, Conduct and Performance (SCP) Paradigm

It is argued that the analysis of a given market's structure is a vital point of departure for making predictions about firms' conduct, Waldman and Jensen (2006). Such analysis can be done with the help of the conventional Industrial economics tool, Structural-Conduct-Performance (SCP) paradigm. The SCP framework suggests that, market structure has an influence on the conduct of firms; and the conduct determines performance of those firms. More specifically, the paradigm propounds that the degree of market concentration is inversely related to the degree of competition among firms; and there is a positive correlation between market concentration and profitability, Edwards et al. (2006). Figure 3.1 portrays the SCP paradigm; it is illustrated that market structure determines conduct; and conduct determines performance and there are the feedback effects of conduct on structure; performance on conduct; and of performance on structure. Moreover, it is shown that government policies have a direct influence on all three variables; structure, conduct and performance.

With respect to the subject addressed in this paper, as introduced earlier, the Norwegian ferry sector is a typical example of the impact of conduct on structure; whereby the mergers and acquisitions that have taken place in the past ten years, have reduced the number of ferry operating companies and thus altering the structure of the sector. That is to say, the conduct in the Norwegian ferry sector in terms of mergers and acquisitions, has resulted into structural changes (reduced number of firms).

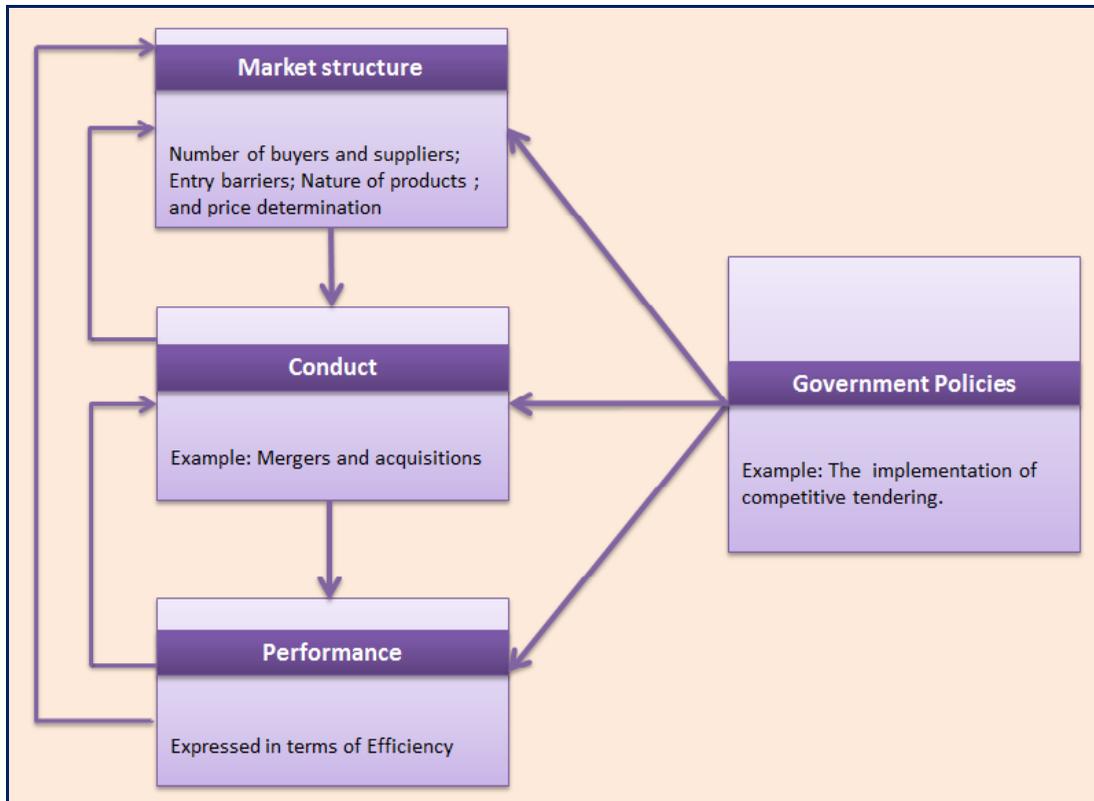


Figure 2: The structure-Conduct-Performance (SCP) Paradigm (Own construction)

Structural changes in the Norwegian ferry sector

As illustrated in Figure 1 above, four aspects structural changes in the Norwegian ferry sector will be addressed in reflection to the objective of this paper. The aspects to be discussed herein below are: Number of operating companies, Ownership structure, Market dominance and Entry barriers.

Changes in the Number of Operating Companies

The number of operating companies in the Norwegian ferry sector has tremendously declined. When competitive tendering was introduced in 1996, the sector had about 15 operators, Hervik (2010); today the ferry sector in Norway is dominated by only 4 companies¹. The decline in number of operators occurred through mergers and acquisitions of the companies. As a result, most of the contracts that have been tendered recently have involved only 1, 2 or 3, and at maximum 4 bidders whereas in the beginning, according to Hervik and Sunde (2000), the number of bidders ranged on average between 6 and 9 for a given contract.

Motives behind Mergers and Acquisitions in the Norwegian Ferry Sector

With intent of adopting a broader perspective to the problem, we make an attempt to present arguments for the occurrence of mergers and acquisitions in the Norwegian ferry sector. These arguments are based on the statements captured from the annual reports of the respective ferry companies especially for the years in which mergers or acquisitions took place. Usually the management would use an annual report as a forum to describe and justify major events that happen to a company within a given financial year. As expected, the various annual reports of the companies that were reviewed stated explicitly the motives behind either merging with or acquisition of another company or its subsidiary. The motives that were captured from the operating companies' annual reports are summarized as follows:

¹ These are the companies that currently operate a total of over 95% of the ferry routes in the sector.

Economies of Scale: Some companies argued that merging with or acquiring another company would reduce production and marketing costs and hence achieve economies of scale. That is to say, the merging firms were motivated by the promised efficiencies resulting from the consolidation of their production activities.

Improving Financial Performance: Some companies argued that due to increased competition in the sector their financial performance had continued to decline; and therefore, merging was one of the options that would help strengthen their market power and improve financial performance.

Business Expansion. Some companies justified a merger or acquisition as means for attaining business expansion. As pointed out earlier, procurement of ferry services in Norway is organized in five regions and thus sufficient capacity is a necessary condition for a company to make appearances in several tender competitions. Therefore, the companies argued that merging with or acquiring another company would help them to increase their capacity and compete more effectively.

Creation of Financial Synergy. With this motive, the companies argued that the merging with or acquiring another company would have both, short run and long run impacts. In the short run, it would result in increased earnings per share and improved liquidity; and in the long-run, it would lead to increased debt capacity, improved capital redeployment, reduction in debt and bankruptcy cost, and stabilizing earnings. In addition, increased firm size would give them an access to cheaper capital.

Risk Diversification. It has been argued by some companies that merging with or acquiring another company can help to spread risks by providing a company with several alternative business lines or several market segments. This is so because by increasing the size of the firm and at the same time reducing the number of competitors, a company is able to spread its presence across the market. That being the case, such a company can compensate losses in one business line/market segment by gains obtained other business lines/market segments.

In quest for the validity of these arguments asserted by operating companies in the Norwegian ferry sector, literature search was conducted to compare them with the evidence presented in other scholarly works. Apparently the arguments coincide with the evidence collected from other scientific studies as summarized in Table 1 below.

Table 1: Motives behind Mergers and Acquisitions as cited in the Literature

S/N	Motive	Author(s)
1.	To achieve synergetic gains.	Porter (1987) Berkovitch and Narayanan (1993) Lehto and Lehtoranta, (2004)
2.	Managerial motives	Malmendier and Tate (2008) Jensen (1986) Roll (1986)
3.	Economies of scale	Walter and Barney (1990) Waldman and Jensen (2006)
4.	Market power	Kim and Singal (1993) Krishnan and Krishnan (2003)
5.	Technical Efficiency	Chaaban, Réquillart and Trévisiol (2005)
6.	Diversification for risk reduction	Goldberg (1983)
7.	Increasing market share	Gosh (2004)
8.	Penetration into new businesses	Walter and Barney (1990)
9.	Empire-building	Black (1989)
10.	Expansion of product lines or markets	Walter and Barney (1990)

Source: Own compilation

The Impact of Structural Changes on Competition Level in the Ferry Sector

Literature on auction theory suggest that the amount of bid placed by a bidder in an auction is partly determined by the level of competition in that particular auction, see in: Waterson (1988), Gomez-Lobo & Szymanski (2001), Hensher and

Stanley (2008). That being the case, the vice versa could be true, i.e., the amounts of bids placed by bidders can tell us something about the level of competition. According to Saunders et al. (1998), one of the ways to measure competition among bidders is to look at measures of bid spreads; they report that as the number of bidders increase, the second highest bidder tends to use the lowest possible valuation (where bidding is done for selling a service/good) or the highest possible valuation (where bidding is done for buying a service/good). Put it in other words, the higher the number of bids, the smaller the difference between the best and the second best bids.

Data from 17 tender rounds conducted in two regions, Møre and Romsdal (6 rounds) and the Western Region (11 rounds) have been analyzed in order to assess the level of competition among bidders. These are the tender rounds that took place in the third phase of the competitive tendering in the ferry sector (2006 to date). The selection of these two regions owes to their extensive experience acquired since the introduction of competitive tendering and also the fact that they comprise over 60% of the ferry links in the country. Due to limited competition the procuring entities in the two regions allowed companies to submit multiple bids for each tendered contract. The Norwegian directives for procurement transport services require that price be the main selection criterion and given that all basic prerequisites are fulfilled, other criteria will be considered only if the difference between the best and the second best bid is 5%.

Findings: Møre and Romsdal

For all the reviewed tender rounds in this region, the price difference between the best and second best bidder was above 5% except in one incident where there was only one bidder who submitted two bids with price difference of 1.1%. Tender rounds that involve more than one bidder had the minimum difference of 9% and the maximum of 56% (See figure 3).

One notable observation is that, in some tender rounds, bidders submitted two or more bids; obviously this aimed at increasing their chance of being selected. In such cases, it appears that the bidders submitted multiple bids with small price differences such that if they happen to be the only bidders for a particular contract, they can still secure a good deal. The tender round that had 9% difference (which was the smallest difference among tender rounds with more than one bidder), is the tender round that also had the largest number of bids (7 bids, out of which 5 were submitted by the same bidder). This observation is partly consistent with the theory [the higher the number of bids, the smaller the difference between the best and the second best bids].

Another interesting observation is the incident where the difference between the best and second best bids was 1.1%. The contracting authorities' rule of thumb is to consider other evaluation criteria only if the price difference is within 5%; this rule is irrelevant in such a case where there is only one bidder. Submission of multiple bids with small differences helps the bidder to secure a good deal when price is the main selection criterion. However, if there is a threat of high competition, even if a bidder submits multiple bids, the smallest of his bids would not be very high above his private valuation so as to avoid the risk of losing the contest. However, if such a bidder were informed in advance he would be the only bidder, the likelihood is that the smallest of his bids could be very high above his actual private valuation.

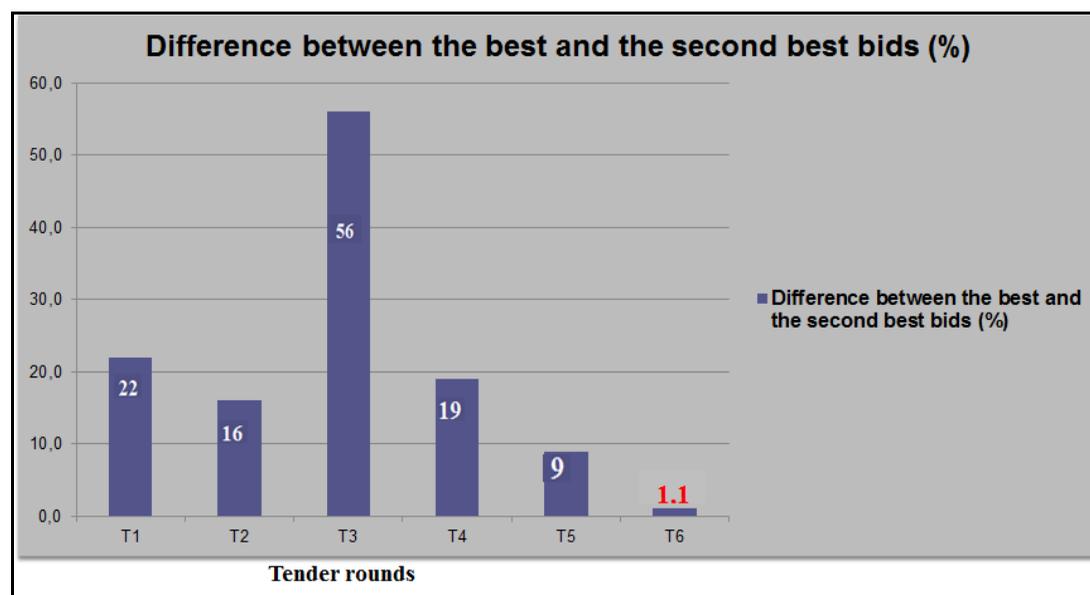


Figure 3: Difference between the best and the second best bids: Møre and Romsdal

Findings: Western Region

Eleven tender rounds were assessed in this region. Five tender rounds had price difference of below 5% between the best and the second best bidder. But of those five tender rounds, four of them had interesting pattern; the pattern was either only one bidder was involved, or the best and the second best bids were placed by the same bidder. In such cases the issue of considering other criteria becomes less important. The submission of multiple bids was intended for and definitely increased the chance of winning the contracts.

The remaining six contracts had the minimum difference of 10% and the maximum of 438% (see figure 4). As the case in Møre and Romsdal, the round with 10% difference is the one that had the largest number of bids (5 bids, out of which 3 were submitted by the same bidder). This is partly consistent with the theory. The 438% difference occurred in a tender round that involved only two bids, again this is in line with the prediction of the theory; the less the competition, the greater the difference between the best and the second best bid.

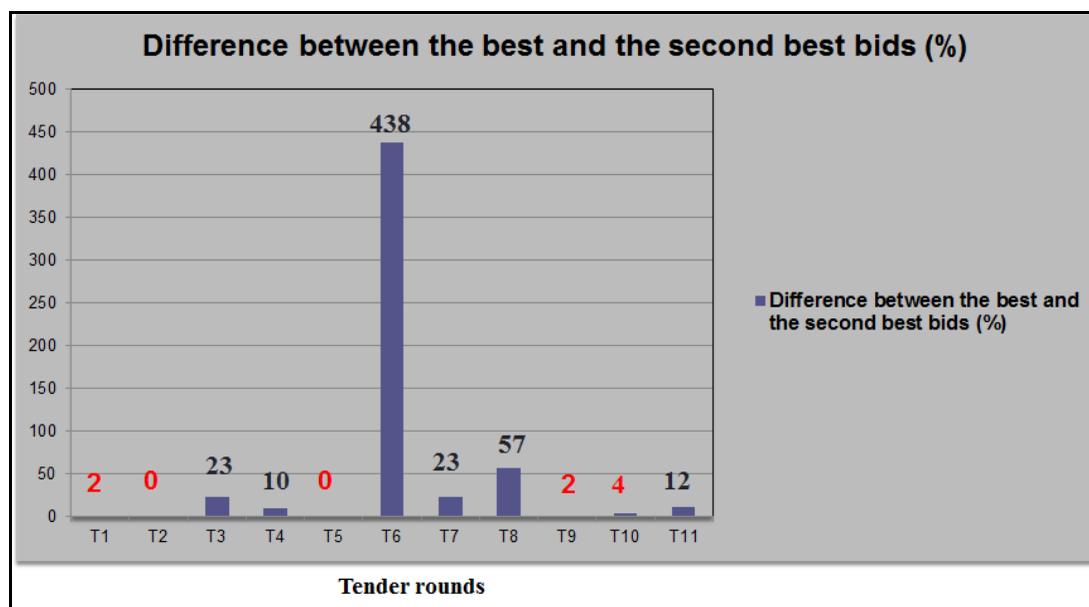


Figure 4: Difference in between the best and the second best bids: Western region

The data for both regions can be combined together and run a simple regression analysis to test the relationship between the number of bids as an independent variable and, the difference between the best and the second best bids as the dependent variable. The results can be summarized by the graph given in Figure 4.3. The linear regression equation suggest that for every additional bid, the difference between the best and the second best bids declines by approximately 9.9% but the relationship seems insignificant as the value of R^2 is very small. One explanation to the small value of the R^2 is the fact that in the studied tender rounds suppliers could submit multiple bids while the theory we employed explains the situation each bidder is allowed to submit only one bid.

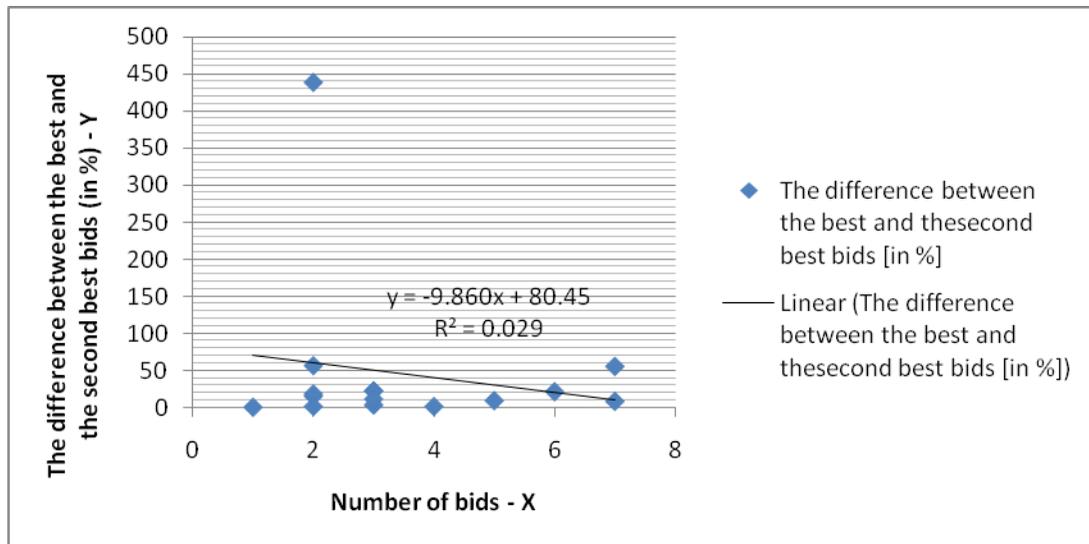


Figure 5: Simple regression analysis to check the relationship between number of bids and the difference in between the best and the second best bids.

Changes in the Ownership Structure of the Operating Companies

It is worth noting that the ownership structure of the companies in the Norwegian ferry sector has changed over time. This is exhibited in the comparison of two periods; the base year 1996 when competitive tendering was introduced in the Norwegian ferry sector, and 2011 the year in which this study occurred. The ownership structure has changed with respect to public/private² ownership as well as foreign/local ownership³. The sector has witnessed many public companies disappearing after the introduction of competitive tendering and interestingly, one foreign company entered the sector. Figure 4.2 summarizes the changes in the ownership structure in the Norwegian ferry sector.

² A company is defined as privately owned if majority (more than 50%) of its shares is controlled by individuals or private companies; otherwise the company is defined as publicly owned (Adopted from Terje and Solvoll, 2008).

³ A company is defined as foreign owned if majority (more than 50%) of its shares is controlled by individuals or companies from another country; otherwise the company is defined as locally owned (Adopted from Terje and Solvoll, 2008).

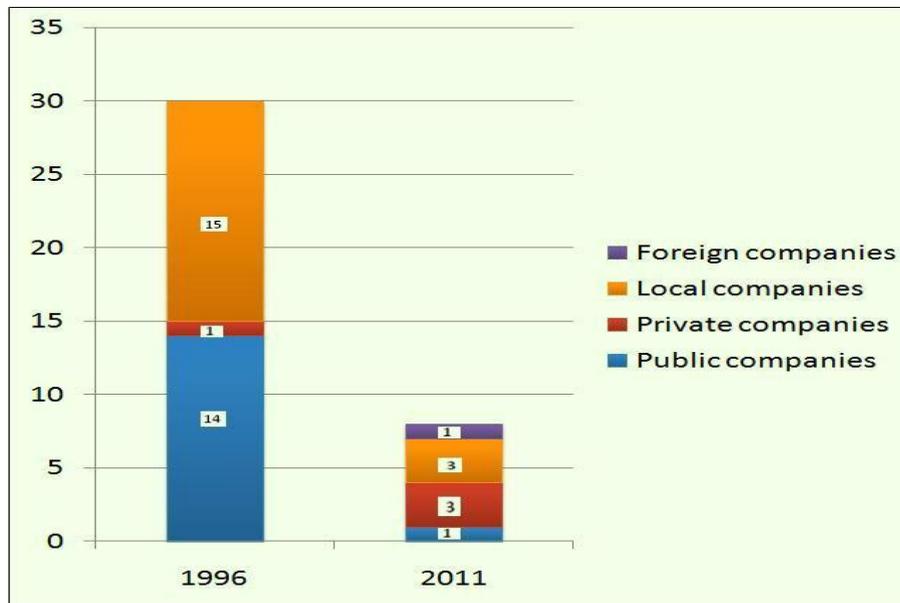


Figure 6: Changes in the Ownership Structure of the Ferry Companies

Arguments for Disappearance of Public Companies from the Ferry Sector

Reporting on the disappearance of public companies might be irrelevant unless an attempt is made to establish the ground for such disappearance. In this paper, an attempt is made to explain why public companies would disappear after the introduction of competitive tendering. This question can be addressed by first considering the essence of the objectives for introducing competitive tendering. As stated earlier, two main objectives are usually asserted to justify the application tendering processes – these are; improvement of efficiency and quality of services. Of significance is the fact that there is overwhelming evidence from existing literature that suggest private companies are generally more efficient than public companies (see Table 2).

Now, when tendering is applied the buying entities expect to achieve cost efficiency and high quality of products/services by stimulating competition among potential suppliers. From the case studies of Møre and Romsdal and the Western region, we could see that the main criterion for selection of a ferry company is price. This implies that in order to survive in such a market, a firm must develop a competitive edge based on price differentiation and cost efficiency. Obviously, that would require a lot of flexibility, innovation, and agility on the part of suppliers who are competing for the contracts. The question follows, are public companies sufficiently flexible, innovative and agile to survive competition?

Existing literature hold, as noted in OECD (2003), Hansmann and Kraakman (2000), Qian and Roland (1998), Frydman et al. (2000) that the main reasons for inefficiency of public entities are among others excessive regulations, formalities, guaranteed back-up support from the government and difficulty in mobilizing equity capital. Public firms dedicate much of their effort in meeting compliance requirements, and at the same time have less incentive to promote cost efficiency since they have that assured financial back-up from the government. These conditions discourage firm’s innovativeness and kill the spirit of competitiveness.

With regard to the disappearance of public companies from the Norwegian ferry sector, we argue that the introduction of competitive tendering most likely made it more difficult for public entities to survive in the sector due to the practical factors stated herein above. It became vivid to public entities that in order to survive in this game, which apparently had become highly competitive, they had to have a single and clear focus – *efficiency*. However, we are aware that the owners of such companies – the government, have multiple objectives and sticking to efficiency alone might contradict other objectives. Therefore, the rules of the game force them out of the industry and leave it in the hands of privately owned firms. This argument is in line with the views of Sheilefer (1998) in his paper “*State versus Private Ownership*”

in which his argument leads to the conclusion that “...private ownership should generally be preferred to public ownership when the incentives to innovate and to contain costs must be strong”.

Table 2: Empirical Evidence on the Efficiency of Public versus Private Ownership

Authors	Workdone	Findings
D’Souza and Megginson (2000)	Examined pre- versus post-privatization performance changes for 17 national telecom companies privatized through share offerings during 1981–94.	Reported that Profitability, output, operating efficiency, capital spending, number of access lines, and average salary per employee all increase significantly after privatization.
Dewenter and Malatesta (2001)	Compared pre- versus post-privatization performance of 63 large, high-information companies divested during 1981–94.	Reported significant increases in profitability; Significantly positive long term (1–5 years) abnormal stock returns, mostly in Hungary, Poland, and UK. Results strongly indicated that private firms outperform SOEs.
Boardman, Laurin, and Vining (2000)	Compared 3-year average post privatization performance ratios to 5-year pre-privatization values for 9 Canadian firms privatized during 1988–95.	Reported that profitability more than doubles after privatization; efficiency and sales increase significantly (though less drastically); and Capital spending increases significantly.
Boubakri and Cosset (1998)	Compared 3-year average post-privatization performance ratios to 3-year pre privatization values for 79 firms from 21 developing countries and 32 industries over 1980–92.	Reported significant post-privatization increases in output (real sales), operating efficiency, profitability, capital investment spending, dividend payments, employment; significant decreases in leverage.
Megginson, Nash, and Randenborgh (1994)	Compared 3-year average post-privatization performance ratios to 3-year pre privatization values for 61 firms from 18 countries and 32 industries from 1961–89.	Reported statistically significant post-privatization increases in output (real sales), operating efficiency, profitability, capital investment spending, and dividend payments; significant decreases in leverage.

Source: Own Compilation

Barriers to Entry in the Norwegian Ferry Sector

While the number of ferry companies is declining, history shows that entry of new companies into the Norwegian ferry sector is very difficult. This paper seeks to establish major aspects that may impede entrance into this sector. The revelation of these aspects may help the relevant authorities take measures so as to facilitate entry into the ferry sector and thus promote competition which in turn will make competition more meaningful. Based on interviews with relevant authorities and review of academic and practitioners' reports pertaining to the Norwegian ferry sector, we argue that this sector is characterized by the following barriers to entry:

Asset Specificity

Williamson (1975) observes that specific assets are those assets that are deployed to support a particular transaction and they have a higher value to that transaction than they would have if they were redeployed for any other purpose. NCHRP (2008) gives examples of specific assets in transportation system; they include highway assets, *ferries*, tunnels, and bridges. Usually such assets are built to suit the purpose for which they were intended or suit particular locations or routes. In case of ferries, the operator may be required to make several specific investments in order to meet the needs of a particular route. Such investments could relate to specific features like size of the ferry, communication technology, special facilities such as those needed for handicapped passengers, size of parking spaces, and specific engine features such as gas powered engines needed for environmental friendliness.

In the case of ferry contracts in the Norwegian ferry sector, the issue of asset specificity is vivid. For instance, ferry companies are required to deploy vessels that are compatible with the existing ferry terminal infrastructure or else modify the infrastructure to suit their vessels. Both options involve huge investments since modification of one ferry terminal may cost up 10 million NOK (About \$ 2 mil.). In some cases, due to environmental concerns, operators are required to introduce gas powered ferries which may compel a company to build a new ferry specifically for that contract (This is evident in several contracts that were issued recently).

Klein et al. (1978) argue that, investments in specific assets may represent a sunk cost since their value cannot easily be recovered elsewhere. For that reason, the requirement of specific assets may discourage new firms from entering a given industry. Therefore, we argue that the presence of specific investments in the Norwegian ferry sector could be one of the factors that discourage new ferry companies from entering this sector.

High Capital Requirement and Difficulties in Securing Finances

From the study conducted by Baird (2009) regarding investments in the European ferry industry, it is clear that the amount of capital required to establish a ferry company, is significantly high. This implies that for such industry, it is less likely that one entrepreneur can finance entry out of his savings. A potential entrant in the ferry industry may therefore be required to turn to lending organizations for funds. However, lending institutions such as investment banks are usually very skeptical on start-ups and small scale operators.

One of the factors that make soliciting finances for ferry operations even more complicated than for other shipping segments is the presence of specific investments. In an interview, vice president of Shipping, Offshore & Logistics for DnB NOR, which is Norway's leading ship industry financing bank, was quoted saying that:

“What differentiates ferry financing to more traditional shipping segments is the lack of a transparent second hand market for ferries. Unlike most other segments with more standard tonnage, many ferries are purpose-built in one way or another. It is difficult to establish what value such a ferry would have for another operator on another route”

[Source: Det Norske Veritas (DNV) 2010]

According Waldman and Jensen (2006), usually financiers are very much concerned about risk of bankruptcy and default; and for that reason, in industries that have high uncertainties they would prefer large and well established firms rather than new firms. Therefore, we formally argue that, high capital requirement and difficulties involved in securing finances is one of the factors that may preclude new firms from entering Norwegian ferry sector.

The Effect of Tendering Ferry Links in Packages/Bundles

The procurement of ferry services is done in such a way that ferry links are tendered in bundles/packages. This means that, a set of two or more ferry links are tendered jointly. The problem of bundling as a barrier to entry is widely discussed in anti-trust literature; however, it is covered mostly from the suppliers' point of view, as noted by Nalebuff (2004), Adams et al. (1976), Bakos and Brynjolfsson (1999). In the Norwegian ferry sector, this problem can be looked

at from the buyer's point of view; that is, the practice of the contracting authorities to package several ferry links for competitive tendering.

When ferry links are tendered in packages, the issue of capacity immediately turns out to be vital to the potential bidders. It is a big challenge for small companies to compete in such a situation where a relatively larger fleet is required in order to meet the conditions of the tendered contracts. Now, as evidence shows that entrants tend to be small relative to all firms in an industry Waldman and Jensen (2006), it is tempting to argue that the practice of tendering the ferry links in bundles will perpetuate the dominance of the existing large firms and discourage small firms from entering this sector.

Market Dominance: Regional Dimension

Through the review of tendering reports and the websites of operating companies, it was clear that market dominance in the Norwegian ferry sector has taken a regional dimension. Each of the operating companies has strong influence and dominance in a given zone that is it has won majority of the contracts in that particular region. However, two of the companies appear to be more powerful as they capture about 65% of the market share combined together. This tendency of regional dominance has started showing some implications that are unhealthy to the practice of competitive tendering. The companies have gradually started building monopolies in their respective regions of influence. This monopoly is mostly facilitated by substantial specific investments that are required in ferry operations. As reported in the previous section, currently there are tender rounds in which only one bidder shows up and thus making the aspect competition non-existing. Worse enough, because of the presence of specific investments, in most cases a company can easily predict that it is going to be the only bidder for a given contract. This may encourage a tendency of companies to place higher bids than their actual private valuation as they know that there is no competitor to challenge them.

Discussion

The analysis of the major structural aspects of the Norwegian ferry sector may give rise to some useful questions that require answers with scientific arguments. This section is devoted to discussing some of these questions. We could begin by questioning whether competitive tendering stimulated mergers and acquisitions in the Norwegian ferry sector. Based on the evidence collected and our synthesis, it is obvious that the answer to this question is not straight forward but rather is inferable. The motives behind mergers and acquisitions in the Norwegian ferry sector have been revealed, these include; economies of scale, business expansion, synergy creation, market power, financial performance and risk diversification. Competitive tendering is not mentioned directly, but if the scenario is examined carefully, it is clear that those factors would not be that much important in the absence of competition. Prior to introduction of competitive tendering, the large majority of the operators in the ferry sector were public companies that received back-up support from the local authorities, and thus were not much concerned about efficiency issues. The introduction of competitive tendering awakened and demanded them to be more strategic and produce more efficiently without compromising quality. Therefore, it can be argued that the strategic moves that have been taken by ferry companies, especially mergers and acquisitions, can be directly linked to the introduction of competitive tendering in this sector. The motives for mergers and acquisitions in a way are the factors that would allow them to overcome the challenges of competitive tendering.

Second, we may also wish to inquire the motives behind mergers and acquisitions in the Norwegian ferry sector. The answer to this, we want to believe, is pretty much straight forward. The aim for posing this question was to trigger an exploration into the underlying motives behind mergers and acquisitions in the ferry sector. From the beginning, it was clear that such a question is sensitive and the companies would not be willing to have an interview on such a subject. We therefore resorted to explore past annual reports of the ferry companies especially in the years when those companies either merged or acquired other companies. Out of this effort, we were able to capture statements from management reports that justify mergers or acquisitions. The reported justifications for mergers and acquisitions were economies of scale, business expansion, synergy creation, and financial performance.

Third, it is vital to investigate whether it is the case that competitive tendering leads to disappearance of public companies from the ferry sector. Based on the synthesis which was done by corroborating evidence from existing literature and that from the ferry sector, it is clear that public companies face more challenges in operating within competitive environment than private companies. Basically there are no sufficient technical reasons to justify public company's participation in such competitive environment. That being the case, it can be concluded that the disappearance of public companies from the Norwegian ferry is due to competitive forces that apparently are too tough for a public company to handle.

Lessons Drawn from the Norwegian Ferry Sector

Lessons to the Practitioners in Procuring Entities

This paper provides insights that might be useful to the practitioners responsible for undertaking procurement especially in the public sector. The paper discusses on one hand, how competitive tendering may trigger structural changes in the industry; and on the other hand, how those changes may pose challenges of implementing competitive tendering. It is clear that in the situation where the number of bidders is limited, the competition level becomes low and thus the selection process becomes more challenging. As argued in the introduction section, efficiency and quality can be attained in competitive tendering because of the stimulated competition among potential suppliers; this means that, when competition declines, the benefits of competitive tendering might be jeopardized. Based on extensive literature review, the following is recommended to the practitioners:

No One Size Fits All

According to Klemperer (2002), different procurement situations may require different mechanisms. This implies that the use of competitive tendering is not expected to be effective in all situations. OECD (2008) reckons that, not all bidding models are equal from the competition point of view. Where the number of firms in the market is enough to sustain reasonable competition, efficient procurement outcomes may be achieved through a simple auction or tender process, but when the number is not sufficient to sustain reasonable competition, more sophisticated arrangements may be necessary to achieve an efficient outcome. Tadelis and Bajari (2006) also argue that competitive tendering may perform poorly when there are few available bidders. The most important lesson here is that there is a need for procuring authorities to assess their position with respect to market the structure in order to decide on the best alternative procurement procedures. Such procedures may include direct negotiations or combination of both, tendering and negotiations.

Help to Reduce the Costs of Participating in Competitive Tendering

In order to encourage tender participation, the procuring entity should consider helping potential bidders by reducing the some participation costs. Milgrom (2004) argue that, since the driving force behind the success of procurement is competition between bidders, the more bidders enter the contest, the more likely the end result is satisfactory for the buyer; and thus, it makes sense for the buyer to keep the entry costs as low as possible. Companies' participation in the tendering processes involve some costs such as gathering information on operational requirements, prepare a bidding strategy and submit bids. The contracting authority may be capable of affecting each of these, for example by providing detailed information on the operational requirements to all potential bidders. Also, there may be a need to consider exploring ways to reduce other barriers to entry such as economies of scale, bundling effect and access to capital to new and small and medium size entrants. For example in the case of Norwegian ferry sector the practice of tendering ferry links in packages could be reviewed to determine the optimal size of bundles that can promote efficiency without causing significant entry deterrence.

Understand Cost Structures of the Potential Suppliers

In the world of strategy the smartest move a player makes is learning the strategy of his opponent and using it against him. That said, the knowledge about cost structures of the potential suppliers is very important to the procuring entity as this will help them benchmark the various quotations made by bidders. Strong knowledge base of cost structures for the goods or services procured will allow the contracting authorities to compare the bids not only against each other but also in real terms. More important, in case negotiation procedure is being adopted, the knowledge of cost structures becomes very useful for the purpose of comparison and carrying out dialogues with suppliers. Procurement practitioners can acquire knowledge about cost structures by cooperating with experts in the user departments or through research.

Lessons to the Competition Authorities

The subject addressed in this paper emphasizes an aspect that is practically useful to the Competition Authorities. The main function of a competition authority in any country is to promote healthy competition in the economy for the benefit of consumers, businesses and industries. It is on that account that the issues discussed in this paper are relevant and should receive attention of the anti-trust authorities. It is obvious that the market structure such as that of the Norwegian ferry sector is likely to jeopardize competition due to increased market concentration. The following lessons are important in view of the Norwegian experience:

Permission of Mergers and Acquisitions should base on Industry Characteristics.

This paper argues that the application of competitive tendering stimulated mergers and acquisitions in the Norwegian ferry sector. However, the competition authority should have foreseen this in advance considering the characteristics of the ferry industry and thus tough conditions could have been imposed to restrict mergers and acquisitions. This lesson can be learnt by any other competition authority since mergers and acquisitions are now a common phenomenon worldwide.

Watch Concentrated Industries for Possible Anti-practices.

OECD (2008) note that, a market structure in which only a few firms exist in a particular sector is one of the industry characteristics that have been found to help collusions in a procurement market. Such collusions may be organized to the disadvantage of the consumers. Therefore, competition authorities should carefully watch in view of the possibility for anti-competitive practices.

Limitation of the Study

This paper is based on an exploratory study conducted on the Norwegian ferry sector. Despite the fact that exploratory research approach provides huge flexibility and versatility in terms of data collection, methods and analysis, it does not permit to undertake rigorous quantitative tests. The evidence presented is largely qualitative and this mainly because of limited data availability as stakeholders in this sector are highly sensitive to confidentiality concerns especially now when competition is a critical issue. Future studies can assess quantitatively the impact of mergers and acquisitions on the efficiency of Norwegian ferry sector.

Conclusion

This paper is devoted to assess the impact of market structural changes on the application of competitive tendering by drawing lessons from the Norwegian ferry sector. The relevance of the study is justified by the need for the public procuring authorities to achieve efficiency and effectiveness through competitive tendering. Theoretical frameworks have been used extensively in describing the phenomenon. Four major structural aspects of the Norwegian ferry sector have been discussed and appropriate lessons drawn from it.

The key question posed in the beginning was: How is competitive tendering affected by structural changes in the Norwegian ferry sector? The paper has attempted to draw an answer to this question by showing how mergers and acquisitions resulted into declining number of potential suppliers and thus affecting competition which apparently is vital for success of competitive tendering. It has been shown that due to structural changes in Norwegian ferry sector the, today there are occasions where only bidder shows up for a tender; this is unhealthy and kills the essence of competitive tendering.

In addition, the paper discusses some other interesting observations such the systematic disappearance of public companies from the Norwegian ferry sector. The question of whether to privatize or not has been widely discussed in literature and other forums, however, from the experience of the Norwegian ferry sector it can be concluded that: in the face of competitive environment, private entities are dominant over public entities. Nevertheless, one should not jump into generalizing this conclusion since it essentially based from an experience of a transport sector thus cannot be quickly inferred to other industries such as those involves high value natural resources where an issue of trust and royalty are important.

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Factors that Influence Growth in Small Enterprises: A Study on Petroleum Retail Outlets in Kenya

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ABSTRACT

Small Enterprises sector is an important sector in any economy as it forms a base for economic growth. Petroleum Retail Outlets fall under this sector. The liberalization of the industry in Kenya in 1994 gave rise to many outlets being established in urban centers and on major highways. More often than not, one finds billboards reading “Station Coming up soon,” “Station under new management,” implying that new outlets are being established and others are changing hands often. There also seems to be stagnation in growth in a number of stations. There was need therefore, to investigate factors that contribute to this trend. The purpose of this study was to explore the factors that influence the growth of these small enterprises.

The ultimate objective of this study was to explore the factors that influence growth of petroleum retail outlets in Kenya. The study objectives were: effect of business location, influence of management skills of the entrepreneur/manager, effect of quality customer service, the influence of credit management and the effect of product mix on the performance of petroleum retail outlets.

The population of the study comprised Petroleum Retail Outlets in Thika town and its environs. The target population represented urban, rural and major highway outlets. A census of the whole population of 25 operational outlets in Thika town and its environs within 15 kilometers radius was conducted. A survey method of research was used and the instruments of survey were questionnaires, interviews and where possible, examination of records. The data collected was both qualitative and quantitative in nature and was analyzed in terms of: business location, management skills of the entrepreneur/ manager, quality customer service, credit management policy and product mix. The data were analyzed both qualitatively and quantitatively. Statistical Package for Social Scientists (SPSS) version 17 was used as the tool for analysis.

The findings were that business location; management skills of the entrepreneur/manager; quality customer service; credit management policy; and product mix are the factors that influence the performance and growth of the small enterprises sector in Kenya.

The recommendations were that security, convenience and ease accessibility of the outlets should be given priority in choosing the location of the outlets; entrepreneurs and their managers should acquire good management skills; high quality customer service should be offered to all customers; credit management policy should be put in place for entrepreneurs willing to extend credit facilities to their customers and entrepreneurs should offer products and services convenient to the customers simultaneously with the main products (one stop shop).

KEY WORDS: Customer Service, Economic Growth, Entrepreneur, Franchise, Management Skills, Petroleum Retail Outlets, Product Mix

INTRODUCTION

In the 20th Century, entrepreneurs radically transformed the world economy by 95% growth rate from 5%, by value addition of consumer goods. Entrepreneurs from all over the world are responsible for the creation and growth of Micro and Small Enterprises (MSE). In Kenya, in 2008, MSE helped create 374,000 new jobs out of the total 467,300 jobs created. In the same year, the total employment was 8,281,700, out of which 7,478,600 were created through the MSE (RoK, 2009). In the year 2009, out of 469,000 new jobs created, 418,000 were from this sector (RoK, 2010).

The MSE sector is, therefore, important to any economy. Sessional Paper No. 1 of 1986, The Development Plan of 1989-1993 and The Rural Enterprise Fund of 1989 (to finance Jua Kali Enterprises) were remarkable policies that recognized the MSE sector in Kenya, as observed by McCormick et al. (1996). Subsequent Sessional Papers, namely, No. 2 of 1992 and No. 2 of 2005, developed policy frameworks to strengthen this sector. The Kenya government in the Finance Bill, 2007, abolished 225 licenses out of the existing over 1300 licenses for trading in the country (Finance Bill, 2007). This was a remarkable step towards the promotion of the MSE sector as the licensing system had been a great impediment towards the growth of the sector. The study looks forward to the day of a single business permit.

The Sessional Paper No. 2 of 1992 clustered the sector according to the number of employees.

Micro enterprises -	1-10 Employees
Small enterprises-	11-50 Employees
Medium -	51-100 Employees

Out of the total employments in Kenya, only about 1% falls in the medium enterprises (GoK, 2006).

Sessional Paper No. 2 of 2005 stated that “[...] according to empirical research, only a few MSE grow to medium enterprises. The MSE are established in great numbers, but the mortality rate is high such that most of them do not survive beyond their third anniversaries.” This phenomenon affects the government policy of creating 500,000 jobs every year and also the base for sustaining economic development.

The Petroleum Retail Outlets

The Economic Surveys of Kenya, 2009 and 2010, classified the petroleum industry at 20% of the Gross National Expenditure (GNE). All the sectors of the economy are affected by this industry because of transportation – which in most cases is fueled through the retail outlets. The Petroleum Retail Outlets sector is, therefore, an important sector, whose performance directly or indirectly affects every economy.

Most Petroleum Retail Outlets (Petroleum Service Stations) fall under the cluster of small enterprises and are the subject of this study. The Petroleum Act, Cap 116 of the laws of Kenya established the petroleum industries. The Act mandates the Minister of Energy to enforce the regulation to cover importation, storage, transportation, safety, quality, licensing and retailing (RoK, 1948).

The industry was liberalized in October 1994 by the Kenya Government following recommendation by the Bretton Woods Institutions. This gave rise to two main categories: independents and franchises. Independent Petroleum Retail Outlets are where the entrepreneurs build their own outlets and buy their products for resale from any marketer. Franchise is where a franchisor grants a license to an individual, partnership or a company which grants the franchisee the right to trade under the franchisor's brand name. The franchisee is commonly referred to as the "dealer." The arrangement is formalized by a dealership contract. The franchisor provides to the franchisee training programmes and a detailed operation manual so that each franchise operates within the franchisor's corporate image, offering customers products and services that are consistent.

The liberalization of the industry scaled down barriers of entry into the business. These included the removal of price controls, shifting the burden of "dead stock" (unutilized stock in the pipeline transportation system) to the major oil companies, allowing retailers to buy refined oil products rather than imported murban or crude oil and pay for the cost of refinery, Apungu (2003). The liberalization of the petroleum industry in 1994 spurred the growth of the industry itself from about 300 stations countrywide to over 800 stations in 2006, Mobil (2007). However, even with liberalization, some petroleum dealers do well while others do not. What are the factors that influence the performance of these dealers?

The deregulation of the sector gave rise to proliferation of petroleum service stations on major highways and urban centers by both the multinationals and independent petroleum entrepreneurs.

At the beginning of 2007, Mobil Oil was sold to Turmoil, a Libyan government corporation and is trading in Kenya as "Oilybia." In March 2007, Shell Company was allowed to acquire the assets of its partner in Kenya, British Petroleum, with the condition to offload 13 stations to National Oil Corporation of Kenya (NOCK), a government corporation, as observed in the Sunday Nation (April 8, 2007: pp 21-22). In 2009, Caltex exited the Kenyan market and sold off its interest to Total Oil and offloading 22 of their stations to NOCK.

Statement of the Problem

Petroleum Product Retail Outlets, commonly known as Petrol Stations or Gas Stations, fall under the cluster of small enterprises (most of them) in Kenya. These outlets have high revenue turnover and handle a lot of cash daily, yet most of them do not grow vertically to become medium enterprises. McCormick et al. (1996) describes two patterns of growth in a sector as:

- (i). Vertical Growth – where an enterprise increases its workers, expands its markets and improves its technology and revenue collection.

- (ii). Horizontal Growth – where an entrepreneur chooses not to invest in a single enterprise but invests in other enterprises.

Performance of Petroleum Retail Outlets is varied. It could be good or poor. Good performance leads to good profits and if wisely re-invested into the business, leads to the growth of the business. Poor performance, on the other hand, leads to losses and subsequent closure of the business.

More often than not, it is common to see bill boards reading “station under new management” and others “new station opening soon.” There also seems to be stagnation in growth in quite a number of petrol stations. For example, some stations have retained the same number of employees for long periods. Others have no observable improvement in the infrastructure or equipment. These observations imply that there is no remarkable growth in this sector and thus there is need to investigate the factors that contribute to this trend.

General Objective

The general objective of this study was to investigate the factors that influence the growth of Petroleum Retail Outlets in Kenya.

Specific Objectives

1. To investigate the effect of business location on the growth of Petroleum Retail Outlets.
2. To identify the influence of management skills of the entrepreneur/manager on the growth of the Petroleum Retail Outlets.
3. To establish the effect of quality customer service on the growth of Petroleum Retail Outlets.
4. To examine the influence of credit management policy on the growth of the Petroleum Retail Outlets.
5. To find out the effect of the product mix on the growth of Petroleum Retail Outlets.

LITERATURE REVIEW

The study was exploratory in nature. Both empirical and secondary literature was reviewed to investigate the factors that influence growth of petroleum retail outlets. The variables investigated included: business location, management skills of the entrepreneur/manager, quality customer service, credit management policy and the product mix. The gaps identified gave rise to the conceptual framework.

Conceptual Framework

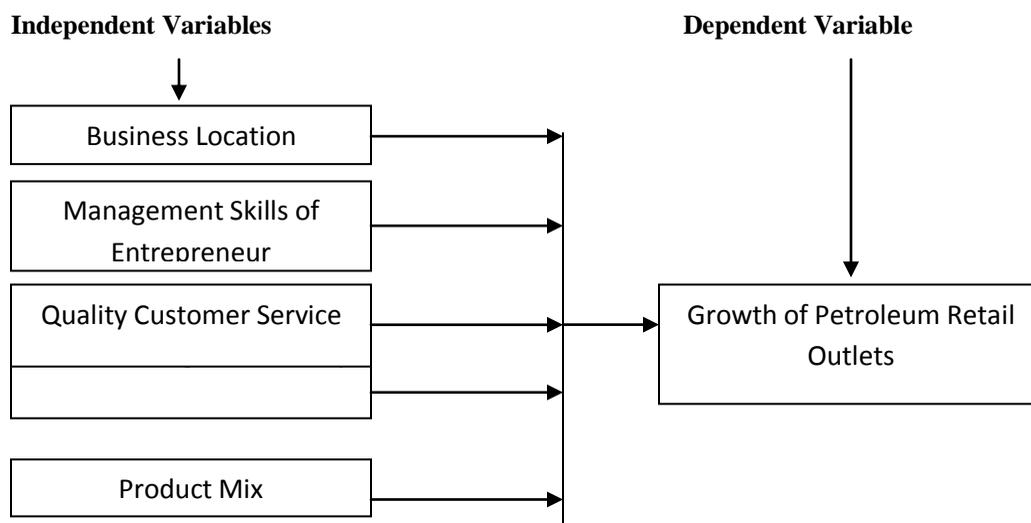


Figure 2.1: Conceptual Framework

Business Location

Choosing a business location is a onetime decision normally made at the establishment of a new business. However, entrepreneurs occasionally consider relocation, for reasons ranging from reducing operation costs to getting closer to customers and other advantages. Relocation could also be necessitated by expansion. Bothma et al. (2003) observe that if the choice of site is poor, the business may never be able to get off the ground, even with adequate financing and superior managerial ability. Established businesses spend a lot of money investigating sites before establishing new branches. In franchising, the franchisors assist entrepreneurs in site selection, which is an advantage to the franchisee.

Management Skills of the Entrepreneur

Smit and Cronje (2002) define management as the process of planning, organizing, leading and controlling a firm's resources to achieve the stated firm's goals as optimally as possible. A skill is "a special ability in a task." Daft (1994) identifies three main skills prerequisite for sound management: conceptual skills – these refer to the mental ability to view the operation of the organization and its parts holistically. Conceptual skills involve the manager's ability to plan and think strategically; interpersonal skills – these refer to the ability to work with people, to communicate and understand their behaviors, to resolve conflicts and to motivate groups and individuals; technical skills – this is the ability to use the knowledge or techniques of a specific discipline to attain goals. An entrepreneur in the petrol station business requires the above management skills to manage their resources effectively for good performance. Financial and

credit management are important for healthy cash flows. Management conceptual skills in such an enterprise lead to achievement of a competitive advantage as a result of strategic planning – the right ideas, good marketing strategies, good business planning, innovativeness, the ability to set and achieve goals, the ability to recognize and exploit opportunities, flexibility to customer needs and customer relationship marketing.

Interpersonal skills help the entrepreneur in communicating with the employees, customers and all stakeholders. The skills also help in conflict management in helping the customer recover from a bad experience, good staff retention and motivation. Technical skills help the entrepreneur in sound financial and credit management, knowledge of industry and good management of people.

Customer Service

Customer service is the manner in which a product or service is conveyed to the buyer. Good customer care and service strategies involve choosing strategically to serve only a specific type of customers or serving all types of customers, Murage (2001). Longenecker et al. (2003) further observe that, customer satisfaction results from a customer's interaction with the firm. Better understanding of the customers, therefore, should lead to higher levels of customer satisfaction. It is therefore important for the staff in customer service to understand the consumer (customer) decision making process.

Credit Management Policy

A seller in a credit sale conveys goods or services to the buyer in return for the buyer's promise to pay later. The major reason for giving goods on credit is to increase sales volumes. Credit influences decisions to buy, by providing an incentive for customers to buy now and pay later.

Gitman (2002) defines credit policy as the determination of credit selection, credit standards and credit terms. He further defines credit selection as the decision whether to extend credit to a customer and how much credit to extend.

Product Mix

Strydom et al. (2002) define the term product as a tangible good, a service, an idea (or a combination of both) that, through the exchange process satisfies consumer or business customer needs. Brink and Berndt (2004) give the objectives of relationship marketing as to identify and establish, maintain and enhance relationships with customers at a profit so that the objectives of the enterprise are achieved. The objectives of the relationship are achieved by mutual exchange and fulfillment of promises and they involve collaboration between the supplier and the customers for mutual value creation. Brink and Berndt (2004) further give the concept of one-to-one marketing as seeking to sell one specific customer as many products as possible over a period of time and across different lines. This is to say the focus is not on

the number of customers that the firm seeks to reach with the product, but on the number of each of the products that each individual customer buys counts.

RESEARCH METHODOLOGY

The following chapter covers the methods used to collect data in this study. It comprises of the following sections: research design, population, sampling design instruments, pilot testing and data analysis.

Research Design

This study is descriptive survey and exploratory in nature. This study used an exploratory survey as it attempted to provide an exploration into the factors that influence performance and growth of Petroleum Retail Outlets in Kenya. The study attempted to explore how far the independent variables influence the dependent variables as shown in the Conceptual Framework.

Population

The population of interest was all the 25 operational petrol service stations in Thika and its environs within a 15km radius. All the service stations had been in operation for more than three years at the time of the research (May, 2007). The list of the Petroleum Retail Outlets was obtained from the Thika District Commissioner's (DC) office, licensing section, which is responsible for the licensing of storage of petroleum products.

Sampling Design

In order to collect enough data and information, the study carried out a census of all the 25 Petroleum Retail Outlets in the area of interest. This was a complete enumeration of all the items in the population and hence it was a census inquiry. The service stations were clustered according to location. They were in three locations: those along Thika dual carriage way; those in Thika town centre; and those located along Garissa Road. This categorization was based on similarity within their location, in regard to competitive environmental dynamics, and the social-economic status and business environment of the customers.

Data Collection Instruments

A survey questionnaire incorporating the variables identified in line with the objectives of this study was prepared to collect primary data. The questionnaire covered the background information of both the enterprise and the owner, and the factors considered in the evaluation of the business performance and growth. In this case, the number of employees, sales volumes, annual profits, number of customers and average daily consumption of each customer served, and the capital base at the time of this study. Part of the questionnaire was semi structured and had the advantage of enumerators being able to interpret questions for any semi-literate respondents. It also had the advantage of increasing the response rate as it motivated the respondents to express their feelings.

Pilot Testing

The questionnaire was pilot tested in five outlets randomly selected from the population. The pilot test was used to validate the data for any adjustments, additions or omissions and to detect any weaknesses so as to conform to the research objectives and questions.

Data Analysis

Emerging themes from qualitative data were used for content analysis. The analysis examined which patterns were embedded in the data. The themes were arranged in categories based on the study variables. Descriptive data collected was coded, classified and subjected to Statistical Package of Social Scientists (SPSS) version 17. The data was analyzed in terms of: business location; management skills of the entrepreneurs/managers; quality customer service; credit management policies; and product mix. The numeric analyses were interpreted and presented in prose form.

DATA ANALYSIS AND FINDINGS

Outlet Demographics

The demographic characteristics of respondents were discussed in terms of location, number of years in business and business growth.

Outlet Location

Most of the petroleum retail outlets were located along Thika Dual Carriageway (45%), 33% were from Thika Town centre while 22% were located along Thika-Garissa Road. The findings imply that a high number of petroleum retail outlets are established in highways and urban centres where large numbers of customers frequent.

Length of Service

Most of the respondents (33%) had been in business between 4-6 years while 28% had been in business for over 13 years and a further 22% between 1-3 years. The findings show that most respondents were in business for a period exceeding business incubation period and chances of failure were low.

Business Growth

Revenue

Revenue is discussed in terms of initial investment and current investment. Majority of the respondents (67%) started their business with a capital of between Kshs.1M to Kshs. 5M, while 17% had a capital of Kshs.10M among others. However, 6% did not respond to this question. The study further found that 29% of the respondents had capital investment above Kshs.10M. Twenty four percent said their current investment was between Kshs.1M to Kshs.5M. Eighteen percent had investments of between Kshs.6M to Kshs.10M. However, 33% did not respond implying that some entrepreneurs were sensitive to matters relating to their investments. The findings show that there was remarkable growth in revenue.

Increase in number of Employees

Most of the respondents (39%) had 6-10 employees when they started operating. Thirty three percent had less than 5 employees while 22% had above 11 employees. Only 5% had no employee. Currently, the number of employees had risen with 56% outlets having above 20-25 employees while 22% had between 10-19 employees and 22% had above 25 employees. These findings show growth of the enterprises in terms of the number of employees.

Increase in Number of Outlets

Eighty three percent or 15 entrepreneur/managers did not have branches, while 17% or 3 entrepreneur/managers had branches elsewhere. These findings show that most entrepreneurs do not prefer this form of growth.

Factors that Influence Growth

The data indicates that the factors that influence growth include business location, management skills, quality customer service, credit management policy and product mix. These factors are analyzed and presented in this section.

Business Location

Customers patronizing the service stations were interviewed on the factors that influenced their choice of the outlet and they noted the following: 89% customers chose most convenient outlet, 85% chose the most accessible, 83% chose the best in security, 60% chose the cleanest and 40% considered the price of the products. The findings indicate that

motorists give a lot of priority to convenience, security and accessibility more than the price of the products. They also give some priority to the general cleanliness of the station.

Management Skills

i) Experience on Management

Majority of the entrepreneurs and managers (56%) had over ten years of experience in management. Thirty three percent of them had between five and ten years of experience. Seventy eight percent of them had formal training in business management. The findings show that management skills of the entrepreneur/manager influence the growth of the enterprise.

ii) Credit Management Policy

Half of the respondents (50%) indicated that they did not offer credit facility to their customers, 30% offered credit, and 10% used credit cards only while 10% used both credit cards and offered credit to their customers. The findings indicate that the majority of the respondents did not offer credit and sold cash. Among those who offered credit, a majority of them had credit policy in place. This shows the importance of effectively managing credit facilities through credit management policy. This then, influences the growth of the PRO as most of them bought their products cash.

Product Mix

i) Services Offered

Most of the respondents (83%) offer carwash services. Seventy two percent (72%) have convenience stores and garage facilities. However, carwash topped the list as the service being offered by the majority of the respondents (73%). Twenty seven percent of the respondents felt that they will offer convenience stores, barbershop/saloon and other facilities in future.

ii) Other Products in the Mix

The respondents gave other products and services they offer to attract more customers. Sixty two per cent (62%) gave priority to professionalism and good service, 45% attracted more customers with discounts and gifts, 22% ensured they sell quality products, 11% extended their business 24 hours a day, 11% used personal marketing, 6% ensured their prices were lower than the competitors, 6% offered tyre repair and carwash services while 6% opened a mini market in their stations. This implies that product mix is important to the growth of the PROs.

Quality Customer Service

Fifty percent of the respondents felt that staff training helped them offer quality customer service, 44% used customer feedback, 33% used personalized customer service, while 11% used customer database. The findings show that the majority of the entrepreneurs valued quality customer service which influences the growth of the outlets.

Strategies Used to Develop “Critical Few” Action Plans

Action Plan Strategies

Good action plan strategies were used to measure the extent of perception on the issues outlined on a scale of 1-5 where 1 is “not used at all” and 5 is “used to a great extent”. A descriptive study of the mean and standard deviation was used. A mean above 4.5 was used to indicate that the particular issue was used to a great extent. A mean of 3.5 but less than 4.5 indicated that the issue was used to some extent. A mean of 2.5 but less than 3.5 indicated the issue was moderately used. A mean score of 1.5 but less than 2.5 indicated that the particular issue was not used. Finally, a mean of 1 but less than 1.5 indicated that the issue was not used at all. A standard deviation of 1 or higher indicated that the respondents varied in their opinion regarding the particular issue. A standard deviation less than 1 indicated that the respondents were all in agreement regarding the particular issue.

Business Location

The vast majority of the respondents agreed to a great extent that security measures should be in place e.g. proper lighting (100%), The outlet should be convenient and easily accessible (84%), general cleanliness of the outlet environment (89%) and special considerations in outlet layout and design were used to a great extent by 72% of the respondents. The findings show that security, customer convenience, and general cleanliness of outlet environment scored highly. They all influence the choice of a location.

Management Skills

Acquisition of management skills and financial management were ranked highly implying that they were used to a great extent (61% and 67% respectively). Setting goals for self and the firm was used to some extent by 61% of the respondents. Thirty nine percent of the respondents agreed that implementation of goals and plans are used to some extent compared to 33% who said it was used to a great extent. Further, 39% of the respondents agreed that short and long term plans for the firm were used to a great extent. However, 44% were not sure to what extent staff motivation and retention schemes were used.

Respondents agreed on “setting goals for self and the firm” and “short and long term plans for the firm.” As shown in the table below standard deviations less than 1 implied that they were all in agreement in regard to the statements. The findings reveal that management skills for the entrepreneurs/managers are important to the growth of the outlet.

Credit Management Policy

Overall, almost half of the respondents (44%) agreed that putting credit policy in place was used to a great extent. Thirty nine percent were of the opinion that offering discounts was also used to a great extent. A further 33% tend to agree that assessing customers for credit worthiness before extending credit facilities was also used to a great extent. It was also worth noting that, offering credit facilities to customer was found to be used to some extent by 39% of the respondents. Although 44% were not sure about the issue of taking deposits from credit customers, payment by credit card was split between those who said it was not used at all (33%) and those who said it was not used often (33%). This implies that

two thirds of the respondents disagreed with the statement. The high standard deviation shown from the table indicates that respondents gave varied responses. The findings imply that putting credit management policy in place is important to the success of the enterprise.

Product Mix

Overall, the statement was ranked highly implying that most respondents agreed that offering high quality products and services was used to a great extent. Nearly half of the respondents (50%) said offering products and a service not provided by competitors was used to a great extent. Likewise, 56% were of the opinion that providing other services that offer convenience to the customers simultaneously with the main products/services was used to a great extent. One eighth of the respondents agreed that offering services/products that complement each other was used to some extent. The findings indicate that providing products and services that offer convenience simultaneously with the main products/services influences the growth of a Petroleum Retail outlet.

Quality Customer Service

Most of the respondents (78%) agreed that serving all customers with high quality customer service was used to a great extent. Forty four percent further agreed that having a good system for getting feedback from customers is used to a great extent. Striving to know and understand one's customers was used to a great extent by 50% of the respondents. However, 33% were of the opinion that having data banks for the customers was not used often while 50% agreed that serving specific type of customers only, was not used at all. The findings indicate that the majority of respondents agreed that offering high quality customer service to all customer feedback and personalized service influences the growth of the outlets.

Overview

Customers patronizing the outlets were interviewed impromptu and they gave the following reasons for patronizing the outlets:

Product Appeal

Some of the reasons mentioned by consumers for using products included good customer service (89%), strategic location of outlet (83%), good facilities (78%), competent staff (72%) and lower prices (50%). However, 6% were not aware. The findings of the product appeal confirm that quality customer service and business location influence the growth of Petroleum Retail Outlets.

Challenges Encountered

The respondents were asked to give the challenges they experience: Competition from other businesses was found to be the biggest challenge encountered by 35% of the respondents. Other difficulties mentioned included shortage of facilities (30%), price fluctuations (24%), and rude customers (18%) among others.

Majority of the respondents (78%) indicated that finances are a hindrance to financial and physical facilities. Other challenges mentioned include poor profit margin, legal requirements and erratic world oil prices (11% respectively) and 6% of the respondents did not respond. The findings indicate that management skills of the leadership of an enterprise influence the growth of that enterprise. Most challenges given above can be overcome with good management skills.

RECOMMENDATIONS

The following were the recommendations that could enhance the growth of small enterprises particularly petroleum retail outlets:

Business Location

It is recommended that, security, convenience and easy accessibility of the outlets should be given priority in choosing the location of a small enterprise particularly Petroleum Retail Outlets as these contribute to the growth of the same.

Management Skills

It is recommended that entrepreneurs and their managers should be well educated and also acquire good management skills to improve the performance and growth of their enterprises.

Quality Customer Service

The study recommends that Petroleum Retail Outlets' dealers and other entrepreneurs should offer quality customer service, and if possible offer personalized service, maintaining customer database will also improve the performance of Small Enterprises including Petroleum Retail Outlets.

Credit Management Policy

The study recommends that credit management policy should be put in place by the entrepreneurs willing to extend credit to their customers as it influences performance and growth of these enterprises.

Product Mix

The study recommends that the Petroleum Retail Outlet dealers should offer products and services convenient to their customers simultaneously with the main products to improve the performance and growth of their enterprises.

Recommendations for Further Research

There are also many independent variables that can influence the performance of a Petroleum Retail Outlet; these include, accessibility to working capital, cost of capital, quality of products, timely quality deliveries, low profit margins and stringent business terms by supply companies.

Due to the limitations and the independent variables discussed above which could not be covered, the following areas are recommended for further research:

- a. What is the influence of working capital accessibility to the performance of PRO?
- b. How does the cost of capital influence the performance of PRO?

c. How do the business terms set by the petroleum supply companies influence the performance of PRO?

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21st Century (6th Ed)

EFFECTS OF A SHARED SERVICES STRATEGY ON COST REDUCTION A CASE STUDY OF EAST AFRICAN BREWERIES LIMITED

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ABSTRACT

Moving to a shared service method of operation entails a huge culture change for an organization. The entire business context must be changed. It takes time, effort and vast amounts of management energy to move from a mindset of purely decentralized management of support activities within each business unit or centralized management of support activities at the corporate level to a mindset of partnership between business units and the consolidated, shared service organization. Together with this, shared service units, despite their importance, receive much less senior executive attention than business units in most companies. The logic for this is that business divisions generate profits, and that is where top management often focuses its time. There is therefore a risk that an organization can lose its focus on shared services if the method is not shown to result in tangible benefits.

The objectives of the study were to establish whether there has been a reduction of transactional costs at EABL as a result of moving to a shared service environment; determine the extent to which the shared service strategy resulted in reduction in employee headcount and overheads; find out how shared service strategy led to improvement in inventory management and establish how shared service strategy at East African Breweries Ltd has impacted on procurement costs.

The study employed the case study design, targeting all the departmental heads working at EABL's shared services centre. Purposive sampling was used to select 10 respondents, among them nine departmental heads from Information Technology (IT), finance, procurement, Human Resource, EABL Kenya Demand, EABL Kenya Supply, CGI, East Africa Malt Ltd, and UDV; and one top management representative. Data was collected from the participants using a semi-structured questionnaire and an interview schedule. Qualitative and quantitative techniques were employed in data analysis. Qualitative techniques involved giving a detailed account of the impact of moving to a shared services strategy on EABL's cost reduction efforts. Quantitative data was analyzed using descriptive statistics including percentages and frequency counts.

The study established that moving to a shared services environment has led to significant cost reduction efforts of East African Breweries Limited. Shared services led to reduction in procurement costs, reduction in employee headcount and overheads, improvement in inventory management, and reduction of transactional costs. As such, companies running their different functions as disparate competing entities should be encouraged to adopt shared services strategy to cut costs and operate more efficiently.

INTRODUCTION AND BACKGROUND

As competition in the world of business increases, and demand for quality products and services from a more informed clientele rises, businesses are moving at a frantic pace to develop and capitalize on the competitive advantage that sets them apart from the competition. Additionally, companies have stepped up their globalization efforts to take advantage of opportunities in emerging markets throughout the world. As a result, we have seen a rush of mergers, acquisitions, and divestitures, as well as downsizing, rightsizing, and restructuring, all in an effort to position businesses to leverage their competitive advantage and build greater shareholder value (Forst, 2001).

Strategic positioning in a competitive environment is of paramount importance. In order to maintain a competitive advantage while embracing growth and expansion, organizations need to contain costs while maintaining best practice and world-class standards and processes. When championing penetration into geographically dispersed new markets, the need to ensure that best practice processes and standards are in place and continually improved becomes a basic survival tool for rapidly growing organizations (Porter, 1985).

One of the ways companies are looking for competitive advantage in this frenetic environment is through the reengineering or redesign of their core business processes, the end-to-end processes that touch customers and through which a company can make strategic changes. Another way is through the use of a tactical technique called shared services. In a shared service environment, a company pulls activities that support core business processes out of each business unit and consolidates them into a separate operating unit that runs these supporting processes as its core business process (Schulman et al., 1999).

Organizations and industries all over the world are under pressure to make business processes more efficient, eliminate unnecessary administrative support activity cost, and to banish duplication of effort and resources (Van Denburg & Cagna, 2000). Porter (1985) also identified support service as an area in the organizational structure where a competitive advantage may be gained by stating that the ability to share activities is a potent basis for corporate strategy because sharing enhances comprehensive advantages by lowering differentiation costs.

Statement of the Problem

Moving to a shared service method of operation entails a huge culture change for an organization. The entire business context must be changed. It takes time, effort and vast amounts of management energy to move from a mindset of purely decentralized management of support activities within each business unit or centralized management of support activities at the corporate level to a mindset of partnership between business units and the consolidated, shared service organization. Together with this, shared service units, despite their importance, receive much less senior executive attention than business units in most companies. The logic for this is that business divisions generate profits, and that is where top management often focuses its time. There is therefore a risk that an organization can lose its focus on shared services if the method is not shown to result in tangible benefits. EABL moved to a shared services environment in 2001 but no studies have been conducted to show whether this has in any way contributed to the growth of the organization. Kirui (2001) conducted a study on competitive advantage through outsourcing of Non –core logistics activities within the supply chain of British American Tobacco Kenya. No study had, to the best knowledge of the researcher, been undertaken on the extent to which sharing of noncore services impacts on cost control efforts of corporate entities, this study will address itself to this problem.

Main objective of the Study

The purpose of the study was to establish the extent to which shared services strategy affect Cost reduction efforts of East African Breweries Limited.

Specific Objectives

The specific objectives of the study were:

- i. Establish whether there been a reduction of transactional costs at EABL as a result of moving to a shared service environment.
- ii. Determine the extent to which the shared service strategy resulted in reduction in employee headcount and overheads.
- iii. Find out whether shared service strategy improved inventory management.
- iv. Establish how shared service strategy at EABL has impacted on procurement costs.

LITERATURE REVIEW

The concept of shared Services

Shared services is a collaborative strategy whereby the staff functions of a firm are concentrated in a semi-autonomous organization and managed like a business unit competing in the open market to promote greater efficiency, value generation and improved service for internal customers. This strategy facilitates organizational flexibility and horizontal integration with good vertical control. Cost reduction, better service, best practices in delivering internal services to users are some positive outcomes of this application, as internal services now need to be delivered with a service-oriented approach to all users within the firm (Rao, 2006).

For most firms, switching to a shared services model inadvertently involves layoffs and major workforce restructuring. Further, new levels and kinds of cooperation are needed. All members of the new shared services unit are expected to interact and be interactive. This naturally requires new skills and demands from employees (Victor and Stephens, 1994). Having common business processes and common IT applications are important to justify the migration to a shared services model.

Schulman et al. (1999) suggest that three important levels of change are needed for this migration: defining responsibilities, that is, governance, accountability and measures to create accountability; focusing on efficiency, that is, processes, systems and economies of scale; and focusing on effectiveness, that is, skills, delivery system and organization. To develop the shared services organization in a phased manner, firms should gradually shift from being the service provider to being customer driven, and finally to being the business partner leveraging on the success achieved at each phase. The primary focus of shared services has been the concentration of transaction- orientated services that are repetitive and are much the same for each business unit. Generally, the types of services included in a shared services model include financial services including accounts payable and accounts receivable; procurement; human resources including payroll; property and facilities management; and information technology operations.

Theoretical models of shared service strategy

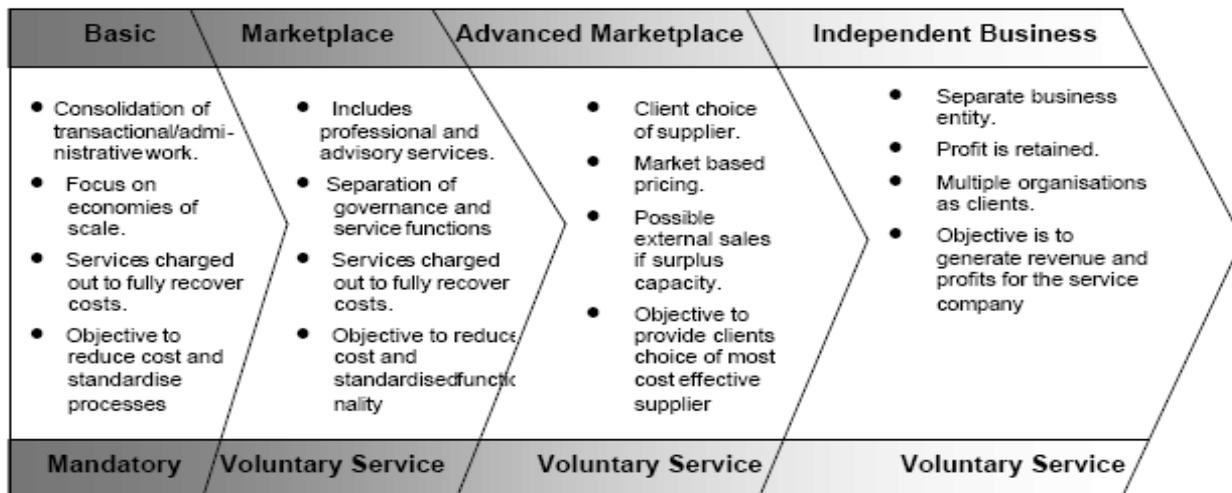
According to Schulman et al. (1999) the decision to create a shared services business environment is a strategic decision and should be undertaken as a part of an organization's overall strategic vision. A shared service per se is "tactical" (Schulman *et al.*, 1999), and in this way the operations of a shared services provides a key factor in the organization ability to reach its strategic goals. Quinn, et al. (2000) identified four models that can be used to explain where an organization is in the journey towards shared services. These are, the basic model, the market place model, the advanced marketplace model, and the independent business model. According to the basic model the move to shared services involves the consolidation of transactional processing and administrative work. At this point the predominant drivers are cost reduction through economies of scale, standardization of processes, and a focus on customer service. The basic transactional model is also a mandatory service as all business units and companies must use this service within an organization, and are not allowed to go outside and source that particular service. Moving to a basic model creates value

at two levels. First, operating costs are lower with a positive effect on the bottom line. Secondly, corporate functions and business units reduce human resources at transactional level, which can be re-positioned at tactical and strategic level (Quinn *et al.*, 2000).

The marketplace model is the next step in the shared services journey. The difference between the marketplace model and the basic model is the inclusion of professional and advisory services, as well as the separation of governance related activities. The professional and advisory services operate on a principle of an internal consulting service. According to Quinn *et al.* (2000) the separation of governance activities from the delivery of services is “the move to a real internal marketplace”. The advanced marketplace model takes the total service approach further by bundling functional competencies (human resources, finance, information technology) with cross-functional synergies (people, knowledge, systems) to create a total service solution. This total service solution also implies that the shared services business unit is not protected and the internal customer can purchase the service from outside. In the advanced marketplace model pricing is based on market prices. The shared services business unit must compete for the internal customers business, not only on pricing but also on offering, efficiency and effectiveness. In the basic and marketplace models, the shared services business unit is protected from outside competitors as business units are prohibited from using outside service providers for a period of up to two years. This is to give the business unit time to establish itself. During this period senior management can see if the shared services business unit supports the overall business strategy, or if it should be outsourced (Van denburgh & Cagna, 2000).

In the advanced marketplace model the shared services product offering can respond to changing market and customer needs quickly and efficiently, due to flexibility. In the advanced marketplace model the shared services move into the realm of supporting the organization’s vision by being supplier of choice, and by supporting cross functional strategies. Performance measures should focus on achieving the organization’s vision, market based pricing and possible external sales of the function and related activities. The Independent Business Model occurs when shared services operate as a separate business entity and becomes a profit center serving both internal customers as clients, and external customers. Few shared service business units are in this stage of independent business units. According to Gunn et Al. (1993), only 17% of today’s shared services are separate legal entities. They are also of the opinion that “commercializing” the shared services business unit will lead to a higher performance of the shared services business unit (Gunn Partners, 2001). Figure 2.1 presents a summary of the four models of shared services.

Figure 2.1: The four shared services models



Source: Adapted from Quinn *et al.* (2000:36)

Benefits Attributed to a Shared Services Model

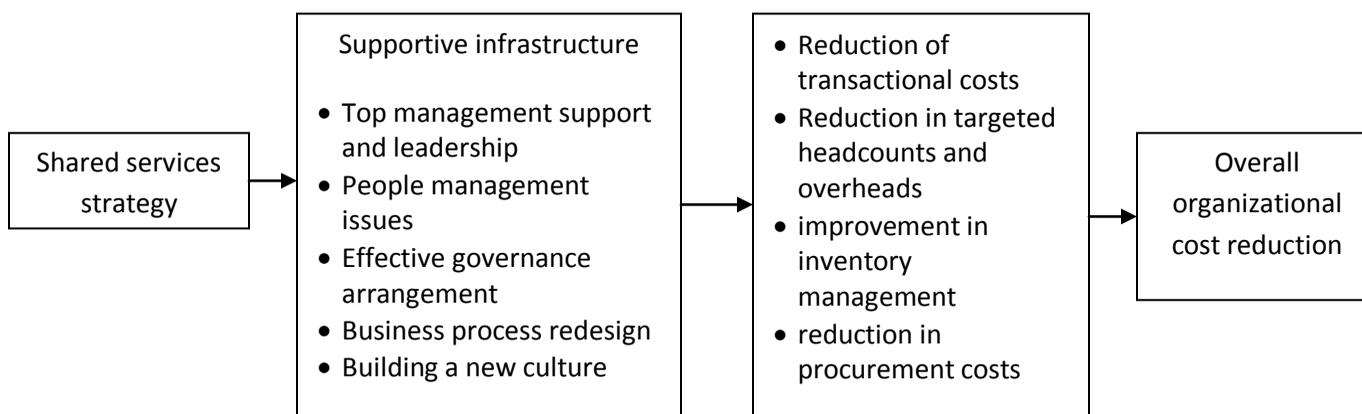
Organizations that have implemented shared services are constantly reaping benefits that go beyond cost cutting and head count. These benefits are both tangible and intangible in nature. Tangible benefits includes; Cost savings through shared service centres can be in the order of 30%, sometimes more (Lester, 2001). According to Van der Linde (2002) cost savings is the major reason for implementing shared services. However, cost savings must go together with an increase in performance, effectiveness and efficiency (Quinn *et al.*, 2000). Working capital improvement gained from standardizing, concentrating and netting treasury activities, operating receivables, payables, and inventory management in a centre of excellence. This creates economies of scale, improves control and decreases expenses. Increased productivity which is achieved through (Forst, 2001). Enhanced professional services, shared services business units liberate governance functions from transactional functions, as well as professional staff from transactional processes to offering professional service (Quinn *et al.*, 2000).

Through process re-engineering, benchmarking and the use of best practices, cost savings are achieved that add value to the organization. According to Schulman *et al.* (1999) economies of scale are achieved through the standardization of processes that are experienced by customers. Quinn *et al.* (2000) are of the opinion that because shared services rely on a team principle and the empowerment of employees to take decisions, it creates motivated teams that provide a consistent reliable cost effective service. Technology as well as qualified and multilingual staff enables a shared services business unit to conduct relationships with local, regional and global entities such as banks, governments and suppliers (Shah, 1998). According to Schulman *et al.* (1999), shared services create one company approach where members of one organization view the organization as a single entity. According to Uhlrich (1995) employees still have a boundary mindset about functions and functionality; shared services remove these boundaries by creating a common goal from doing a “job” to “add value”. Members in a shared services team share expertise (knowledge management), solve problems and add value through process re-engineering. This enhances team knowledge and according to Uhlrich (1995) it creates a new set of competencies and roles within the organization.

Conceptual Framework

The figure 2.2 below presents the conceptual framework of the study.

Figure 2.2: Conceptual framework



Source: Researcher (2008)

Independent variables

Dependent variables

The study will find out whether shared services strategy, and existence of supportive infrastructure for success and growth of the shared services centre (the independent variables), have had an impact on cost reduction efforts of East African Breweries in terms of reduction of transactional costs, reduction in targeted headcounts and overheads, improvement in inventory management, and reduction in procurement costs (the dependent variable)

RESEARCH METHODOLOGY

Research Design

The study was a case study of the effects of the extent to which a shared services strategy has affected the cost reduction efforts of East African Breweries Limited. According to Gay (1992), a case study is a research approach in which one or a few instances of a phenomenon are studied in depth. The main advantage of a case study is that it enables researchers to study a given case in depth. Since the interest of this study was to understand the benefits of shared services on one organization, case study was considered the best approach.

The Population of the study and data collection methods

The target population of study was all the functional heads of departments working at EABL's Shared Service Centre and the MDs of the Kenyan based companies; viz KBL(2), UDV,CGI EAML. The organization has a total of 798 employees. Being a case study, the study involved functional heads of the following departments, which are represented in the Shared Services Centre: procurement, IT, finance, HR and MDs of the Kenyan based companies. As such, nine respondents will be selected. The study used both primary and secondary data. Primary data was collected from the respondents using a semi-structured questionnaire designed by the researcher. This was a questionnaire consisting of both open-ended and closed questions. It provides greater depth than is possible with a totally structured questionnaire. Secondary data sources included reports such as the financial reports and cost report from EABL. An interview guide was used to collect in-depth information from the top management on the impact of Shared services on cost reduction..

To ensure reliability and validity before the actual data collection, piloting or testing of questionnaires was conducted among five employees of EABL's shared services centre, who were not selected to participate in the actual study. The pilot study helped to improve face validity of the instruments. According to Chaves (1996), content validity of an instrument is improved through expert judgment.

Data Analysis Methods

Since qualitative and quantitative data was obtained, both qualitative and quantitative data analysis techniques were employed. Qualitative techniques involved giving a detailed account of the effects that moving to a shared services strategy has had for EABL's Cost reduction. Quantitative data was analyzed using descriptive statistics including percentages and frequency counts. The results of data analysis were presented in frequency tables.

DATA ANALYSIS, FINDINGS AND PRESENTATION

Effects of Shared Services on Transactional Costs

The first objective of the study was to establish whether there had been a reduction of transactional costs at EABL as a result of moving to a shared service environment.

The nine heads of departments were asked to rate the impact of moving to a shared services strategy on transactional processing on a four point scale ranging from excellent to poor. Their responses are captured in Figure 4.1, which shows that 22.2% of the departmental heads rated transactional processing to be excellent, while 77.8% rated transactional processing to be good.

Figure 4.1: Ratings of transactional processing after moving to SSC

Department	Excellent	Good
Procurement		1
IT	1	
Finance	1	
HR		1
Kenya Demand		1
Kenya supply		1
CGI		1
EAML		1
UDV		1
Total	2	7
%	22%	78%

Table 4.1 shows the number of transactions processed at the organization in the year 2000 before moving to a shared services strategy and the year 2009 (after moving to a shared services strategy).

Number of Transaction processed before and after moving to a shared service centre.

In the year 2000 (before SSC), the average number of manual journal vouchers raised in a month organization reduced by about 70%. The average number of invoices processed reduced by 44%.The average number of days taken to produce monthly accounts reduced by 57%. The average number of days taken to fully process and pay an invoice reduced by 33%.All this has come through as a result of process re-engineering and knowledge sharing see table 4.2 below.

Table 4.2: Transaction processing for the period before and after moving to a shared services environment

Item	Year 2000 (before moving to shared services)	Year 2009 (After moving to shared services)	% Change
Average number of manual journal vouchers raised in a month	200	60	70%
Average number of invoices processed?	1600	900	44%
Average number of days taken to produce monthly accounts	7	2	57%
Average number of days taken before an invoice is finally paid.	90	60	33%

Impact of the Shared Services Centre on Employee Headcount and Overheads

The second study objective was to determine the extent to which the shared service strategy resulted in reduction in employee headcount and overheads. Table 4.3 shows the number of employees working in each of the nine departments for the year 2000 before moving to a shared services strategy and the year 2009 after moving to a shared services strategy. In all the nine departments, year 2000 had more employees than year 2009. This is an indication that moving to a shared services strategy led to overall reduction of 21% in number of employees. Based on the fact that reports from EABL show that the organization has recorded growth in performance over the last four years, it can be concluded that reduction in the number of employees resulted to efficiency.

Table 4.3: Number of employees per department before and after moving to a shared services environment

Department	Number of employees in 2000 (Before SSC)	Number of employees in 2009 (After SSC)	% Change
Procurement	25	12	52%
IT	20	13	35%
Finance	55	35	36%
HR	20	5	75%
Kenya Demand	185	165	11%
Kenya supply	260	238	8%
CGI	175	148	15%

EAML	138	122	12%
UDV	135	60	56%
Total	1,013	798	21%

Annual overheads on salaries and wages before and after moving to shared services

As shown in Table 4.4, annual overheads for salaries and wages in all departments were lower in year 2009 than in 2000 by about 8% despite the general annual inflation and cost of living adjustments on the salaries. It therefore emerges that moving to a shared services environment availed a better control on the salaries and wages costs.

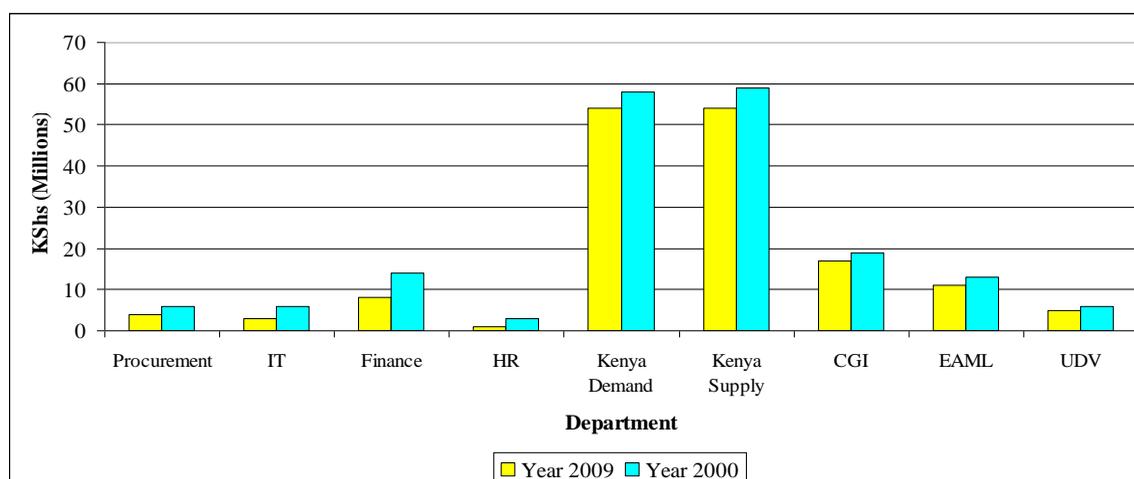
Table 4.4: Annual overheads on salaries and wages per department

Function	Salaries & Wages (Millions)		
	Year 2000	Year 2009	% change
Procurement	19	10	47%
IT	21	15	29%
Finance	58	40	31%
HR	9	3	66%
Kenya Demand	288	282	2%
Kenya Supply	394	393	0%
CGI	192	178	7%
EAML	144	140	2%
UDV	67	33	51%
Total	1,191	1,094	8%

Costs incurred on overtime for the years 2000 and 2009.

Figure 4.1 shows that for all the departments, the costs incurred on overtime were higher in year 2000 (before SSC) than in year 2009 (after SSC). In total, overhead cost for year 2000 was KShs 184 million, as compared to KShs 156 million in 2009, a decrease of 15%.

Figure 4.1: Costs incurred on overtime



Costs incurred for conferences, training and travelling for the years 2000 and 2009.

Table 4.6: Costs incurred on conferences, training and travelling

Function	Costs incurred in KShs (Millions)					
	Conference		Courses & training		Travelling	
	2009	2000	2009	2000	2009	2000
Procurement	1	2	1	2	2	4
IT	1	3	1	3	2	3
Finance	1	2	1	2	3	4
HR	1	1	1	1	3	4
Kenya Demand	13	13	13	13	26	25
Kenya Supply	15	15	15	15	32	30
CGI	4	6	4	4	7	5
EAML	2	3	2	2	6	5
UDV	2	3	2	2	2	5
Total	40	48	40	44	82	85
Change	-17%		9%		-3.5%	

Table 4.6 shows that the costs incurred for conferences, training, and travelling were higher in 2000 than in 2009. This is an indication that moving to a shared services strategy led to a reduction on these costs. This can largely be attributed to the fact that as a result of concentration of this activities, there was no need for travelling and holding conferences.

The employees also became experts in their fields as a result of shared knowledge rather than operating like competing entities.

Costs incurred for telephone, medical and stationery for the years 2000 and 2009.

Table 4.7: Costs incurred on telephone, medical and stationery

Function	Costs incurred in KShs (Millions)					
	Telephone		Medical		Stationery	
	2009	2000	2009	2000	2009	2000
Procurement	0.25	1	3	5	1	3
IT	0.25	1	3	4	1	2
Finance	0.25	1	8	11	4	6
HR	0.25	1	1	4	1	2
Kenya Demand	14	12	36	37	26	24
Kenya Supply	12	10	52	52	10	8
CGI	6	5	33	35	11	18
EAML	5	4	27	28	6	14
UDV	1	5	13	27	2	14
Total	39	40	176	203	62	89

Change	-2.5%	-13%	-30%
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Table 4.7 shows that all of telephone, medical and stationery expenses declined after the organization moved to a shared services strategy by 2.5%, 13% and 30% respectively.

Impact of Shared Services Strategy on Inventory Management

The third objective of the study was to find out how shared service strategy led to improvement in inventory management. All the nine (100%) departmental heads agreed that since moving to a shared services environment, inventory management had improved. Table 4.8 presents the indicators to show the extent to which inventory management had changed.

Table 4.8: Inventory management indicators

Item	Year 2009	Year 2000	Variance
Stockholding Level (Billions)	2.6	2.4	+8%
Stocktaking costs (Millions)	3	4.5	-33%
Stock loss due to pilferage (Millions)	4	14.5	-69%
Stock loss due to stock obsolescence (Millions)	72	154	-53%
Insurance costs for stocks (Millions)	10	15	-33%

Table 4.8 shows that stockholding level was at KShs 2.4 billion in year 2000 and this rose to KShs 2.6 billion in year 2009, meaning that moving to a shared services strategy led to rise in stockholding level by 8% despite the impressive growth in turnover and production level. After moving to a shared services strategy, stocktaking costs reduced from KShs 4.5 million in 2000 to 3 million in 2009 reflecting a 33% improvement in stockholding costs. Stock loss due to pilferage reduced by a massive 69%, loss due to stock obsolescence reduced by 53%, while insurance costs reduced by 33% between year 2000 (before SSC) and 2009 (after SSC).

Impact of Shared Services Strategy on Procurement Costs

The fourth research objective was to establish how shared service strategy at EABL has impacted on procurement costs. The nine heads of departments were asked to rate the impact of moving to a shared services strategy on procurement costs on a four point scale ranging from excellent to poor. Their responses are presented in Figure 4.2 below.

Figure 4.2: Ratings of procurement costs after moving to SSC

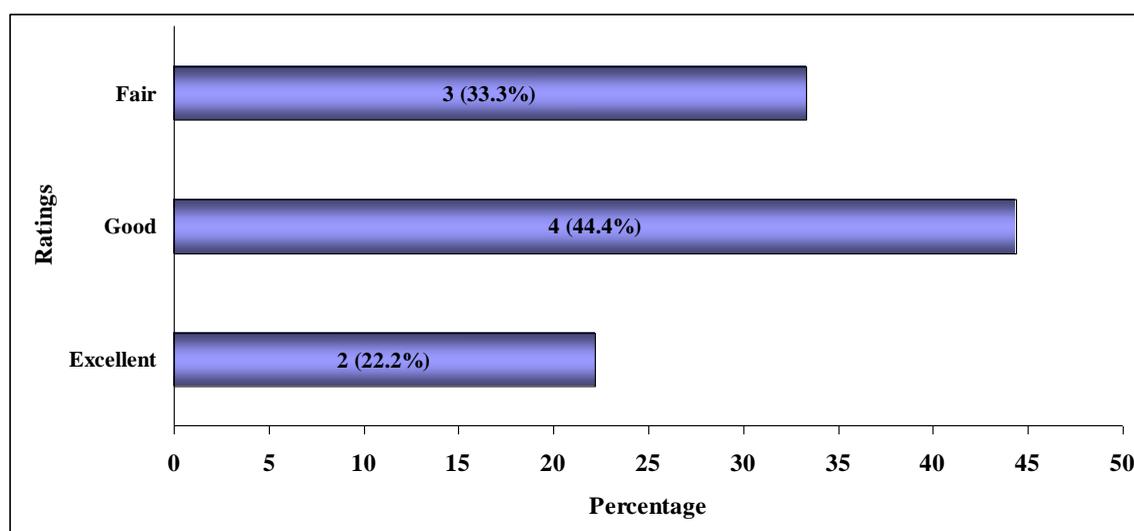


Figure 4.2 shows that 44.4% of the departmental heads rated procurement costs as good, 33.3% rated them fair, while 22.2% of the

departmental heads rated procurement costs as excellent. Table 4.9 shows the impact of moving to a shared services environment on various procurement cost indicators.

Table 4.9: Effects of shared services on procurement costs

Item	Today –Year 2009	Year 2000	%Change
Average number of purchase orders raised (Annually)	18000	27000	-33%
Average number of days taken to conclude a contract	14	60	-76%
Average production cost per Hectolitre (KShs)	1000	925	+8%
Average cost of completing a purchase order in terms of stationary, printing etc (KShs)	0.85	2	-63%
Average period of having a purchase order fulfilled (days)	30	60	-50%

Table 4.9 shows that before moving to a shared services strategy, about 27,000 purchase orders were raised annually, while after moving to a shared services strategy this reduced by 33% to 18,000 orders. The average number of days taken to conclude a contract reduced by an impressive 67% after SSC. The table also shows that the average production cost per hectolitre rose nominally by about 8% over the 8-year period. This is attributable largely to external factors such as the global economic meltdown, inflation, electricity and fuel costs etc all beyond the control of the company. Moving to a shared services environment also led to reduction in cost of completing a purchase order (stationery, printing etc), and period of having a purchase order fulfilled.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on the findings presented above, it can be concluded that moving to a shared services environment has led to significant cost reduction at East African Breweries Limited. Specifically Shared services led to reduction in procurement costs, reduction in employee headcount and overheads, improvement in inventory management, and reduction of transactional costs. Besides, business processes have been harmonised and EABL is able to present a common face to all its customers

Recommendations from the study

EABL as part of the wider Diageo group should look further to consolidating the processes within the wider Diageo group. Companies running their different functions as disparate competing entities should be encouraged to adopt shared services strategy to cut costs and operate more efficiently.

Suggestions for Further Research

Since this study was conducted in only one organization, findings may not be generalized to other organizations. It is therefore important to study other organizations employing the shared services strategy to find out the impact the strategy has had in those organizations. A study on the challenges experienced by organizations in the process of moving to a shared services environment and the strategies employed to counter such challenges could also be useful.

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The Need for Operations Research in Ensuring Franchiseable Brand Presence in Uganda

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ABSTRACT

Introduction

Studies show that franchiseable brand presence is one of the main determinants of the successful use of franchising for competitive business expansion, job creation and wealth creation which are part of Uganda’s national visions in the East African integration. The current and/or potential franchiser should ensure franchiseable brand presence for mutual success in the franchiser-franchisee partnership. This calls for competitive operations research to establish proven/time-tested, standard but adaptable/flexible operating systems, procedures, manuals, and other key features of franchiseable brands.

Purpose

To examine which constructs/areas show a greater need for operations research in ensuring franchiseable brand presence for Uganda's regional competitiveness.

Design/methodology/approach

This paper uses a mixture of quantitative and qualitative methodology. A survey of 346 service-related business chains is used alongside a selection of key informants within and around Kampala who are interviewed to further examine those areas where operations research is more needed in ensuring franchiseable brand presence.

Findings

The study revealed that although there is a generally high level of franchiseable brand presence among the studied business chains, there was low ease to manage (for example, its combined mean was 2.88, and factor analysis revealed variance change of only 11.9%). Key informants analysis of the interviewees' responses confirmed that there is need for operations research to establish teachable business systems that can be easily duplicated and managed by the franchisees.

Practical implications

This paper provides practical information to owners and managers of business chains that are likely to become franchisers through franchisee-owned outlets that are easier to be managed. Operations researchers now know where, why, and when to use which mathematical models in ensuring franchiseable brand presence for Uganda's regional competitiveness in job and wealth creation.

Key Words: Operations Research, Franchiseable brand, Ease to manage, Uganda

Introduction

Uganda as a country is seeking for strategies that can lead to competitive economic growth focusing on the promotion of business expansion, job and wealth creation, (Uganda's Budget Speech for the Financial Year 2011/2012). Franchising is one of Africa's proven and adaptable strategies that can and will enable the country's aspirations especially in terms of competitive economic growth and development across the nation and region, (Hoffman & Preble, 2004; Saunders, 2002). Franchising is the selling of rights by the franchiser to the franchisee through a franchise contract allowing the franchisee to use the brand name, patents, trade mark, and proven/time-tested operating system of the franchiser in line with the set standards of the entire franchise system, (Kotler, Makens, & Bowen, 2007). Studies show that franchiseable brand presence is one of the main determinants of the successful use of franchising for competitive business expansion, job creation and wealth creation which are part of Uganda's national visions in the East African integration, (Uganda's Budget Speech for the Financial Year 2011/2012; Doherty, 2007; Hoffman & Preble, 2004; Mutumba, 2010; Sen, 1998).

Exemplar countries like South Africa, Egypt, and Kenya whose leading business chains have been enabled to ensure their franchiseable brand presence are competitively expanding their respective brands while creating jobs and wealth for their people and communities across the East African region, (Hoffman & Preble, 2004; Kotler, *et al.*, 2007; Mutumba, 2010). Although Uganda is experiencing an increasing number of franchisers and franchisees especially in the service-related businesses, most of the current franchisers are foreign brands while the respective Ugandan business partners are the franchisees, (Mutumba, 2010; Mutyabule, 2006). Such a trend indicates one of the main reasons why South African and Kenyan business chains have more branches/brands in Uganda and vice-versa especially in the private service sector. Those service-related business chains that try to expand using their own resources instead of choosing franchising

as their business expansion strategy end up collapsing especially after 6-10 years in Uganda, (Mutumba, 2010; Oketch, 2008; Zake, 2007). Their collapse may also be attributed to Uganda's business expansion environment which the country's local business community generally blames to favor the foreign investors at the expense of Ugandan business chain, but, without empirical data to back up this allegation. Whichever the cause, whenever Uganda's business chains collapse, employees lose their jobs while the investors and entrepreneurs lose their wealth instead of expanding their business chains, (Oketch, 2008; Zake, 2007). Franchising researchers like Doherty, (2007) and Sen., (1998) stress that there is a need to ensure franchiseable brand presence for the survival and competitiveness of any service-related business chain that intends to growth and expand using franchising partnerships.

In a study conducted by Mutumba & Tuzinde in 2009 on how to create franchiseable club football brands in Uganda, it was recommended that operations researchers should find and use the right tools that enable the respective potential franchisers to make use of operations research in this challenge. Other scholars like Altinay, (2007), Illtetschok, (1999), Mutumba, (2010), Reeb & Leavengood, (2002), Saunders, (2002), and Sen., (1998), generally support the use of operations research in ensuring franchiseable brand presence for mutual success in most franchiser-franchisee partnership in a country like Uganda. However there is little empirical evidence to specifically show where and why franchiseable brand presence should be ensured and how to continuously improve on this key success factor for sustainable and competitive business expansion, job and wealth creation in Uganda, (Mutumba, 2010; Mutyabule, 2006). This calls for competitive operations research from the universities and other research institutions to enable the potential franchisers to establish proven/time-tested, standard but adaptable/flexible operating systems, procedures, manuals, and other key features of franchiseable brands, (Gappa, 2007; Huang, Hsu, and Cheng, 2006; Mutumba & Tuzinde, 2009; Mutumba, 2010; Reeb & Leavengood, 2002). That is why the purpose of this study is to examine which constructs/areas show a greater need for operations research in ensuring franchiseable brand presence for Uganda's regional competitiveness. The researchers go further to examine the specific areas/issues under the identified construct(s) where operations research is needed, why it is needed, and which mathematical tools are to be used to ensure franchiseable brand presence in Uganda.

This paper begins with the above introduction which gives the background to the research challenge and the purpose which reflects the respective research objectives. This introduction is followed by the literature review on what other scholars and/or researchers say about the need for operations research in ensuring franchiseable brand presence in a country like Uganda. The reviewed literature leads into the research methodology which describes where and how the data was collected, processed, analyzed, discussed, presented, and how the resultant conclusions were drawn for the right recommendations/policy implications. Other parts like the limitations to the study and acknowledgements are also presented at the end of this paper.

Literature review

All over the world, the franchising concept continues to grow in popularity as a business expansion, job creation, and wealth creation strategy, (Hoffman & Preble, 2004; Mutumba, 2010). Business chains like McDonalds' attribute their faster business expansion to selling their proven franchise systems to well-selected franchisees compared to their rival non-franchise chains, (Duckett, 2008; Wolfe, 1995). Franchising is a strategic choice which is usually taken by the potential franchisers. A franchising choice is the decision to become a franchiser usually to expand the business chain in mutually beneficial ways, (Ducket, 2008; Sen, 1998). For the franchiser to be successful at expanding the business chain elsewhere using franchising there is need for franchiseable brand presence in a favorable business expansion environment like that in South Africa, (Doherty, 2007; Hoffman & Preble, 2004; Mutumba, 2010; Saunders, 2002).

Franchiseable Brand Presence

Doherty, (2007) stresses that presence of a franchiseable brand is mainly determined by the business/brand's ability to be duplicated elsewhere (duplicability) and its ease to be managed by other people especially the franchisees. Proven business success, and the customers' brand recognition are the other determinants of whether a brand can be franchised or not, (Bandura, 1977; Siebert, 2006; Walker, 1996; Wolfe, 1995). Research findings by Stanworth et al., (2004) and Kotler et al., (2001) show that small expansion/growth-oriented owners and/or managers whose businesses are perceived to be franchiseable are likely to exploit the existing business expansion environment by selling franchises to well selected franchisees. When they become aware of their ability to use franchising as their collaborative business

expansion strategy, such owners and managers (potential franchisers) are encouraged to the choice of ensuring franchiseable brand presence across their business network/partnership. This is an indication of the relationship between franchiseable brand presence and the franchising choice especially among owners and managers of service-related business chains, (Doherty, 2007).

Franchiseable Brand Presence and the Franchising Choice

Appreciating that the business chain has a franchiseable brand increases its key managers' likelihood of making a franchising choice for business expansion, (Campbell & Srikant, 2008; Doherty, 2007; Wolfe, 1998). The likely franchiser ought to be willing to make some strategic changes in the way that the entire business will be managed throughout its mix of both company-owned and franchise outlets for mutual benefits on a sustainable basis, (Altinay, 2007; Doherty & Alexander, 2006; and Sen., 1998). Such changes come through franchise system development initiatives like attending franchising awareness events, and seeking franchising and operations research consultancy among other initiatives, (Carter, 2002; Gappa, 2007; Saunders, 2002; Wolfe, 1998). Willingness to change and/or restructure the business chain's management control systems in order to match the next role of working like a 'parent' or 'champion' of the entire franchise system, is another important determinant of the likelihood of a franchising choice, (Campbell & Srikant, 2008; DiPietro, Welsh, Raven, & Severt, 2007; Doherty, 2007; Doherty & Alexander, 2004; Doherty & Alexander, 2006; Sen, 1998). For sustainable business expansion, the likely franchiser has to be willing to create a new structure through which the franchisees will be supported in terms of; intensive support for the initial outlet opening, on-going visits from franchisers to franchisees and vice versa, operating manuals that are easy to use in mutually beneficial ways, supporting the continuous customer-centered innovations by the individual franchisees, training of franchisee's staff, and the monitoring of sales and other financial data (Doherty & Alexander, 2006; Walker, 1996). Since establishing a really franchiseable brand with the right operating guidelines and support for the potential franchiser's future franchisees is based on research and experience from the daily operations, there seems to be a need for operations research for a competitive franchising choice, (Gappa, 2007; Mutumba, 2010; Mutumba & Tuzinde, 2009; Saunders, 2002).

The Need for Operations Research

Operations research is concerned with scientifically deciding how to best design and operate people-machine systems under conditions requiring allocation of scarce resources, (Reeb & Leavengood, 2002). Franchiseable brands are said to have mastered the science and art of allocating and managing scarce resources at their respective company-owned and franchisee- outlets, (Kotler, Makens, & Bowen, 2007; Roh & Yoon, 2009; Sen, 1998). Operations research has been found to play a vital role in ensuring franchiseable brand presence because franchiseable brands usually establish their attractiveness for their current and future franchisees through time-testing, proving, and properly documenting their competitive know-how/intellectual property from their daily operational experience, (Doherty, 2007; Huang, Hsu, and Cheng, 2006; Mutumba & Tuzinde, 2009; Reeb & Leavengood, 2002). When daily operations data from the experienced owners and/or managers of the respective business chains is collected, analyzed, documented into time-tested operating guidelines, it becomes easier to manage the chain's operations as the duplication of the brand to other locations in partnership with franchisees goes on, (Doherty, 2007; Wolfe, 1998). The way such operational data is used to establish the optimum sales and inventory levels is well demonstrated using OR tools like Economic Order Quantity-EOQ to create frameworks like the Material Requirement Planning-MRP1 in Van Weele's 2006 book on purchasing and supply chain management. In so doing, one is making use of operations research as a means of ensuring franchiseable brand presence, besides Van Weele argues that MRP1 can even have a software version since most franchise chains are becoming software/ICT-driven in their daily operations. Scholars like Carter, (2002) and Kotler *et al.*, (2002), warn that using operations research (OR) in service-related businesses is challenging because service delivery is usually difficult to standardize across the various locations of the business/franchise chain. In spite of such an application challenge, franchise managers and other practitioners in today's retail, healthcare, and other related businesses are showing a need for operations research solutions, (Carter, 2002; Kots, Jacks, & Aartjes, 2008). Such managers believe that their practical operational problems in areas like transportation, outlet location, queuing, staff scheduling, sales maximization, cost minimization, and establishing the fees to be charged especially by service-related franchisers can be solved using operations research, (Carter, 2002; Doherty, 2007; Huang, Hsu, and Cheng, 2006; Kotler *et al.*, 2002; Reeb & Leaven good, 2002). For example, Huang, et al., (2006) indicate that the franchiser usually delivers the stock to the respective franchisee location which calls for an operation research solutions in transportation and distribution management to

make it easier for the franchisees to minimize such costs and maximize the respective profits. OR-driven software will deliver faster and more economical results, (Konts, *et al.*, 2008).

The applicable need for operation research has also been demonstrated in a study conducted by Reeb & Leavengood, (2002) on USA's wood industry. It revealed how the transportation model of operations research is used in combination with an decision support software like LINDO can make it easier for the managers to plan the trucks/vehicles' routes between outlets. This way of adapting operations research in service-related business chains makes it easier to ensure franchiseable brand presence in African countries like Uganda, (Konts, Jacks, & Aartjes, 2008; Mutumba, 2010; Reeb & Leavengood, 2002). Researchers like Konts, Jacks, & Aartjes, (2008) have revealed that operations research increases franchiseable brand presence especially in terms of making it easier to manage the distribution problem in mutually beneficial ways. Carter, (2002) highlights those mathematical tools such as linear programming may not be applicable enough in some operations areas of some service business chains. Such challenging calls for successful application of operations research in ensuring franchiseable brand presence raises the following research questions that are answered by this paper;

1. Which general and specific areas/issues in ensuring franchiseable brand presence are showing a greater need for operations research?
2. Why do the respective owners and/or managers believe that operations research ensures franchiseable brand presence in the above area(s), and how?
3. Which mathematical tools are to be used in ensuring franchiseable brand presence among Uganda's service-related business chains?

Research Methodology/approach

This paper used a mixture of a quantitative and qualitative research methodology in collecting, analyzing, drawing conclusions from the data in line with the above purpose and research questions, (Creswell, 2002; Hofman & Preble, 2004; Roh & Yoon, 2009). A sample of 346 businesses chains from a population of 3,757 of service-related businesses which were registered and located within and around Kampala was initially used, (Uganda Business Register, 2007/2008). This sample includes service-related business chains in retail trade, restaurants and hotels, and car (fuel) sales, repair and maintenance. The researchers selected these industry categories out of the other service-related businesses because the franchising choice is most popularly made by the owners and managers of such chains compared to other service-related chains (Hoffman & Preble, 2004; Perigot, 2006; Sen, 1998; Stanworth *et al.*, 2004). The business chains were the unit of analysis while the respective owners, managers, and 3 lecturers were the respondents in this study, (Doherty, 2007; Mutumba, 2010; Stanworth *et al.*, 2004; Watson & Kirby, 2004). The research was limited to Kampala because 45% of the registered businesses in Uganda including the above service-related chain businesses are in Kampala, (Uganda Business Register (2007/ 2008). Qualitative data was collected from a selection of 10 key informants using a semi-structured interview guide to further examine those areas that show a greater need for operations research is more needed to ensure franchiseable brand presence for the respective business chains, (Doherty, 2007). The above key informants included 7 managers from the above sample-4 retail/supermarket managers, 2 hotel and restaurant managers, and 1 car (fuel) sales, repair, and maintenance according to their categories' respective response rates above, and 3 lecturers of operations research related course units at MUBS, (Roh & Yoon, 2009; Watson & Kirby, 2004). The 7 managers responded to questions one and two in the interview guide while the 3 lecturers answered question three from all the 7 managers' documented interview guides/sheets in order to establish which mathematical (operations research) tool to use where, why, and when.

The survey data used was from 281 questionnaires out of the 332 which were returned and the data collection took around 6 weeks. The interviews with the 10 key informants which were conducted after analyzing the quantitative/questionnaire data took 1 week (5 working days) with 10-20 minutes per interviewee during the data collection. The quantitative data was analyzed using SPSS Version 12 while the qualitative data was analyzed using Key Informant Analysis in order to establish trend/links an comparisons with the figures analyzed from the survey. The

respective conclusions and recommendations were drawn from such a quantitative and qualitative data analysis in line with the above purpose of the study. Below are the data and a discussion of the study results.

The Data

A response rate of **81%** ($281/346 \times 100$) is reported for the study. In describing the data characteristics, the researchers present and briefly describe the industry categories and number of branches of the service-related business chains where the respondents came from, using the frequency tables below.

Table 1 Showing the Industry Category of the Respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Restaurant & hotel	55	19.6	19.6	19.6
Retail/supermarket	203	72.2	72.2	91.8
Car (fuel) sale, repair & Maintenance	23	8.2	8.2	100.0
Total	281	100.0	100.0	

Source: Primary.

The majority of the respondents came from the retail/supermarket category of service-related businesses with a frequency of 203 respondents and making a percentage of 72.2% of the total number of respondents. 91.8% of the respondents came from the Restaurant & Hotel and the Retail/supermarket categories while only 8.2% (23 respondents) came from the car (fuel) sale, repair & maintenance category. This confirms the Doherty, (2007) and Sen., (1998) view that retail and restaurant/hotel business chains are usually more interested in establishing whether they can take on franchising choice using their franchiseable brands presence.

Table 2 Showing the Number of Branches for the Respondents' Business Chains

	Frequency	Percent	Valid Percent	Cumulative Percent
2-5 Branches	139	49.5	49.5	49.5
6-10 branches	104	37.0	37.0	86.5
Above 10 branches	38	13.5	13.5	100.0
Total	281	100.0	100.0	

Source: Primary.

Table 2 above shows that 49.5% of the respondents' business chains were consisting of 2-5 branches. This implies that most of the sampled business chains in the above 3 categories were still small in terms of number of branches.

The following findings are mainly based on data from service-related business chains with the above characteristics.

Discussion of Findings

The study revealed that although there is a generally high level of franchiseable brand presence among the studied business chains, there was low ease to manage according to the following tables.

According to Sarandakos, (2005), the mean which is the most common measure of central tendency is the average of all observations and is obtained by adding up all scores and dividing the sum by the number of scores. The data collected on the 2 variables was ordinal in nature and the distributions were showing some central tendency which makes mean analysis more appropriate to establish the average level of responses. Mean analysis was conducted in order to empirically establish the perceived level of appreciation for the variables and respective contracts under this study since the statement of the problem highlighted low franchising choice might be due to limited franchiseable brand presence in Uganda, among other factors.

Areas/Constructs Showing a Greater Need for Operations Research

The respective responses were analyzed to establish the perception levels of the 2 variables as reflected by the means of the constructs/areas under franchiseable brand presence and franchising choice respectively, as presented in Table 3 below.

Table 3: Means and Standard Deviations

Franchiseable Brand Presence	N	Minimum	Maximum	Mean	Std. Deviation
Duplicability	281	2	5	3.97	.53
Proven Business Success	281	2	5	3.98	.57
Brand Recognition	281	3	5	3.90	.52
Ease to Manage	281	2	4	2.88	.46
Franchising Choice	N	Minimum	Maximum	Mean	Std. Deviation
Awareness of Franchising Benefits	280	2	5	3.44	.58
Willingness to Change	281	2	5	3.12	.71
Franchise System Development Initiatives	281	1	5	3.28	.74
Motivation of Key Managers	281	1	5	3.24	.79

Source: Primary.

A 5-Point Anchor ranging from 1-5 (where 1=Strongly Disagree, 2=Disagree, 3=Not Sure, 4=Agree, and 5=Strongly Agree) was used in the semi-structured questionnaire. Where a mean was close to 4 or 5 such as 3.97, it indicated that the respondents were generally in agreement with that construct's combination of items/issues raised in the questionnaire hence there was a high perception level of the construct in question. Means close to 3 (not above or below 3) indicated that the respondents were Not Sure about the construct relating to the variable hence had average appreciation of the construct. While means close to 2 indicated that the respondents generally disagreed with the construct under study meaning there was low perception of the construct.

Mean results from **Table 3** above show that the respondents generally agreed that their chains were enjoying high franchiseable brand presence. High/positive perception or presence was reported on the 3 constructs while low franchiseable brand presence was reported on the construct of ease to manage (mean=2.88). The mean for duplicability was 3.97, the mean for proven business success was 3.98, and the mean for brand recognition was 3.90. This implies that the respondents perceived that their chains had high presence of franchiseable brands but with limited ease to manage the branches. The low perceived ease to manage the branches and/or future franchisee-outlets is line with Doherty, (2007) who argues that when a chain still has a smaller number of branches, the owners and managers may be less interested in developing the chain into an easy to manage system for business format franchising. Table 1 above shows that most (49.5%) of the sampled business chains had small number (2-5) of branches which is a reflection of low duplicability that affects the ease to manage the branches/future franchisee-outlets and affects the likelihood of a franchising choice.

Why Operations Research in Ensuring Ease to Manage (Using Quantitative Data)

To explain why the sampled owners and managers might believe that proper use of operations research in ensuring ease to manage is important to any business chain that is likely to make a franchising choice, correlation analysis is one of the analyses which were conducted. Correlation analysis measures the direction and the strength (and significance) of the relationship between the independent/explanatory variable(s) and the dependent/explained variable, (Sarantakos, 2005). The researchers had to conduct the correlation analysis because the research objectives reflected some relationships. Spearman's rank correlation (r) was used to establish the direction and significance of the association/relationship between the 2 variables and the 8 constructs because the findings are in terms of ranked data (Sarantakos, 2005). A simple correlation analysis of relationships between the 8 constructs under study is presented in Table 4 below.

Table 4 Spearman Correlation Coefficients between the 8 Constructs under Study

	1	2	3	4	5	6	7	8
Duplicability (1)	1.000							
Proven Business Success (2)	.153*	1.000						
Brand Recognition and Loyalty (3)	.370* *	.179* *	1.000					
Ease to Manage (4)	.392* *	.242* *	.270* *	1.000				
Appreciation of Franchising Benefits (5)	.107	.174* *	-.004	.101	1.000			
Willingness to Change(6)	.082	.163* *	-.062	.050	.491* *	1.00 0		
Franchise System Development Initiatives (7)	.217* *	.017	.089	.222* *	.199* *	.138 *	1.000	
Motivation of Key Managers(8)	.134* *	.125* *	.115	.281* *	.123* *	-.024 *	.387* *	1.000

Source: Primary

It was further revealed that there is a positive and significant relationship between duplicability and perceived ease to manage the branches ($r = .392^{**}$, $p < .01$), which means that the more duplicable a chain is the more the respondents perceived it to be easy to be managed. This is likely attract to attract entrepreneurs/franchisees hence increasing the likelihood to make a franchising choice for the business chain as reflected by relationships between ease to manage and constructs 5 to 8 under the variable of franchising choice. This is in line with Doherty, (2007), Sen, (1998), and Wolfe,

(1998) who stress that potential franchisees are attracted to business chain that they perceive to be easy to manage. That is why there is a positive and significant relationship between ease to manage the branch (es) and motivation of key managers towards making a franchising choice ($r = .281^{**}$, $p < .01$), which means that the more the branches become easier to manage the more the respective key managers pick interest in making a franchising choice as their business expansion strategy. The positive and strong relationship between ease to manage and franchise system development initiatives is in line with Carter (2002), Gappa (2007), and Saunders (2002) who argues that the motivated key managers need to make some strategic changes. The respective changes come through franchise system development initiatives like attending franchising awareness events, and seeking franchising and operations research (OR) consultancy among other initiatives in order to find ways of improving and competitively standardizing their daily operations to ensure their respective business chains' franchiseable brand presence in a country like Uganda.

The perceived low ease to manage the potential franchiser's respective branches and future franchisee outlets calls for operations research because according to researchers like Mutumba, (2009) and Richielieu & Pons, (2006), the right operations research tools enable current and/or potential franchisers to create franchiseable brands that have well developed systems which are easy to be managed by the respective franchisees and their staff. Operations research being more concerned with finding specific management solutions to daily operational problems, according to Reeb & Leaven good, (2002), there was a need to further identify the specific problem areas where operations research was need.

Where and when is Operations Research Specifically Needed for Ease to Manage?

The researchers used the main questionnaire items on the construct of ease to manage from the factor analysis below to specifically establish the main challenges that complicate this revealed franchiseable brand presence issue.

Factor analysis is a multivariate technique which allows for a big number of original variables/constructs and respective questionnaire items to be reduced to a small number of observable abstract variables, called factors (Murakumi & Cruz, 2004). The researchers also needed to conduct a factor analysis in order to establish the relative significance of the best-value contributing factors (BVCFs) to the variable under this study. Using a factor loading of .400, factor analysis was conducted in order to identify, reduce, distribute, rank, and form a factor (construct) structure out of those items in the questionnaire that best describe the specific factors/issues under the low scoring construct of ease to manage as presented and discussed below ;

Table 4 Factor Analysis for Franchiseable Brand Presence

Rotated Component Matrix

	Component			
	Duplica bility	Proven Business Success	Brand Recognit ion	Ease to Manage
Our branch meets the uniform standards like our sister branches	.741			
Our chain's proven success attracts individual investors out there	.648			
Our uniformity across our business chain is appreciated by our customers	.574			

Our top managers simplify the management of our branches	.559			
Our brand's unique attractiveness enables our branch to maximize sales	.508			
Our business chain is a market leader		.853		
Our business continues to attract its target customers		.827		
Our business and its outlets can continue to be profitable		.448		
Our sister branches are competing well at their locations			.676	
Customers to our branch quickly identify our chain's brand name			.611	
Our customers are emotionally attracted to what our brand's offers			.563	
More branches under our chain's brand can successfully be opened in other locations (streets, towns, and cities) in Uganda and the region.			.547	
Our new managers and staff can easily learn how to use our chain's time-tested business management systems				.829
Our branch's business management system is straight forward				.733
Our staff can learn how to use our business operating systems with ease				.539
Eigen values	2.257	1.840	1.822	1.779
Variance %	15.044	12.263	12.149	11.861
Cumulative %	15.044	27.312	39.462	51.322

Source: Primary. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. A Rotation converged in 6 iterations.

Results from Table 4 above showed that duplicability explained 15% of the variability in franchiseable brand presence, followed by proven business success which explained 12.3%, brand recognition which explained 12%. Ease to manage only explained 11.9% (the lowest) of the variability in franchiseable brand presence. When added together, these patterns indicated that 51.3% of the collected data on franchiseable brand presence had an underlying regularity. The Eigen values of the above 4 construct was reported to be above 1.000 which qualified them as acceptable (Yang and Miller, 2007).

From the same Table 4, the three (3) questionnaire items under the construct of ease to manage were used as the basis for establishing the specific areas of need for operations research hence formed the 3 interview questions for the qualitative data collection and analysis. This enabled the researchers to raise the respective questions for getting the in-depth explanations of where, why, when operations research is specifically needed in ensuring franchiseable brand presence (ease to manage) using which OR/mathematical tools. After interviewing the 10 key informants the following results explain the in-depth reasons for the need for operations research in ensuring franchiseable brand presence for the sampled service-related business chains within and around Kampala, Uganda. For the confidentiality of the key informants' responses and their respective business chains' identity against their competitors, their business names are give letter such A, B, C, In an alphabetical order according to who was interviewed first. The 3 operations research lecturers who responded to the match 3rd question in the guide are give numbers 1, 2, and 3 respectively.

Interview Results on Where, Why, When Which OR what Tools are needed

The 1st informant/interviewee was an operations manager of Supermarket A which currently has 3 branches and is soon opening a company-owned 4th branch in Kampala. When simply asked to outline and briefly explain which areas of daily operations she thinks operations research can be used in making the chain's branches easy to be managed, she outlined

areas like.... staff scheduling especially for the till cashiers, queuing standards to reduce the time that customers have to wait in order to clear their bills, the layout decisions of where to install/place which stand for displaying which category of retail products and services to the satisfaction of the supermarket's customers. The researcher asked her why she believes OR can solve the identified areas of need to improve the ease to be managed by their branch managers and future franchisees, her responses includes answers like.....

'Operations research can enable us to establish the standard number of cashiers for each branch depending on the size and seasonal demand', we are currently using 7 cashiers per shift but this key issue is yet to be standardized because we lack a well studied operational standards to make it easy for our supervisor to learn the formula for.....across our branches. This response links well with the high correlation ($r = .829$) for the questionnaire item of 'Our new managers and staff can easily learn how to use our chain's time-tested business management systems' in Table 5 above. She said that their management needs to set product quality and quantity specifications/standards for supermarket's..... according to seasons like back-to-school and Xmas shopping at our branches and/or future franchisee-outlets'. The 2nd informant who was OR-related Lecturer 1 who was advising on which OR tools to use ,recommended linear programming (LP) to the best mathematical tool for standardizing the staff scheduling and product mix-location problem. However he stressed the need for not over- relying on the manual LP calculations in a very busy supermarket, he recommended a OR-oriented software which name he could not mention, he tried to say ORSE..... but he failed. The researchers agree with the lecturer's recommendation of turning the manual LP algorithms into software language because it is line with Reeb & Leaven good, (2002) who support the use of more economical approaches like the transportation model and software(s) like LINDO.

The 3rd informant/interviewee belonged to business chain B which was a Car Garage that also dealt in selling spare parts. This supervisor's response to the question of where their 2nd or 3rd or next branch needed OR as a means of ensuring ease to manage the vehicle repairs and maintenance plus the sale of spare parts, his areas of need included solving issues like... 'Deciding which mechanic of which training background and experience to allocate/deploy to which section of the garage' this he said is to be key because they have built a reputation for quality service delivery which they are not ready to lose at any branch, 'we rather lose the money, BUT, not our reputation, we have a book that guides us on the process of repairing the different parts of any vehicle.....' Besides deciding on the mechanics, we also need to use research to set the customer waiting time, are you willing to assist us in doing this.....you university guys think that we cannot understand and use research in our garage work'. Let me see ... I think, your operations research idea is good for us as we open-up more branches and sell those franchise rights you mentioned, besides, we also have a training/internship department just like Spear Motors. This interviewee could not give more areas of need because his branch manager seemed to be in need of his help in solving a wiring problem for a certain Japanese vehicle. This garage supervisor believed that in OR tools enabling them to standardize their daily operating procedures, they will be able to opening more garages in various in Kampala, Jinja, Mbarara, and other big towns in Uganda with ease and at low business risk. On asking the 4th informant who was the 2nd OR-related lecturer (Lecturer 2) to identify and match which mathematical tool can help such a garage, he matched 'the decision on the deployment of mechanics with the transportation model', and matched 'the waiting time standardization problem with Local Search Algorithm which seemed to be too complicated for simple minds and also suggested the Queuing Method as the other matching OR tool for this assignment problem'. He added.....What I have to tell you is that although the transportation model is not the same as the Queuing Method of.....it can also be used to solve both problems. When we go into the details, you might not.....or you may even think of OR tools as being too academic moreover they are used in solving daily management problems like sequencing the traffic lights. 'It is better to just understand the simple OR tools and then use them to easily learn and use the appropriate software instead of the manual simplex, LP, and other time-consuming approaches like.....Unfortunately MUBS is yet to provide us -the management science/OR lecturers with the teaching software to demonstrate how OR and software can be used together in solving such transportation, distribution, scheduling problems. The garage supervisor and Lecturer 2's appreciation of OR making it easy to set the right management standards for the respective business chain's outlets is in line with researchers like Konts, Jacks, & Aartjes, (2008) whose study on the Coca-Cola Enterprises (CCE) revealed that operations research increases franchiseable brand presence. This is true when ensuring that it easy to manage the distribution problem in standardized and mutually beneficial ways especially when you use related software like SHORTREC. With the use of mathematical tools in connection with OR software solutions makes it more straight forward for the branch managers, supervisors, and respective franchisees to use the business and/or potential franchise chain's management systems which is in line with importance give to this issue in the Factor Analysis Table 5 above.

The 5th informant was another supervisor from supermarket chain C whose specific areas of need for operations research were reflected in his responses such as;

... 'as you defined it, we need operations research to set the sales targets per section of our supermarket per day, per week, per month, etc... according to the changes in the branch territory/location's demand and other factors like availability of what to sell,.....,, and other factors that determine what we sell here'. He also identified the area of establishing who should work overtime, when, and at what cost? This problem has been disturbing us especially when there is a sudden change in customer traffic at 2 or 3 of branches. Let me ask you, 'can operations research also help us to solve our delivery service vans problem more efficiently and with less customer delays?' Lucky enough by then, the researcher was near Lecturer 3 who interjected with the matching answer that operations research tools like linear programming can solve the overtime and delivery issues especially where there is a profit maximization target (objective function) set by the management. The same 5th informant also asked for ways of implementing such standards in ways that deliver competitive advantages for the different branches and/or franchisee-outlets because their chain was considering the idea of becoming a franchise network of branches in a few years to come. Apart from recommending a step-by-step software solution, the other answers from Lecturer 3 (6th informant) were not enough. However the step-by-step approach to implementing any OR-related solution was in line with both Konts, *et al.*, (2008) and Reeb & Leaven good, (2002) whose studies demonstrated the efficient applicability of this implementation approach towards making the franchise outlets/branches easy to be managed by the respective managers of the franchiseable brand.

The 7th informant was some owner of a 3-branch chain of restaurants who had ever been introduced to the need for OR in ensuring franchiseable brand presence, but in general terms. She was eager to be helped in identifying those specific areas of need because she already had 2 potential independent operators who were interested in becoming franchisees to her 4-branch chain of restaurants. After a 5 minute interactive discussion of what makes a franchiseable brand ensure ease to manage, she mentioned areas of need for OR with phrases like, 'mmhh', we need to test and standardize the distance between both our company-owned and franchisee-owned outlets in order to ensure harmonious sales according the respective agreement which the researcher interpreted as operations research-based territorial agreements. Her other areas of need for operations research were establishing the optimum levels of food and other restaurant inventory to be purchased on a weekly basis under normal business condition, also to establish how much franchise fees and on-going fees to charge the franchisees when the time comes. She asked, 'am I right? What do you think?' The researcher's answer was that, ' you are right BUT on deciding the fees to the respective franchisees, you need to also first pilot at least 3 branches in different locations for at least 14 months for Uganda and at least 1 year when trying to expand into regional markets like Kenya, Rwanda, and Tanzania'. When the researcher asked the 6th informant for the right OR tools for the restaurant owner's 3 areas of need, this female lecturer recommended the optimization algorithms like the construct algorithm for the outlet location (territorial) distance problem between the different outlets at the respective sub-regional, national, and levels. The OR-related lecturer's match was in agreement with Konts, *et al.*, (2008) whose study on CCE's distribution trucks approach revealed the use of such mathematical tools. On the operations area of establishing the standard optimum restaurant inventory he suggested tools that establish standards like EOQ. These suggestions are in line with Van Weele, (2006), who demonstrated how the EOQ is used in the MRP1 hence making it easy to predict sales demand and the needed inventory to meet the demand across the brand's branches and franchisee outlets according the changing business levels.

The 8th informant was from a nearby restaurant branch which was located about 300 meters away from the above restaurant. This manager's area of need for operations research which he claimed to already using since he claimed to have been good at statistics was in terms of establishing the optimum sales levels for the different outlets at the different locations. I believe this will enable us to tell our future franchise partners how much they should expect to sell since I think our percentage is likely to come from sales made, isn't so? This was related to the 7th informant above who also needed to find OR solutions to establishing sales standards and calculating the franchisee fees which are both issues raised by writers like Kotler, *et al.*, (2007) who argue that franchise fees should be established the set and/or actual sales made. He also raised the operations research need in establishing how many supervisors, chefs, waiters and waitresses, cashiers, and cleaners should particular suppliers in specific territories should be hired and at what labor costs per staff. These identified 2 areas of need are accompanied with the expected operational/business advantages of enabling the easy to be managed, duplicability, brand loyalty, and mutual benefits were in agreement with the above correlations in Table 4 above. The respective interpretations of those correlations were in line with researchers like Doherty, (2007), Sen, (1998), Stanworth *et al.*, (2004); and Wolfe, (1998) who stress that franchisees are attracted to brands that are easy to manage. Lecturer 1 matched such OR needs with Linear Programming-LP and other tools that use the objective function and optimization models in ensuring the achievement of such business objectives for the respective branches and franchisee-outlets.

The 9th and 10th informants were a relationship manager and a section manager respectively from the same supermarket which is located near MUBS and is an arch rival to the like of Uchumi and Shoprite especially in terms of customer turn-over. The relationship manager's OR need was in the area of establishing the flexible-but-standard waiting times at the different inquiry desks and establishing the standard operating procedures in handling cross-cutting customer complaints and enquiries especially during peak seasons. This she expected the respective operations research answers will help in reducing the average handling time while increasing the affected customer satisfaction and loyalty (as a quality standard) which matches with the fact that there exists a positive and strong correlation between ease to manage and brand (customer-based) recognition and loyalty as presented in Correlation Table 3 above. The 10th informant's areas of OR need were reflected in his interview responses like, if indeed operations research is concerned with finding tested mathematical formulae for solving our daily management challenges in a section like mine which mainly sells fruits and vegetables in this branch of our supermarket chain, then I think we need operations research in establishing weekly and monthly sales target for his section 7 staff members. Such formulae may also help us in setting standards for ensuring that we have the needed fruits and vegetable in their freshness especially towards the weekends when families are shopping as we try out, fine-tune such sales and inventory formulae we might be able to establish flexible, adaptable, and profitable standards for other vegetable sections at our other 2 branches around Kampala. The respective lecturer recommended the use of the software instead of manual approaches. However when the supermarket buys the generic version, it needs to involve an operations consultant to ensure that the specific waiting, staff scheduling, sales optimization, and profitability problems are properly addressed more economically using OR-related software. This suggestion is in line with the software recommendation from Lecturer 1 above and researchers like Konts, et al., (2008).

Conclusions

From the above discussion of the findings, there is need for operations research in ensuring franchiseable brand presence among Uganda's service-related business chains in the industry categories of hotel and restaurants, retail trade/supermarkets, and the car repair and maintenance/garages within and around Kampala. Making the respective branches/outlets easy to be managed is the main construct/area where operations research is greatly needed. Key informants analysis of the interviewees' responses confirmed that there is need for operations research to establish teachable business systems that can be easily duplicated and managed by the potential franchisees. The specific business areas where operations research is needed to ensure ease to manage have been established to be in the challenges of using formulae for establishing standards for staff scheduling, waiting and queuing durations, sales targets, optimum inventory levels, territorial distances between outlets among others, especially for the retail/supermarket chains. This implies that operations researchers and consultants under the ORSEA now know where to focus their mathematical tools for these chains. The restaurant chains' specific areas where they need operations research solutions are in setting uniform standards for deciding on the optimum inventory per outlet, sales targets, number of chefs and waiter/waitress to deploy for the outlets, and establishing standard formulae for establishing and charging the respective franchise fees. This last area of need is also needed for industry categories above. The garages mainly needed OR tools in deciding which mechanics to work on which cars in which sections, and deciding on how to pay the staff among others.

The main reason why the survey respondents needed OR solutions were to increase the motivation of the key managers towards making a franchising choice as their brands become duplicable and easy to be managed by the respective branch managers and franchisees. The other main reason for their OR need in making the branches easy to be managed include being able to use their franchise system development initiatives in increasing the success of their franchising choices as they expand across Uganda and East Africa. The key informants revealed that the specific reasons why they needed operations research were to establish standard operation procedures to be documented in their franchise manuals/documents as they choice franchising to be their expansion strategy, to set flexible-but-standard sales targets to be based on in charging the respective franchise fees, to ensure duplicability/opening more branches while maintaining the quality standards across the chain in profitable and mutually beneficial ways. In spite of these expected business benefits of using operations research that the key informants hope for, most of the interviewed managers are informally demanding the universities' operations researchers to work with them in ensuring the above benefits in the above areas of need.

The main OR/mathematical tools that were recommended by the above 3 lecturers were linear programming, the transportation model, optimization algorithms like the construction algorithms, and the economic order quantity for the above areas of need and to achieve the above franchising benefits that the interviewed managers hope for in their respective franchising choices. However they strongly recommend that OR-based software like LINDO or SHORTREC is more practical for busier business chains because it delivers faster and more economical results for the chains

involved. Unfortunately, leading ORSEA members like MUBS are not facilitating their management science lecturers with the teaching versions of such software moreover the respective students are expected to use them especially when they get employed or start their own businesses that might expand using the franchising strategy.

Policy Implications

This paper provides practical information to owners and managers of business chains that are likely to become franchisers with franchisee-owned outlets that are easier to be managed. Operations researchers now know where, why, and when to use which mathematical models in ensuring franchiseable brand presence for Uganda's regional competitiveness in job and wealth creation.

Managers of service-related chains that are beginning to appreciate the need and benefits of OR tools and software should be encourage to put in place a policy of involving the surrounding university/institutional operations researchers in standardizing their business operations and ensuring their franchiseable brand presence especially in terms of ensuring the wanting area of ease to manage. Operations research dissemination strategies like this 7th ORSEA Conference by the respective universities need a policy on how to attract more of such potential franchisers and franchisees. This twin-suggested policy which focuses on both the respective managers and operations researchers can be productively implemented through the formation of collaborations between the respective universities and such potential franchise chains.

Since ease to manage was reported to be low, the researcher recommends that the owners and managers of the business chains should be facilitated in developing the right management systems and manuals that can be taught and easily learnt by the potential franchisees in order to increase the level of franchiseable brand presence and franchising choice in Kampala and Uganda at large. Establishment of business incubators at the respective universities with support from the respective ORSEA Chapters and governments especially the Ugandan government will enable the operations researchers to test and pilot standard operating systems , manuals, and the jointly design OR-based software intended increase access to better solutions locally. Huaug, *et al.*, (2006) have demonstrated how the how universities in developing markets have become the main providers of OR-based software solutions to the respective franchise chains through the flagship approach that encourages the current and potential franchisers to integrate operations research incubation in their budgeting. This is a win-win approach for us.

Study Limitations

This study was only carried out within and around Kampala, and it did not consider the contribution of the moderating variables on franchising choice. Similar studies that include the moderating variables of university contribution to OR solutions, use of software's in OR solutions, franchising laws/regulatory framework, and the business culture of need to be conducted at various levels. Related multi-disciplinary studies that connect OR, franchising, and disciplines line marketing and organizational development need to conducted.

Acknowledgements

We are grateful to the entire management of Makerere University Business School (MUBS) for sponsoring at least 60% of this study and the conference registrations, travel, and other related expenses. The entire ORSEA community is appreciated for providing us with this opportunity to be part of this field of study which is key in franchising as illustrated in this study and other related studies.

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A PAPER PRESENTED FOR THE ANNUAL CONFERENCE AT KICC

**KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY KENYATTA UNIVERSITY OF
AGRICULTURE AND TECHNOLOGY**

**THEME: ROLE OF OPERATIONS RESEARCH IN THE NATIONAL VISIONS WITHIN THE
EAST AFRICAN COMMUNITY & NATIONAL AND REGIONAL INTEGRATION**

SUB- THEME; ENTREPRENEUERSHIP AND BUSINESS MANAGEMENT

**TITLE; HINDRANCES TO THE GROWTH OF YOUTH LED MICRO AND SMALL AGRI-
BUSINESSES IN KENYA**

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APRIL, 2011

HINDRANCES TO THE GROWTH OF YOUTH LED MICRO AND SMALL AGRI-BUSINESSES IN KENYA

ABSTRACT

Micro and Small Enterprises have been identified as the engine for economic growth and technological innovations in developing countries. Consequently, the Kenyan government has put in place interventions geared towards improving the business environment through appropriate policy frameworks. However, the MSE sector continues to be dogged with myriad of constraints which include; lack of appropriate technology, access to market information, credit, business management skills, rigid legal and regulatory framework, among others.

The study focused on the following

- a. Determining forms of investment in technology prevalent amongst youth led micro and small agri-businesses
- b. Investigating effect of investment in technology to youth led micro and small agri-businesses' performance.
- c. Discovering challenges faced by micro and small agri-businesses in applying emerging technologies to get competitive advantage and sustained productivity

The study focused on youth led micro and small agri-businesses in Makueni District of Kenya in November 2010. A descriptive research design was used to carry out the study. Stratified random sampling technique was employed to select the sample. An interview guide was the main instrument for collecting data. Data was analyzed using the SPSS software.

From the study, three main discoveries came to the limelight. First, our youths have no problem working in agri-businesses if that's where they see their future prospects contrary to our common belief that youths are lazy and would only opt for white collar jobs. Secondly, people including our educated youths fear technology. Finally, adults do not take youth requests seriously even when youths are paying for land and premises rent; a situation which leaves our youths frustrated and therefore not knowing whom to turn to for the services.

Among key recommendations from the study are that youth led micro and small agri-businesses need to be provided with adequate finances, relevant tools and equipment and frequent refresher courses to upgrade their business skills.

Key words

Youth, micro and small enterprises (mSES), technology, agri-businesses

1. INTRODUCTION AND RESEARCH OBJECTIVES

The foregoing is a research project conducted in Makueni district and whose aim was to find out whether the Kenyan youth are making use of their acquired technology to improve quality of their products and thus enhance their agri- business competitiveness. Technology has been identified as an enabler of economic growth as well as a means through which SMEs can gain competitiveness through creativity and innovativeness.

Statement of the problem

Youths are innovative, enthusiastic, vibrant and optimistic. If given a chance, they are capable of transferring their acquired technologies into business enterprises and drive Kenya towards achieving its vision 2030. However things are different. Youths are not employed. They are not starting own enterprises to create jobs for themselves and for others. Even the already started MSES are closing up within their first two years after start up (Nelson, 1986).

Study objectives

The study focused on the following

- a. Determining forms of investment in technology prevalent amongst youth led micro and small agri-businesses
- b. Investigating effect of investment in technology to youth led micro and small agri-businesses' performance.
- c. Discovering challenges faced by micro and small agri-businesses in applying emerging technologies to get competitive advantage and sustained productivity

Definition of terms

This section deals with operational definitions whose role is to indicate the specific manner in which a term or concept is to be applied. Their use may be different in another perspective. This study used the following concepts.

Micro and small enterprises (MSEs) A micro or small enterprise is an undertaking, which employs between 1 and 20 employees, with capital investment of not more than kshs 30 million. Operational and administrative management lies in the hands of one to three persons who usually make major decisions.

Technology According to Van Dijk (2001), Technology may be seen as a resource that can be useful if adapted by firms to improve their efficiency and factor productivity. This study used the same definition.

Appropriate technology Is defined as the technology that is suitable to the needs of an MSE operating in the labour intensive, low-skill spheres and using local materials and resources

2. THEORETICAL BACKGROUND AND INFORMING LITERATURE REVIEW

The Kenyan youth

A Kenyan Youth has been defined as one aged between 15 – 30 years. The youth in Kenya, who number about 9.1 million, account for about 32% of the population. They form 60% of the total labour force but many of them have not been absorbed in the job market owing to the country's high unemployment level (GOK, 2006). Youths are innovative, enthusiastic, vibrant and optimistic. If given a chance, they are capable of transferring their acquired technologies into business enterprises and drive Kenya towards achieving its vision 2030.

Micro and small enterprises (MSES)

The economic recovery strategy for wealth and employment creation recognizes the great role that MSE sector play in wealth generation, employment creation and poverty reduction (GOK, 2003). The strategy paper goes on to state that the sector contributes about 18% GDP and plays a critical role in easing foreign exchange constraint, in penetrating new markets and in stimulating growth and development particularly in the rural areas. The sector also acts as the seed bed for entrepreneurial pursuits and complements the process of adjustment in large enterprises by bringing backward and forward linkages for products and services previously not available in the market.

In Kenya, much of existing technology is insufficient and cannot produce goods of a quality or type that enables them to break into new, expanding or more demanding markets. This is because choosing a technology requires specific skills and knowledge that MSEs just do not have (Buainain, 2004). The Kenyan's sessional papers No. 2 of 1992 and 2005 clearly summarize the problem of technology in Kenya as follows.

“MSEs have restricted levels of technology, in appropriate technology and inadequate institutional capacity to support adaptation and absorption of modern technological skills. Such enterprises suffer from lack of information on existing technologies and are exposed to a weak environment that hampers coordination and transfer of technology. They have no way of gauging appropriateness of technology. In addition, there is a wide gap between the suppliers of technology and the end users of technology products.”(GOK, 2003). Effective transfer of technology is therefore not taking place in the country because decisions relating to cost aspects rest with multinational corporations” (GOK, 1982).

Technology

The purpose of technology is to improve productivity of enterprises, and enhance the quality of goods produced by enterprises to help them with-stand local and international competition (ILO/UNDP, 2000). Technology transfer can be defined as the process that allows techniques, knowledge as well as products and management practices to flow from one entity to another (Moyi and Njiraini, 2005). Formal means of technology transfer include acquisition of capital equipments and machinery through trade, licensing and/ or franchising agreements. Informal technology transfer mainly occurs via technology-spillovers such as demonstration, imitation effects, competition, printed information, observations during visits to foreign plants and so on. Successful business operation depends on the ability to complete; the ability to compete depends largely on the quality of the product (Lyman & Grubellini, 1975). This will therefore require that an entrepreneurial organization works towards product/service improvement on a continuous basis. This will, in turn, call for managerial talent that is capable of harnessing organizational resources – human, material, physical and informational resources- efficiently and effectively toward meeting the organizations objectives and goals. Most organizations objectives are to make profit; which is partly realized through the provision of competitive and quality products/services.

3. RESEARCH METHODOLOGY

Research design

The study used both qualitative and quantitative research designs which were descriptive in nature; Qualitative data was manually analyzed using the researcher’s insight and research skills to bring out the main themes..

Data Analysis

Graphical analysis as well as descriptive statistics of the variables was used in the study and which conforms to Gall and Borg (1989) observations that “descriptive studies by nature emphasis interpretation”. Data was collected using a predominantly 5 point likert type scale. The choices were coded and so also were the questions to facilitate analysis.

4. RESEARCH FINDINGS AND DISCUSSIONS.

Introduction

This chapter examined the research objectives formulated in relation to the findings obtained.

Conclusions and recommendations were subsequently given being based on information generated from the analysis of the questionnaire.

Summary of the findings.

Family Background

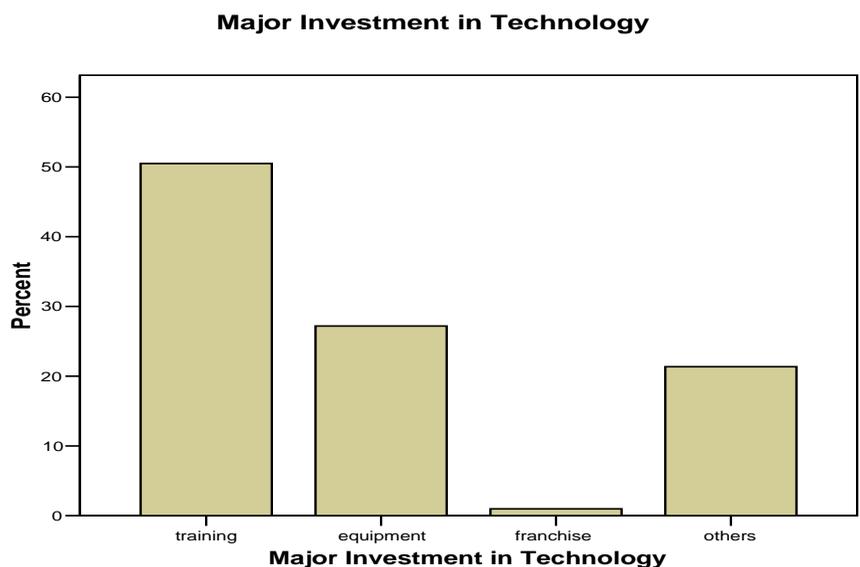
From the findings, majority of entrepreneurs were aged 21 to 25 years (38.8%), single (52.4%) and with zero to one child (71.8%). They had trade test professional qualification (45.6%) and 3 to 4 years of working experience (39%). These findings agree very well with our expectations that youths are either single or have just gone into family life. They have therefore very little or no resources; an assertion shared by the Ministry of youth affairs and sports in their draft strategic plan (GOK, 2006).

Major investment in technology

The study revealed that 54% of all businesses had training as their major investment in technology, 28% in equipment, 16% in franchise and 2% on others. These findings tend to strengthen Ikiara’s and UNIDO’s assertion that education and on job training are drivers of adoption, survival and growth amongst enterprises and economies (Ikiara et al, 2005; UNIDO, 2004). Likewise, the results also compare fairly well with Biggs et al (1995) and Gichira (1999) that firms in Africa have not invested much since they are young and small and that most of their investment in technology is in training.

This means that these businesses are not able to reap much from emerging technologies as they have invested in only one form, training.

Figures1 below shows entrepreneurs’ major investment in



technology

.Fig1 Major Investment in Technology and their frequencies

Effect of Technology Adoption on Business Performance

Record Keeping

The study revealed that 48% of respondents were of the opinion that technology helps them very much in calculating their profits as well as keeping their business records. Forty-three per cent (43%) responded that technology assists them fairly well, 6% said it has not been of much help while only 3% said it does not at all assist them.

These results confirm Gichira (2002) findings that technology helps MSES achieve effectiveness of financial assistance, strengthens communication channels and helps in marketing. They also concur with Buainainn (2002) assertion that appropriate technology helps SMES to operate in low-skill spheres with local materials and resources. Equally, Biggs et al (1995) states that high technology firms which have invested in research and development, foreign technical licenses and technical assistance contracts have higher productivity than lower technology firms. He also contends that investment in technology adds about 25% to value added (Biggs, 1995). These findings show that technology is of paramount importance in enhancing MSEs technical documentation and business record keeping.

Marketing

When asked the extent to which technology is addressing problems of lack of market, most respondents (38%) indicated fairly well, 29% of respondents said technology was of much help in addressing their marketing problems, 27% said it was not of much help while 6% were of the opinion that technology was either not of help or were non committal. This information is represented in fig. 4.4 and seemed to concur very well with a number of scholars as follows; Albu (1997) and Maskell (1999) indicated that one way of achieving and maintaining competitiveness in a market oriented environment is to be able to create, distribute and exploit knowledge faster than competitors. In turn, this depends on cost advantages, innovations and continuous improvement of products and services; they claimed (Albu, 1997; Maskell and Malmberg, 1999). Biggs et al (1995) suggested that investment in technology and worker training should be incorporated at firm level policies as they are major determinants of firms' ability to get connected to foreign markets' through exporting'. Gichira (2002) defines technology capabilities as information and skills that allow productive enterprises to utilize equipment and technology efficiently.

As a result of efficiently utilization of technology, MSES become innovative and achieve improved product consistency and reliability; better packaging technology for bulk markets; increased output to open up bulk markets and thus increased marketing independence.

These results mean that technology is very crucial in improving MSES product marketability and growth. It improves product design, quality control and ensures increased product markets. Figure 4.4 below represents respondents' views on how technology helps them solve problems of lack of market.

Business competitiveness

For effects of appropriate technology on business competitiveness, 32% of respondents said it helps them increase their sales, 28% stated it improves quality, 19% talked of increasing efficiency while 16.5% said it improves their customer royalty.

These results bring out two most important outcomes that technological assistance to MSES can achieve, also mentioned by Gichira (2002) Biggs (1995), Oakland (1993) and Government of Kenya (G O K, 2005).

These two achievements from use of appropriate technology are improvement of quality of products and increase in sales volume of an enterprise. This is reflected in table 1 and figure 2 below and shows that most entrepreneurs perceived use of appropriate technology is helping them to increase their sales volume and improve quality of their products to enhance their competitiveness.

Table.1 Information on Appropriate Technology

A. Effect of Technology on Business Competitiveness

Options	Percent
Quality products	28.2
Increased sales volume	32.0
Reduced waste	3.9
Fast/ efficient production	19.4
Customer loyalty/repeat buying	16.5
Total	100.0

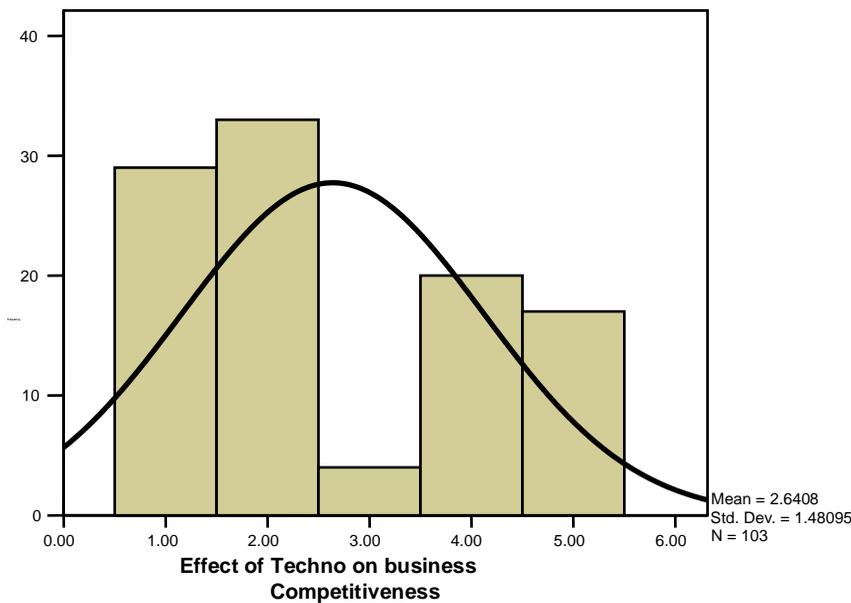
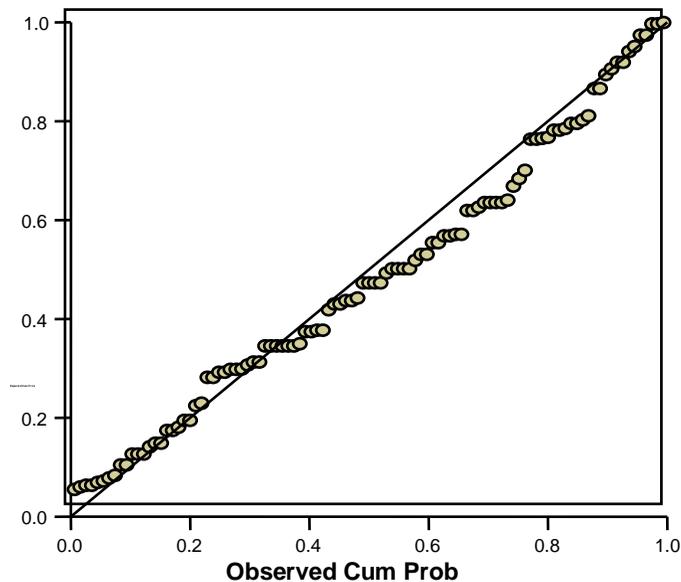


Fig. 2 Effect of Technology on Business Competitiveness

When plotted on a normal regression graph, effect of technology as perceived by entrepreneurs and business competitiveness produces a perfect positive regression line.

This implies that there is a one-on-one relationship between the two variables (effect of technology as perceived by entrepreneurs and business competitiveness). This is similar to ILO/UNDP (2000) expectations that the purpose of technology is to improve productivity of enterprises and help them withstand local and international competitions. According to Gichira (1999), technology has proved to be the engine of economic growth when applied to micro and small enterprises amongst ‘Asian Tigers’. Lucas (1993) observes that accumulations of human capital in form of technological capabilities far outweigh all other factors of production and that it is a cause of sustained development success. Lastly, Moyi and Njiraini (2005) say that technology is a key source of growth and competitiveness. They conclude that ability to use technology is best measured by the production and investment capabilities. These results therefore imply that Technology is very effective in enhancing entrepreneurs’ business competitiveness. Figure 3 below represents the relationship between Effect of Technology and Business Competitiveness.



Normal P-P Plot of Regression Standardized Residue

Fig. 3 Effect of Technology on Business Competitiveness.

Challenges faced in Applying emerging technologies

When asked the challenges they face in applying quality improvement technique, 49% of the respondents said they have insufficient funds. Inappropriate skills were mentioned by 22.3%, and inefficient machines were mentioned by 18.4%. 11% however said their major challenge in applying the technique was lack or insufficient information. These results concur well with Moyi (2005) who observes that Kenya's productive and investment capability is constrained by factors such as high cost of equipment and machine components; Gichira (2002) who concludes that widening gap between the technological capabilities employed by African firms and those employed by firms in other parts of the world are caused by inadequate funds; and Biggs, Shah and Srivastova (1995) who asserts that studies in African countries reveal that Africa exhibits much more inter firm technological heterogeneity than other developing regions (due to lack of funds); and Patel (1986), Chambers (1967) and Albu (1997) who conclude that entrepreneurs need skills, knowledge as well as financial resources to be able to assimilate change and create technology.

These discussions imply that the most important challenge in using quality improvement techniques is insufficient funds. These results are represented in table 2 below.

Table 2; Challenge Faced In Applying Quality Improvement Techniques

Options	Percent	Qualitative Questions
No/ little money	48.5	These were mainly from part three
No/inappropriate skills	22.3	
No efficient machines	18.4	
No/little information	10.7	
Total	100.0	

of the questionnaire. The questions in part three were aimed at checking and confirming the outcomes of the quantitative questions as they also bring out other main themes. The section had varied responses. However the responses which could be grouped were analyzed in numerical terms using the SPSS. They are as follows.

Comment on Any Other Technology Issue

When asked to comment on any other technology issue, 62.1% had no comment. 1.9% said they do not know what to say. 15.5% said technology is complicated while 2.04% talked of other issues. These results imply that entrepreneurs fear technology as it is complicated. This observation is also shared by the Government of Kenya that “MSEs have restricted levels of technology, in-appropriate technology and inadequate institutional capacity to support adaptation and absorption of modern technological skills. In addition, there is a wide gap between the suppliers of technology and the end users of technology products.”(GOK, 2003). Fig.4 below shows respondents’ comments on other technological issues not captured in the main questionnaire.

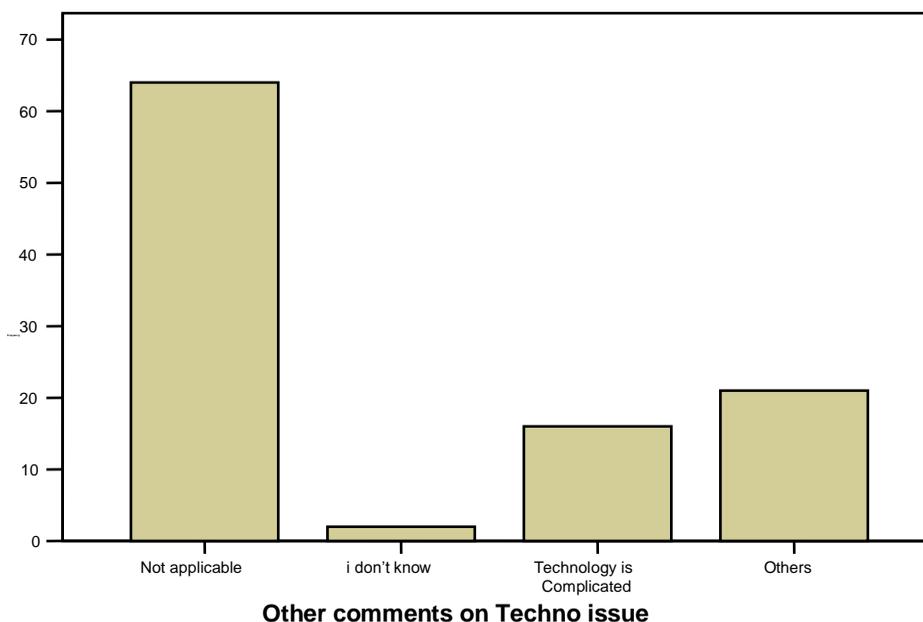


Fig.4: Comments on Other Technology Issues

Comment on Any Other Technology Issue of Importance to Youth Led Business

For comments on any other technology issue of importance to youth businesses, a shocking revelation came out that many landlords do not take requests on repairs and maintenance of business premises from youth tenants seriously. This view is very well supported by the Ministry of Youth Affairs and Sports strategic objectives of empowering youth to participate in decision making at all levels (GOK, 2006).

Recommendations.

1. To enable MSEs cope with challenges of financial resources, it is recommended that the government of Kenya provide them with accessible, cheap and adequate loans.
2. The government should capacity build young entrepreneur’s human resource base with relevant skills to be able to benefit from emerging technologies
3. The government should promote all sectors of the economy including agriculture for young entrepreneurs to invest in
4. Finally, it is highly recommended that youth entrepreneurs be given a forum where they can air their views concerning issues affecting their businesses, a situation which would build their confidence in entrepreneurship and business management skills.

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**RELATIONSHIP MARKETING AND FIRM PERFORMANCE:
A CRITICAL LITERATURE REVIEW**

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Abstract

Despite the existence of a large and growing body of literature on relationship marketing, there is still some misunderstanding surrounding the practice and how it influences performance. Today, marketing is taking on a new paradigm that aims at engaging the customer interactively in creating value which is shared between the service provider and the customer. The concern is how an organization can establish and maintain long-term relationship with its customers. This paper explores the theoretical foundations of relationship marketing practice and performance in organizations. It attempts to provide insights into the understanding of relationship marketing and how the practice contributes to favourable performance. Existing literature proposes that there is a positive relationship between relationship marketing and organizational performance. It involves a two-way communication that creates value to the stakeholders. The conclusion is that organizations should put more emphasis on establishing long-term customer lasting relationships within their operations through interactive marketing, customer value creation in terms of loyalty, customer satisfaction and retention and strategic partnerships.

Key Words: Relationship Marketing, Interactive Marketing, Customer Value Creation, Strategic Partnership.

1.0 Introduction

Today, relationship marketing has caught attention of most scholars in many parts of the world, including North America, Europe, Australia and Asia. Its scope covers the entire spectrum of marketing disciplines, including marketing channels, business-to-business marketing, services marketing, marketing research, customer behavior, marketing communication, marketing strategy, international marketing and direct marketing. Sewell (1990) refers to this process as “customers for Life.” That is, an organization must become a life-time partner with the customer, anticipating needs and developing a level of trust that commits the customer to staying in the relationship. To Webster (1992), the ability to create a long-lasting relationship with the customer has been singled out as the most important business asset for an organization. According to Peppers and Rogers (1995) the success of an organization depends on relationship marketing and further adds that it can cost between six to nine times more to acquire new customers than to retain current ones. To Morgan and Hunt (1994) relationship marketing refers to all marketing activities directed toward establishing, developing and maintaining successful relational exchanges.

Previously known as customer relationship management, relationship marketing today has emerged as the favorite catchword in business world at the turn of the millennium (Storbacka & Lehtinen, 2000). Today, the concept has been proliferated with many definitions and many programs (Parvatiyar and Sheth, 2000). It includes affinity marketing, loyalty marketing, cross selling, up-selling, co-branding, co-marketing and customer-supplier partnering among others. In professional services, it includes personalized one-to-one relationship with individual clients and dedication of organization’s resources to the individual relationships. Edelstein (2000) further reported that relationship marketing should help organizations improve the profitability of their interactions with current and potential customers while at the same time making those interactions appear friendly through individualization and personalization of processes. Relationship marketing can be defined as the process of attracting, maintaining and enhancing relationships with key people or customers (Young, 1988, Kotler and Armstrong, 2002). Researchers like (Kotler and Armstrong, 2002); Zikmund *et al.*, 2003; Jobber and Fahy, 2006) concurred with this and further stated that, it is a process of creating, maintaining and enhancing strong value-laden relationships with customers and other stakeholders.

The present day business environment is characterized by increasingly saturated markets, caused by changes in the nature of competition and an ever-changing environment making it difficult for organizations to achieve a comprehensive appreciation of customer needs. Thus, matching the growing complexity of the business environment has led to an ever-more diversified and demanding customer base (Barnes *et al.*, 2004). However, relationship marketing emphasizes that relationships are partnerships and mainly focuses on social bonding, co-operation, and joint problem solving, sharing resources and activities, and basing relationship on a common goal. It emphasizes that long-term relationships are mutually beneficial. Despite all these attempts, customers are smarter; more informed and have an access to many channels and choices.

Bhardwaj (2007) asserted that today, customers easily defect to competitors that promise them better offerings at lower prices. The researcher further reported that the challenge facing the marketers today is in finding ways of increasing customer loyalty and retention and transforming indifferent customers into loyal ones and, thus establishing a long term relationship with them is a critical issue. For success of organizations, there is need to increasingly strive to establish long-term relationship with the target customers. This can be achieved by offering a product or service, which satisfies customers’ needs that is delivered in a friendly, caring, responsive, convenient and flexible way. Hence, the key success

factor for organizational survival in mature markets relies on sustaining long-term relationships with customers (De Madariaga and Valor, 2007).

2.0 The Theoretical Background

Literature on relationship marketing evolved in the 1980s from the transactional marketing of the 1960s and 1970s and also migrated from organizational behavior and industrial marketing where interdependence between firms was the foundation of successful business operations. Notwithstanding the existence of a large and growing body of literature on the subject, there continues to be ambiguity about the nature of marketing relationships in enhancing business performance. According to Berry (1983) relationship marketing is attracting, maintaining and enhancing customer relationships. It aims at increasing organizational profitability while providing better services for customers. The focus of relationship marketing is frequently considered to be customer retention because current literature suggests that retention is less costly than acquisition and small increases in retention rates can have a dramatic effect on the profits of a company (Reichheld and Sasser, 1990; Reichheld, 1996).

Several studies have empirically demonstrated a positive association between relationship marketing strategies and business performance (Naidu *et al.* 1999). However, most scholars have argued that relationship marketing will not automatically lead to stronger customer relationships but rather, customers will exhibit different levels of relationship closeness and strength with the organization (Berry, 1995 and Liljander and Strandvik, 1995). Thus, in order to be able to attract and maintain customers, organizations must put in place strategies that enhance customers' perceived benefits of engaging in a relationship. One of the basic tenets of relationship marketing is customer orientation which is based on the premise that this orientation increases customers' long-term satisfaction. In the past, selling oriented sales people were considered to prioritise the achievement of an immediate sale at the expense of customer needs. Today, subsequent research has shown that the degree of customer orientation indeed has an effect on a firm's relationships with its customers (Liljander and Strandvik, 1995).

Theory and practice of marketing has now taken a paradigm shift from traditional or transactional marketing to relationship marketing (Gronroos, 2000 and Parvatiyar and Sheth, 2000). Thus today, managers realize that their most valuable resource is the relationship with their customers and acknowledge the increased emphasis on customer centric strategies. The researchers further asserted that if organizations are able to manage the relationships better than their competitors, they will not only succeed in business but will retain and attract new customers too.

3.0 Interactive Marketing

Interactive marketing refers to buyer- seller communications in which the consumer controls the amount and type of information received from the marketer. In today's highly volatile world of dynamic change, organizations have to adopt interactive techniques like interactive advertising, (point-of-sales brochures, displays and coupon dispensers have to be put in place) for continued survival of firms. Interactive marketing frees communication between marketers and their

customers. That is, today customers come to companies for information thus, creating opportunities for one-to-one marketing.

According to Boone and Kurtz (2007) interactive marketing involves a two-way communication which results in the creation and development of one-to-one marketing. It further depends on the development of close ties between the buyer, whether an individual or company and the seller. This underlying relationship is based on promises from organizations that go beyond obvious assurance that potential customers expect. It represents an asset of promises, which could either be outside or within the organization and between buyers and sellers that determine whether a marketing encounter will be positive or negative. To this extent, an organization that makes unrealistic promises can disappoint customers who may not buy the good or service again. That is, every customer interaction with a business reaches the moment of truth when a good or service is provided to the customer that meets their level of expectation. Therefore, buyer-seller relationship defines the point at which a company keeps its promises, hence emphasizes on cooperation rather than competition.

The conclusion here is that, every marketing transaction involves a relationship between the buyer and seller in a transaction-based situation where the relationship may be quite short in duration and narrow in scope. The customer-seller bonds develop in a relationship marketing situation and are likely to last longer and cover a much broader scope than those developed in transaction marketing. In this case, customer contacts are more frequent when a company emphasizes on customer service thus, contributing to consumer satisfaction (Armstrong and Kotler, 2008).

3.1 Buyer-Seller Relationship

Relationship marketing depends on the development of close ties between the buyer and the seller. This tie considers the core elements of the buyer-seller relationship incorporating the promises that form the basis of relationship marketing (Gronroos, 1994 and Boone & Kurtz, 2007).

Today, most firms make promises to potential customers through external marketing that communicates what a customer expects from the firm's goods and services. The promises must be both realistic and consistent. According to Zeithmal *et al.* (2006) and Boone and Kurtz (2007), a firm that makes unrealistic promises will disappoint customers who may not buy the product again. Therefore, organizations must keep these promises and follow up carefully through external marketing to ensure customer satisfaction and retention. Thus, all relationships depend on the development of emotional links between the parties including dimensions like bonding, empathy, reciprocity, trust and tangibility (Chris and Graham, 2007).

3.2 Customer Value Creation

Researchers like Engel and Blackwell (1982) reported that value is constantly used to mean benefits to the consumers. This means that customer value is considered an important constituent of relationship marketing and the ability of a company to provide superior value to its customers is regarded as one of the most successful competitive strategies in business performance. The researchers further emphasized on the importance of value creation by organizations and suggested that organizations must be able to identify what customers are trying to satisfy by offering the best at a particular time and place. Thus, any company attempting to provide competitive value to its customers must gain a

thorough understanding of the customers' needs and wants which constitutes the customer's value chain. This ability has become a means of differentiation and a key to the riddle of how to find a sustainable competitive advantage (McKenna, 1991, Treacy and Wiersema, 1993, Gronroos, 1994 and Heskett *et al.* 1994).

According to Peterson (1995) marketing has progressed from a simplistic focus on giving the customer what he or she wants to an orientation in which the specific capabilities of the business are focused around creating and delivering customer value much better than competition. This constitutes an opportunity for the company to improve the customer-perceived value and thereby establish and maintain a long-term relationship (Monroe, 1991). Therefore, creating superior customer value is key to a company's long-term survival and success (Slater, 1997). Today, customer value is the cornerstone of the marketing management process and it is the perceived sacrifice customers undertake (Anderson and Narus, 2004). To Zeithaml *et al.* (2006), the key role of marketing in this new paradigm is to determine what value proposition to create and deliver to the target customer or market.

3.3 Customer-Perceived Value

The concept of perceived value has been defined severally by the different researchers. According to Porter (1985), the buyer's value chain is the starting point for understanding what is valuable to the customer who represents the sequence of activities performed by an individual buyer or a household with various members in which the product or service is appropriate. Zeithaml (1988) reported that customer-perceived value should be viewed in terms of the consumer's overall assessment of the utility of a product based on a perception of what is received and what is given and stated that quality can be viewed as an overall judgment of the superiority or excellence of a product. The researcher further pointed out that perceived value is subjective and individual, and therefore will vary among consumers. For example, a person may evaluate the same product differently on different occasions and in many instances, the price may be the most important criterion at the time of purchase while, a clear and easily comprehensible manual may be of importance at installation and assembly. But, Zeithaml has not given a reason as to why consumers may have different perceptions of the value attached to an offering.

On the other hand, Monroe (1991) reported that perceived value can be defined as the ratio of perceived benefits relative to the perceived sacrifice which include all the costs the buyer faces when making a purchase decision in terms of the purchase price, acquisition costs, transportation, installation, order handling, repairs and maintenance and risk of failure or poor performance.

4.0 Customer Loyalty and Retention

According to Oliver (1980) customer loyalty explains that the loyal customers of today might not be so loyal in the future. In a study by Dwyer, Schurr, and Oh (1987) customer loyalty is reported to contribute to increased revenues along the relationship life cycle because of cross-selling activities and increased customer penetration rates. However, Dick and Basu (1994) argued that brand loyalty should not be regarded as mere repurchase behavior, but rather as a combination of purchase behavior and attitudes. According to the researchers like, Reichheld and Sasser (1990) and Oliver (1999), the connection between loyalty and retention and performance has been the focus of both theoretical and empirical studies. According a study by Berry (1995) this body of research has found customer loyalty and retention to positively influence organizational performance through increased revenues per customer. Basically, customer loyalty refers to the tendency of customers to select one company or product over another so as to satisfy a particular need. It

also describes the behavior of repeat customers hence loyalty is observed through the actions of the customers. However, Dick and Basu (1994) argue that brand loyalty should not be regarded as a mere repurchase behavior, but rather as a combination of purchase behavior and attitudes.

Customer loyalty is defined as a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behaviour (Oliver, 1999). It is assumed that customers who are behaviourally loyal to a firm display more favourable attitudes towards the firm in comparison to competitors. However, in some cases behavioural loyalty does not necessarily reflect attitudinal loyalty, since there might exist other factors that prevent customers from defecting to other competitors (Reinartz and Kumar, 2002).

According to Breshnahan (1998) many organizations have begun to implement one-to-one marketing and loyalty-programs with their end user customers. However, Novo (2008) reported that organizations are today focusing on customer retention and customer commitment in order to outdo their competitors in the market. The scholar further noted that a loyal customer is more than a customer who frequently purchases from a company but one that is also emotionally bonded with the organization. To the researcher, true brand loyalty requires repeat purchase behavior in addition to a significant psychological attachment to the chosen brand. Eisingerich & Bell (2007) concurs with this and finds empirical support that customer loyalty emerges as the dominant, significant, direct determinant of repurchase intention.

Numerous studies have shown positive links between loyalty and firm profitability and that, not all loyal customers are profitable (Hallowell, 1996 and Reichheld, 1996). Nonetheless, (Storbacka, 1997). In addition, customer relationship and profitability arises through the acquisition and retention of high quality customers with low maintenance costs and high revenue (Anderson and Mittal, 2000). Over the past years the interest in retaining customers has increased considerably with marketing attention shifting gradually but definitely from mutually independent transactions to loyalty-based repeat purchases and cross-selling opportunities (Berry, 1995; Peterson, 1995; Blattberg and Dayton, 1996 and Winer, 2001). Today, it is argued that the primary goal of value creation can sometimes even be equated to relationship marketing concept itself (Sheth, 1996). The connection between loyalty and performance has been the focus of both theoretical and empirical studies (Reichheld and Sasser, 1990). Customer loyalty is also reported to contribute to increased revenues due to cross-selling activities and increased customer penetration rates (Dwyer, Schurr, and Oh, 1987).

Another researcher (Businessstown, 2008) reported that customer loyalty can be built through effective communication, customer service, employee loyalty, employee training, customer incentives, product awareness, reliable service provision, flexibility in solving customer problems or complaints, customer service, and knowledge of names of regular customers. Thus, relationship marketers need to note that a key to winning customer loyalty in competitive industries is to view interactions with customers not as one time transactions but as a means to establish a long-term relationship and also being customer centric.

3.0 Customer Satisfaction

According to Heskett *et al.* (1994) customer satisfaction is one of the most important criteria for achieving customer loyalty. A study by Liljander and Strandvik (1995) on customer relationships in service sector revealed that overall customer satisfaction is a better predictor of intentions to rebuy. Thus, a satisfied customer is supposed not to defect but to stay loyal to the company for a long period of time and to buy more and more often than others, not so loyal, customers do. Furthermore, new customers may be attracted and the market shares increased, but any long-lasting bonds will hardly be tied. In addition, Bennett and Rundle-Thiele (2004) reported that customer satisfaction has a good feedback to the firms and that it is central to the development of business relationships.

Customer retention can be defined as a commitment to continue to do business or exchange with a particular company on an ongoing basis. In today's highly competitive markets, companies strive to build professional customer retention management systems alongside common strategies like process re-engineering and employee redundancy exercises. Retention strategy also builds barriers to customer switching. This can be done by product bundling (combining several products or services into one package and offering them at a single price), cross selling (selling related products to current customers), cross promotions (given discounts or other promotional incentives to purchasers of related products), loyalty program (giving incentives for frequent purchases) and increasing switching costs (adding termination costs, such as mortgage termination fees) and integrating computer systems of multiple organizations particularly in industrial marketing.

4.0 Strategic Partnership Alliances

Business or partnership alliances can be defined broadly as collaborative efforts between two or more firms that pool their resources in an effort to achieve mutually compatible goals that they could not achieve easily alone (Das and Teng, 2000 and Day, 1995). These alliances have been identified as a core competence of an organization (Gulati, 1995). Therefore organizational performance can be explained in terms of partner satisfaction with the relationships (Cannon and Perreault 1999). That is, relationship marketing fosters external partnerships that cater for the mega-marketing needs of a business through external networks as well as alliances. These sets of external relations bring together market elements synergistically. The deep personal and social contacts fostered under the umbrella of relation building helps solve the external decisions to a firm-customer relationship. Therefore most companies today are partnering with other members of the supply chain to improve the performance of the customer value-delivery network.

5.0 Relationship Marketing and Performance

A study by World Bank shows the presence many firms operating in Kenya, both domestic and internationally. Literature shows that a majority of them have not embraced relationship marketing in their operations. Business partnerships and alliances are being increasingly used to achieve a sustainable competitive advantage. Whilst partnerships might be popular, they are often risky, unstable and vulnerable to failure with less than 50% of alliances performing satisfactorily (Das and Teng, 2000).

Christopher *et al.* (2002) emphasized that the key feature of organization performance is the development of mutually beneficial relationships. The assumption is that, a satisfied customer equates to a loyal customer and that a loyal customer implies a long-term relationship thus, leading to improved performance (Thurau, *et al.* 2002).

6.0 Suggested Conceptual Framework for Research

Fig. 1 depicts the relationship marketing in terms of interactive marketing, customer value creation and partnership alliance influences organizational performance. It is assumed that through the proper use of the indicated dimensions, organization performance is bound to be higher.

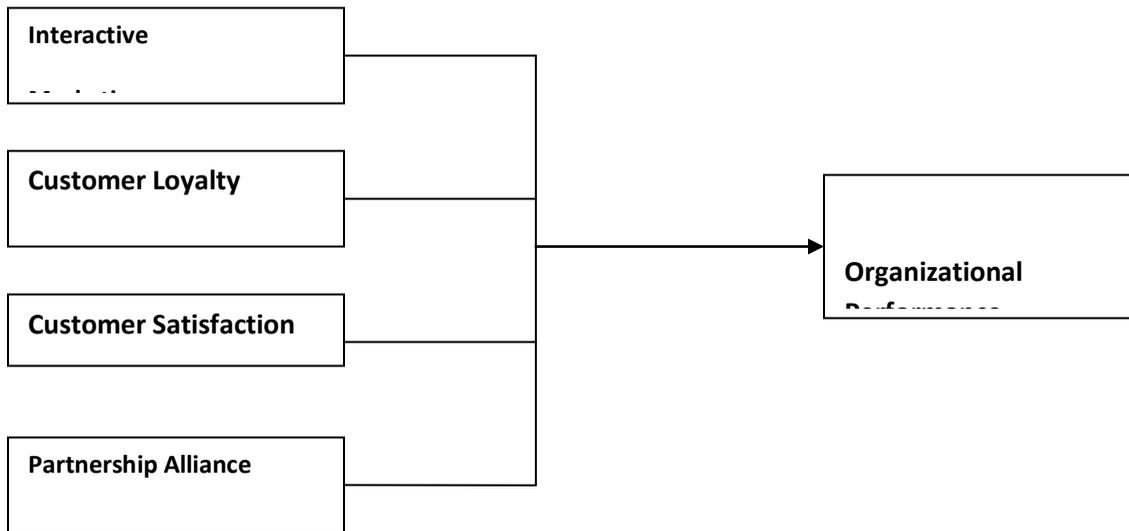


Figure. 1 Conceptual Framework

7.0 Conclusion

Relationship as a focus of marketing strategy aids in the understanding of consumer needs and wants, which is useful in the implementation of profitable exchange relationships. It also helps customizing solutions to important customers, more efficiently than otherwise. Thus, knowledge and application of relationship marketing helps in achieving creating customer value, customer satisfaction, customer retention, and customer loyalty. In addition, organization clients must understand that organizations are committed to long-term customer relationship in order to gain better performance. Therefore, to be effective, organizations must establish a long-term relationship with the customers. Also, through individualized marketing and adoption of mass customization processes, relationship marketers can better address the needs of each selected customer, making marketing more effective (Kim, 2003).

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**The Impact of Informal Sector Training on Economic Development
(Perspectives from Kisii County, Kenya)**

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Abstract

This paper is about the impact of informal Sector Training on economic development, a study of Kisii County. The objectives of the study were to find out whether there is a relationship between informal sector training and economic development and evaluate the factors that influenced informal sector training. To achieve this, a sample of 300 respondents in all the districts in Kisii County was selected. 20 training centers and working places were picked using simple random sampling from 50 informal sector training centers and work place identified. Questionnaires were administered to the respondents. Assistants presented copies of the questionnaires to workers to complete and supplementary information was obtained from management staff of the training centers. Data collected was analyzed using descriptive and inferential statistics. Chi-square test was used to establish the relationship between informal sector training and economic development. The Chi-square value that was obtained at 95% confidence level revealed that there were more than the principle factors that influenced informal sector training. The informal sector or informal economy is the part of an economy that is not taxed, monitored by any form of government, or included in any gross national product (GNP), unlike the formal economy. The informal sector in developing countries plays significant roles: the provision of employment, incomes and supplying ignored markets. However, the working and employment conditions in the sector are still poor. Thus, its expansion and changing structures have drawn the attention of scholars and international policy makers on factors hindering its formalization. The Ways to improve the informal sector include formalizing informal jobs through regulation by the state. Informal sector training plays a vital role in empowering the people who work in the informal sector with the necessary skills and knowledge to be able to work better. Another possible improvement would be to provide better protections and benefits in the informal sector. It might also be possible to create other methods of generating income through microloans.

KEY WORDS: GNP- Gross Domestic Product, IS- informal sector, ILO- international Labor Organization, GDP- Gross Domestic Product.

Introduction

There is a growing acceptance of the need to base training offerings on identified market needs and opportunities, together with an increasing institutionalization of instruments and processes (e.g. development of training curricula and modules. Good experiences are gained with participatory approaches in which the informal sector operators are involved at an early stage in the design of training programs, as well as in implementation. There is fresh evidence that, with an appropriate framework, skills upgrading of the technical and pedagogical skills has a positive effect on their training and production activities. (Lynch & Black 1998)

Training projects in informal sector often combine technical skills training with functional literacy training, though no solid data on the advantages and disadvantages of this combination were identified, informal sector actors are also more and more involved in efforts to improve training delivery for the informal sector. In the field they participate, through their members, in training project committees (to assist in trainee selection, curriculum development, organization of trade testing) and, at national level, in boards of Employment and Training Funds (levy administration, guidance for selection of training providers and financing of Skills training). (Addison, 2005)

The informal sector refers to the part of the economy that does not fall under the purview of organized economic activities. The concept has a very interesting and cheered history. As the concern of the world community increased over the lack of economic growth and perpetuation of poverty in the developing countries, policy makers began looking for a solution to ease the situation. A planned promotion of growth in selected leading sectors of the economy would then lead to the overall growth of the economy. Thus, the primary problems were perceived to be the identification of the target sectors with maximum linkages to the rest of the primary and the mobilization of enough finance to enhance the growth rate of the target sectors. (Adeke, 2003)

The growth that was visualized by those early development economists was essentially the growth of organized economic activities through rapid industrialization via capital formation and the expansion of domestic and export demand. The reality that a large section of the population was earning a daily living by participating in activities that fell outside the orbit of the organized sector was summarily ignored as it was considered to be a temporary phenomenon. It was expected that those activities would disappear with the growth of the economy. In other words, the idea was that once the take-off in economic growth was accomplished, with the growth of the organized economy the demand for, and returns to labor would increase. (Bangazer, 2000)

The informal economy contributes significantly to production, consumption, employment and income generation in developing countries. It is a source of livelihood to a majority of the poor, unskilled, socially marginalized and female population and is an important means of survival for people in countries lacking proper social safety nets and unemployment insurance especially those lacking skills for formal sector jobs. Apart from being a major source of employment, the informal economy also contributes significantly to the output of developing countries. According to the World Bank estimates, the informal economy accounts for 40 percent of Gross National Product (GNP) of low-income countries, to illustrate, the 'unorganized sector' in Kenya accounts for 62 percent of Gross Domestic Product (GDP), 50 percent of gross national savings and 40 percent of national exports. In addition, the informal workforce is estimated to make up about 93 percent of total workforce and 83 percent of non-agricultural employment in Kenya. Such figures across countries, however, are arrived at using a varied range of measures of the informal economy. (ILO, 2002 (a))

The importance of the informal sector in supporting livelihoods and contributing to production and consumption activities of developing countries is widely evident. However, lack of consensus across countries in regard to a clear and uniform definition of the informal sector has hampered its identification and measurement for proper comparison. In addition, relationship between informality and economic growth is not straightforward and there is no concrete evidence that this sector enhances economic growth. (Meyer, 1993)

Training refers to the acquisition of [knowledge](#), [skills](#), and [competencies](#) as a result of the teaching of [vocational](#) or practical skills and knowledge that relate to specific useful competencies. It forms the core of [apprenticeships](#) and provides the backbone of content at [institutes of technology](#) (also known as technical colleges or polytechnics). In addition to the basic training required for a [trade](#), [occupation](#) or [profession](#), observers of the labor-market recognize as of 2008 the need to continue training beyond initial qualifications: to maintain, upgrade and update skills throughout [working life](#). People within many professions and occupations may refer to this sort of training as [professional development](#) (Lynch & Black 1998)

On-the-job training takes place in a normal working situation, using the actual [tools](#), equipment, documents or materials that trainees will use when fully trained. On-the-job training has general reputations most effective for vocational work.

Off the job training is training from normal work situations — implying that the employee does not count as a directly productive worker while such training takes place. Off-the-job training has the advantage that it allows people to get away from work and concentrate more thoroughly on the training itself. This type of training has proven more effective in inculcating concepts and ideas.

Informal sector training in Kisii County, Kenya

There have been attempts to re-focus some public and non-governmental Organization training providers to become more 'business-like' and 'market responsive', for instance by involving them in complementary training. Such efforts have enjoyed mixed success as it is necessary to re-equip them, adjust the technical skills of the instructors, and adapt their teaching methodologies in recent years there has been a rapid expansion of private-for-profit training institutions, but so far their relevance for the informal sector appears limited as they largely focus on office (e.g. computer) and business skills rather than technical skills, in part because of the high demands of training colleges that offer technical training aimed mainly at modern wage employment. (Lynch & Black 1998)

There have emerged a number of private small one-trade training centers, for instance in hairdressing and dressmaking, which are directly relevant for informal sector operators (e.g. suitable level of technology, practical training, and short duration) there are interesting embryonic examples of public-private sector partnerships, such as private training providers that issue training certificates or diplomas. Useful training mechanism by which formal sector businesses interact with informal sector firms to help them to upgrade their skills, products and markets (and by so doing, create interesting, value-adding sub-niches) through training, technology transfer and sometimes longer term partnerships; whereas apprenticeship training used to be of particular importance for the training of members of the family, such training is now much more open (i.e. non-kin or family based), especially in 'modern' trades (e.g. welding and hairdressing). (Lynch & Black, 1998)

Training in the informal sector has the means to increase the skills and qualification levels of employees and micro-entrepreneurs, and make a positive contribution to their working conditions and the profitability of their activities. The formal methods of training and acquiring qualifications, there is a whole range of ways and means of developing skills

that are either not known to those responsible for existing formal training systems or under-valued in terms of the knowledge and know-how generated, and are consequently neither recognized nor validated: skills acquisition in the family, on-the-job training, through observation and imitation, and by means of traditional apprenticeship in the countries where this is well developed. These alternative routes taken by the sector's workers account for the training of up to 90% of a country's workforce. In terms of the results achieved, they often amount to being the countries' real training systems. The time has come for developing countries to acknowledge the true role played by the informal sector in training young people and adults and helping them enter the labor market. It is also time to recognize the content and levels of knowledge and skills thus acquired and to incorporate the best skills development schemes and practices into a comprehensive reform of existing systems. (Jack, 2004)

Impact of informal sector training on the economy

The informal economy is, at many times, referred to as the non-observed economy. It should be noted that the informal economy is only a component of the non-observed economy and needs to be distinguished from underground and illegal production activities, although these may not always be mutually exclusive. 'Underground production' activities are legally not forbidden but are intentionally hidden from public authorities with the objective of evading tax and social security payments as well as to avoid bureaucratic procedures and regulatory compliance. 'Illegal production' activities are those that are 'forbidden by law' or become illegal when undertaken by unauthorized individuals. For example, drugs and narcotic production and trafficking, production of certain explosives, production and distribution of counterfeit goods, and services such as unlicensed medical practice. (Becker, 2004)

Underground production is illegal as it involves non-compliance with administrative rules, while 'illegal production' is associated with criminal behavior. In many instances, different terms such as the informal, shadow, parallel or black economy among others, are used interchangeably wherein informal sector operations are not distinguished from illegal and underground production activities. Informal sector operations pertain to activities where a legal counterpart exists and are not always performed with the deliberate intention of evading taxes and infringing labor and other regulations, hence departing from the concepts of illegal and underground production. Therefore, most informal sector activities in developing countries are not underground and not illegal as these are undertaken as measures for survival. Some scholars have even objected to conceptualizing informality through a dualistic economy, i.e. a distinct bifurcation between the formal and informal which identifies informal employment. (Brown, 2007)

In describing this sector, one should bear in mind that the informal economy is not a deviation of the formal economy, if only because all economic activities started informal and formed the basis from which the formal economy sprang, with firms and annual accounts, taxes, chambers of commerce, etc. Although the informal economy is often associated with developing countries, where up to 60% of the labor force (with as much 40% of GDP) work, all economic systems contain an informal economy in some proportion. (Blanch, 2001)

Governments have tried to regulate (formalize) aspects of their economies for as long as surplus wealth has existed which is at least, yet no such regulation has ever been wholly enforceable. Archaeological and anthropological evidence strongly suggests that people of all societies regularly adjust their activity within economic systems in attempt to evade regulations. Therefore, if informal economic activity is that which goes unregulated in an otherwise regulated system then informal economies are as old as their formal counterparts, if not older. The term itself, however, is much more recent. The optimism of the modernization theory school of development had led most people in the 1950s and 1960s to believe that traditional forms of work and production would disappear as a result of economic progress in developing countries. As this optimism proved to be unfounded, scholars turned to study more closely what was then called the traditional sector. They found that the sector had not only persisted, but in fact expanded to encompass new developments. (Carr, 2001)

Case problem

The increase in unemployment in Kenya as a direct result of the economic crisis, Loss of employment in the affected sectors, as businesses closed down and GDP contracted, was considered to be the most important social consequence of the crisis. But the unemployment figures told just one part of the story. The bulk of the job losses were concentrated in modern sectors that depended on institutional finances, the lack of which resulted in the closures. As a result, many skilled workers were pushed into taking relatively inferior jobs in the informal sector. Flexible labor markets in many of the affected countries allowed the affected employees to be reallocated from the formal sector to the informal sector, thus moderating the impact of the recession.

The informal sector was originally treated as a residue emanating from the insufficient absorptive capacity of the formal economy. It has been emphasized that productivity growth in the formal sector acts as a 'pull' factor in drawing informal sector workers and enterprises towards it. Paradoxically, informal sectors of most developing countries have actually increased over time. Informality has been characterized as a response to high transaction costs caused by cumbersome bureaucratic procedures for business start-ups, and irksome compliance with unclear and prohibitive rules and regulations. Rise in informality is associated with economic restructuring and economic crisis. For example, the structural adjustment programs (SAPs) of the 1980s and 1990s is said to have increased the informal economy due to retrenchment of the public sector and associated liberalization policies. The relationship between informality and growth is not only inconclusive but it can go in both directions: Economic growth can have expansionary effects on the informal economy and the informal economy can have a positive or negative impact on economic growth. Sustained economic growth that is pro-poor is believed to reduce informality. Developing countries with no growth, capital intensive growth (jobless growth), or high-tech growth (rise in demand for skilled service sector jobs rather than unskilled manufacturing jobs) could experience an expansion in their informal sectors

The contribution of the informal sector or informal enterprises to non-agricultural GDP is substantial, Street vending units usually referred to as 'informal traders' make up a large proportion of informal sector enterprises. Their contribution to total trade value added (GDP from trade) ranges from 50 to 90 percent Informal sector's share. Despite substantial contribution from the informal sector to the GDPs of many developing countries, there is inadequate evidence of informal sector enterprises contributing to economic growth.

The study sought to determine the impact of informal sector training since its operations provide a way out of the draconian reigns confronting the formal sector. Low entry barriers and low operation costs in certain sectors (e.g. food, repair, trade and transport) imply dominance of informal firms. The large number of small producers and sellers producing almost identical products, for example in the fruit and vegetable markets, also facilitates a high degree of competition. As a result, consumers, mostly from the low and middle income brackets, can avail of relatively low prices. This leads to a rise in household savings, which can potentially translate into economic growth.

3.0 Research strategy

This study was about the impact of informal training on economic development. The research partly involved a complete survey of all informal sector training centers and work place and a sample of workers and customers who accessed the informal sector services within the study setting. Information regarding the factors that influenced the need for informal sector training was obtained via administering questionnaires to the respondents at the various training centers. Assistants were engaged in presenting the questionnaires to the respondents. Data collected was analyzed using descriptive and inferential statistics. Supplementary information was obtained from management staff of the informal sector training centers. Primary data collection involved the use of self-administered questionnaires for literate respondents and researcher administered questionnaires to cater for those who would not easily interpret the questions due to their low literacy levels.

The research was based in Kisii County, which is a rural county with a relatively adult population of 470,531 residents (Central Bureau Of Statistics Census Report, 1999). The county is central to the neighboring districts of Homabay, Migori, Nyamira and Rachuonyo. The population of the proposed study was drawn from Kisii County consisting of Kisii Central District, Gucha District, Nyamache District, Sameta District, Kenyena District, South Kisii District and Masaba

North District. The study targeted 300 respondents from all informal sector training centers and work places and the customers who accessed the informal sector services in Kisii County during the period of research.

Informal training centers and workplace were selected because the target population was big. The respondents to participate in the research were selected using the random sampling procedure. Customers were picked randomly from the work place were 50 and 100 respondents from the management staff (caretakers and executive staff to represent the informal sector trainers). Respondents from the stakeholders in the informal sector selected were 150. This consequently ended up with 300 respondents selected.

A questionnaire was used to collect data. The questionnaires were administered to respondents at the work place and informal sector training centers. The questionnaires were filled as the researcher waited to reduce non-response rates. They presented copies of the questionnaires to customers as they left after the service has been rendered the researcher presented the questionnaire to the management staff to fill.

The study incorporated data analysis tools, which included descriptive and inferential statistics to analyze the data collected. Likert scale was used to identify the degree of importance of each factor. Chi-square test was used to establish the relationship between informal sector training and the impact on human resource development.

4.0 Data Analysis, Findings and Discussions

4.1. General characteristics of the respondents

4.1.1. Gender, marital status and age of the respondents

Table 1 presents the general characteristics of the respondents. Males (72%) worked in the informal sector. It is apparent that compared to males, women were less attached to the labor market and tended to accumulate less specific human capital. Informal sector services have traditionally been directed to the needs of male members. Women were, therefore, likely to be offered informal sector training. Many shied away due to cultural beliefs that women are not supposed to be involved in strenuous activities. The findings concur with those of Tadić, (2005). Studies on gender and career development have also shown that women were more committed to their careers than their male counterparts (Jack, 2004). Conversely, no significant relationship between gender and career development of the respondents have been found to exist (Akinyemi, 2001; Popoola and Oluwole, 2007).

Those married (89%) were the majority of the informal sector players followed by the singles (7.3%) and least were the widowed (1.2%). The married members were responsible not only for themselves but also for their families, a situation that would increase the propensity to work, especially when one had children or when one is the only bread earner for the family. The findings concur with those of Popoola and Oluwole (2007) that majority of the personnel in the informal sector in Osun State in Nigeria were married. Besides, married workers had a lower mean career commitment than the unmarried ones, implying that the married workers are more committed to their family matters and career.

The age category of 46-55 years was the majority (50%) followed by the age bracket 36-45 (29.3%) then 56-65 (15.9%). It was, therefore, apparent that the majority of the people who work in the informal sector were relatively old. The reason why the old are the majority may be because many organizations have reduced investment in younger employees. Previous studies have found that, younger employees are more willing and eager to learn, develop themselves and have more opportunities for career development than old employees (Meyer et al., 1993). Other studies have indicated that, in any organization, old workers were more likely to be committed to their careers than young employees (e.g., Adeleke, 2003; Robert 2005; Popoola and Oluwole, 2007).

Table 10: Biographical characteristics of the Respondents

Variable	Aspect	Frequency	%
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Gender	Male	216	72
	Female	84	28
	Total	300	100
Marital status of respondent	Single	24	8
	Married	267	89
	Widowed	3	1
	No response	6	2
	Total	300	100
Age of respondent (years)	Below 30	12	4
	31-35	15	5
	36-45	87	29
	46-55	150	50
	56-65	36	12
	Total	300	100
Length of service	< 1	6	2
	1-3	39	13
	4-6	78	26
	> 6	168	56
	No response	9	3
	Total	300	100

Table 2 show standard errors and standard deviations of mean for the general characteristics of the Respondents. The standard errors of the means are less than the standard deviation, implying the information provided by the respondents was reliable.

Table 11: Means and standard deviations for the Respondent's biographical characteristics

Variable	N	Mean	SE	SD
Age of respondent	300	3.77	0.09	0.78
Academic qualification	300	3.12	0.11	1.02
Length of service	300	3.74	0.06	0.56

SE = standard error of the mean; SD = standard deviation.

4.3. The contribution of the informal sector training to employee career development and performance

Table 3 presents the contribution of the informal sector training to employee career development and performance. Majority of the respondents (54%) had artisan certificates in electrical engineering, beauty therapy, computer packages, mechanical engineering and welding. Diploma (44%), Higher National Diploma and first Degree holders were few (1% each). Consequently, the informal sector respondents who had artisan Certificates were the majority and corresponded to the level of knowledge an individual worker has can be appraised in terms of performance, which signify the level of success that has been attained (Colarelli and Bishop, 1990; Brown et al., 2007). However, the findings of Popoola and Oluwole (2007) are at variance that low educational qualifications may force workers to have strong commitment to their job

Table 3: The contribution of informal Sector Training on employee career development and performance

Variable	Level	Frequency	%
Academic qualification	First Degree	3	1
	Higher National Diploma	3	1
	Diploma	132	44
	Artisan Certificate	162	54
	Total	300	100
Frequency of employee training	High	48	16
	Moderate	192	64
	Low	51	17
	very low	3	1
	Not sure	6	2
	Total	300	100
Extent to which investment in human capital contributes to development	None	12	4
	Small	84	28
	Moderate	144	48
	Large extent	39	13
	Very large	15	5
	Not negotiated	3	1
	No response	3	1
	Total	300	100

The perception of the respondents on the frequency of employee training was moderately high. Respectively 16% and 64% of the respondents agreed that employee training had highly and moderately improved. Correspondingly, 17% and 1%, perceived it as low and very low (Table 3) Motivation is the key to performance improvement, and ability to perform depends on experience and training. It has been observed that the probability of receiving on-the job training and the amount of work-related training received are higher (e.g., Lynch 1992; Harley et al., 1995).

On the extent to which the investment in human capital contributed to career development, respectively, 4% and 28% of the respondents believed that there was no contribution or it was small. Correspondingly, 48% and 13% believed the contribution was moderate or large (Table 3). These findings concur with those of Lynch (1992) and Harley et al. (1995) who found development to be significantly and positively correlated with employee training and career advancement. However, Duncan and Stafford (1980) observed a significant and negative correlation between performance and employee training while Lynch and Black (1998) established no significant relationship between performance and employee training.

Table 4 depicts the mean contribution of training on employee career advancement and employee performance. The standard deviations of the means were greater than the respective standard errors, indicating that the information provided by the respondents was reliable. The mean response when rounded-off was 3 (moderately agree), showing that the respondents agreed that the training moderately improved their career advancement.

Table 4: Means and standard deviations for the aspects explaining employee training, career advancement and performance

Parameter	Academic qualification	Employee training	Employee performance
N valid	300	300	300
Mean	3.12	3.11	2.96
SE	0.11	0.09	0.11
SD	1.02	0.77	1.04

SE = standard error of the mean; SD = standard deviation.

The variables explaining employee training career development and performance had a mean response of between 3.21 and 3.80, indicating that training moderately improved employee career development (Table 4). Informal sector training had a similar (Friedman test: $\chi^2 = 5.59$, $df = 3$, $P = 0.35$) impact on the employee career development (Table 5) relevance of training, investment in human capital, academic qualification, and frequency of employee training.

Table 5: Means and ranks for the aspects explaining employee career development and performance as contributed by training

Aspect	Mean
Relevance of employee training and economic development	3.47
Extent to which investment in human capital	3.21
Academic qualification	3.45
Frequency of employee training	3.43

Table 6: Friedman test for the aspects explaining employee career advancement and performance as contributed by training

N	300
Chi-Square	5.59
Df	5
Asymp. Sig.	0.35

Level of significance used– 5%

The impact of the informal sector training on economic development

Table 7 depicts the mean responses for wage rates, employee morale, organization performance and working practices, employee commitment to the job, satisfaction with job performance, employee’s individual output, and employee training and development assessed in the current study. The mean responses for all the factors were greater than their respective standard deviations, indicating the information provided by the respondents was reliable.

The extent to which investment in human capital positively affected the effective mix of wages and employee living standards ($r=0.32$, $p<0.01$), employee morale, motivation and cooperation towards productivity ($r=0.34$, $p<0.01$), and organizational performance or improved working practices ($r=0.25$, $p<0.05$). Ensuring investment in human capital positively and significantly affected effective mix of wages and employee living standards ($r=0.44$, $p<0.01$), employee morale, motivation and cooperation towards productivity ($r=0.37$, $p<0.01$), organizational performance or working practices ($r=0.51$, $p<0.01$), and employee commitment to achieving organizational goals

There was strong agreement regarding employee morale, with a mean response of 4.86 (Table 7). This showed that economic development increased due to the training offered to the respondents. This is supported by the fact that among the respondents 85.7% and 14.3% strongly agreed and agreed, respectively, that the economic status of the respondents improved. No respondent disagreed or was neutral to the issue. The increased economic standard could be attributed to the increased wage rates of the respondents as the respondents improved living standards by having high saving and investment. Olatunji (2004) noted that an attractive salary package and participative management besides regular promotion influenced workers to exhibit high career commitment in any organization. Conversely, low salary growth was responsible for low career commitment and productivity (Okorie, 1995).

Improved organizational performance and working practices had a mean response of 4.29 (agreed), the observation was supported by, correspondingly, 14.3% and 71.4% of the respondents who agreed and strongly agreed. Only 14.3% of the respondents strongly disagreed (Table 7). The improved workers morale and increased output may be attributed to the improved working conditions and living standards due to a good wage that lead the employee to make a saving and investment provided for by training. The findings concur with those of Olatunji (2004) who found that a good working environment significantly and positively influenced commitment and performance of employees. Freeman and Medoff (1984) also observed that training could have a positive impact on the employee who works on the informal sector competitiveness by encouraging management to introduce more productive work practices.

Studies have shown that the informal sector training leads to lower probabilities of quitting, longer job tenure and a lower lay-off rate, which in turn reduces the costs of recruitment, and increases productivity this lead to the increase in the GDP of the country. (Freeman and Medoff, 1984; Delery et al., 2000.

Table 9. The impact of informal sector training on economic development

Variable	Response	N	Valid %
Better organizational performance	Strongly disagree	42	14
	Agree	42	14
	Strongly agree	216	72
	Total	300	100.0
Improved employee morale	Agree	42	14
	Strongly agree	258	86
	Total	300	100.0
Improved wage rates	Strongly disagree	42	14
	Strongly agree	258	86
	Total	300	100.0
Improved living standards of the employee	Agree	42	14
	Strongly agree	258	86
	Total	300	100.0

Improved employee commitment	Agree	171	57
	Strongly agree	129	43
	Total	300	100.0
Improved individual output	Agree	42	14
	Strongly agree	258	86
	Total	300	100.0
Improved economic growth	Neutral	42	14
	Agree	42	14
	Strongly agree	216	72
	Total	300	100.0

It was apparent that employee training contributed to better living standards, the respondents agreed (57 %) and strongly agreed (42 %) that the services improved commitment of the respondents to their jobs (Table 7). There is evidence that employee training makes an important contribution to workplace performance by reducing exit behavior, including quits, absenteeism, malingering and quiet sabotage, (Addison, 2005; Ramirez et al., 2007).

It was apparent in the present study that the output per individual member increased due to informal sector training (agreed 14 %, strongly agreed 86 %) and training of members enhanced them to be economically endowed, the responders indicated that through training they were able to make informed choices, be able to perform better, get promotions, work effectively and efficiently hence employees were satisfied and had some investment which increased the saving and investment hence increasing the GDP of the country. The living standards of the respondents were better than before training (neutral 14 %, agreed 14 %, strongly agreed 72 %) had improved. This increased output may be attributed to the increased morale and commitment as a consequence of increased wage rate, training, improved working practices and employment terms and conditions. The findings concurred with those of Okorie (1995) who observed that performance among Nigerian employees working in the informal sector was positively related to continued commitment in their jobs.

5.0 Conclusion and Recommendation

The study concluded that informal sector training has an impact in the general economic growth of a nation in this period when there is a rapid increase in unemployment, high inflation rates, technological and globalization. Informal sector training provided the employees with better skills to be able to perform get promotions, increase efficiency and effectiveness in the workplace, and get better pay which increases their savings and investment hence the country GDP increases. The study recommended on Ways to improve the informal sector training that includes formalizing informal jobs through regulation by the state. The issue with this policy is that so many different types of informality exist. It would be extremely difficult to create solutions to meet so many diverse circumstances. Another possible improvement would be to provide better protections and benefits in the informal sector, but creating protection programs could lead to a disconnect between the labor market and protections, which may not actually improve informal employment.

It might also be possible to create other methods of generating income through microloans or land rights when access to the formal sector is limited. This is not a satisfactory solution to effectively combat the issues underlying the informal sector though, efforts towards conceptualizing, defining and measuring the informal sector training have evolved and progressed over time both at the

national and international levels. However, our knowledge of this sector, its impact and inter-linkages with various economic and social spheres is still rudimentary. This calls for more research and study to comprehend the heterogeneity and reach of the informal sector for targeted policy making.

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FOOD SECURITY

Performance of National Agricultural Advisory Services Projects in Uganda; does Stakeholder Commitment Matter?

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Abstract

The increased poor performance of National Agricultural Advisory Services (NAADS) projects in Uganda has become a concern of many stakeholders. This paper presents findings of a study carried out to examine the performance of NAADS projects which were set up by the government in 2001 to eradicate poverty in Uganda. The data showed low performance levels of these projects and raised pertinent questions on the influence of NAADS stakeholders' commitment to the performance of the projects. Data was sought from farmers and coordinators of the projects. Mukono district was used as a case study and a sample of 323 NAADS projects was used, covering a wide range of agricultural activities. Cross sectional and quantitative survey designs were also used. The paper therefore calls for urgent review of NAADS policy and practices to ensure that project managers and coordinators discuss with farmers the personal benefits of carrying out activities of NAADS such that farmers fill a great deal of personal meaning of the project to their lives.

Key words: NAADS, project performance, stakeholder, commitment

INTRODUCTION

The increasing turbulence in the modern business environment has made it necessary for many organizations both private and public to adopt project approach as the means to achieving organizational goals. Each project however, strives for excellence and success yet is by definition a unique task normally subjected to severe restrictions on budget and time (Andersen, 2006). A project has therefore to perform well in terms of the planned budget, time, and the quality of the project processes and outputs, Munns & Bjeirmi (1996) so as to fulfill the intended objectives of satisfying the stakeholder's needs, Baccarini (1999); Shenhar et al. (2001). Failure to achieve this, the project will be branded unsuccessful and failed.

In Uganda the government has started many projects in order to eradicate poverty. A case in point is the District Development Project (DDP), *Entandikwa* scheme and *Bonna Bagaggawale*. These projects aimed at giving low income earners financial support in form of capital to start small businesses. According to DDP pilot report of 2000, these projects were mismanaged and failed to achieve the set objectives. The government also established the Northern Uganda Social Action Fund (NUSAF) projects as a transitory tool and funding mechanism to assist Northern Uganda to catch up with the rest of the country in matters of development. However, according to NUSAF report of 2008, this project did not live to the expectations of the government. In 2001 the government established the National Agricultural Advisory Services (NAADS) projects to eradicate poverty through enhancement of agriculture. However according to the NAADS secretariat report of 2007/08, NAADS projects had registered 60% failure rate with some projects in districts like Kotido registering 100% failure rate while projects in more than 10 districts registering a failure rate of above 90%.

As a result of this high failure rate of poverty eradication projects in Uganda, the poverty level has remained high with more than 31% of Ugandan population living below a dollar a day. According to Steers (1977), the weak performance of projects can be attributed to the low commitment of the key stakeholders to the projects. The NAADS secretariat report of 2003/04 points out that in districts like Kotido farmers who are the principle beneficiaries of the projects were not involved in the projects activities thus registering 100% failure rate. The Auditor General's report of 2008 also indicates that NAADS coordinators spent most of the money on workshops which were never attended by farmers.

It is therefore probable there is a link between stakeholder commitment to the project and performance of poverty eradication projects, Crawford (2005); Koh & Boo (2001). The challenge for project champions is to ensure commitment of key stakeholders in project activities so as to improve performance of poverty eradication projects in Uganda.

LITRETURE REVIEW & CONCEPTUAL ANALYSIS

Past studies have defined commitment in many different ways. Mowday et al. (1979) and Porter et al. (1974) defined organization commitment as the relative strength of an individual's identification with, and involvement in, a particular organization. According to Moorman et al. (1992) commitment is an enduring desire to maintain a valued relationship. Dwyer, Schurr and Sejo (1987) described commitment as the existence of an implicit or explicit pledge of relational continuity of exchange partners. Morgan and Hunt (1994) described commitment as exchange partner believing that an ongoing relationship with another is so important as to warrant

maximum efforts at maintaining it. Porter et al. (1974) characterized commitment by three factors. These factors are a strong belief in and acceptance of the organization's goals and values, a willingness to exert considerable effort on behalf of the organization, and a strong desire to maintain membership in the organization. Allen and Meyer (1990b) conceptualized three components of organizational commitment: affective (i.e., employee's emotional attachment to, identification with, and involvement in the organization); continuance (i.e., commitment based on the costs that the employee associates with leaving the organization); and normative (i.e., employee's feeling of an obligation to stay with the organization). However, Kanter (1968) with her argument that different types of commitment result from the different behavioral requirements imposed on employees by the organization, suggests three different forms of commitment: Continuance commitment (member's dedication to the survival of the organization. This is caused by requiring members to make personal sacrifices to join or remain with an organization); Cohesion commitment (attachment to social relationships in an organization brought on by such techniques as public renunciation of previous social ties or by engaging in ceremonies that enhance group cohesion); and Control commitment (member's attachment to the organization's norms that shape behavior in desired directions. It exists when employees believe their organization's norms and values serve as a model for suitable behavior).

A project is a temporary endeavor undertaken to create a unique product, service, or results (PMBOK, 2004). It's an undertaking with defined scope, time and budget to create a unique output. Project performance can be viewed narrowly as achievement of intended outcomes in terms of project specification, completing the activities on time, completing the project on the agreed budget, only carrying out activities within the Scope and with requisite performance (technical requirements), Atkinson (1999); Pinto & Slevin (1988); Wateridge (1998). According to PMI Standards Committee (2004) and Bryde (2005), this is the golden or the iron triangle measurement of project performance i.e. if the project is completed on time, within budget, according to agreed specification, it will have performed well. This is the operational mindset, which is influenced by the "get the job done" approach as observed by Dvir et al. (2006). Several studies support the inclusion of customer satisfaction as a fourth dimension of project performance, Lipovetsky et al. (1997); Lim & Mohamed (1999); Zwikael & Globerson (2006); Kerzner (2006); Voetsch (2004); Bryde (2005). This study therefore adopts the measurement of project performance in terms of Schedule, project quality, Customer satisfaction, time management and achieving project objectives.

Various scholars have established that commitment has a positive influence to organizational performance, Lum et al. (1998); Sims & Kroeck (1994). Commitment to the project affects its performance, Benkhoff (1997); Brett et al. (1995). Stakeholders with strong affective commitment remain with the project because they want to, and they attach strong belief in and acceptance of the project's goals and values. According to Tansky et al. (1997), affective organizational commitment connects a worker to the organization's goals and values because of the strong cognitive desire to belong to the organization (Steers, 1977). A worker therefore bonds with organization because he or she chooses to do so, McElroy et al. (1999), thus improving performance. Stakeholders with strong continuance commitment remain attached to the project because they need to, and they are willing to exert a considerable effort on behalf of the organization. According to Becker's (1960) side-bet theory, employees form sunken costs, such as monetary, social, physical, psychological, lost opportunities, and so forth and the greater

the sunken costs a person develops with an organization, the less likely he or she is willing to leave employment with the organization. This means that the sacrifice of leaving becomes so great that the employee becomes bonded to the organization, Jaros et al. (1993). Therefore, commitment to the organization occurs under continuance commitment because the investments made with an organization tie the person to that organization, McElroy et al. (1999). It reflects a sense of being locked in place because of the high costs of leaving. According to Hrebiniak and Alutto (1972), this type of commitment is a structural phenomenon which occurs as a result of individual– organizational transactions and alterations in investments over time. According to Lambert, Barton, & Hogan, (1999), Continuance commitment is also referred to as calculative commitment where an employee calculates in some manner the costs and benefits of working for a given organization and it is these calculations that determine the level of commitment to the organization. Stakeholders with strong normative commitment remain in the project because they feel they ought to, due to their strong loyalty to the project, Schappe & Doran (1997). This is so because according to Jaros et al. (1993) normative commitment involves acceptance of the norms of the organization and the need to be loyal to employers. It therefore makes the employee fill a sense of duty or obligation to be committed to the organization because it has employed him/her, Jaros et al. (1993). It is this that pressurizes the employee to act in a way that meets the organizational goals and interests, Allen & Meyer (1990). According to Weiner (1982), the stronger the normative commitment, the stronger is the person’s predisposition to be guided in his actions by such internalized standards rather than by a consideration of the consequences of these actions. Thus, committed individuals may exhibit certain behaviors not because they have figured that doing so is to their personal benefit, but because they believe that it is the “right” and moral thing to do, Weiner & Vardi (1980).

In their study of antecedents (causes) and consequences (results) to organizational commitment, Steers (1977) and Aven (1988) conclude that highly committed employees are more likely to have higher levels of participation, remain with the organization for longer periods and make more contributions for achieving organizational objectives, higher levels of involvement in their jobs and exert considerably more effort on behalf of the organization. According to Etzioni’s (1961) commitment model focusing on employee compliance with organizational objectives, any actual or perceived authority or power organizations have over individuals is rooted in the nature of employee commitment in the organization. This means that organizations have substantially less authority or power over employees who have lower levels of commitment. Etzioni (1961) concludes that when employees have higher levels of commitment to organizational objectives, the organization will have more authority and power over these employees.

Hypothesis

The purpose of this study is to establish whether commitment of stakeholders influences the performance of National Agricultural Advisory Services Projects in Uganda. To achieve this goal, the following hypotheses are formed for examination in this study. Hypothesis 1 (H1): there is no affective, continuance, normative and cohesion commitment among the stakeholders of NAADS projects. Hypothesis 2 (H2): Affective, Continuance, normative and cohesion commitment positively affects performance of projects.

METHODOLOGY

The study adopted a cross sectional and quantitative survey design. Correlational and regression designs were adopted to explain the relationships between stakeholder commitment and project performance and the extent to which the components of stakeholder commitment explain project performance. The study sample consisted of 323 projects of the 2,062 NAADS projects undertaken in the 28 sub-counties of Mukono district. Mukono district was selected to be the study area because the District has had the benefit of being first on many government pilot programs (NAADS baseline study report of 2002). Two categories of stakeholders of the project were considered, these included coordinators and project beneficiaries (farmers). This study adopted a multi stage sampling procedure in order to get representative views of the various stakeholders on performance of NAADS projects. This involved using proportionate sampling to select the 323 projects and 370 project stakeholders (respondents) who comprised of 356 farmers and 14 NAADS coordinators. Simple random sampling was used to select respondents of the two categories (farmers and project coordinators) from each project. The response rate was 88.5%. Primary data was collected through administering Questionnaires which contained structured questions relating to each study variable in question. The respondents answered based on the extent to which they agree or disagree with the statements in the questionnaire. Secondary data was also used.

Commitment to the project was measured using the instrument developed by Allen and Meyer (1990b) and Kanter (1968). This involved testing commitment to the project in terms of four categories; Affective (stakeholder's emotional attachment to, identification with, and involvement in the project activities), Continuance (commitment based on the costs that a stakeholder associates with abandoning the project), Normative (stakeholder's feelings of obligation to stay with the project) and Cohesion commitment (attachment to social relationships in an organization). Each of the four categories was measured by items on a five-point scale, where 5 represented "strongly agree" and 1 represented "strongly disagree". Project performance was measured using five dimensions; Schedule overrun (this tests whether the project committed outputs were delivered within the agreed timeframe), Cost overrun (whether the committed outputs were produced within the agreed budget), Project quality (whether all committed outputs were delivered and met agreed quality standards), Customer satisfaction (whether the project customers achieved all the targeted outcomes), Achieving project objectives (whether the government achieved its major objectives, the major one being reducing poverty level) (NAADS secretariat report of 2003/04; Kerzner (2006); Voetsch (2004). Each of the five categories was measured by items on a five-point scale, where 5 represented "strongly agree" and 1 represented "strongly disagree". The research instrument was examined for its reliability by using Cronbach's Alpha value and the results showed that the instrument was reliable with a coefficient of 0.915. Data analysis was done using SPSS version 16.0

RESULTS AND DISCUSSION

The study used Factor analysis with principal Component Analysis to extract variables from the questionnaire and to analyze them. The Kaiser-Meyer-Olkin value was 0.908 and Bartlett's test was significant at [$\chi^2(231) = 3769.7$, $P < 0.001$] thus implying that factor analysis was a suitable model for analysis in this study. The communalities for each of the variables were within the range of 0.287 to 0.786. Variables with a communality of 0.55 were considered to have a strong variance and variables with a communality of less than 0.55 were considered to have a weak variance. This is shown in Table 1

Table1; Extracted Communalities for Variables of Commitment

	Initial	Extraction
1) I would be very happy to spend the rest of my career with this project	1.000	.562
2) I enjoy discussing my project with people outside it	1.000	.748
3) I really feel as if this project's problems are my own	1.000	.735
4) I think that I could easily become as attached to another project as I am to this one	1.000	.777
5) I feel like part of the family when with project team members	1.000	.287
6) I feel emotionally attached to this project	1.000	.466
7) This project has a great deal of personal meaning for me	1.000	.686
8) I feel a strong sense of belonging to my project	1.000	.714
9) I feel I have an obligation to remain part of this project	1.000	.786
10) Even if it were to my advantage, I do not feel it would be right to leave my project now	1.000	.670
11) I would feel guilty if I left my project now	1.000	.623
12) This project deserves my loyalty	1.000	.682
13) I have a sense of obligation to the people in this project	1.000	.631
14) I owe a great deal to this project	1.000	.419
15) I am afraid of what might happen if I quit this project without having another one lined up	1.000	.472
16) It would be very hard for me to leave this project right now, even if I wanted to	1.000	.661
17) Too much in my life would be disrupted if I decided to leave this project now	1.000	.707

18) It would be too costly for me to leave this project right now	1.000	.752
19) Right now remaining part of this project is a matter of necessity as much as desire	1.000	.759
20) I feel that I have too few options to consider leaving this project	1.000	.777
21) One of the few serious consequences of leaving this project would be the scarcity of available alternatives	1.000	.647
22) One of the major reasons I continue working with this project is that leaving would require considerable personal sacrifice - another project may not match the overall benefits that I have here	1.000	.643

Extraction Method: Principal Component Analysis.

Variables 1-8 represented affective commitment, with variables 2 (I enjoy discussing my project with people outside it), 3 (I really feel as if this project's problems are my own), 4 (I think that I could easily become as attached to another project as I am to this one) and 8 (I feel a strong sense of belonging to my project) having the strongest variances of 0.748, 0.735, 0.777 and 0.714 respectively. Variables 9-14 represented normative commitment, with variable 9 (I feel I have an obligation to remain part of this project) having the strongest variance of 0.786. Variables 15-22 represented continuance commitment with variables 17 (Too much in my life would be disrupted if I decided to leave this project now), 18 (It would be too costly for me to leave this project right now), 19 (Right now remaining part of this project is a matter of necessity as much as desire) and 20 (I feel that I have too few options to consider leaving this project) having the strongest variance.

A factor analysis with principal component method using varimax rotation was also applied to all the variables to determine any underlying components for each variable and validate whether the respondents perceived the four components of commitment to be distinct. The components of commitment included commitment; affective, continuance, normative and coherent commitment.

Table2: Rotated Component Matrix^a

	Component			
	1 Affective	2 Continuance	3 Cohesion	4 Normative
I enjoy discussing my project with people outside it	.839			
I really feel as if this project's problems are my own	.826			

I would be very happy to spend the rest of my career with this project	.583		
It would be too costly for me to leave this project right now		.828	
I feel that I have too few options to consider leaving this project		.822	
Right now remaining part of this project is a matter of necessity as much as desire		.810	
Too much in my life would be disrupted if I decided to leave this project now		.804	
One of the few serious consequences of leaving this project would be the scarcity of available alternatives		.780	
One of the major reasons I continue working with this project is that leaving would require considerable personal sacrifice - another project may not match the overall benefits that I have here		.766	
It would be very hard for me to leave this project right now, even if I wanted to		.755	
I am afraid of what might happen if I quit this project without having another one lined up		.606	
I think that I could easily become as attached to another project as I am to this one			.870
I feel I have an obligation to remain part of this project			.839
I feel a strong sense of belonging to my project			.792
This project has a great deal of personal meaning for me			.784
This project deserves my loyalty			.761
Even if it were to my advantage, I do not feel it would be right to leave my project now			.674
I feel emotionally attached to this project			.646

I would feel guilty if I left my project now				.642
I have a sense of obligation to the people in this project				.640
I owe a great deal to this project				.505
Eigenvalues	1.541	9.231	1.065	2.369
Percentage of variance explained	7.004	41.959	4.839	10.767
Cumulative Percentage of variance explained	7.004	48.963	53.802	64.569

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

The results as indicated in Table 2, showed a four factor loadings with eigenvalues greater than 1.0 for all the components of commitment. The total variance explained was 64.57%. A closer examination revealed that for factor 1 (Affective), the total variance explained was 7%. For factor 2 (continuance), the total variance explained was 41.96%, for factor 3 (cohesion), the total variance explained was 4.84% and for factor 4 (normative) the total variance explained was 10.767%. This implied that continuance commitment has the highest variance explained followed by normative commitment, followed by affective commitment and cohesion commitment having the least variance.

Zero-order Pearson correlations among study variables were used and is presented in table 3

Table3: Zero- Order Pearson Correlations

	Mean	S.D	1	2	3	4	5	6
Affective (1)	4.0962	.79167	1.00					
Continuance (2)	3.8633	.99206	.304**	1.00				
Cohesion (3)	3.2238	1.45298	.051	-.131*	1.00			
Normative (4)	3.9151	.84981	.438**	.619**	.007	1.00		
Commitment to the projects (5)	3.7712	.62970	.619**	.628**	.548**	.725**	1.00	
Performance of NAADS Projects (6)	3.6718	.46686	.318**	.315**	-.059	.363**	.303**	1.00

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Affective commitment (mean= 4.0962, s.d=0.79167), continuance commitment (mean= 3.8633, s.d= 0.99206), cohesion commitment (mean= 3.2238, s.d=1.45298) and normative commitment (mean= 3.9151, s.d=0.84981), exists among stakeholders of NAADS projects which leads to performance of NAADS projects (mean=3.6718, s.d= 0.46686). This finding partially rejects H1; (there is no affective, continuance, normative and cohesion commitment among the stakeholders of NAADS projects). The finding shows that there is relatively high affective commitment with low continuance, normative and cohesion commitment.

Results from Table 3 also revealed a strong positive relationship between commitment and performance of NAADS projects ($r = .303^{**}$, $p < .01$). Results also showed that Affective, Normative and Continuance are positively related to performance of NAADS projects with the parameters ($r = .318^{**}$, $p < .01$), ($r = .363^{**}$, $p < .01$) and ($r = .315^{**}$, $p < .01$) respectively. These

results are in support of H2 and consistent with Lum et al. (1998) and Allen & Meyer (1990) who concluded that commitment has a positive influence to organizational performance. They are also consistent with Benkhoff (1997) and Brett et al. (1995) who contend that commitment to the project affects its performance. Tansky et al. (1997) argued that stakeholders with strong affective commitment remain with the organization because they want to, and they attach strong belief in and accepts the organization's goals and values yet stakeholders with strong continuance commitment remain attached to the organization because they need to, and they are willing to exert a considerable effort on behalf of the organization. Becker (1960) asserted that stakeholders with strong normative commitment remain in the project because they feel they ought to, due to their strong loyalty to the project. This implies that if stakeholders feel emotionally attached to the project and have an obligation to remain part of the project, it will probably improve the quality of products and services on a timely basis.

Hierarchical Regression Analysis

Hierarchical regression analyses were carried out with variables entered simultaneously within each hierarchical step. Co-linearity diagnostics were examined for all items entered at each step and found to be within the recommended range (e.g. $VIF < 4$; Field, 2005). The regression results are showed in Table 4.

Table4: Hierarchical Regression Analysis With Performance Of NAADS Projects As The Dependent Variable

Variables	Model 1 Affective	Model 2 Continuance	Model 3 coherent	Model 4 normative	Collinearity Statistics	
					Tolerance	VIF
(constant)	2.634	2.352	2.366	2.297	Na	Na
Age Group	.056	.052	.052	.060	.922	1.084
Gender	-.082	-.032	-.032	-.037	.907	1.102
Marital status	.021	-.003	-.003	-.006	.927	1.078
Number of years worked in such projects	.169	.144	.142	.140	.957	1.045
Highest education attained	.055	.030	.029	.042	.983	1.018
Affective	.303	.233	.234	.185	.970	1.031
Continuance		.279	.277	.177	.884	1.131

Cohesion			-.009	-.018	.914	1.094
Normative				.173	.507	1.974
R	.385 ^b	.466 ^c	.466 ^d	.482 ^e	Na	Na
R square	.148	.217	.217	.232	Na	Na
Adjusted R square	.126	.193	.190	.202	Na	Na
F- statistics					Na	Na
Sig	.000	.000	.879	.034	Na	Na
R square change	.089	.069	.000	.015	Na	Na
F change-statistics	24.299	20.298	.023	4.524	Na	Na
Sig F Change	.000	.000	.879	.034	Na	Na

Affective commitment was entered in model 1 and predicted 14.8% of the variance in performance of NAADS projects. ($R^2 = .148$, $P < 0.01$). The R^2 change was 8.9% and the F change statistics was significant (F – statistics = 24.299, $\beta = .385$, F change of 0.00), supporting H2. When a second model was run entering continuance commitment, both affective commitment and continuance commitment were significant predictors of performance of NAADS projects with a predictive potential of 21.7%, the R^2 change was 6.9% and the F change statistics was significant (F – statistics = 20.298, $\beta = .466$, F change of 0.00). This implied that continuance commitment predicted 6.9% of the variance in performance of NAADS projects thus supporting H2. A third model was run entering cohesion commitment, the results revealed that the predictive potential of the three variables remained 21.7%, the R^2 change dropped to 0.00% and the F change statistics was insignificant (F – statistics = 0.23, $\beta = .466$, F change of 0.879). This meant that cohesion commitment did not influence and predict performance of NAADS projects, thus partially rejecting H2. In model 4 normative commitment was entered in the regression model and results showed that the predictive potential of the four variables (affective, continuance, cohesion and normative) increased to 23.2%, the R^2 change increased to 0.15% and the F change statistics was insignificant (F – statistics = 4.524, $\beta = .482$, F change of 0.034). This implied that normative commitment predicted 1.5% of the variance in performance of NAADS projects, thus partially supporting H2.

POLICY AND MANAGERIAL IMPLICATIONS

At the policy level, there is need to increase commitment of key stakeholders of NAADS projects. This can be done by ensuring that project coordinators discuss with farmers the personal benefits of carrying out activities of the projects such that farmers fill a great deal of personal meaning of the project to their lives. The procedures and guidelines should be clearly communicated to all stakeholders such that they are willing to be part of the project. This will make farmer fill like spending the rest of their career carrying out project activities.

CONCLUSION

From the discussion above, it can be concluded that stakeholders of NAADS projects have low commitment to the projects' activities. However this commitment can be increased in order to improve performance of the projects. The correlation and regression models show that commitment to the project strongly correlates positively and predicts performance of NAADS projects. Implying that in order to improve performance of NAADS projects, commitment of stakeholders to the projects activities has to be increased.

LIMITATION OF THE STUDY

The major limitation of this study was that it focused on stakeholders of NAADS projects in Mukono districts. This may limit the generalization of the findings to all NAADS projects in Uganda due to different factors affecting stakeholders in the different localities. The other limitation is that most of the farmers were illiterate which posed a problem of language barrier. Though the researcher spent time with respondents trying to interpret the questionnaire for them in Luganda, the local language, this might have caused some bias and common understanding of the questionnaire.

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**AN APPLICATION OF OPTICAL ACTIVITY AND FARADAY EFFECT TO
PROMOTE FOOD SECURITY: A CASE STUDY OF VEGETABLE OILS**

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Sub-Theme: Food Security

ABSTRACT

The purpose of the study was to examine the relationship between the angle of rotation of the Vibration Plane and Calorific Value of Transparent Oils.

Fourteen different types of vegetable oils and three mineral oils samples were studied.

For vegetable oils contaminated with impurities or expired, the cut-off angle ϕ was found to satisfy the relationship

$$\phi_{Vegimp} = A_v + VHL \quad (1)$$

Where A_v is the impurity concentration in the sample, V is the Verdict constant, H is the magnetization and L is the length traversed by the light in the sample.

For vegetable oils without impurities and unexpired therefore suitable for human consumption, the cut-off angle obeyed the equation.

$$\phi = VHL \quad (2)$$

For transparent mineral oils the cut-off angle gave the relationship

$$\phi_{\text{mineral}} = A_{\text{min}} + VHL \quad (3)$$

Where A_{min} is the constant that causes intrinsic circular briefings responsible for optical activity in mineral oils?

- The calorific values of both mineral and vegetable oils were determined by using the equation
$$K = \left[(W_1 + W_2) \left\{ 1 + n VI + (VI - V)_{/2} \right\} \right] / W \quad (4)$$

Where W_1 is the weight of water in grams, W_2 is water value of the apparatus in grams and W is weight of oil sample. VI is the rate of temperature fall in degrees per minute at the end of the test and V is the rate of temperature rise in degrees per minute at the beginning of the test, n is the number of minutes between the ignition and attainment of the maximum temperature.

- The graph of angle of rotation β per unit current against calorific value of oils was plotted.
- A straight line graph of the relationship $y = 8.781x - 25.25$ was obtained.
- This technique is a potential method for designing an instrument that can be used to determine calorific values of transparent oils by using Faraday Effect.

Key words: angle of rotation, verdet constant, briefrings and Calorific value.

INTRODUCTION

Food security is the assurance of food availability in terms of both quality and quantity. This involves the following (Kyaruzi, 1980), (a) Land, (b) Labour, (c) Production, (d) Processing, (e) Storage, (f) Quality control, (g) Preservation, (h) Marketing and (i) Distribution.

In many parts of East Africa farmers produce food in large quantities for subsistence and for sale. Cash crops are sold cheaply because farmers lack:

- (i) Technology for processing their produce, (ii) Mechanisms for ensuring quality control for processed products, (iii) Facilities for storage, (iv) Transportation to the market (Kyaruzi, 1980).

In addition there is no policy to cater for prices of agricultural products all over East Africa. Farmers lack awareness about foods which have high Calorific value (Kyaruzi, 1980).

This has resulted in cases of malnutrition in East Africa each year, for example children suffer from kwashiorkor, and others lack calcium in their bodies. In some cases when vegetable oil of poor quality particularly that one with high level of fats is consumed, high blood pressure may result from accumulation of cholesterol and other associated complications.

Despite the health hazards associated with poor quality of vegetable oil, the rate of using oil as one of the ingredients in cooking has drastically gone up. There is need to improve on the quality of vegetable oils in order to suppress health hazards.

Oil industries in East Africa produce vegetable oils that do not meet international standards and so cannot compete on the world market with similar products from other regions. Because of poor methods of production, farmers get low returns from the sale of their produce (raw materials). This could also be attributed to the inferior technology used in vegetable oil quality control.

In the vegetable oil industry, it is difficult to get pure oils from the methods of processing such as Solvent Extraction (SE) and Single Refinery (SR) Mucungizi-Rugwebe (2000). In the SE which is superior to SR the raw material is crushed and then mixed with petroleum product as an oil solvent. The mixture is distilled, and then purified oil is obtained as a distillate. SR is the classical approach technique in which Caustic Soda (NaOH) is used for preservation, bleaching and isolating oil from impurities. In this process the semi refined oil is obtained as a filtrate. Afterwards, semi refined oil is mixed with charcoal and the mixture is heated, and then filtered out to get pure oil.

Vegetable oils may contain impurities like: (i) Variety of particles, (ii) Drops of foreign liquids, (iii) Soap, (iv) Sand, (v) Wax , etc. the product often has either oil fats, oil-moisture or oil-fats-mixture.

In the Uganda National Bureau of Standards the most used quality indices are chemical indices.

Optical Activity is an intrinsic property of molecular structure and is one of the best methods of obtaining structural information of a sample. Whenever the d.c. magnetic field is applied through a material (without birefringence) in the direction parallel to that of propagation of light, it will exhibit a phenomenon known as induced circular birefringence.

Mucunguzi-Rugwebe (2000) reports that, Hecht, emphasizes that Faraday Effect can be used to analyse mixtures of hydrocarbons like vegetable oils, since each constituent has a characteristic magnetic rotation.

In experiments where Optical Activity and Faraday Effect is highly utilized it is clear that there exists a connection between the angle of rotation of the vibration plane and Calorific value of the oil tested

Mucunguzi-Rugwebe (2000). If this connection can be established, then the principle presents a novel method for determining the calorific values of the different oil products in the oil industry.

The purpose of this work is to utilize Optical Activity and Faraday Effect technique to study the dependence of rotation angle on Calorific value of some mineral and vegetable oils. This relationship will be used as a tool to analyse oil quality in terms of its calorific value.

Farmers, oil consumers and the oil industry will be the beneficiaries as this project is geared towards protecting customer needs.

METHODOLOGY

Fourteen different samples of vegetable oils and three types of mineral oils were analyzed to determine the relationship between the rotation angles of the vibration plane per unit current β with their calorific values.

The calorific values of oils were determined by using bomb calorimeter as described in the Parr bomb calorimeter system arrangement in Figure 1.

Recommended steps necessary for safety precautions and ensuring complete combustion of the sample were followed with due care using the guidelines given in the manual “instructions for the 1341 Plain Oxygen Bomb Calorimeter, Parr Instrument Co. (Moline 1960).

Experimental lay out for determining calorific values of oils

Apparatus

Parr bomb calorimeter system including a bomb, pail, jacket, cover, stirring motor and Beckmann thermometer. Support stands for the calorimeter cover and the bomb head. Ignition unit for the calorimeter, oxygen filling system, sample holder and fuse wire, 2000 ml volumetric flask and timer and an oxygen cylinder.

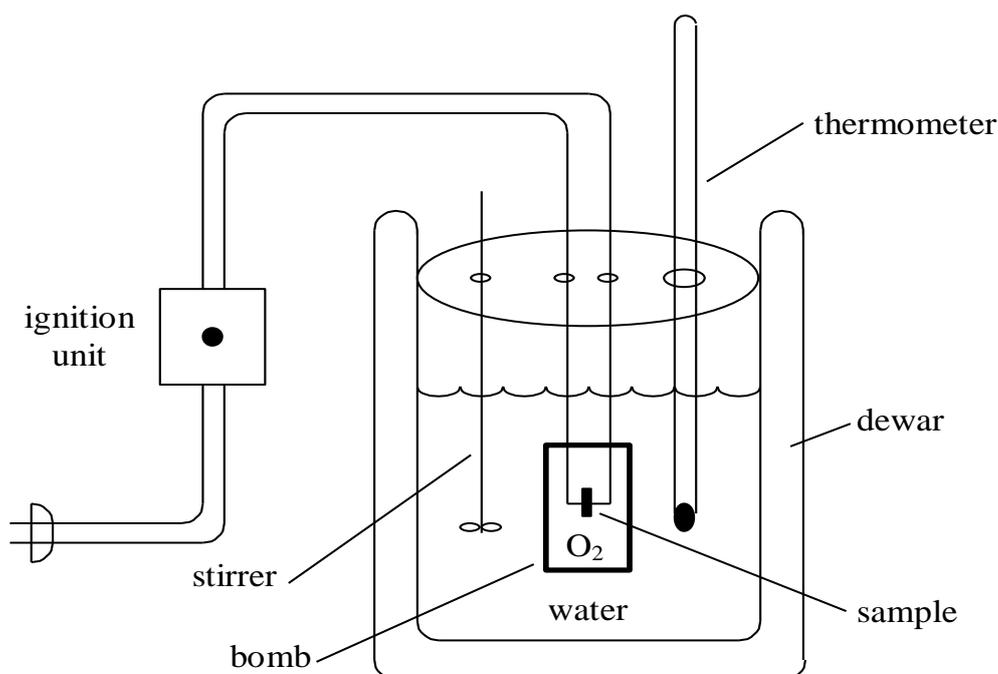


Figure 1: Schematic diagram of the bomb calorimeter system.

Recommended steps necessary for safety precautions and ensuring complete combustion of the sample were followed with due care.

- The bomb calorimeter was checked to ensure that it was clean and dry with no bits of iron wire in the terminals.
- A fuse wire free from kinks or sharp bends of 10 cm length was accurately measured and weighed with the help of a half metre rule and an analytical balance respectively.
- A sample of about 0.7g of oil was determined using an analytical balance and then placed in the pan.
- Care was taken to ensure that the fuse wire only came into contact with the two electrode terminals and the sample, not the pan or the walls of the bomb.
- The temperature range of the thermometer was first checked.
- A 200ml volumetric flask near the lower end of the thermometer was filled with deionized water up to about three - quarters of its volume.
- The bomb lifting handle was attached to the two holes in the side of the screw cap on the bomb
- The bomb was carefully lowered into water in order to avoid the sample and the fuse wire from being disturbed.
- The gas leakage was checked by looking for gas bubbles around the screw cap
- The stirrer was first turned using the hand to be sure that it rotated freely, and after that, it was rotated by a motor.
- Then the “10cm fuse” terminals on the ignition unit were connected to the leads on the calorimeter jacket.
- The temperature change per minute was recorded as water temperature slowly increased.
- After the water temperature had become fairly constant for about four or five minutes, the bomb was ignited.
- To ignite the bomb, the button on the ignition unit was pressed to fire the charge.
- The passage of current through the fuse wire ignited the sample.
- The temperature began rising after a short time delay.
- Values of temperature change per minute were recorded until the run was over.

- After a few minutes, the water temperature reached its maximum value.
 - After this maximum value, the water temperature dropped at a slow, steady rate.
 - Recording of temperature change per minute continued for about 5 minutes.
 - After the last temperature observation, the stirrer motor was stopped.
 - All the recommended steps to open the calorimeter were followed with due care.
 - UN burnt fuse wire was removed and weighed.
 - The weight of the UN burnt fuse wire was subtracted from the initial wire weight to obtain the net weight of the wire UN burnt.
 - The graph of temperature in $^{\circ}\text{C}$ versus time in minutes was plotted for each sample of oil used.
- The equation for radiation correction used was

$$\Delta t = nVI + \frac{(VI - V)}{2} \quad (1)$$

Where Δt is the temperature correction, n is the number of minutes between the ignition and the attainment of maximum temperature, VI is the rate of temperature fall in degrees per minute at the end of the test and V is the rate of temperature rise in degrees per minute at the beginning of the test. Then, corrected rise in temperature

$$\Delta T = t + nVI + \frac{(VI - V)}{2} \quad (2)$$

Where t is the temperature rise during test.

- Hence the calorific value of mineral or vegetable oils is given by

$$\left[(W_1 + W_2) \left\{ t + nVI + \frac{(VI - V)}{2} \right\} \right] / W \quad (3)$$

Where W_1 is the weight of water in grams, W_2 is water value of the apparatus in grams and W is weight of oil sample.

- Equation (3) was used to calculate the calorific value of the sample.

EXPERIMENTAL SET UP TO MEASURE ANGLE OF ROTATION

The light source is the laser beam. It's used for the advantage that it produces monochromatic light and the light it produces is polarized.

SET – UP AND PROCEDURE

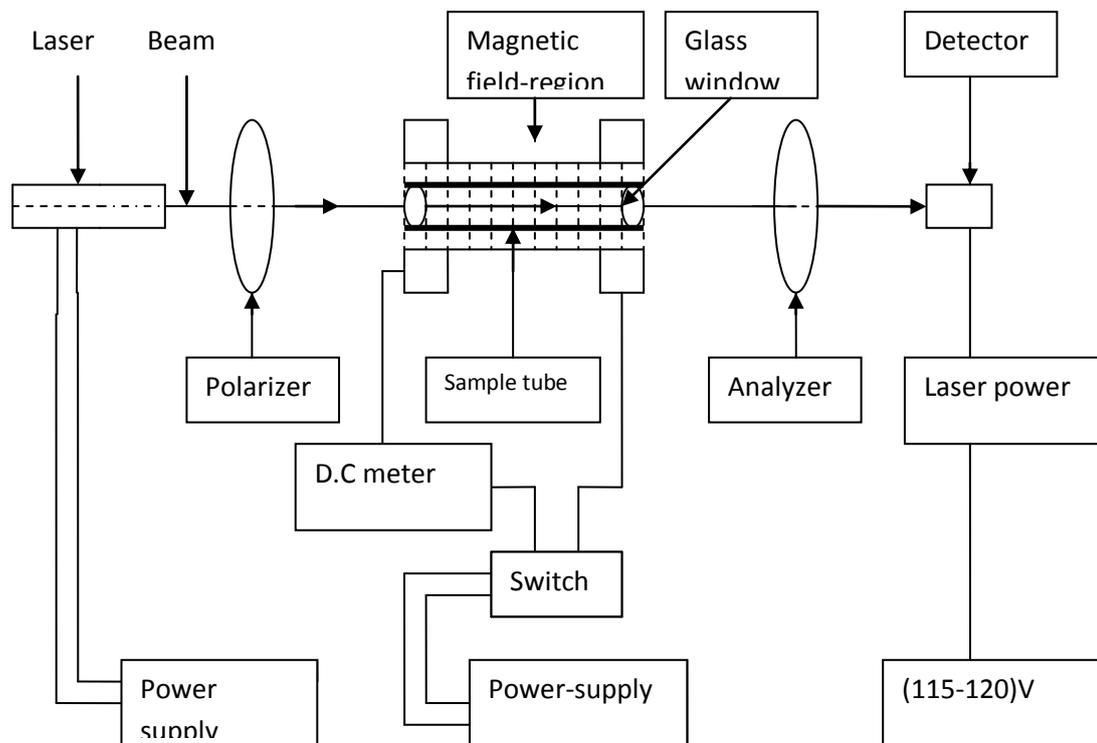


Figure 2. Experimental Arrangement for determining Rotation Angle

The set up of the equipment is shown in Figure 2.

The analyzer, polarizer, sample holder, laser and the head sensor of the laser power meter were fixed on the optical bench using clamps (which were strongly fixed to avoid any change of position during the experiment). The laser beam was directed to pass through the centres of the polarizer, sample and analyzer thus all these were at the same height.

The head sensor was adjusted from time to time to be in line with the beam transmitted through the sample because the beam kept on being rotated. The sample container was thoroughly cleaned with liquid soap to remove any stain along its walls and then properly dried with blotting paper.

- One end of the container was closed with a lid leaving the other end open purposely for the container to be inserted in the hole through the hub of the coil framework.
- After inserting the sample container in the hub, the coil and container were positioned on a table in such a way that the open end of the container faced directly vertically upwards while the closed end rested on the table.
- The sample was poured in the container and the open end was closed.
- The coil into which the sample holder was inserted (as shown in the diagram) was symmetrically and centrally fixed in its support which was firmly fixed on the optical bench.
- Without d.c. magnetic field, the beam was directed through the sample and the angle ϕ at which minimum irradiance I_{\min} occurred was determined for each vegetable sample.
- It was found that oils suitable for human consumption there cut-off angle ϕ_c was equal to cut-off angle for water α_w .
- However, if oil is contaminated or expired the cut-off angle ϕ is different from α_w . Then, the rotation caused by impurity concentration in the sample is given by

$$A = \phi - \alpha_w$$

- The solenoid current was varied to change the magnetic field which consequently changed the angle of rotation ϕ for oil suitable for human consumption to θ . The angle of rotation ϕ due to application of d.c. magnetic field is obtained as the

Difference between two angles i.e. $\phi = \theta - \phi_c$

For each sample a graph of angle ϕ against current I was plotted and the angle β the angle of rotation per unit current i.e. $\frac{\phi}{I}$ for each oil sample was obtained.

RESULTS

In this section results are presented starting with graphs (temperature versus time) used to determine calorific values, the angle of rotation versus current and lastly a graph of angle of rotation β per unit current versus calorific values of the oils.

Figure 3: Graphs of Temperature against Time for Vegetable Oils from Mukwano Group of Companies

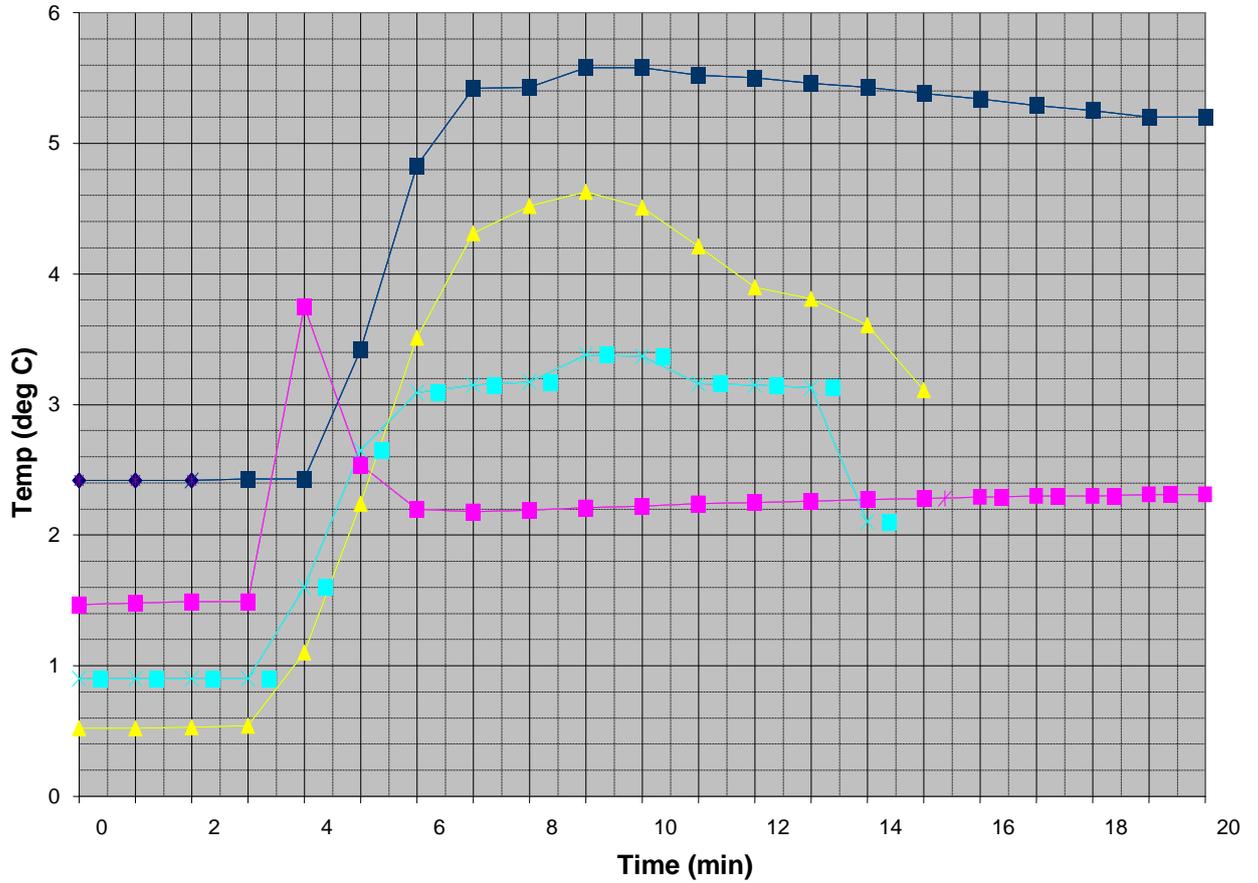


Table 1: Showing Calorific values of vegetable oils from Mukwano Group of Industries

Type of vegetable oil	Calorific value in (kJ/kg)
Corn Oil	39,555
Sunflower Seed Oil	43,011
Fully refined Palm Olein + Sunflower Seed Oil	45,161
Fully refined Palm Olein	46,276

The results show that Fully refined Palm Olein is superior to the three types, followed by Fully refined Palm Olein + Sunflower Seed Oil, then Sunflower Seed Oil and the lowest calorific value is found in Corn Oil.

Figure 4: Graphs of Temperature against Time for Vegetable Oils from Arua

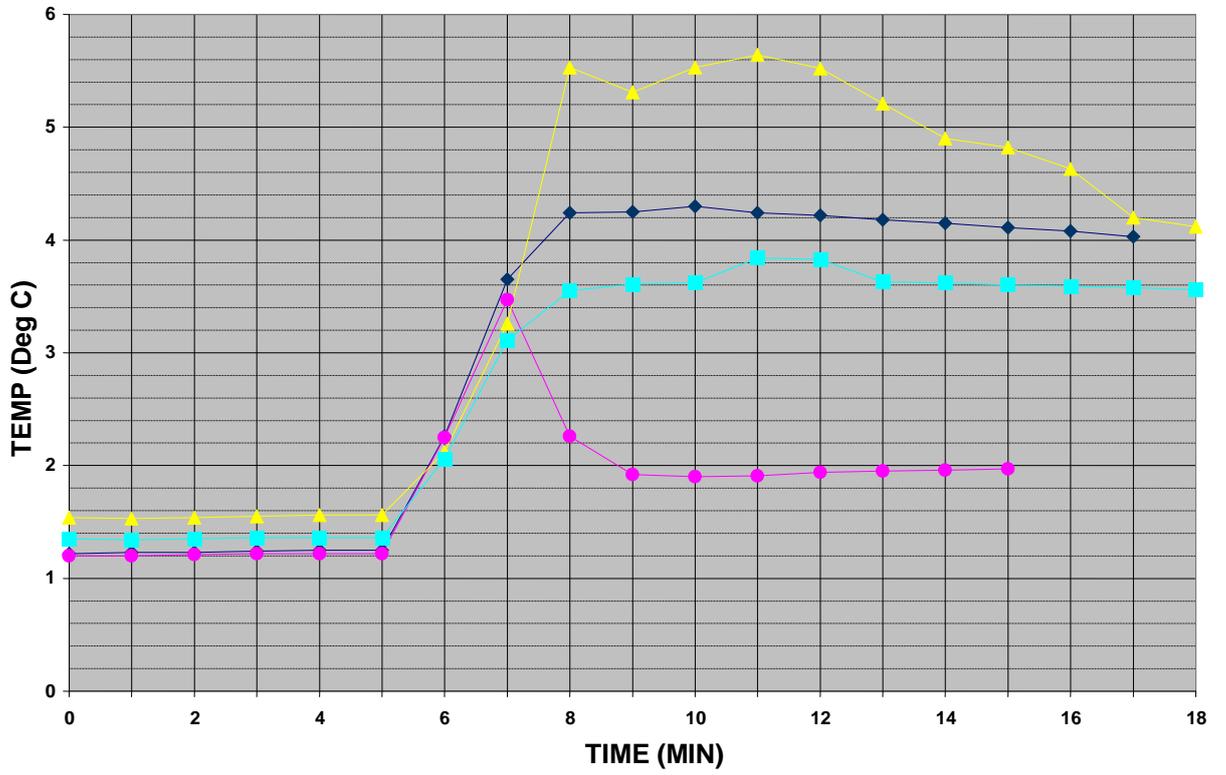


Figure 5: Graphs of Temperature against Time for Vegetable Oils from Tororo

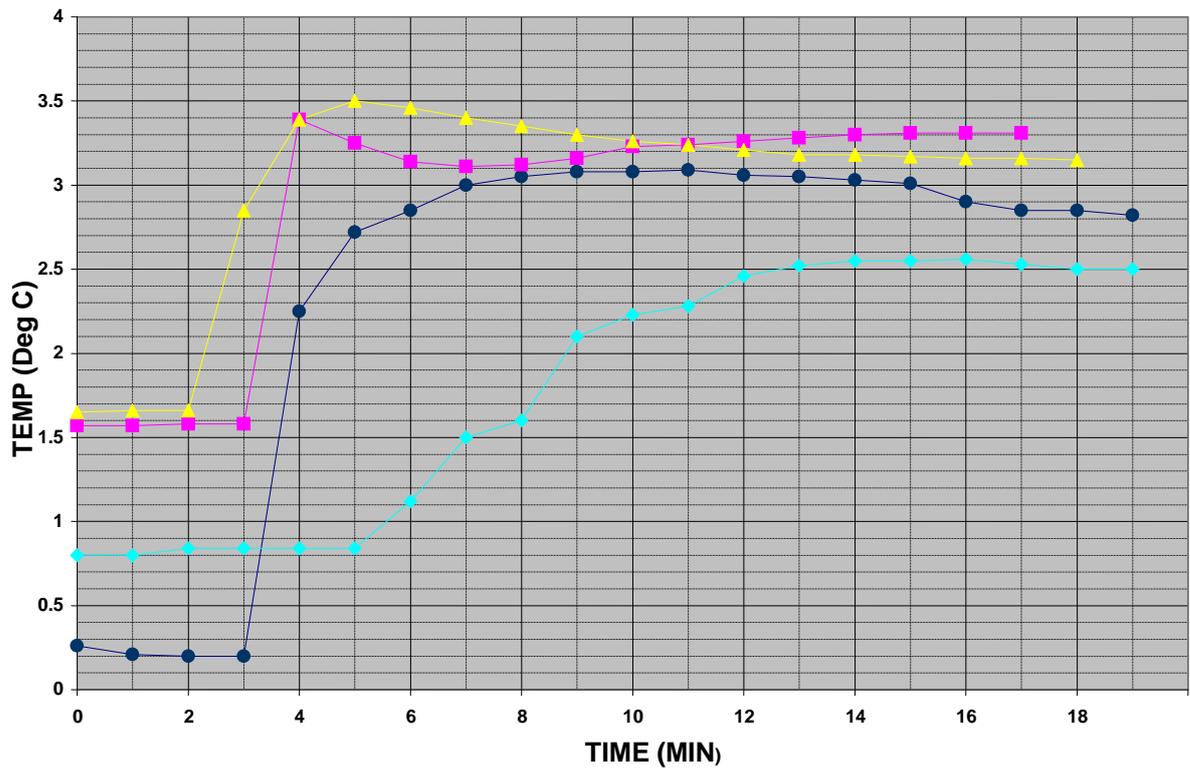
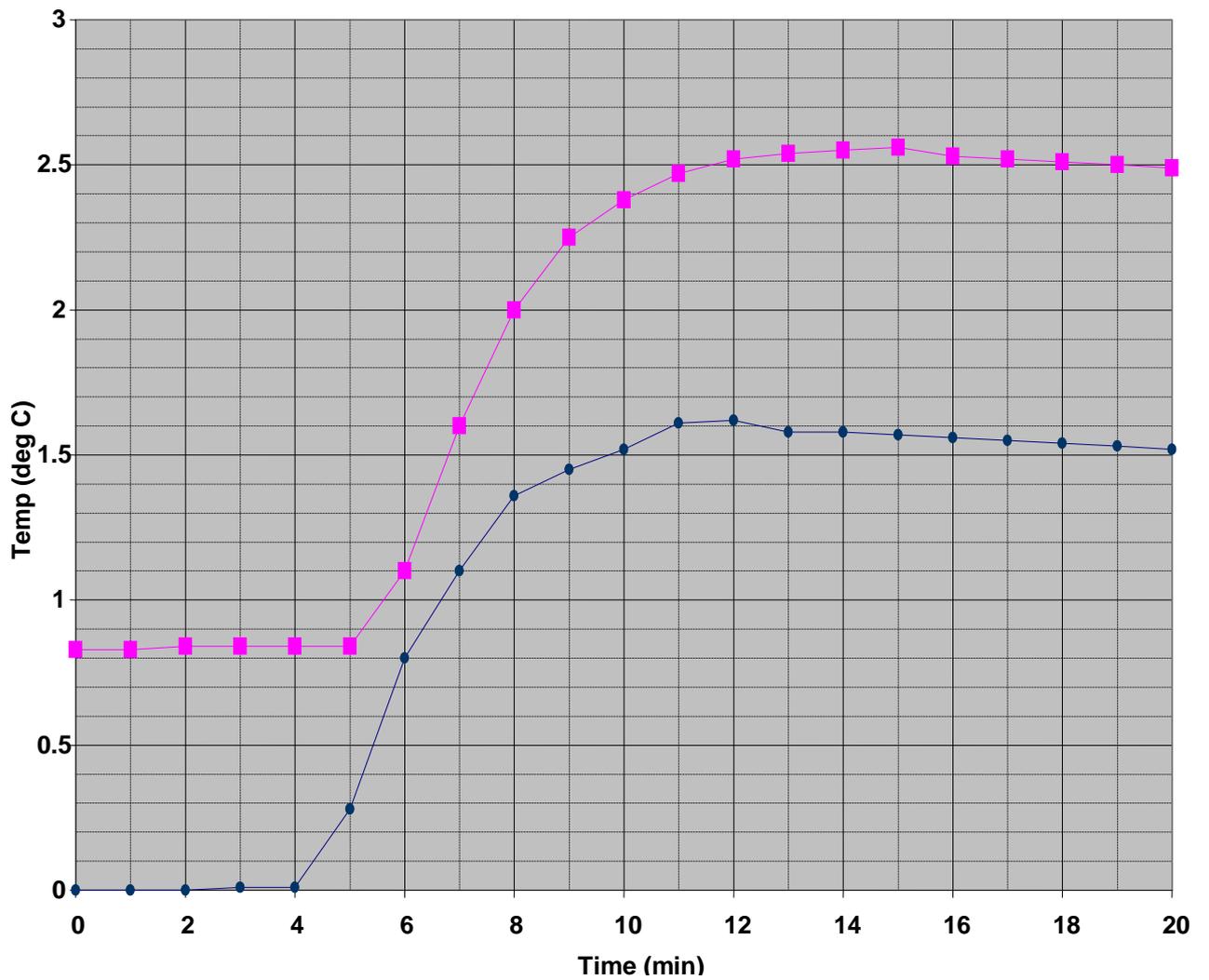


Figure 6: Graphs of temperature against time for Vegetable Oils from Bidco



The calorific values of three samples of mineral oils were also determined for the sake of comparison, that is, to see the difference between calorific values of mineral oils and vegetable oils

Figure7: Graphs of temperature against time for diesel from Jinja, and for Petrol and Kerosene from Kampala.

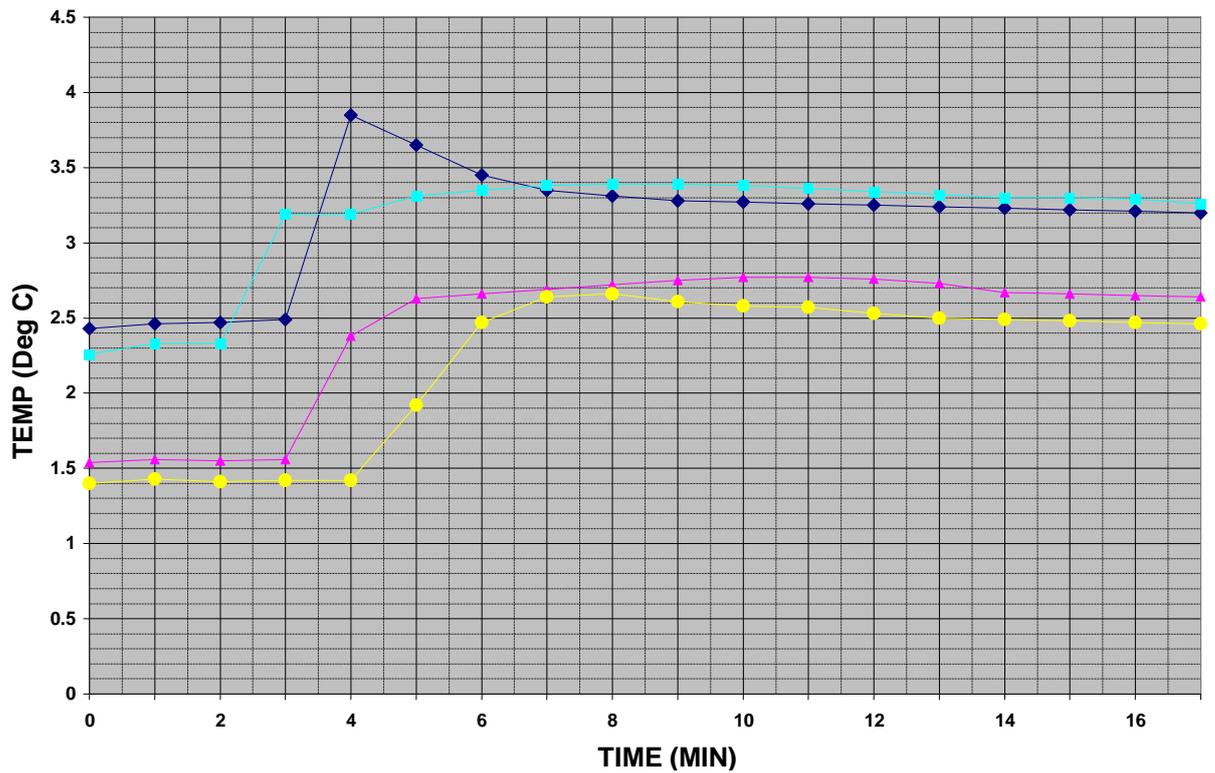


Table 2: Calorific values of mineral oils

Type of mineral oil	Calorific value (kJ/kg)
Petrol	46,239
Diesel	45,624
Kerosene	34,998

Figure 8: Graphs of angle of rotation against current for vegetable oils from Mukwano Group of Companies

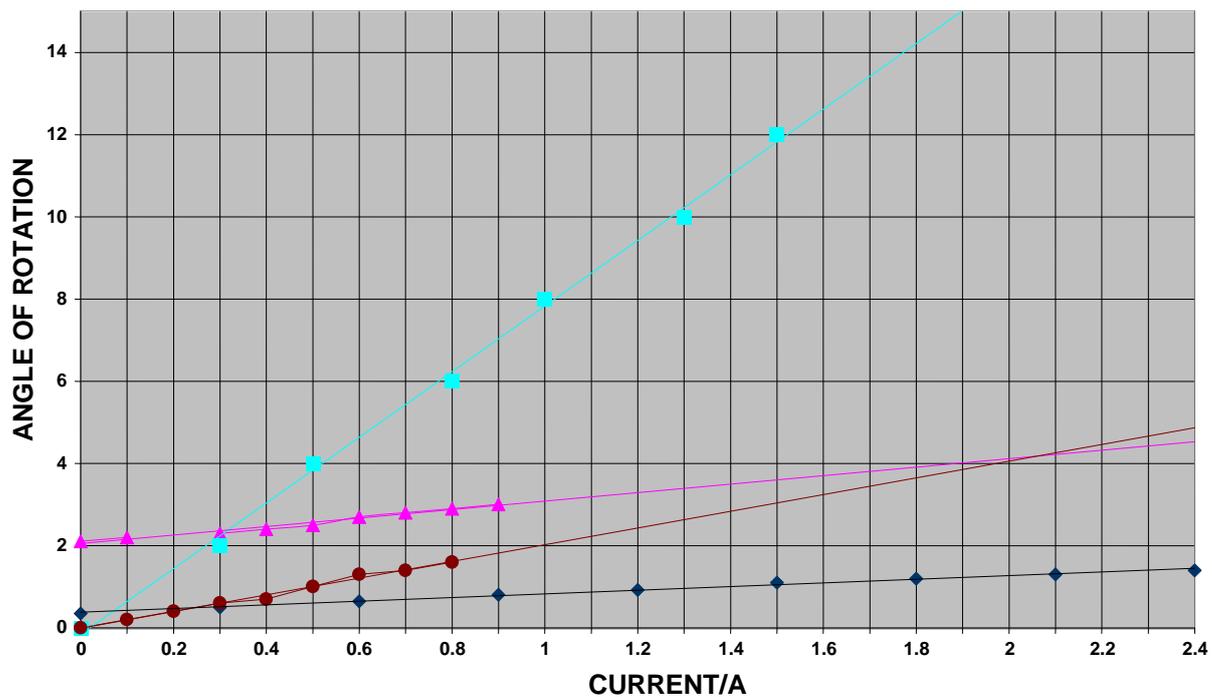


Table 3: Angle of rotation per unit current in vegetable oils from Mukwano Industries

Type of vegetable oil	Angle of rotation per unit current β
Corn oil	9.4
Sunflower seed oil	12.8
Fully refined Palm olein + sunflower seed oil	14.8
Fully refined Palm olein	16.0

Figure 9: A graph of angle of rotation against current for vegetable oil products from Arua.

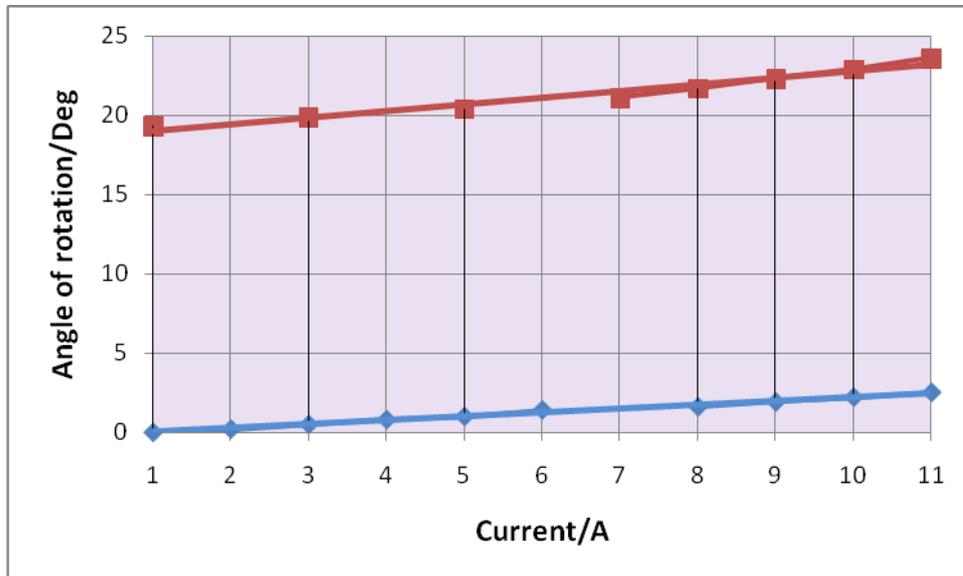


Figure 10: A graph of angle of rotation against current for pork fat oil

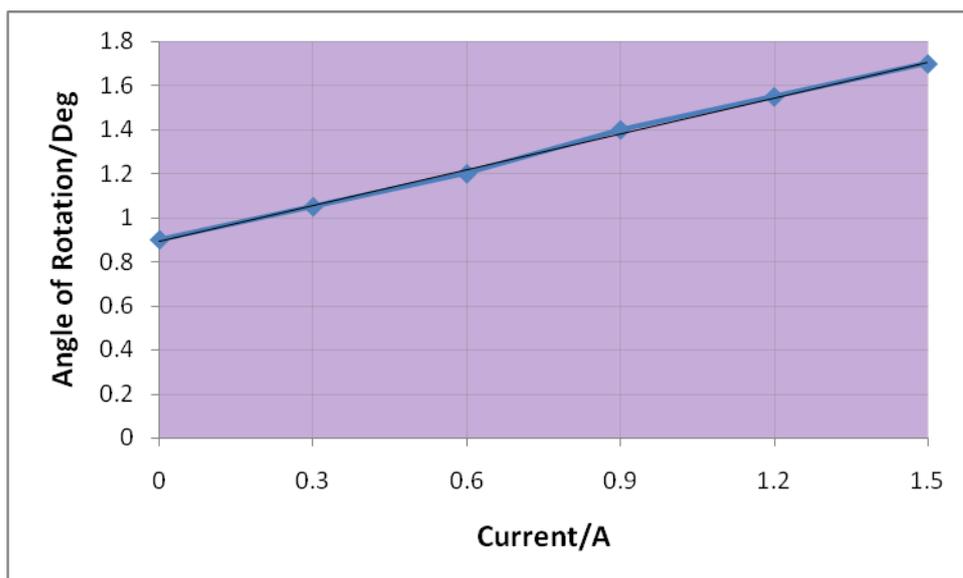


Fig 11: A graph of angle of rotation against current for cooking oil from Bidco.

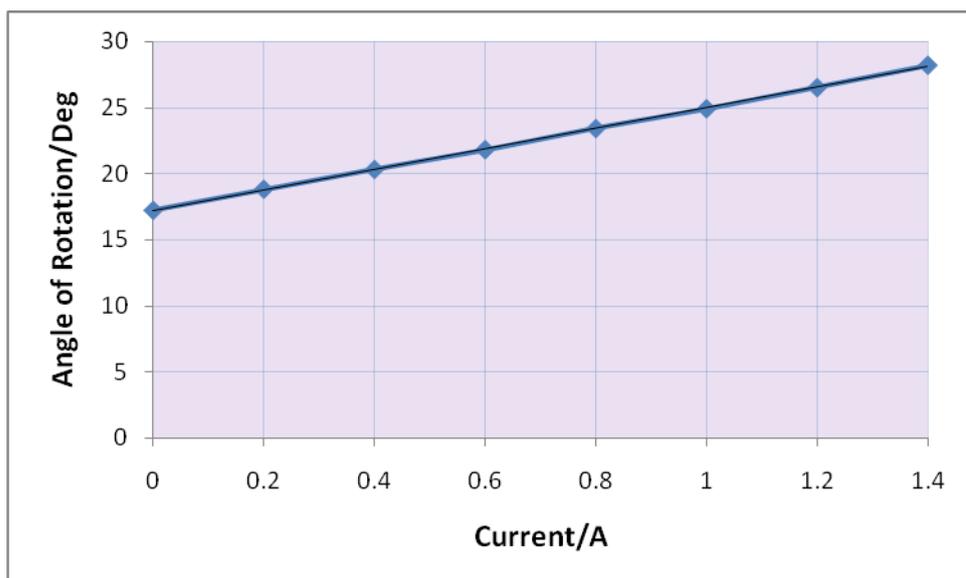


Figure 12: A graph of Angle of Rotation against Current for Expired Palm Seed Oil Sample

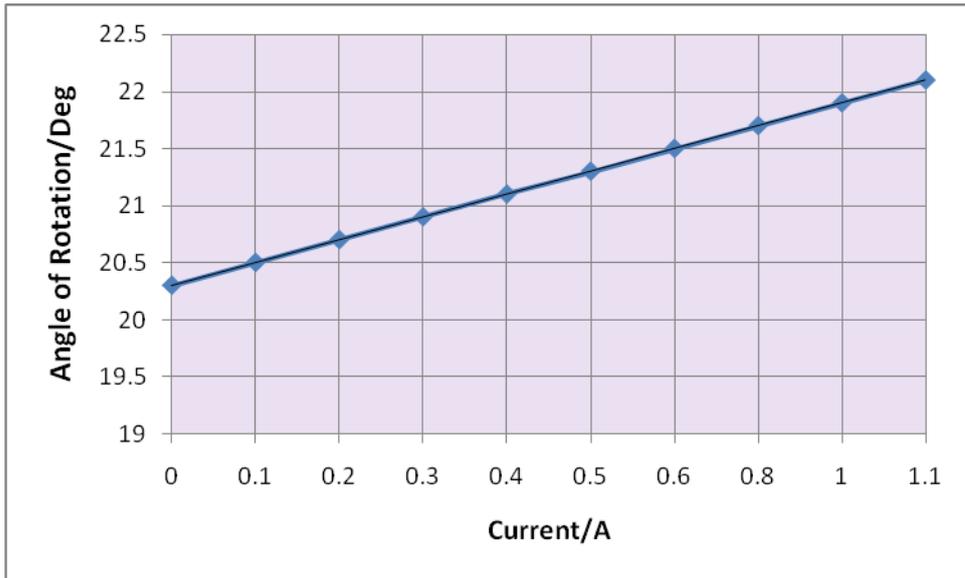
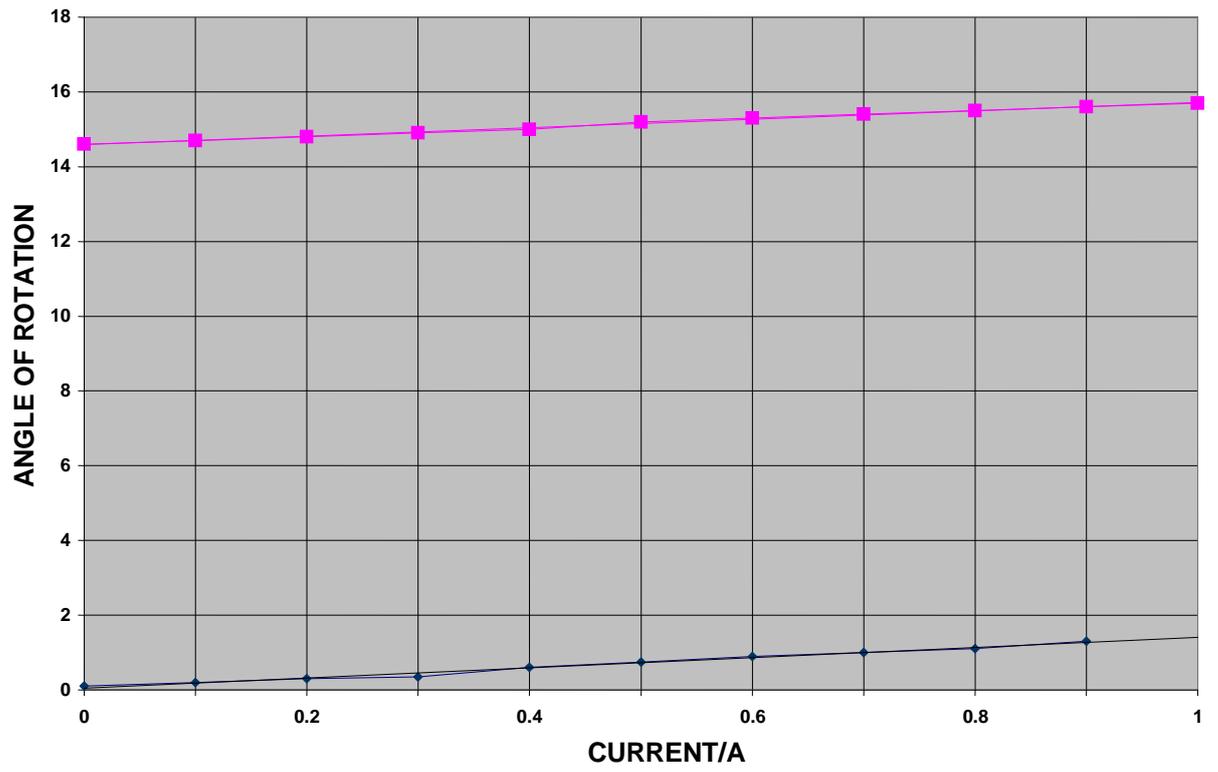


Figure 13: A graph of angle of rotation against current for diesel oil from Jinja and kerosene from Kampala.



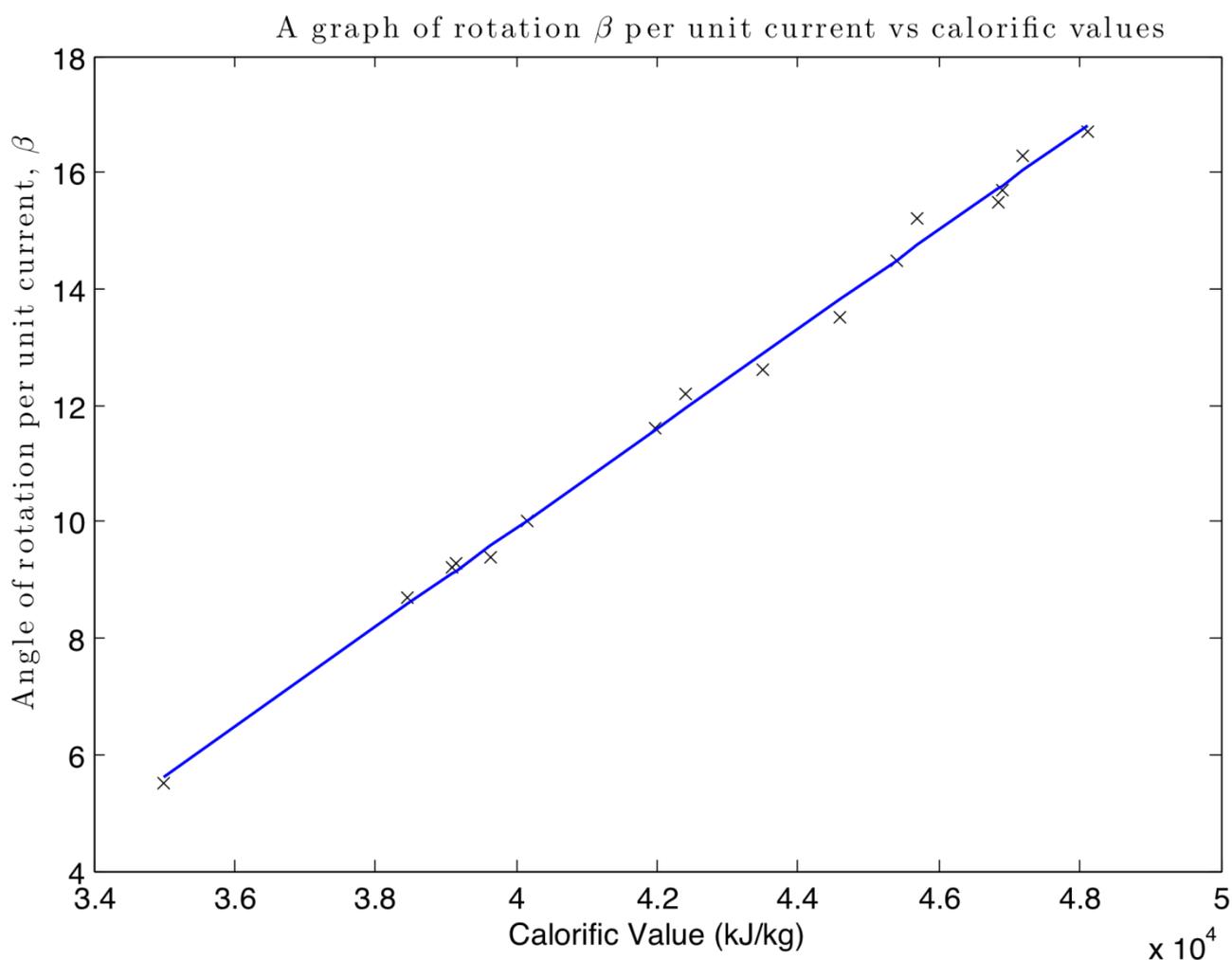


Figure 10: Rotation β per unit current Vs Calorific values in $\times 10^8$ J/kg

DISCUSSION OF RESULTS

It was observed that the calorific values of both vegetable and mineral oils lie in the range of 35.0 to 48.2 MJ/kg. It was noted also that kamura oil from Arua has the highest vegetable calorific value of 47.2 MJ/kg followed by groundnut oil from the same area with 46.9 MJ/kg. Groundnut oil from Tororo had a calorific value of 45.7 MJ/kg.

The results also show that kamura oil from Arua has the highest rotation per unit current β

Of 16.3° followed by groundnuts oil from Arua with 15.7° . A plot of rotation angle per unit current β against calorific value gave a straight line graph given by the equation

$$y = 8.781x - 25.5$$

CONCLUSION

The results show a good linear relation between calorific value and the angle of rotation per unit current. This technique is a potential method for designing an instrument that can be used to determine calorific values of transparent oils using Faraday Effect.

ACKNOWLEDGEMENT

The group is highly indebted to Research Grants and Publications Committee of Kyambogo University that sponsored this project. The team is very grateful to the Manager of Mukwano Industries, the Cottage Industries of Tororo and Arua for providing them with samples for analysis.

We express heartfelt thanks to the team of experts of Chemistry Department of Makerere University whose cooperation made it possible to obtain the measurement of calorific values.

We are also grateful to the Physics Department Makerere University for assisting us with their optical bench and other components that enabled the team to obtain measurements of the angle of rotation β per unit current.

Last but not least, we thank very much the Department of Physics Kyambogo University for their cooperation and encouragement while undertaking this study.

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FINANCIAL SERVICES

DEBT FINANCING AND RETURN ON EQUITY

A CASE OF LARGE CORPORATE TAXPAYERS IN UGANDA

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ABSTRACT

This study examined the relationship between debt equity ratio and return on equity for large corporate taxpayers in Uganda. It addresses the question of whether debt financing magnifies return on equity. The research also established the capital structure of large taxpayer companies and confirms that the theories on the advantages of debt financing are true in a developing economy like Uganda. It was established that all sectors under study employed debt in their capital structure during the study period and they had a positive correlation ($r = 0.322$, $p\text{-value} < 0.05$) between debt equity ratio and return on equity. Sector by sector analysis showed that the Manufacturing sector had the strongest relationship between debt equity ratio and return on equity ($r = 0.835$, $p\text{-value} < 0.05$) and the Construction sector had the weakest correlation between debt and equity ($r = 0.128$, $p > 0.05$)

Construction sector had a high probability of leverage change ($r = 0.76$). Empirical evidence shows that debt financing improves return on equity. The findings for all the sectors were in line with the theory that debt financing magnifies shareholders' return.

Keywords: Debt financing, Return on Equity, Uganda

Background to the Study

Many firms use debt as a major source of financing. A research by Booth et al., (2000), on 5,281 firms in Europe, Asia and USA revealed that the debt to equity ratio ranged from a low of 30.3% in Brazil to a high of 73.4% in South Korea.

In theory, the primary motive of a company using financial leverage was to magnify the shareholders' return Pandy, (1997). According to Paraque (1992), the capitalization of a given firm closely connected to its return on equity and that highly profitable slow-growing firms should generate cash and can finance their operations by internally generated funds whereas less profitable fast-growing firms need significant external financing. Paraque and Pandy's theories did not show the extent to which financial leverage could magnify shareholders' return; an aspect this research sought to establish.

Divya et al (2011), in their study on Inside Debt and the Design of Corporate Debt Contracts found out that a higher CEO relative leverage, defined as the ratio of the CEO's inside leverage (debt-to equity compensation) to corporate leverage, was associated with lower cost of debt financing and fewer restrictive covenants. Additional analysis on a sample of new public bond issues also showed a negative relation between CEO relative leverage and bond yield spread. The evidence supports the notion that debt holders recognize the incentive effects of executive debt-like compensation and adjust the terms of corporate debt contracts accordingly.

Hull (2011), in his non empirical study of Debt-equity decision-making with and without growth attempted to instill knowledge and skills to students when making debt-equity and plowback-payout choices.

According to Nadeem (2011), empirical study of firms in manufacturing industry of Pakistan, suggested that profitability, liquidity, earnings volatility, and tangibility (asset structure) are related negatively to the debt ratio, whereas firm size was positively linked to the debt ratio. Non-debt tax shields and growth opportunities do not appear to be significantly related to the debt ratio. The findings of this study are consistent with the predictions of the trade-off theory, pecking order theory, and agency theory which showed that capital structure models derived from Western settings does provide some help in understanding the financing behavior of firms in Pakistan.

Govindasamy (2010), "Leverage" – An Analysis and its Impact on Profitability with Reference to Selected Cement Companies in India, established that the leverage, profitability and growth are related and the leverage has impact on the profitability of the firm.

Abimbola (2004), a test of the endogenous relationship between financial leverage and bank debt's use in the UK indicated that industry classification has a significant effect on reliance on bank debt. Although firms that used bank debt seemed to have higher agency cost potential than firms that did not use debt, long term leverage does not have a significant relationship with long term bank debt's use in the evidence. But total leverage has a significant positive relationship with total bank debt's use. It appears that banks give only more short term debt, but not more long term debt, to their borrowers than other lenders. It also appears that the firms observed used long term and short term bank debt for different purposes.

Molina (2005), in the study are firms underleveraged found out that the leverage's effect on ratings was three times stronger if the endogeneity of leverage was ignored. This stronger effect results in a higher impact of leverage on the ex ante costs of financial distress, which can offset the current estimates of the tax benefits of debt.

Elliott et al. (2007), "Target debt ratios: The impact of equity mis-pricing" reported that portion of variance was caused by two factors. First, firms faced a 'hard' boundary when over levered. This was due to the present value of bankruptcy costs increasing at an increasing rate. These firms will adjust towards a target debt ratio more rapidly than under leveraged firms which face a 'soft' boundary. Second, if a firm's equity was mis-priced, the cost of issuing equity may be reduced /increased.

Elliott et al. (2008), "Target Debt ratios: differential rates of adjustment and market timing". The findings were robust to various means of measuring leverage and mis-pricing.

Nishat (2000), "The Systematic Risk and Leverage Effect in the Corporate Sector of Pakistan," indicated that the debt-equity ratios across industries are higher throughout the study period, except for a few industries like tobacco and vanaspati and allied. The returns and risk relationship with the hypothesis that leverage causes a change in the volatility of stock returns.

Jiming et al. (2010). "The Impact of Debt Financing on Firm Investment Behavior: Evidence from China" established that there was a negative relation between debt financing and investment behavior in both firms with low-growth opportunities and high-growth opportunities and a negative effect was more significantly stronger for firms with low-growth opportunities than those with high-growth opportunities.

Secondly, there was a positive relation between debt financing and investment behavior in firms with mid growth opportunities and operating performance.

Thirdly, for the state-owned holding companies, there was a positive relation between the scale of investment and debt financing; while a negative relation between investment and debt financing exists in non-state-owned holding companies.

Chava. S., & Micheal R. R. (2008). "How Does Financing Impact Investment? The Role of Debt Covenants." Found out that Capital expenditures declined by approximately 1% of capital per quarter in response to covenant violations with a 13% decline relative to the pre-violation level of investment. Additionally, this decline concentrated among firms in which agency and information problems were relatively more severe. Thus, the results highlighted how the state-contingent allocation of control rights mitigated investment distortions arising from financing frictions.

Cîrciumaru, et al., (2010), study on the return on equity for the Romanian industrial companies found out that there were positive relationships between study variables; Operating margin, Total assets turnover (Efficiency of Assets) and leverage as independent variables positively affected ROE.

Adamia et al, (2010), The Leverage Effect on Stock Returns, Indicated that returns were decreasing in firm leverage. Their study tested the relationship empirically with other risk factors and found that the results remained robust. Further their results showed that leverage was a firm characteristic that loads on a risk factor. This suggested that leverage should be priced as a risk factor and required adequate incorporation into common asset pricing models.

The leverage effect on monthly returns for all three models was negative and significant although very small. Thus it remained negative and significant when other risk factors such as tax-rate and industry concentration were added.

When their study used leverage as sole explanatory variable and estimate returns with the CAPM the results still indicated a negative and significant relation between leverage and returns.

In trading, when a firm employs debt in its capital structure, it has to pay fixed charges on the debt regardless of the firm's income generating capacity. There was a risk of making low profits or even losses and faced liquidation when the expected return on investment fell short of the cost of borrowed funds. However, management of business enterprises usually enter into loan covenants using financial projections that assume favorable or optimistic economic conditions and hope that the fixed charge on debt remain lower than the firms' expected rate of return on capital employed and as such project higher returns on equity.

In a developing economy like Uganda, there was no guarantee for the prevalence of favorable economic conditions. The liberalization of the economy and subsequent economic reforms in Uganda since 1986 exposed the economy to

both local and foreign competitions. For example Celtel, a mobile telephone company pioneered the introduction of mobile phone services in Uganda. Shortly after MTN joined the market and discounted call charges, monthly subscriptions and sold handsets at tremendously reduced price compared to that of the competitor. Uganda telecom and other networks joined the market and also offered substantial discounts for the use of their networks. In addition, Uganda eased its tariff barriers; however, non-tariff barriers remained non-transparent and inconsistent. For example bureaucracy was non transparent, inconsistent and subject to corruption. Corruption has remained pervasive and the most serious impediment to advancing Uganda's overall economic freedom. Load shading of power, poor feeder road network, political interference, poverty and other factors were the major encumbrance to productivity and profitability of various sectors of the Ugandan economy.

Statement of the Problem

Capital structure theories depict debt financing as a double-edged sword. That is, it is the cheapest source of capital when a firm has income generating capacity to meet the debt obligations but when the return on capital slips below the cost of debt, business will make losses and may gradually be liquidated on failure to meet the debt obligations.

The theories on debt financing were developed premised on developed country case scenarios. It is not clear whether debt-financing effects are relevant and true in a developing economy like that of Uganda. This study set out to establish the relationship between debt equity ratio and return on equity for the targeted sectors of the study.

Purpose of the Study

The study set out to establish the relationship between debt equity ratio and shareholders' return for various business sectors in the Ugandan economy.

Objectives of the Study

The following were the major objectives of the study:

- a) To establish the capital structure of the two large tax paying business entities in Uganda.
- b) To establish the effect of leverage chance and leverage risk on return on equity of the two sectors of large taxpayers.
- c) To examine the relationship between capital structure and return on equity.

Research Questions

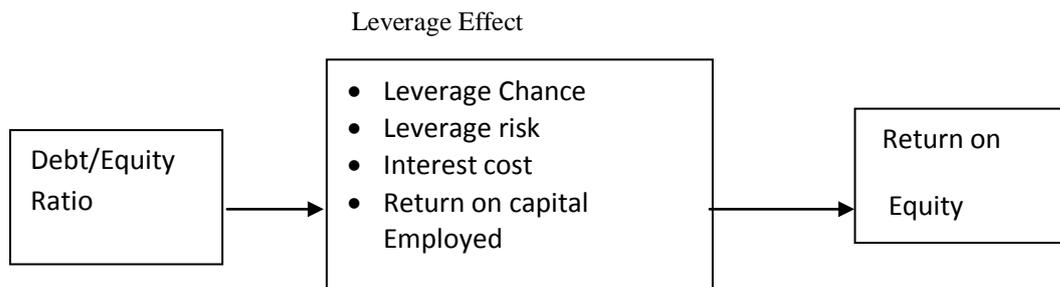
The study focused on answering the following questions:

- a) What is the capital structure of the two large corporate taxpaying entities in Uganda?
- b) What is the effect of leverage chance and leverage risk on return on equity of the study population?
- c) To what extent does debt financing magnify shareholders' return on equity in Uganda?

The conceptual framework

The researcher has discussed research findings in the subsequent chapters based on the conceptual framework as follows:

Fig.1 Conceptual Framework (adapted from Du Pont Model)



The common and direct ratio for calculating a firm's return on equity is the ratio of retained earnings to owner's equity.

However, the Du Pont's model (<http://www.uic.edu>) decomposes the ratio as a function of three factors; the firm's profitability, assets turn over and leverage summarized as:

Profit Margin X Asset Turnover X Leverage = Return on Equity

- Profit Margin = Net income/Net Sales
- Asset Turnover = Net Sales / Average Total Assets
- Leverage = Average Total Assets/Average Owner's Equity

Profit margin shows the percentage of each shilling in sales that result in net income, asset turn over measures how efficiently assets are used to generate sales and the leverage indicates how the assets used in generating sales are financed. Leverage shows that the firm is entirely equity financed and higher ratio indicates a higher leverage. The Du Pont model return on Equity decomposition formed a basis for the choice of the independent variables in this study.

Significance of the Study

The findings will benefit the following:

Shareholders

The study will enable shareholders to appreciate the contribution of debt financing to the return on their funds.

It will enable them examine those sectors that give a higher return on equity for a given combination of debt and equity.

Managers of business enterprises

The study will enable managers to ascertain proportion of debt that has a high contribution to the shareholders' funds.

It will provide information on the various costs associated with debt financing and also provide a guide for the choice of capital structure for certain business sectors.

The study will provide management with information about which sector is best suitable for equity financing, debt financing or a mixture of debt and equity and in what proportions.

Tax Administrators

The study will provide a basis for assessing the earning capacity of equity holders in the various business sectors.

Scope of Study

The scope of the study was in terms of geographical scope, subject matter and time.

Geographical Scope

The study covered a sample of 43 large taxpaying companies in construction and manufacturing in Uganda that submit financial statements to Uganda Revenue Authority at Crested Towers Kampala.

The major reasons for choosing Large tax paying companies was that their business operations were centrally monitored by the Large Tax payer Unit of the Uganda Revenue Authority and their financial statements were prepared by reputable audit and accounting firms like Price Water House Coopers, Ernest and Young, KPMG; and the large taxpayers were frequently audited or monitored by Uganda Revenue Authority.

Subject Matter

The study aimed at finding out:

- (a) The composition of capital structure of the selected companies
- (b) The relationship between return on equity and the various combinations of debt and equity for the selected companies.

Time

The study covered a period of 11 years (2000-2010).

Literature review

Relevant materials drawn from various sources for the researcher believes that any literature related to debt financing and return on equity regardless of the time or place may still be substantial to provide a good basis upon which the findings of the study may be based. It was reviewed along the major theme of the topic: debt financing and return of equity under which sub themes like leverage chance and leverage risk were discussed.

Debt and Equity

Theories on proportions of debt and equity in the capital structure of business enterprises were developed and the relevancy of some of the theories was studied.

Modigliani and Miller (1958) theorized that the capital structure of a firm does not affect its value. They illustrated and justified their theory by holding the weighted average cost of capital constant and assumed perfect capital markets, absence of corporate taxes, easy classification of firms into equivalent returns and that the expected values of the probability distributions of operating earnings for all future periods are the same as present operating earnings.

The Modigliani and Miller (MM) theory was based on ideal assumptions that do not exist in many countries. For example in Uganda corporation tax (30% for resident and 25-45% for mining companies) is existent and compulsory. Average cost of capital cannot remain constant because most financial institutions practice price discrimination by

categorizing their clients into corporate clients and non-corporate clients and charge different rates of interest on borrowed funds

The MM theory did not put into perspective the reaction of lenders as capital shifts from equity to debt, a factor Smith and Watts (1992) examined and established that when capital structure shifts from equity to debt, lenders restrict borrowers in the usage of working capital, capital expenditure for fixed assets and equity re-involvements. By focusing on the value of a firm, which is market value of stock outstanding plus market value of debt outstanding Van Horne (2002) Modigliani and Miller mainly concerned themselves with one entity, the firm. The firm as an entity has a number of stakeholders who share in its value namely, shareholders, the public, the government, employees among others. It is not clear whether the shareholders' value increases proportionately and whether the theory is relevant in Uganda.

This study focused more on what happens to the value of shareholders as the proportions of debt and equity in the capital structure vary.

Other theories or models reviewed are the capital asset pricing model (CAPM), According to Investopedia (2011), CAPM describes the relationship between risk and expected return and used in the pricing of risky securities.

$$\bar{r}_a = r_f + \beta_a(\bar{r}_m - r_f)$$

Where:

r_f = Risk free rate

β_a = Beta of the security

\bar{r}_m = Expected market return

“Fama-French three factor model and the Fama-French plus Carhart four factor model from other studies on; Stock returns for each company calculated monthly, using the percentage change in consecutive closing prices adjusted for dividends, splits and rights issues (Fama et al. 1969), then estimates of abnormal returns in excess of the risk free rate using Sharpe (1964)'s Capital Asset Pricing Model, Fama-French (1993) model and Carhart (1997) model”.

Divya et al (2011), in their study on Inside Debt and the Design of Corporate Debt Contracts found out that a higher CEO relative leverage, defined as the ratio of the CEO's inside leverage (debt-to equity compensation) to corporate leverage, is associated with lower cost of debt financing and fewer restrictive covenants. Additional analysis on a sample of new public bond issues also shows a negative relation between CEO relative leverage and bond yield spread. The evidence supports the notion that debt holders recognize the incentive effects of executive debt-like compensation and adjust the terms of corporate debt contracts accordingly.

Hull (2011), in his non empirical study of Debt-equity decision-making with and without growth attempted to instill knowledge and skills to students when making debt-equity and plowback-payout choices.

According to Nadeem (2011), empirical study of firms in manufacturing industry of Pakistan, suggested that profitability, liquidity, earnings volatility, and tangibility (asset structure) are related negatively to the debt ratio,

whereas firm size was positively linked to the debt ratio. Non-debt tax shields and growth opportunities do not appear to be significantly related to the debt ratio. The findings of this study are consistent with the predictions of the trade-off theory, pecking order theory, and agency theory which showed that capital structure models derived from Western settings does provide some help in understanding the financing behavior of firms in Pakistan.

Govindasamy (2010), *Leverage* – An Analysis and its Impact on Profitability with Reference to Selected Cement Companies in India, established that the leverage, profitability and growth are related and the leverage has impact on the profitability of the firm.

Hasanhodzic J.&Lo. A. W., (2010). In their study of sample of all-equity financed companies from January 1972 to December 2008, found out that the leverage effect were just as strong if not stronger, implying that the inverse relationship between price and volatility was not based on leverage, but was more likely driven by time-varying risk premia or cognitive mechanisms of risk perception.

Riddiough (2004), in a study of optimal capital structure articulated the economics underlying the market for outside finance in commercial real estates and established that mortgage debt is typically the optimal form of finance as it economizes on transaction costs and provides proper incentives for the property owners. An inside equity-outside mortgage financing maximizes comparative advantage. He concluded that for commercial real estate, debt financing was cheaper than equity.

However, his study did not involve numerical figures to show the contribution of debt financing to shareholders. His focus was mainly on how to determine the optimal capital structure for one form of business: commercial real estate business.

The current study considered two sectors, establish their capital structure, and then analyze its relationship with return on equity.

Brounen and Eichholtz (2001), examined the stock price reaction on announcements of additional equity and debt on European property companies' capital offerings. They established a positive reaction on employing more debt than equity as a result of perceived tax shield benefit from debt financing. The study justified the use of more debt than equity in an environment where capital markets are perfect.

However, it's not known whether the same results are true for unlisted companies operating in an environment of developing imperfect capital markets as in the case of Uganda.

Theory on debt financing

The advantage of debt financing in taxation of business enterprises is that interest payments are tax deductible. They elude taxation at the corporate level, whereas dividends or retained earnings associated with stock are not deductible for corporation tax purposes. Debt financing improves the total amount of payments available for stockholders Van Horne (2002)).

Pandy (1997), states that the role of debt financing is to magnify the shareholders' return. The assumption that the fixed charge funds are obtained at a cost lower than the firm's rate of return on the assets was the basis for the magnifying impact of debt financing.

Julius Kakuru (2000), observed that whereas debt could be beneficial especially in times of economic boom, excessive debt financing will mean that business enterprises have high interest obligations and the burden of repayment of principle amounts periodically.

Firms enter into agreements to borrow funds with a view of boosting their capital base, asset turnover and to enable the company expand its operations.

Debt financing was desirable when cost was lower than the expected rate of return on investment.

Elliott, B., W., Koeter-Kant, J., & Warr. R., S. (2008) found out that the average book debt ratio for all firms was about 23%, compared to a market debt ratio of approximately 28%. On average, sample firms had earnings 6.7% of assets, before interest and taxes.

Omole D. A., and Falokun. G. O., (1999), indicated that there was a link between interest rates and the corporate financing strategies and the profitability of firms. It also revealed that interest rate liberalization had a link with the growth of the equity markets. On sectorial analysis, their study indicated that the interest rate liberalization does not seem to have similar effects on all the investigated quoted companies

Leverage Chance and Leverage risk

Pandy (1997), states that debt financing provides a potential of increasing shareholders' earnings only when the interest rate charged on borrowed funds was less than the rate of return on assets financed by debt. When the rate of return falls below the cost of borrowed funds, the firm stands a risk of making a loss. Risk adverse managers, under such circumstance, opt for increased equity financing.

Pandy (1997) gave numeric illustrations of how debt financing increases shareholders' return for constant earnings before interest and tax (EBIT) and for a varying EBIT. However, the values used were not for specific firm or industry.

The study used data from financial statements of business enterprises for specific sectors in Uganda, examined the changes in return on equity, and established that sector that had the highest or lowest potential of maximizing shareholders' return from assets financed by debt.

Volatility risk alone predicted 50% of credit default swap CDS spread variation, while jump risk alone forecast was 19%. After controlling for credit ratings, macroeconomic conditions, and firms' balance sheet information, explained 77% of the total variation. Moreover, the marginal impacts of volatility and jump measures increased dramatically from investment grade to high-yield entities. The estimated nonlinear effects of volatility and jumps were in line with the model implying that there was a relationship between equity returns and credit spreads (Benjamin Yibin Zhang, Hao Zhou, Haibin Zhu 2005).

The corporate level taxes decreased the effect of leverage on the cost of equity and personal tax disadvantage of debt did not have a significant effect. Firms' capital structure choices related with corporate and investor level taxes in a predicted manner. Dhaliwal D, Heitzman. S. & Li.O. Z. 2005.

Bandi. F. M., Bandi & Ren`o. Roberto (2009), Kernel estimate of leverage effects had asymptotic sampling distributions which crucially depended on the features of objects that are fundamentally hard to pin down, namely the probability and size distribution of the individual and joint discontinuities in the return and volatility sample paths. Their study focused on the nature of

dependence and its implications, while providing tools for feasible identification of (potentially time-varying) leverage effects under mild parametric structures and weak recurrence assumptions. It empirically showed that, for stock index futures, stronger leverage effects are associated with higher volatility regimes that economically important time-variation in leverage with more negative values associated with higher volatility levels.

According to The Journal of Finance (2000), a study on Boeing, Intel, Pacific gas and Electric, RJR Nabisco and Safe Way for the period (1983-1993) indicated that large liquid and profitable collateralized firms with low expected costs of distress and small research expenses had the largest tax benefits arising from debt financing. Firms below average growth opportunities had larger benefits than growth firms.

Taylor (2001) analyzed the impact of debt financing on return on equity where he used an example of an entrepreneur investing in a machine worth \$250,000 to generate an expected profit of \$75,000. In his analysis, if the investment were financed 100% equity, the return on investment would be 30%. In addition, if the entrepreneur used 50% debt at an interest of 12%, the rate of return on investment remained 30% but the rate of return on equity increases to 48%. He considered an increase in the interest rate while holding expected profits constant and established a negative rate of return on equity.

Taylor's analysis assumed absence of corporation tax and did not take into account capital allowances the firm would enjoy.

In Uganda firms that bring into use eligible property for the first time during the year of income, enjoy initial capital allowance at the rate of 50%, 70% or 20% of the cost base (Section 29 of Income Tax Act 1997 and Sixth Schedule) depending on the location of the investment. In chapter four, the study considered earnings after corporation tax. The study did not investigate whether the tax shield advantage was applicable in Uganda.

Capital structure and Return on Equity

Cohen (2004) in his illustration of the effect of Modigliani and Miller theorem on capital structure used simplified financial statements and arrived at a generic conclusion that as the ratio of debt to equity in the capital structure of the firm increases, return on equity also increases. He assumed constant earnings before interest and tax (EBIT), and a constant cost of capital for all periods. In practice, EBIT cannot be constant within a firm or industry. Different firms apply different accounting policies for example in the computation of depreciation of fixed assets. The rates and method of calculation vary from firm to firm. Operational expenses and sales volume may vary in response to changes in economic factors of a given country.

In this study, empirical data from financial statements of business enterprises in Uganda was used to establish whether the same relationship as in Cohen's conclusion exists.

McDonald (2004) examined a number of factors that drive return on equity. He examined in detail profit margins of Corporate America in relation to the lowest long term interest rates, inflation rate and return on equity, Just in Time inventory management and turnover, restructuring and accounting charges (using Dow Jones Industrials) and return on equity.

However, on the part of the effect of leverage on return on equity he did not illustrate but stated the factors that can deplete equity and attract a high leverage.

The study provided details establishing the extent to which leverage drives return on equity.

At <http://partners.financenter.com>, retrieved on 16/9/2005), financial leverage was analyzed considering an example of varying debt-equity ratio and constant net sales. It was established that leverage magnifies return on equity.

However, in practice net sales differ over time for a given firm or within the industry as a result of changes in the environment of business. This was put into consideration in this study.

METHODS AND MATERIALS

Research Design

The purpose of this study was to establish the relationship between debt financing and return on equity. A longitudinal research design was used to analyze secondary data based on financial statements for the selected corporate taxpayers in Uganda. The descriptive survey research design is a method of investigation in which self report data collection from various samples of interest can be generated. Given the nature of the study, the researcher needed to adequately describe the different combinations of debt and equity and the resultant return on equity.

Area and Survey Population

The survey population for the study was 99 large corporate taxpayers in Construction and manufacturing classified by Uganda Revenue Authority and distributed as:

Table 1: DISTRIBUTION OF LARGE TAXPAYERS BY SECTOR

SECTOR	CONSTRUCTI ON	MANUFACTURI NG	TOTAL
NO. OF TAXPAYERS (x)	18	81	99

Source: URA Large Taxpayer Register2010

Each sector represented a stratum and from each stratum sampling units proportionate to stratum size were selected randomly.

Sample size and selection

Sample size determination

The researcher set confidence level at 95% and error term of ± 1 such that from table1 and using the Z-distribution tables, the sample size was determined using the formula

$$n = \frac{NZ^2S^2}{NE^2 + Z^2S^2} \quad \text{adopted from Krieger, (1999)}$$

}

Where

N = Total number of companies

Z = 1.96 (for 95% confidence interval)

E = 1

S^2 = population variance

$$= \frac{\sum (x_i - \mu)^2}{N} = \frac{32^2 + 31^2 + \dots}{99} = 20$$

$$\mu = \frac{99}{2} = 50$$

$$n = \frac{99 * 1.96 * 1.96 * 20}{99 * 1 + 1.96 * 1.96 * 20} = 7606.368 / 175.832 = 43$$

Sample selection

Sample size of 43 was obtained using Simple random sampling.

The response rate was as shown in table 2 below;

Table2. NUMBER OF SAMPLE UNITS PER STRATUM

SECTOR	CONS	MAN	TOT
Sample units)	5	20	25

Source: URA large tax payers register

Data collection

Research Instruments

The study used Uganda Revenue Authority Large Taxpayer registry document analysis, observation and taxpayer profile schedules that served as questionnaires.

The URA staff working in the registry served as local agents through whom the information was collected.

Each staff was given taxpayer profile schedules detailing the specific fields of data records.

Source of Data

The study involved the use of secondary data from financial statements of the selected companies and documents, textbooks and journals with data related to debt financing and return on equity.

Measurement of variable

Capital structure

The study used the ratio of total debt in the balance sheet to the total of ordinary share capital, retained earnings and other equity instruments to determine debt/equity fraction for all sectors of study.

Imputed interest rates

This was obtained by dividing total finance costs excluding foreign exchange movements with total short term and long term borrowed funds extracted from the balance sheets.

Return on equity

This was computed by dividing retained earnings for the year with ordinary share equity.

Leverage risk/ chance

Leverage risk and leverage chance were measured by comparing return on capital employed with imputed interest rate. Leverage chance was measured by the excess of return on capital employed over imputed interest rate and leverage risk was measured by the excess of imputed interest rate over return on capital employed.

Quality Control

Quality was ensured by collecting data from the two sectors of the population legible for the study using data schedules and cross checked for completeness and accuracy of the data collected with that in the audited and published financial statements specifically for those taxpayers such as Stanbic Bank, DFCU Bank, Uganda Clays, BAT that were listed on the stock exchange.

Data schedules had a provision of coding each sample unit for purposes of editing the extracted data in the event of incorrect data capture by the local agents.

Model specification and estimation

Expanding on Modigliani and Miller's (1958) Proposition II, abnormal returns are estimated using the asset pricing models of Sharpe and Lintner (the traditional Capital, Asset Pricing Model, CAPM), of Fama and French and of Carhart.

The estimated model $ROE = a + b_1 DER + b_2 LE$

Where,

$a =$ represents other factors other than Debt Equity Ratio and Leverage effect

$b_1 =$ the regression coefficient of DER

$b_2 =$ the regression coefficient of Leverage effect.

DER = Debt equity ratio

LE= leverage effect

Data Analysis

The study used a combination of Microsoft Excel and SPSS for analysis. Microsoft Excel was used to capture the financial statements and compute the Debt equity leverage and return on equity ratios. Figures or graphs showing ratio trends were generated from the Microsoft Excel. Correlation and regression analysis were generated from SPSS to determine the magnitude of the relationship between study variables and to fit the Debt financing model.

RESULTS/FINDINGS

Basis of categorization of firms in the sample

A total of 43 out of 99 large corporate tax payers in construction, manufacturing, oil industry, general trade, financial services and those in other services other than financial services were selected for the study. For each company data was extracted from financial statements for the period (2000 – 2010).

Uganda Revenue Authority defined the sectors adopted for the study in the year 1998 when Uganda Revenue Authority set up the Large Tax Payer Department (LTD). Following the general restructuring of URA in (2005), the Large Taxpayer Department was restructured to Large Tax payer Unit (LTU).

The study used the list of the Large taxpayer Department that was in use since the year 2000 with a distribution of the large taxpayer companies distributed as follows:

Table 3 Distribution of Large Taxpayers

SECTOR	NUMBER OF COMPANIES	SAMPLE SIZE PER SECTOR
Construction	18	5
Manufacturing	81	20
TOTAL	99	25

Source: Large Tax Department tax payer List 2000-2010.

The Commissioner Domestic taxes, in-charge of the Large Corporate Taxpayers Unit, confirmed that the choice of the selection of taxpayers into the LTD/LTU was based on annual tax contribution to URA over a period of at least

four years time. In light of the Commissioner's clarification on the criteria for selection of taxpayers into the large taxpayer department, the sector distribution of large taxpayers in table 3 shows that few oil companies followed by construction companies contributed large taxes to the central treasury.

Descriptive Analysis of findings

To answer the research questions and to achieve the objectives of this study, return on equity ratios, debt equity ratios, return on capital employed, leverage chance/risk and imputed interest costs were calculated for Construction and Manufacturing. The average ratios for the sectors understudy were used to generate line graphs to depict trends of behavior of the study variables as in tables 4 to 5 and in figures 1 to 2 discussed in the subsequent sections of this report.

It was established that firms in the two sectors of study employed debt financing in their capital structure as depicted by the following bar graph.

The graph shows that the manufacturing sector had the highest debt proportion in its capital structure followed by the construction sector.

The study also performed analysis of variance (ANOVA) to determine whether there were significant differences among the various sample means for purposes of identifying those sectors that experienced high or low variations in the study variable and subsequently provide a guide to the users of this research to assess the two sectors in Uganda that were suitable for debt financing.

Table 4: MEAN FOR THE STUDY VARIABLES

	Minimum	Maximum	Mean	Std. Deviation
DEBT EQUITY	.1211	.8900	.4324	.3014
LEVERAGE CHANCE RISK	-.1430	.2030	.0272	.1081
IMPUTED INTEREST RATE	.1166	.3052	.1902	.0451
ROCE	-.0268	.3615	.2174	.1023
ROE	-.1858	.3069	.1328	.1151

Source: URA-financial statements for selected large taxpayer companies 2000-2010

From table 4 and 5 the results were significant at 5% ($\alpha = 0.05$). The computed values of F , in the F column in table 5 and the critical values F_c in the footnote to table 5 revealed that the computed F for ROCE, Imputed interest rates, debt equity ratio and leverage chance and leverage risk was greater than the critical value of F . This implied that there was a significant difference between the means of the study variables for each sector. However, the F test also showed that there were no significant differences between ROE of the two sectors of the study (the computed $F = 1.750 < F_c = 2.49$)

Table 5: ANOVA FOR THE STUDY VARIABLES

		SUM OF SQUARES	MEAN SQUARES	F-COMPUTED	SIG
ROCE	Between groups	.381	0.07621	4.436	0.003
	Within groups	.618	0.00172		
	Total	.999			
ROE	Between groups	.010	0.00199	1.750	0.148
	Within groups	.409	0.00114		
	Total ROE	.509			
IMP. INT RATE	Between groups	.205	0.00410	19.296	.000
	Within groups	.008	0.00021		
	Total	.282			
DEBT/ EQUITY	Between groups	297.676	59.535	111.238	.000
	Within groups	19.267	.535		
	Total	316.943			
Leverage chance/leverage risk	Between groups	.536		6.145	.000
	Within groups	.628			
	Total	1.164			

Source: URA-financial statements for selected large taxpayer companies 2000-2010

Based on the analysis of variances (ANOVA) in table 5 the sector by sector analysis of the relationships between the study variables and then performed overall analysis for all sectors.

Table 6 shows sample means for each study variable per sector. The highest variations were realized in the debt-equity means with computed $F = 111.238$, p -value < 0.05 , compared to the critical $F = 2.49$. Comparing the sector means with the population means in table 4, the manufacturing sector controlled its debt equity ratio at an average of 0.0001 far below the industrial mean of 0.1773. Imputed interest rate, leverage chance and leverage risk and ROCE with computed F -values of 19.296, 6.145 and 4.436 respectively registered significant variations in their means.

Table 6: Summary of sector by sector means for each study variable

VARIABLE	SECTOR	N	Mean	F	Sig.	
ROCE	Construction	7	.247148	4.436	.003	
	Manufacturing	7	.187644			
	Total	14	0.434792			
ROE	Construction	7	.102404	1.750	.148	
	Manufacturing	7	.163195			
	Total	14	.265599			
IMP.INT. RATE	Construction	7	.158460	19.296	.000	
	Manufacturing	7	.221847			
	Total	14	.379307			
DEBT/EQUITY	Construction	7	.179727	111.238	.000	
	Manufacturing	7	.685143			
	Total	14	.864870			
LEVERAGE - CHANCE/(RISK)	Construction	7	.008868	6.145	.000	
	Manufacturing	7	.000034			

	Total	14	.008902			
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Source: URA-financial statements for selected Large taxpayer companies 2000-2010

Construction sector analysis

Average financial ratios for five construction companies for the years 2000 to 2010 were computed and summarized as in table 7.

YEARS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ROCE	0.3615	0.3123	0.3306	0.3252	0.1492	0.2781	-0.0268	0.2471	0.2308	0.2192	0.2033
ROE	0.1448	0.3069	0.0877	0.0398	0.0637	0.2598	-0.1858	0.1024	0.0964	0.0663	0.0632
IMP.INT. RATE	0.1585	0.1410	0.1630	0.1963	0.1638	0.1700	0.1166	0.1585	0.1585	0.1610	0.1607
DEBT/EQUITY	0.1211	0.2031	0.2392	0.1546	0.1969	0.1743	0.1689	0.1797	0.1881	0.1860	0.1784
LEVERAGE - CHANCE/(RISK)	0.2030	0.1712	0.1675	0.1289	-0.0147	0.1082	-0.1434	0.0887	0.0723	0.0582	0.0426

Source: URA -Construction company financial statements 2000-2010.

Capital structure of construction sector

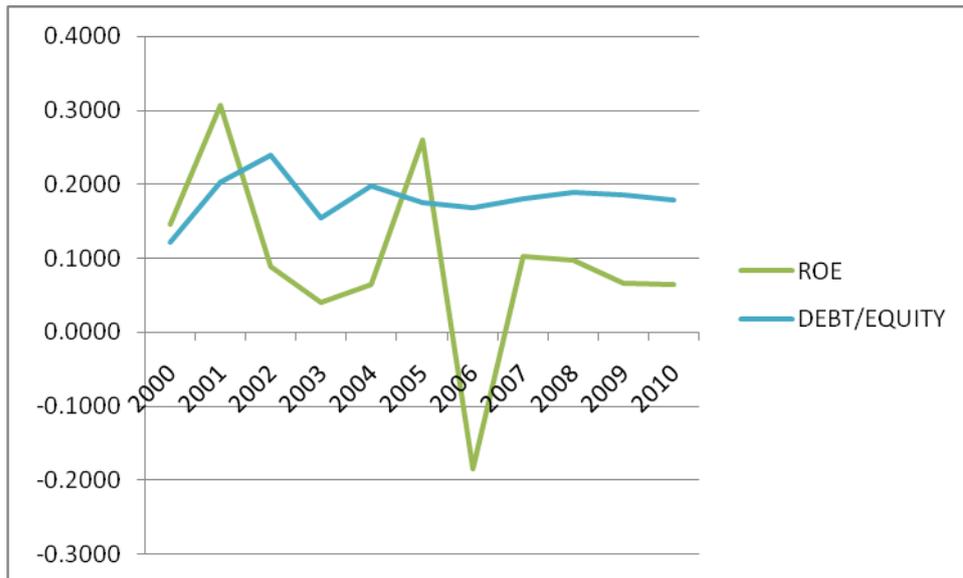
Table 7 shows that debt to equity ratio was highest in 2002 at a rate of 24% and lowest in 2000 at 12%. Implying that over 76% of the capital structure of large corporate taxpayers in the construction sector in Uganda in the period of study was equity.

Capital structure and return on equity for construction sector

From table 7, return on equity was highest at 31% in 2001 in the construction sector when debt-equity ratio was at 20%. The return on equity was lowest at 14% in 2003 when debt equity ratio reduced to 15% respectively. This trend is depicted by the line graphs in figure 4.1 that showed a general decline in return on equity as debt on equity declined over the years (2000 -2010).

A correlation analysis revealed a positive relationship between debt equity ratio and return on equity ($R = 0.125$, p -value > 0.05). This implied that as debt equity ratio increased in the construction sector during the period of study, return on equity increased respectively.

Fig 1: DEBT/ EQUITY & ROE TRENDS FOR 2000-2010

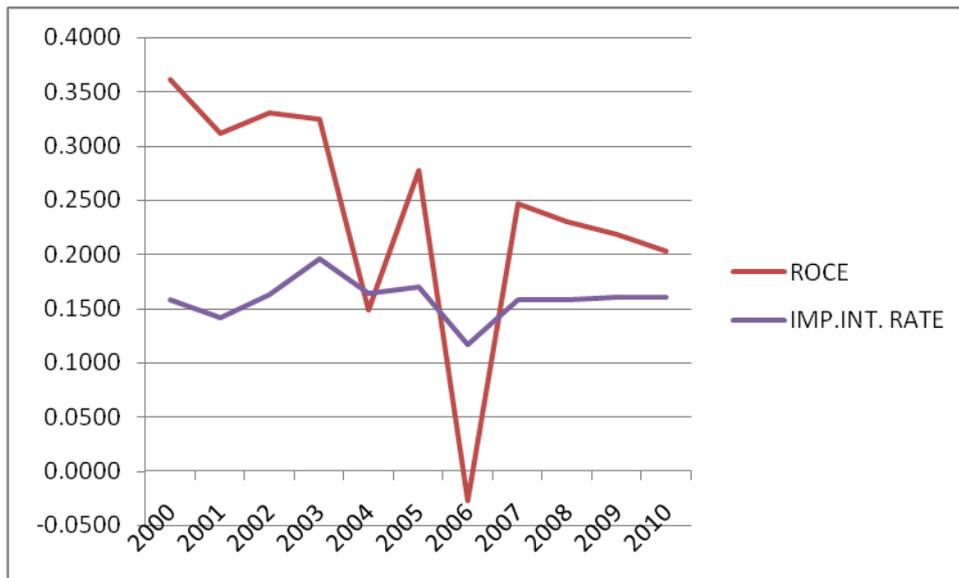


The coefficient of determination, r^2 , for debt equity ratio and return on equity indicated that the changes in debt equity ratio accounted for 2% of the changes in return on equity. Other factors accounted for 98% variation in return on equity. 2% on is materially a very small effect. The positive correlation between the two study variables implied that shareholders' return increased or decreased with increase or decrease in debt proportion in the construction sector.

Leverage effect on return on equity in the construction sector

When debt is introduced in the capital structure, it introduces interest cost and other loan related charges like commitment fees, insurance cost which have to be paid together with the principle loan repayments regardless of cash flow generating capacity of the firm. The total financing cost in the financial statements was attributed to debt financing. Imputed interest rate for construction sector was derived as the ratio of total finance costs to total borrowed funds in the balance sheet and the results were as shown in table 3. Leverage chance and leverage risk was computed as the difference between return on capital employed (ROCE) and the imputed interest rate for each year. It was established that the construction sector experienced a leverage risk exposure in 2004 when ROCE fell below the imputed interest rates. The general trend of leverage chance and leverage risk position of the construction sector is as illustrated in figure 2. The figure shows that construction sector had an advantage of leverage chance for all the years of the study except in 2004 and 2006. Figure 2 shows that the greatest leverage chance effect was in the period (2000 – 2003) and 2005 to 2006. In theory return on equity would follow a similar trend on the assumption that the managers of those companies deployed fixed assets profitably and did not revalue nor change the depreciation policies to ensure a favorable return on capital employed against the imputed interest.

Fig.2 LEVERAGE CHANCE AND LEVERAGE RISK TRENDS FOR
CONSTRUCTION SECTOR FOR THE PERIOD 2000-2010



A further analysis of leverage effect on return on equity using the ratios in table 7 revealed that at lowest imputed interest rate of 12% in the year 2006, return on equity was 19% and at the highest imputed interest rate of 20% in 2003, ROE was 3%. This was a prima-facie demonstration that the higher the imputed interest the lower the ROE. However, the study extended the analysis to cover other years in table 3. A correlation analysis of the study variables revealed a positive relationship between leverage chance and leverage risk and return on equity ($r = 0.76$, p -value < 0.05). The coefficient of determination showed that the leverage effected accounted for 58% of the variations in return on equity while other factors accounted for 42%. This analysis confirmed the double-edged sword theory of debt financing. That is, shareholders would benefit from debt financing as long as the return on capital employed remained higher than the imputed interest rate and vice versa.

The extent to which debt financing magnifies return on equity (ROE)

To assess the extent to which changes in debt /equity proportion affects the shareholders return, the researcher performed a correlation analysis of debt equity ratio and return on equity and established that there was a positive correlation between the two variables ($r = 0.125$, p -values > 0.05). However, the relationship was weak. That is, the coefficient of determination, r^2 , demonstrated that changes in debt financing accounted for 2% of the changes in ROE. This implied that 98% of the variations in return on equity for the construction company were accounted for by other factors other than changes in debt to equity ratio during the period 2000 to 2010. Considering these results above, this can be deduced that the mix of debt and equity in the capital structure in Uganda during the study period did not have

a significant magnifying effect on return on equity instead the rate at which the funds were borrowed and other factors had a significant effect. These findings matched the Modigliani and Miller theory stated earlier in the literature review.

Manufacturing sector analysis

Financial statements for 20 out of 81 manufacturing companies in the large taxpayers unit of the Uganda Revenue Authority were examined in accordance with the research objectives and questions. Average financial ratios summarized in table 8 were computed.

Table 8 Manufacturing sector computed Ratios

YEARS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ROCE	0.1305	0.1574	0.1737	0.2094	0.2195	0.1937	0.2293	0.1876	0.1958	0.2013	0.2052
ROE	0.1757	0.1667	0.1689	0.1860	0.1660	0.1272	0.1518	0.1632	0.1614	0.1607	0.1595
IMP.INT. RATE	0.1931	0.2088	0.2067	0.2191	0.1982	0.2219	0.3052	0.2218	0.2260	0.2284	0.2315
DEBT/EQUITY	0.6500	0.8900	0.7270	0.8250	0.8430	0.2580	0.6030	0.6851	0.6902	0.6616	0.6523
LEVERAGE - CHANCE/(RISK)	-0.0626	-0.0514	-0.0330	-0.0097	0.0213	-0.0281	-0.0759	-0.0342	-0.0301	-0.0271	-0.0263

SOURCE: URA-financial statements for manufacturing companies 2000-2010

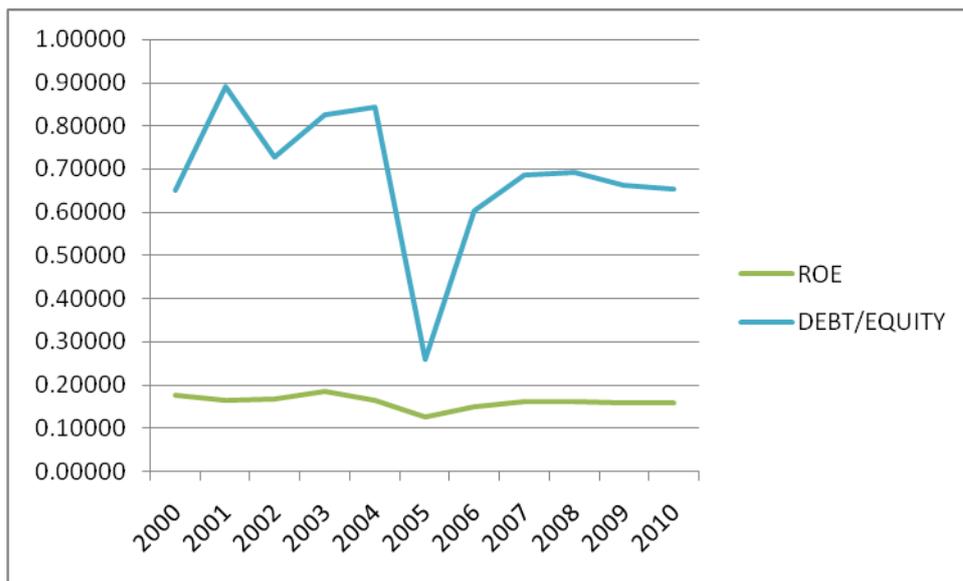
Capital structure of manufacturing sector

The computed debt to equity ratio for the manufacturing sector in table 8 shows that for the period 2000 to 2010, the ratio of debt to equity was highest in 2001 at 89% and lowest in 2005 at 25%. Apart from 2005, the debt equity ratios in this sector were above 60% indicating that the capital structure of manufacturing large corporate taxpayers in Uganda, for the period under study, was mainly debt.

Capital structure and return on equity for manufacturing sector

The line graph for debt equity ratio and return on equity in figure 3 shows that debt equity ratio ranged between a low of 26% in 2005 and a high of 89% in 2001 and ROE was 13% and 16% respectively. Figure 3 further shows that fluctuations in debt equity ratio were not proportionate to those in the ROE.

Fig 3: Manufacturing Company Trends



A correlation analysis of debt equity ratio and return on equity established that there was a positive correlation between debt equity ratio and return on equity ($r = 0.84$, $p\text{-value} < 0.05$). The coefficient of determination showed that 71% of the changes in return on equity in the manufacturing sector of large tax payers were attributable to changes in debt equity ratio. Implying that for a 100% increase in return on equity, 71% was brought about by increase in debt equity ratio.

Leverage effect on return on equity in the manufacturing sector

In assessing the leverage effect on return on equity in this sector, the researcher compared ROCE and imputed interest rate.

It was established that the manufacturing sector was exposed to a leverage risk throughout the study period with exception of the year 2004 when ROCE was greater than the Imputed interest rate. Figure 4 shows the general trend of ROCE and imputed interest rates during the period of study.

FIG 4 LEVERAGE CHANCE AND LEVERAGE RISK TRENDS FOR MANUFACTURING SECTOR FOR THE PERIOD 2000 -2010

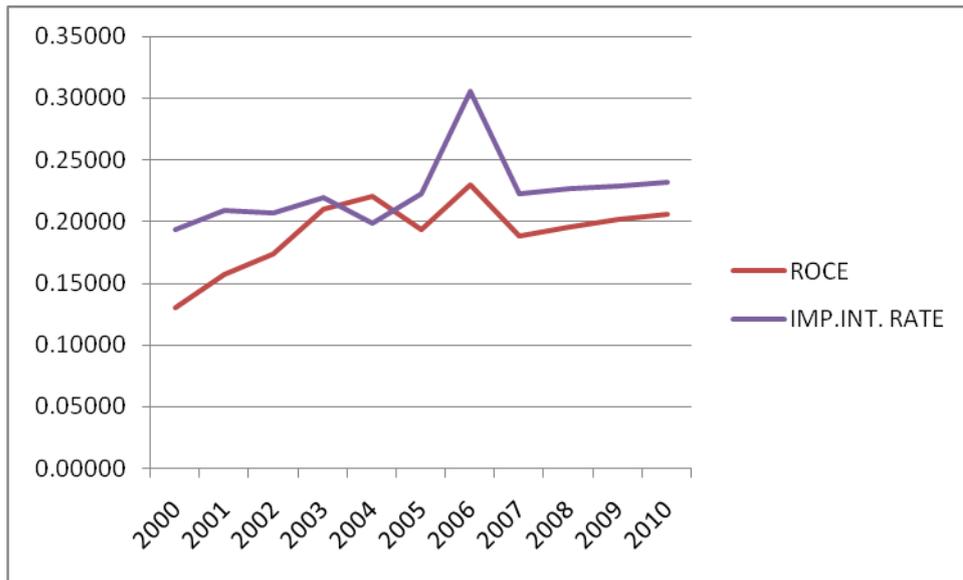


Figure 4 demonstrated that, apart from the year 2004, return on capital employed was above the imputed interest rate.

The changes in imputed interest rates were in tandem with changes in ROCE. Imputed interest rate ranged higher than the ROCE for the period 2001 to 2010.

This implied that firms that employed debt financing in this sector were exposed to a high risk of low return on equity for the period 2001 and 2010. The fluctuations in ROCE were an indication of fluctuations in cash flows in this sector. The risk associated with uncertain cash flows is failure to meet the loan repayment deadlines.

The magnitude of imputed interest rate impact on return on equity was assessed using correlation coefficient analysis. The results of the analysis revealed that there was a negative correlation between return on equity and imputed interest in the manufacturing sector ($r = -0.36$, $r^2 = 13\%$, $p\text{-value} > 0.05$). This implied that imputed interest accounted for 13% of the changes in return on equity. Other factors accounted for 87% of the variations in the return on equity in the period of study.

Debt equity ratio and return on equity in the manufacturing sector.

A correlation between debt equity and return on equity was computed. It was established that there was a positive correlation between the two variables ($r = 0.84$, $p\text{-value} < 0.05$). The coefficient of determination for debt equity ratio and ROE showed that changes in debt equity ratio accounted for 71% of the changes in ROE. Other factors account for only 29% of the changes in return on equity. This shows that debt equity ratio has a significant effect on return on equity in the manufacturing sector.

INFERENCE ANALYSIS

Sector suitable for debt financing

The study adopted the criteria of comparing debt equity ratio and the return on equity as a basis for establishing that sector suitable for more debt financing.

Table 9 A COMPARATIVE VIEW OF THE RELATIONSHIP BETWEEN RETURN ON EQUITY AND THE INDEPENDENT VARIABLES

SECTOR	VARIABLES	CORRELATION COEFFICIENT r	COEFFICIENT OF DETERMINATION r ²
Manufacturing	Debt equity Vs ROE	0.835	0.697
	Imputed Interest Vs ROE	-0.362	0.131
	Leverage Vs ROE	0.150	0.023
Construction	Debt equity Vs ROE	0.125	0.016
	Imputed Interest Vs ROE	0.319	0.102
	Leverage Vs ROE	0.763	0.582

Source: URA – Financial statements for all sectors understudy for 2000 to 2010.

The results in table 9 show that all sectors had a positive correlation between debt and equity. Manufacturing sector had the strongest positive correlation ($r = 0.84$) between debt equity ratio and return on equity and therefore more suitable for debt financing. This was followed by the construction sector as listed in a descending order. This implies that as increase in debt equity ratio for those sectors would result into an increase ROE. However, the coefficient of determination in table 9 indicates that the extent to which debt equity ratio increases return on equity is not proportionate within the sector and across the sectors.

Correlation matrix for all the study variables

Table 10 Pearson Correlation matrix summarizing the relationships between ROE

And other independent study variables

STUDY VARIABLES	ROE	ROCE	IMPUTED INTEREST RATE	DEBT/EQUITY	LEVREGE CHANCE/RISK
ROE	1.000				

ROCE	.258	1.000			
IMPUTED INTEREST RATE	-.060	.111	1.000		
DEBT/EQUITY	.322*	-.527**	-.343*	1.000	
LEVEREGE CHANCE/RISK	.268	.872**	-.390*	-.320*	1.000

*. Correlation is significant at the 0.05 level (2-tailed)

***. Correlation is significant at the 0.01 level (2-tailed)

Results in table 10 indicate a significant positive relationship between Debt to Equity Ratio and Return on Equity ($r = 0.322$, $p\text{-value} < 0.05$). This implies that high Debt to Equity ratio had a positive contribution to return on equity for all sectors and on average, changes in the proportion of debt equity in the capital structure accounted for 10% of changes in return. There was a negative weak relationship between imputed Interest rate with Return on Equity ($r = -0.060$, $p\text{-value} > 0.05$). This implies that high Imputed Interest rate reduced Return on Equity.

There was a positive relationship between ROCE and ROE ($r = .258$, $p\text{-value} > 0.05$). This revealed that ROCE positively enhanced ROE for the various sectors under study.

Multiple Regressions

There was a linear relationship between Debt to Equity Ratio, Imputed Interest Cost, ROCE and ROE ($F = 7.340$, 0.001). This was derived from analysis of variance as summarized in the ANOVA table 11.

Table 11 ANOVA^b

MODEL	SUM OF SQUARES	MEAN SQUARE	F	Sig.
Regression	.187	0.00622	7.340	.001 ^a
Residual	.322	0.00084		
Total	.509			

a. Predictors: (Constant), Leverage chance/risk, Debt/Equity, Imp. Int rate

b. Dependant variable: ROE c. $F_c = 2.49$

The results in table 11 revealed a high correlation between ROCE and leverage chance/ risk.

To eliminate the problem of multi-co linearity arising from the two study variables, enter method of regression analysis was used to select the variable used in the multiple regression analysis for all the sectors as shown in the table below.

The multiple regression analysis of the selected study variables was as summarized in the table 12.

Table 12 MULTIPLE REGRESSION ANALYSIS

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.0019	.043		.433	.667
IMP.INT. RATE	.571	.223	.425	2.563	.014
DEBT/EQUITY	0.0027	.006	.676	4.190	.000
LEVERAGE - CHANCE/	.430	.109	.650	3.952	.000

Dependent var. =ROE; R = 0.606; R² = 0.367; Adjusted R² = .317

The regression analysis indicated that debt Equity Ratio, Imputed Interest Cost and Leverage chance explain 31.7% of the total variance of ROE for the whole population.

Debt Equity Ratio explains more of the changes in ROE (Beta = .676) followed by Leverage Chance (Beta = 0.650) and Imputed Interest rate (Beta = .425). That is, the Beta coefficient shows that Debt to equity ratio had a significant effect of 68% on the changes in return on equity. All sectors had a positive relationship between return on equity and debt equity ratio. The results imply that return on equity for all sectors would increase by shs.68 as debt proportion increased by shs.100. Imputed interest rate and leverage chance also had a significant impact on return on equity of 43% and 65% respectively. However, imputed interest had a weak negative 6% relationship with return on equity.

CONCLUSIONS

Capital structure of large taxpayers in Uganda

The study showed that all large corporate tax paying companies in Uganda used debt financing in their capital structure during the period of study. The manufacturing sector registered 0.89:1 in the year 2001. This showed that companies in Uganda combined debt financing with equity financing just like firms in Europe, Asia and USA as established by Booth et al., (2000). The debt equity ratio in Uganda was found to be higher (9.83:1) than that in Europe Asia and USA (0.734:1) as reported by Booth et al., (2000).

Relationship between debt financing and return on equity

There was a positive correlation between debt equity ratio and ROE for all sectors. The manufacturing sector had the highest debt equity ratio and highest return on equity followed by the construction sector. These results conformed to Pandy's (1997) statement that debt financing magnifies shareholders' return. They also agreed with Brounen and Eichholtz (2001) conclusion that employment of more debt in the capital structure results in higher return to the equity holders.

The leverage effect on return on equity

A correlation between imputed interest and return on equity indicated a positive correlation between the two variables for all sectors and the coefficient of determination for leverage chance and return on equity ranged from 0.64% to 58% for the six sectors. Construction sector had the highest coefficient of determination of 58% for leverage chance and return on equity. The results agreed with Van Horne (2002) statement that equity shareholder get a higher return on their funds when more debt is employed in the capital structure.

The magnifying effect of Debt financing to return on equity

The findings in this study revealed that debt financing significantly magnified return on equity for all sectors. However, the magnifying effect was greatest in the manufacturing sector followed by the construction sector. This signified that the Manufacturing sector was more suitable for debt financing compared to the construction sector. Shareholders in those sectors would realize significant growth in the return on equity when debt financing is employed.

RECOMMENDATIONS

The research finding showed that for desirable growth in shareholder value, business entities should mix debt financing with equity financing provided the cost of the borrowed funds does not exceed the actual return from assets financed by debt.

Sectors that had a positive correlation between debt ratio and return on equity with a coefficient of determination of 30% or more could blend equity financing with debt financing for a better return to the shareholders.

However, management of business enterprises in Uganda should cautiously consider other factors that accounted for 90% in changes in ROE, when choosing the mix of debt financing equity financing that would maximize equity holders' value. Over reliance on ROE as a major factor may result into loss of investment in some sectors such as construction sector that require a lot of initial capital for investments and generate better returns in the long run.

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**CODE OF CONDUCT AND ETHICS ON PERCEIVED FINANCIAL PERFORMANCE IN
UGANDA PUBLIC SERVICE:**

A CASE OF MINISTRY OF EDUCATION AND SPORTS IN UGANDA

BY

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MUSA MOYA

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Abstract

The study examined the code of conduct and ethics and financial performance of the Ministry of Education and Sports in Uganda. There was deteriorating situation in financial performance as per audits of the Ministry despite having code of conduct and ethics in place. Across sectional design followed by descriptive and correlation methods were used to examine and determine the relationship between the code of conduct and ethics with financial performance. Code of Conduct and ethics in terms of transparency and trust, positively explained 53.4% of the financial performance. There is ongoing need to focus on trust and transparency for improved financial performance of the Ministry.

Keywords: Code of conduct and ethics, financial performance, Uganda.

Background to the Study

The code of conduct and ethics for Uganda Public Service sets out standards of behaviour for public officers in the Public Service. It is designed to ensure the impartiality, objectivity, transparency, integrity and effectiveness of public officers when performing their duties, Lwamafa (2004). It is intended to guide public officers in their behaviour and how they relate to each other and the public.

There are various forms of violation of the code of conduct and ethics by the public officers directly charged with accounting and financial management in the Ministry of Education and Sports (MoES). These include bribery, illegal use of public assets for private gain, payment of salaries to non-existent workers (ghost workers), payment for goods and services not supplied, fraud and embezzlement, ten percent commissions, misappropriation of public assets, removing documents from case files or even carrying off the whole file, Bertucci (2006). Due to widespread concern about the quality of SFG, the 8th Education Sector Review in October 2002 recommended that an independent auditor undertakes a value for money audit of the programme; a report was submitted in October 2003. The report raised the concern that the government and the donors are not getting value for money. It is stated in an overall evaluation of the procurement process in SFG that delays in the programme implementation were caused by failure in administering guidelines.

Based on the enrolment of 2.5 million students (Ministry of Finance and Planning, 2002), the overall capitation grant should have been approximately US\$8 billion. In 2002, schools received 21.9% of their entitlement but around US\$6 billion was diverted. In Financial Year (FY) 2000/2001 the government released UGX 38.9 billion for Universal Primary Education (UPE) Capitation Grant according to the Ministry of Education and Sports (2007). At this time schools then received 81.8% of their entitlement. This means that about 7 billion Ushs (18.2%) was diverted in 2001. The Permanent Secretary Ministry of Education admitted that Gulu had problems accounting for its School Facilities Grant (SFG) fund. The district is yet to account. This case involved some MoES officers who were responsible for diversion of funds before they reached the final destination.

Concerning accountability, the code of conduct and ethics stipulates that a public officer shall hold office in public trust and shall be accountable to the public, has been violated. This is evident in the SFG project under the MoES. Due to wide spread concern about the quality of SFG, the 8th Education Sector Review in October 2002 recommended that an independent auditor undertakes a value for money audit programme. A submitted in October 2003 raised the concern that the government and the donors are not getting value for money. Loss in value is estimated between US\$75 billion to US\$125 billion out of a total expenditure of US\$240 billion in 2003. Based on expenditure and personnel audits and evaluations, the estimated leakages of recurrent expenditures between the Ministry of Finance, Planning and Economic Development and the schools is UGX16 billion, or 6 percent of total budgeted recurrent primary education expenditures (Annual Budget Performance Report, 2005/06). The single largest source of government to school leakage is the UPE grant. The leakage is 16 percent of total UPE grants, or Ug Shs 5 billion (USAID, 2006).

Statement of the Problem

The existence of a Code of Conduct and Ethics for public officers to enhance performance and reflect a good image of the public service and promote good governance has not mitigated against the financial malpractices in the Ministry of Education and Sports, Lwamafa (2004). Public officers are accountable for the financial dealings they are engaged in, they however rarely account for all resources under them. In the execution of official government business, the public officers directly charged with accounting and financial management have put themselves in a position where their personal interests conflict with their duties and responsibilities as public officers. They directly or indirectly enter into any contracts with Government. This is unethical since it affects the impartiality of a Public Officer and mars his or her reasonable judgement which may affect the financial performance. This research therefore focuses on effect of these violations of the Code of Conduct and ethics on the financial performance in the Ministry of Education and Sports.

Purpose of the Study

The study seeks to establish the effect of the code of conduct and ethics on the financial performance in the Ministry of Education and Sports in Uganda.

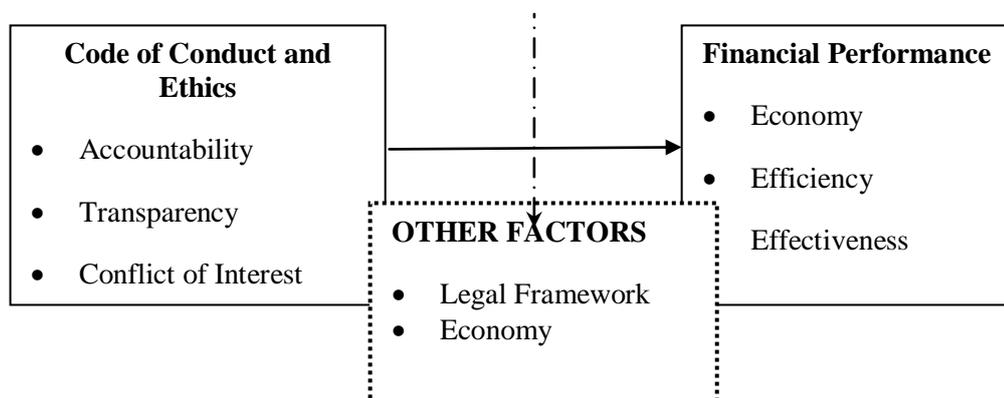
Objectives of the Study

- i. To examine the structure of Code of Conduct and Ethics for the Ministry of Education and Sports.
- ii. To explore the perceived financial performance in the Ministry of Education and Sports.
- iii. To investigate the relationship between the Code of Conduct and ethics and the perceived financial performance of the Ministry of Education and Sports.

Research Questions

- i. What is the structure of the Code of Conduct and Ethics for the Ministry of Education and Sports?
- ii. What is the level of perceived financial performance in the Ministry of Education and Sports?
- iii. What is the relationship between the Code of Conduct and Ethics and the perceived financial performance of the Ministry of Education and Sports?

1.8 Conceptual Framework



Source: *Developed from Literature Review*

Code of conduct is the principle that sets out standards of behavior for public officers in every professional setting, the Uganda public service being one such setting. In the Ugandan case, a Code of Conduct is designed to ensure the impartiality, transparency, integrity, efficiency and effectiveness of public officers when performing their duties. It is intended to guide public officers in their behavior and how they relate to each other and the public, Lwamfa (2006).

The effectiveness of such codes of ethics depends on the extent to which management supports them with sanctions and rewards. Violations of an organization's code of ethics usually can subject the violator to the organization's remedies. The code of ethics links to and gives rise to a code of conduct for employees, Baron (2000).

The conceptual framework demonstrates that Code of Conduct and Ethics is quite instrumental in ensuring good financial performance management in an effort to effectively deliver the services. In the same way accountability, transparency and conflict of interest make the operation of controls in financial management possible. In so doing, financial management is smoothly carried out. However there are other factors that seem to influence the effectiveness of accountability, transparency and conflict of interest. In the conceptual framework they are shown to be economy and legal framework to work in aggregate contribution to financial performance in selected departments in the Ministry of Education and Sports.

LITERATURE REVIEW

Code of Conduct and Ethics

According to Baron (2000), ethical standards in major corporations are coming under scrutiny, and financial institutions have been challenged about conflicts of interest and their investment advice. Considering that ethical scandals have been exposed even in the very large corporations, e.g. Enron, WorldCom etc., managers are becoming more conscious of how they are perceived by the public, and want to be seen as 'ethical'.

Corporate codes of business ethics studies generated evidence of a positive relationship between ethics/ CSP and financial performance (Orlitzky, Schmidt and Rynes, 2003).

Although quite a number of previous researchers have revealed that there is a positive relationship between ethics and financial performance, a few others have found that this said link could neither be proved nor disproved. Barnett and Salomon (2003) supported the inconclusiveness of these previous studies when they said that despite the intensity of study directed at it, the relationship between Code of ethics and financial performance remains in dispute.

Also, the review of previous literature shows that many of these studies are quite dissimilar in their findings. However, these inconsistencies could be due to the fact the different methods used for researching and reviewing the link between Code of ethics and financial performance were not sophisticated enough to find correlations that were obscured by methodological errors such as sampling or measurement errors¹³. To address this issue, this paper will review those studies that have applied meta-analysis in reviewing the subject (Report by Social Investment Forum Foundation, 2004).

Orlitzky, Schmidt and Rynes (2003) describes business ethics can be simply seen as the application of moral philosophies to issues in business and its goal is to describe morally good behaviour for managers and corporations as a whole. It can also be defined as the study of business situations, activities and decisions where issues of right and wrong are addressed and it deals with those issues not explicitly covered by law. In some cases, ethical and /or socially responsible behavior can be considered an investment in transparency and trust, and consequently, help reduce transaction costs within and across an organisation.

Ethical Investment Research Services (EIRIS) (2005) defines business ethics as how a company conducts its business and the behaviour of its employees. Therefore, in present times, it is expected that most, if not all companies should have a code of ethics and also an ethical identity.

Constructs of Code of Ethics

The values of integrity, transparency and accountability in public administrations have enjoyed resurgence within the past three decades or so. Sound public administration involves public trust. Citizens expect public servants to serve public interests with fairness and to manage public resources properly on a daily basis. Fair and reliable public services and predictable decision-making inspire public trust and create a level playing field for businesses, thus contributing to well-functioning markets and economic growth, Elia (2005).

Accountability

According to Elia (2005) accountability refers to the obligation on the part of public officials to report on the usage of public resources and answerability for failing to meet stated performance objectives. In leadership roles, accountability is the acknowledgment and assumption of responsibility for actions, products, decisions, and policies including the administration, governance, and implementation within the scope of the role or employment position and encompassing the obligation to report, explain and be answerable for resulting consequences.

Recently, accountability has become an important topic in the discussion about the legitimacy of international institutions. Because there is no global democracy to which organizations must account, global administrative bodies are often criticized as having large accountability gaps. One

paradigmatic problem arising in the global context is that of institutions such as the World Bank and the International Monetary Fund who are founded and supported by wealthy nations and provide aid, in the form of grants and loans, to developing nations, Hunt (2008).

Schedler (1999) urged that internal rules and norms as well as some independent commission are mechanisms to hold civil servant within the administration of government accountable. Within department or ministry, firstly, behavior is bounded by rules and regulations; secondly, civil servants are subordinates in a hierarchy and accountable to superiors. Nonetheless, there are independent “watchdog” units to scrutinize and hold departments accountable; legitimacy of these commissions is built upon their independence, as it avoids any conflicts of interest. Apart from internal checks, some “watchdog” units accept complaints from citizens, bridging government and society to hold civil servants accountable to citizens, but not merely governmental departments.

Basically, the Government states that a strong accountability regime ensures public resources are used “effectively and efficiently” (producing “value-for-money”); promotes ethical and policy-based decisions, motivated by a concern for the public interest; rewards good performance and carries consequences when “rules are knowingly broken”, and embraces transparency as a way to make “government more accountable” and support the participation of citizens and organizations in public policy development, Ben and Anderson (2007).

Aucoin and Jarvis (2008) maintain that there is the “other side” of accountability, asserting that it is not just a one-way street of reporting. To work best it involves a relationship that allows for and supports decision-making, and feedback that informs program delivery and outcomes performance.

Transparency

Transparency refers to unfettered access by the public to timely and reliable information on decisions and performance in the public sector, Elia (2005). Winkler (2002) emphasizes the idea that transparency needs to be better defined before it can be debated.

Geraats (2001) created taxonomy of five categories of transparency. She lists political, economic, procedural, policy, and operational transparencies as distinct realms of possible transparency for the public sector. While each of these aspects is important and can be illustrated within several of the models, this degree of specificity is perhaps excessive, particularly given the substitutability across types of transparency.

Conflict of Interest

A conflict of interest occurs when an individual or organization has an interest that might compromise their actions. The presence of a conflict of interest is independent from the execution of impropriety, Thacker (2006). More generally, conflict of interests can be defined as any situation in which an individual or corporation (either private or governmental) is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit.

Depending upon the law or rules related to a particular organization, the existence of a conflict of interest may not, in and of itself, be evidence of wrongdoing. In fact, for many professionals, it is virtually impossible to avoid having conflicts of interest from time to time. A conflict of interests can, however, become a legal matter for example when an individual tries (and/or succeeds in) influencing the outcome of a decision, for personal benefit, McDonald (2006).

Davis and Andrew (2001) noted that often there is confusion over these two situations. Someone accused of a conflict of interest may deny that a conflict exists because he/she did not act improperly. In fact, a conflict of interests can exist even if there are no improper acts as a result of it. (One way to understand this is to use the term “conflict of roles”. A person with two roles – an individual who owns stock and is also a government official, for example may experience situations where those two roles conflict. The conflict can be mitigated.

Generally, codes of ethics forbid conflicts of interests. Often, however, the specifics can be controversial. Codes of ethics help to minimize problems with conflicts of interests because they can spell out the extent to which such conflicts should be avoided, and what the parties should do where such conflicts are permitted by a code of ethics. Thus, professionals cannot claim that they were unaware that their improper behavior was unethical. As importantly, the threat of disciplinary action

helps to minimize unacceptable conflicts or improper acts when a conflict is unavoidable. As codes of ethics cannot cover all situations, some governments have established an office of the ethics commissioner, Porter and Thomas (2002).

Constructs of Financial Performance in the Public Sector

According to Belli, Anderson, Barnum, Dixon, & Tan (2001), Value for Money (VfM) is the term used to assess whether or not a government agency has registered a good or bad financial performance. Achieving VfM may be described in terms of the 'three Es' - economy, efficiency and effectiveness.

Efficiency

Efficiency is a measure of productivity, i.e. how much you get out in relation to how much you put in. The efficiency of services such as rent collection may be measured by the cost of the service compared to the rent roll. Efficiency is primarily associated with the process and the best use of resources (also involves the delivery of procurement). It includes whether you get it right first time or whether you have duplication, as observed by Anderson, et al. (2001).

Effectiveness

According to Potts (2002), this is sub-divided further into three categories: one, impact, i.e., the output of all these functions either contributes to or influences corporate performance as a whole; two, satisfaction, i.e., perception of the service by both senior management (the commissioners, for example, senior decision-makers within the organisation) and those internal staff that use the function (the users, for example, frontline managers and staff); and finally, modernization, i.e., the extent to which the organization has adopted management practices that would be regarded as being innovative and forward looking. Efficiency and effectiveness are well understood terms and both are contained in the set of primary and secondary indicators for each function.

Economy

According to Jan (2003), Economy aims at minimising the cost of resources ('doing things at a low price'). Economy basically means doing less with fewer resources that *is*, making savings. It is the price paid for what goes into providing a service, for example, the cost per hour of staff, the rent per square metre of accommodation etc. It includes taking bulk discounts, using spare in-house capacity instead of buying in resources or looking at cheaper outsourcing solutions.

Relationship between Code of Ethics and Financial Performance

The relationship between code of ethics and financial performance has been a primary issue in the field of business and society over the past 25 years. Significant research has been carried out in several geographical locations, with different parameters for defining 'ethical' and 'corporate social responsibility' and using numerous proxies for financial performance. According to the findings of Orlitzky et al. (2003), they indicate that the code of ethics has a positive impact on financial performance and that this is strongest in the UK context.

Griffin and Mahon (1997) supported the theory of the positive code of ethics and financial performance relationship with findings from their research. They demonstrated this by studying and classifying the results of 62 studies, spanning 25 years of research, into three categories; positive, negative and no effect/inconclusive. They identified 33 results that found a positive relationship, 20 with negative results and 9 which found no relationship or were inconclusive.

With respect to the relationship between code of ethics and financial performance, Curtis C. Verschoor (1998) found that companies publicly committing to follow an ethics code as an internal control strategy achieved significantly higher performance measured in both financial and non-financial terms.

Similarly, Berrone, Surroca and Tribo (2005) in their working paper "Corporate Ethical Identity as a determinant of Firm Performance: A Test of the Mediating Role of Stakeholder Satisfaction" indicate that firms with a strong ethical identity achieve greater degree of stakeholder satisfaction, which in turn, positively influence the firm's financial performance. However, in contradiction to the studies above, there have been a few studies such as Abbot and Monsen (1979), Ingram and Frazier (1983) and Freedman and Jaggi (1986) which found no relationship between code of ethics and financial

performance, and furthermore, others such as Vance (1975), Shane and Spicer (1983) and Hill, Kelley and Agle (1990) which have shown that a negative code of ethics and financial performance relationship exists.

Conclusion

Following the above literature review, it is evident that the above authors and writers do not close the gap between the code of ethics and the financial performance of the public sector. Further, most of the literature about the study variables is for the public sector but in the developed world.

Therefore, this study provides findings that tend to close the gap on code of ethics and financial performance.

METHODOLOGY

Research Design

A cross sectional research design was used and selected because it ably facilitated the collection of data from the different strata of respondents namely accounting officer, accountants, auditors, accounts assistants and department heads.

Study Population

The study population comprised employees from middle to top level managers in departments of Accounts, Audit, Procurement, Finance and Administration at the Ministry's headquarters in Kampala who are 140 permanent staff in total.

Sample Size

As Ministry of Education and Sports maintains a total of 140 staff at the top and middle level as managers, the sample size for this study will be 60 respondents. This has been determined in line with Roscoe's (1970) rule of thumb that states sample size between 30 and 500 as sufficient. This number is considered to be large enough to yield reliable data and to guard against non-responses.

Sampling Design and Procedure

Simple random sampling and purposive sampling designs were used to select the 60 respondents and managers respectively. Sampling frame was a payroll since it contained the names of all serving employees.

Measurement of Variables

The independent variable had three major constructs that included accountability, transparency and conflict of interest, while the dependent variable had constructs which mainly summarized the Value for Money concept (Effectiveness, Efficiency, and Economy).

a) Accountability

This was measured by identifying its attributes such as rules, procedures and regulations. These were measured in terms of the degree of divergence between the accepted standards and the actual prevailing practices. Therefore, to test perceived accountability a set of statements were used and applied to a five-point likert scale ranging from strongly agree (5), Agree (4), Not sure (3), Disagree (2) to strongly disagree (1).

b) Transparency

This construct was measured by examining the degree of regression of the current practices on the required practices. The attributes used in measurement included adherence to transparency regulations, policies, procedures and rules and these were measured on a five-point likert scale ranging from strongly agree (5), Agree (4), Not sure (3), Disagree (2) to strongly disagree (1).

c) Conflict of Interest

This was measured by looking at the extent to which individuals have interest that might compromise their actions by using a five-point likert scale that range from strongly agree (5), Agree (4), Not sure (3), Disagree (2) to strongly disagree (1).

d) Financial Performance

This was measured using the three indicators of Value for Money (VFM) a good measure for financial performance in the public sector. That is, economy, efficiency, and effectiveness. Therefore, to test financial performance the research will devise for each measure a set of statements to test the perceptions of the respondents, using a five-point scale from strongly agree to strongly disagree.

Data Collection Sources and Instruments

The study used both primary and secondary sources. Primary data is original data collected for the first time using questionnaires. Secondary data was acquired from existing literature such as internal reports, previous research done on the company, internal memos, minutes of meetings, journals, textbooks and the Internet. The use of both primary and secondary data gave a comprehensive coverage of challenges facing procurement of drugs.

Validity

The validity of an instrument is defined as the ability to an instrument to measure what it is intended to measure. Content validity index was used to determine the relevancy of the questions. A four point scale of relevant, quite relevant, somewhat relevant and not relevant was applied and two experts rated the instrument as follows; expert one CVI was 0.7395 and expert two CVI was 0.7175. This implied that all questions were relevant to study variables.

Reliability

The reliability of an instrument is defined as the consistence of the instrument in picking the needed information. Reliability (Internal consistency and stability) of the instruments was tested using Cronbach's Alpha (α) coefficients (Cronbach, 1946), to ensure that there is the consistency of respondents' answers to all items in the measure.

Table 3.1: Reliability Test

Variable	Cronbach alpha
Accountability	.6753
Transparency	.7459
Conflict of Interest	.6165
Code of conduct and ethics	.6987
Economy	.7597
Efficiency	.7865
Effectiveness	.8548
Financial Performance	.7869

Source: Primary data

All cronbach coefficients are above 0.60, implying the scales used to measure study variables were consistent and therefore reliable.

Data Processing, Analysis and Presentation

Data collected was compiled, sorted, edited, classified, coded into a coding sheet and analysed using a Computerized Data Analysis tool/package called SPSS 17. This package generated descriptive statistics about the study variables and regression analysis was used to predict the relationship between the study variables. Pearson's correlation analysis determined the existence and significance of the relationship between the study variables.

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

Demographic Characteristics

The demographic characteristics of the study were as presented in Table 4.1 to 4.3 below;

Table 4.1: Gender

	Frequency	Percent
Male	14	37.8
Female	23	62.2
Total	37	100.0

Source: Primary data

Most of the respondents were women with 62% and only 38% men.

Table 4.2: Age group

	Frequency	Percent
18 - 29	2	5.4
30 - 39	9	24.3
40 - 49	21	56.8
> 49	5	13.5
Total	37	100.0

Source: Primary Data

Majority of the respondents were in the age group 40-49 with 57% followed by 30-39 with 24%, >49 with 14% and lastly 18-29 with 5%.

Table 4.3: Highest level of Education

	Frequency	Valid Percent
O'level & Below	2	5.6
"A" level	1	2.8
Diploma	7	19.4
Degree	14	38.9
Postgraduate	12	33.3
Total	36	100.0

Source: Primary data

Most of the respondents were graduates with at least first degree 72% followed by 19% Diploma, 3% A-Level and 6% O-Level and below.

Data Analysis

Data was analyzed by using descriptive statistics, factor analysis, and correlation and regression analyses as shown in tables 4.3 to 4.9.

Examine the Structure of Code of Conduct and Ethics (Objective One)

Table 4.4: Descriptive Statistics

	Mean	Std. Deviation
The MOES Officials have an obligation to report on the usage of public resources and answerability for failing to meet the stated performance objectives	4.3810	.97346
The MOES Officials are answerable for failing to meet the stated performance objectives	4.3952	.87458
The MOES Officials acknowledge and assume responsibility for actions within the scope of their employment under the reporting obligations.	4.0952	.94365
The MOES Officials acknowledge and assume responsibility for decisions within the scope of their employment under the reporting obligations.	3.9048	1.13599
The MOES Officials acknowledge and assume responsibility for their policies within the scope of their employment.	4.0476	.86465
In the MOES there are internal rules and norms that hold Civil Servants accountable.	4.5238	.67964
In the MOES there are independent commissions that hold Civil Servants accountable.	3.5714	1.07571
There is a special Department in the MOES which accepts complaints from citizens, bridging government and society to hold Civil Servants accountable to citizens.	3.2381	.94365
The government of Uganda has a strong accountability regime that ensures that public resources are used "effectively and efficiently".	3.9524	1.07127
he government of Uganda (GoU) promotes ethical and policy-based decisions, motivated by a concern for the public interest.	3.8095	.98077
The GoU has a mechanism that rewards good performance.	2.4286	1.02817
The GoU has a mechanism that carries consequences when "rules are knowingly broken".	3.8571	1.06234
The GoU has a mechanism that embraces accountability.	4.0952	1.04426

The MOES supports the participation of citizens and organizations in public policy development issues.	4.0000	.83666
The MOES has created a relationship that allows for and supports decision making.	3.7143	.90238
The MOES has created a relationship that allows for and supports feedback that informs program/project delivery and outcomes performance.	3.6667	.91287
I am personally accountable for all the resources under the office I hold.	4.0000	1.30384
I can confirm that there is free access by the public to timely information on decisions and performance in the MOES.	3.8095	.74960
I can confirm that there is free access by the public to reliable information on decisions and performance in the MOES.	3.9048	.83095
There is effective communication, not simply announcements in MOES.	3.8571	.79282
In the MOES there is potential transparency as a distinct realm of possible transparency for the public sector.	3.5714	.74642
In the MOES there is economic transparency as a distinct realm of possible transparency for the public sector.	3.8095	.67964
In the MOES there is procedural transparency as a distinct realm of possible transparency for the public sector.	3.9048	.62488
In the MOES there is operational transparency as a distinct realm of possible transparency for the public sector.	5.8095	8.77279
All MOES staff are fully informed of relevant matters and there are never any surprises.	3.5714	1.02817
There is full and accurate reporting on MOES affairs to the stakeholders and beneficiaries.	4.0000	.77460
There is openness in order to enhance public confidence in the Ministry.	3.9048	.83095
Ministry staff is consulted whenever introducing ideas affecting the Ministry.	3.4762	.92839
Ministry meetings are always conducted in a manner that encourages open communication.	4.0476	.92066
The various MOES projects requirements are communicated to project staff on a regular basis.	3.7143	.84515
MOES Financial information is easily accessible by stakeholders and other users.	3.3810	1.07127
MOES Technical information is easily accessible by stakeholders and other users.	3.9048	.62488
The Ministry Administration publishes financial details in the press to allow a balanced judgment of overall Ministry performance.	2.9524	1.07127
The Ministry Administration publishes technical details in the press to allow a balanced judgment of overall Ministry performance.	3.6667	1.11056
All staff of MOES are as open as possible about the decisions and actions they take.	3.3333	1.06458
All staff of MOES are always prepared when called upon to give reasons for the decisions and actions they have taken.	3.5714	.74642
A conflict of interest occurs when an individual or organization has an interest that might compromise their actions.	4.1905	.92839
Most Officers in the MOES are in a position to exploit a professional or official capacity in some way for their personal or corporate benefit.	2.9524	1.11697
According to our Code of ethics, the existence of a conflict of interest may not, in and of itself, be evidence of wrongdoing.	3.1905	1.20909
For many officials, it is virtually impossible to avoid having conflicts of interest from time to time.	2.9524	1.11697

We have had cases of in which conflict of interests became a legal matter especially when individual tried (and/or succeeded in) influencing the outcome of a decision, for personal benefits.	3.2381	.94365
In our code of conduct someone accused of a conflict of interest may deny that conflict exists because he/she did not act improperly.	3.2857	1.14642
Generally, our code of ethics forbids conflicts of interests.	3.9048	.99523
Codes of ethics help to minimize problems with conflicts of interests because they can spell out the extent to which such conflicts should be avoided.	4.0000	.94868
Codes of ethics spell out what the parties should do in case there are conflicts that are permitted by a code of ethics.	3.7143	.95618
The threat of disciplinary action helps to minimize unacceptable conflicts or improper acts when a conflict is unavoidable.	4.0000	1.18322
The codes of ethics used by MOES covers all situations.	3.3333	1.23828
The MOES has established an office in charge of ethics and integrity.	2.4286	.81064
Whenever i realize that there is a conflict of interest in any of my duties, i inform my supervisor of the nature and extent of my interest.	3.1429	1.19523
Every Civil servant/staff in the MOES holds his/her office in public trust and is personally responsible for his/her actions.	3.8571	1.27615
I always hold my office in public trust and iam accountable to the public at all times.	3.8571	1.31475
My ethical behavior is considered an investment in the public trust.	3.9048	1.04426
My social behavior is considered an investment in the public trust.	3.8571	1.06234
Everything, i do it for the public benefit which increases the public trust.	3.8095	1.07792
I act responsibly in my office which increases public trust for the ministry services	4.0000	1.09545
There are high standards of accountability set for my supervisors which increases public trust.	3.9524	1.11697

Source: Primary Data

Most of the item means are approximately 4 and above which is the score for agree and strongly agree, implying that Code of conduct and ethics largely exists in the MOES.

MOES Officials have an obligation to report on the usage of public resources and answerability for failing to meet the stated performance objectives 4.3810, are answerable for failing to meet the stated performance objectives 4.3952, acknowledge and assume responsibility for actions within the scope of their employment under the reporting obligations 4.0952, acknowledge and assume responsibility for decisions within the scope of their employment under the reporting obligations 3.9048, acknowledge and assume responsibility for their policies within the scope of their employment 4.0476, there are internal rules and norms that hold Civil Servants accountable 4.5238 and there are independent commissions that hold Civil Servants accountable 3.5714.

The government of Uganda has a strong accountability regime that ensures that public resources are used “effectively and efficiently” 3.9524, promotes ethical and policy-based decisions, motivated by a concern for the public interest 3.8095, has a mechanism that carries consequences when “rules are knowingly broken” 3.8571 and has a mechanism that embraces accountability 4.0952.

The MOES supports the participation of citizens and organizations in public policy development issues 4.0000, created a relationship that allows for and supports decision making 3.7143, created a relationship that allows for and supports feedback that informs program/project delivery and outcomes performance 3.666.

Staff are personally accountable for all the resources under their offices 4.0000, can confirm that there is free access by the public to timely information on decisions and performance in the

MOES 3.8095 and also can confirm that there is free access by the public to reliable information on decisions and performance in the MOES 3.9048.

There is effective communication, not simply announcements in MOES 3.8571, there is potential transparency as a distinct realm of possible transparency for the public sector 3.5714, there is economic transparency as a distinct realm of possible transparency for the public sector 3.8095, there is procedural transparency as a distinct realm of possible transparency for the public sector 3.9048, there is operational transparency as a distinct realm of possible transparency for the public sector 5.8095 and staff are fully informed of relevant matters and there are never any surprises 3.5714.

There is full and accurate reporting on MOES affairs to the stakeholders and beneficiaries 4.0000, openness in order to enhance public confidence in the Ministry 3.9048, Ministry staff are consulted whenever introducing ideas affecting the Ministry 3.4762, meetings are always conducted in a manner that encourages open communication 4.0476, and various MOES projects requirements are communicated to project staff on a regular basis 3.7143.

MOES Financial information is easily accessible by stakeholders and other users 3.3810, technical information is easily accessible by stakeholders and other users 3.9048, Administration publishes technical details in the press to allow a balanced judgment of overall Ministry performance 3.6667 and all staff of MOES are always prepared when called upon to give reasons for the decisions and actions they have taken 3.5714.

A conflict of interest occurs when an individual or organization has an interest that might compromise their actions 4.1905, Generally, our code of ethics forbids conflicts of interests 3.9048, Codes of ethics help to minimize problems with conflicts of interests because they can spell out the extent to which such conflicts should be avoided 4.0000 and Codes of ethics spell out what the parties should do in case there are conflicts that are permitted by a code of ethics 3.7143.

The threat of disciplinary action helps to minimize unacceptable conflicts or improper acts when a conflict is unavoidable 4.0000, Every Civil servant/staff in the MOES holds his/her office in public trust and is personally responsible for his/her actions 3.8571, staff hold offices in public trust and accountable to the public at all times 3.8571, staff ethical behavior is considered an investment in the public trust 3.9048, social behavior is considered an investment in the public trust 3.8571, Everything staff do, do it for the public benefit which increases the public trust 3.8095, act responsibly in office which increases public trust for the ministry services 4.0000 and there are high standards of accountability set for my supervisors which increases public trust 3.9524.

However, there is a disagreement and not being aware of the code of conduct issues below; GoU has no mechanism that rewards good performance 2.4286, not aware of special Department in the MOES which accepts complaints from citizens, bridging government and society to hold Civil Servants accountable to citizens 3.2381, not aware of Ministry Administration publishing financial details in the press to allow a balanced judgment of overall Ministry performance 2.9524, Officers being in position to exploit a professional or official capacity in some way for their personal or corporate benefit 2.9524, According to Code of ethics, the existence of a conflict of interest may not, in and of itself, be evidence of wrongdoing 3.1905.

For many officials, it is virtually impossible to avoid having conflicts of interest from time to time 2.9524, had cases of in which conflict of interests became a legal matter especially when individual tried (and/or succeeded in) influencing the outcome of a decision, for personal benefits 3.2381, In our code of conduct someone accused of a conflict of interest may deny that conflict exists because he/she did not act improperly 3.2857, The codes of ethics used by MOES covers all situations 3.3333, The MOES has established an office in charge of ethics and integrity 2.4286, Whenever staff realize that there is a conflict of interest in any of my duties, I inform my supervisor of the nature and extent of my interest 3.1429 and all staff of MOES are as open as possible about the decisions and actions they take 3.3333.

Table 4.5: Rotated Component Matrix

	Component			
	1	2	3	4
Codes of ethics spell out what the parties should do in case there are conflicts that are permitted by a code of ethics.	.860			
The MOES Officials acknowledge and assume responsibility for actions within the scope of their employment under the reporting obligations.	.814			
The GoU has a mechanism that carries consequences when "rules are knowingly broken".	.808			
Codes of ethics help to minimize problems with conflicts of interests because they can spell out the extent to which such conflicts should be avoided.	.803			
The government of Uganda (GoU) promotes ethical and policy-based decisions, motivated by a concern for the public interest.	.779			
The MOES Officials have an obligation to report on the usage of public resources and answerability for failing to meet the stated performance objectives	.744			
A conflict of interest occurs when an individual or organization has an interest that might compromise their actions.	.730			
The MOES Officials acknowledge and assume responsibility for their policies within the scope of their employment.	.728			
The government of Uganda has a strong accountability regime that ensures that public resources are used "effectively and efficiently".	.716			
The MOES Officials acknowledge and assume responsibility for decisions within the scope of their employment under the reporting obligations.	.677			
The GoU has a mechanism that embraces accountability.	.663			
The MOES supports the participation of citizens and organizations in public policy development issues.	.663			
I am personally accountable for all the resources under the office I hold.	.658			
Most Officers in the MOES are in a position to exploit a professional or official capacity in some way for their personal or corporate benefit.	.603			
Generally, our code of ethics forbids conflicts of interests.	.590			
For many officials, it is virtually impossible to avoid having conflicts of interest from time to time.	.545			
According to our Code of ethics, the existence of a conflict of interest may not, in and of itself, be evidence of wrongdoing.	.502			
There is effective communication, not simply announcements in MOES.	.448			
There is openness in order to enhance public confidence in the Ministry.		.864		
MOES Technical information is easily accessible by stakeholders and other users.		.822		
Ministry staff is consulted whenever introducing ideas affecting the Ministry.		.808		
In the MOES there is procedural transparency as a distinct realm of possible transparency for the public sector.		.767		
All MOES staff are fully informed of relevant matters and there are never any surprises.		.739		
Ministry meetings are always conducted in a manner that encourages open communication.		.716		

The MOES has created a relationship that allows for and supports decision making.		.703		
The various MOES projects requirements are communicated to project staff on a regular basis.		.692		
There is full and accurate reporting on MOES affairs to the stakeholders and beneficiaries.		.674		
I can confirm that there is free access by the public to timely information on decisions and performance in the MOES.		.662		
All staff of MOES are always prepared when called upon to give reasons for the decisions and actions they have taken.		.655		
I can confirm that there is free access by the public to reliable information on decisions and performance in the MOES.		.602		
In the MOES there is economic transparency as a distinct realm of possible transparency for the public sector.		.568		
The MOES has created a relationship that allows for and supports feedback that informs program/project delivery and outcomes performance.		.549		
All staff of MOES are as open as possible about the decisions and actions they take.		.505		
MOES Financial information is easily accessible by stakeholders and other users.		.505		
There is a special Department in the MOES which accepts complaints from citizens, bridging government and society to hold Civil Servants accountable to citizens.		.444		
My ethical behavior is considered an investment in the public trust.			.866	
Everything i do, i do it for the public benefit which increases the public trust.			.845	
There are high standards of accountability set for my supervisors which increases public trust.			.826	
I act responsibly in my office which increases public trust for the ministry services			.821	
My social behavior is considered an investment in the public trust.			.820	
The threat of disciplinary action helps to minimize unacceptable conflicts or improper acts when a conflict is unavoidable.			.797	
Every Civil servant/staff in the MOES holds his/her office in public trust and is personally responsible for his/her actions.			.762	
I always hold my office in public trust and iam accountable to the public at all times.			.752	
The codes of ethics used by MOES covers all situations.			.739	
Whenever i realize that there is a conflict of interest in any of my duties, i inform my supervisor of the nature and extent of my interest.			.617	
In our code of conduct someone accused of a conflict of interest may deny that conflict exists because he/she did not act improperly.			.525	
The Ministry Administration publishes technical details in the press to allow a balanced judgment of overall Ministry performance.				.787
The Ministry Administration publishes financial details in the press to allow a balanced judgment of overall Ministry performance.				.747
In the MOES there is potential transparency as a distinct realm of possible transparency for the public sector.				.549

Eigen value	11.810	9.998	9.292	4.543
% of variance	21.089	17.854	16.593	8.113

Source: Primary Data

Four components with Eigen values greater than explaining 64% of the total variance of code of conduct and ethics in MOES. This implies that trust, transparency, conflict of interest and accountability are the dimensions of code of conduct and ethics.

Explore the Perceived Financial Performance (Objective 2)

Table 4.6: Descriptive Statistics for Perceived Financial Performance

	Mean	Std. Deviation
On almost all the MOES programs/ projects, activities are done the same as before, but with fewer resources in terms of money, staff, space, etc.	3.4444	1.15470
MOES officials and Administrators always look forward to getting out much in relation to how much they put in.	3.4074	1.04731
The ministry always ensures that in every process, there is the best use of resources by getting it right first time or whether you have duplication.	4.1852	3.71108
Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's Objectives.	3.6296	.96668
Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's set targets.	3.7037	.86890
Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's set tasks.	3.8148	.83376
On all the MOES programmes/projects the officers always look out for the impact which is the output of all these functions either contributes to or attainment influences Ministry performance as a whole.	4.0000	.67937
There is satisfaction on all the MOES programmes/projects which is exhibited by how the service is perceived by both senior management and the internal staff on these projects.	3.4815	.89315
There is a high level of modernization exhibited by the extent to which the Ministry has adopted management practices that would be regarded as being innovative and forward looking.	3.8519	.81824
All staff at the MOES strive to achieve the intended results in terms of quality in accordance with the set targets and performance standards for service delivery.	4.0741	.54954
All staff at the MOES strive to achieve the intended results in terms of quantity in accordance with the set targets and performance standards for service delivery.	4.0370	.51750
The MOES aims at minimizing the cost of resources for all the available programmes/projects.	4.0000	.67937
The MOES generates cost savings on most of its procurements. That is, it does less with fewer resources.	3.4074	.79707
The Ministry pays the price that is exactly for what goes into providing a service or product.	3.4074	1.00992
The Ministry takes bulk discounts by buying/procuring in large quantities.	3.1481	.90739
The Ministry uses in-house Technical capacity instead of recruiting expensive Consultants	3.2963	1.06752
Ministry looks out for cheaper outsourcing solutions rather than directly buying in expensive services.	3.3333	1.00000
In the MOES cost is more significant than the quality of the Ministry's services.	3.8519	5.92065
In the MOES quality of the services is more significant than the costs.	3.5556	.84732

I always ensure that there is proper and economical utilization of public funds.	3.9259	.61556
I always safeguard the public property/assets entrusted to me to ensure that there is no damage.	4.3333	.55470
The procurement staff of the MOES always ensures that there is no loss or misappropriations in the process of procurement, storage, utilization, and disposal.	3.4444	.93370

Source: Primary Data

Most of the items have means above 3.5 indicating the score of 4 with agree category of agree which implies that there is minimum performance by MOES.

The ministry always ensures that in every process, there is the best use of resources by getting it right first time or whether you have duplication 4.1852, Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's Objectives 3.6296, Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's set targets 3.7037

Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's set tasks 3.8148, On all the MOES programmes/projects the officers always look out for the impact which's is the output of all these functions either contributes to or attainment influences Ministry performance as a whole 4.0000, there is satisfaction on all the MOES programmes/projects which is exhibited by how the service is perceived by both senior management and the internal staff on these projects 3.4815, there is a high level of modernization exhibited by the extent to which the Ministry has adopted management practices that would be regarded as being innovative and forward looking 3.8519, All staff at the MOES strive to achieve the intended results in terms of quality in accordance with the set targets and performance standards for service delivery 4.0741, All staff at the MOES strive to achieve the intended results in terms of quantity in accordance with the set targets and performance standards for service delivery 4.0370, The MOES aims at minimizing the cost of resources for all the available programmes/projects 4.0000, In the MOES cost is more significant than the quality of the Ministry's services 3.8519, In the MOES quality of the services is more significant than the costs 3.5556, I always ensure that there is proper and economical utilization of public funds 3.9259, and always safeguard the public property/assets entrusted to me to ensure that there is no damage 4.3333. However there is a disagreement, and lack of awareness of the following:

The procurement staff of the MOES always ensures that there is no loss or misappropriations in the process of procurement, storage, utilization, and disposal 3.4444, and MOES generates cost savings on most of its procurements that is, it does less with fewer resources 3.4074. Further, the Ministry pays the price that is exactly for what goes into providing a service or product 3.4074, it also takes bulk discounts by buying/procuring in large quantities 3.1481 and uses in-house Technical capacity instead of recruiting expensive Consultants 3.2963. The Ministry also looks out for cheaper outsourcing solutions rather than directly buying in expensive services 3.3333.

Table 4.7: Rotated Component Matrix for Perceived Financial Performance

	Component		
	1	2	3
Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's set targets.	.869		
Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's set tasks.	.847		
Every staff in the MOES endeavors to optimally use resources in the attainment of the Ministry's Objectives.	.775		
All staff at the MOES strive to achieve the intended results in terms of quality in accordance with the set targets and performance standards for service delivery.	.715		

All staff at the MOES strive to achieve the intended results in terms of quantity in accordance with the set targets and performance standards for service delivery.	.664		
There is satisfaction on all the MOES programmes/projects which is exhibited by how the service is perceived by both senior management and the internal staff on these projects.	.586		
I always safeguard the public property/assets entrusted to me to ensure that there is no damage.	.584		
There is a high level of modernization exhibited by the extent to which the Ministry has adopted management practices that would be regarded as being innovative and forward looking.	.583		
On all the MOES programmes/projects the officers always look out for the impact which is the output of all these functions either contributes to or attainment influences Ministry performance as a whole	.574		
The Ministry pays the price that is exactly for what goes into providing a service or product.		.775	
he Ministry looks out for cheaper outsourcing solutions rather than directly buying in expensive services.		.743	
The Ministry uses in-house Technical capacity instead of recruiting expensive Consultants		.742	
The MOES generates cost savings on most of its procurements. That is, it does less with fewer resources.		.697	
The MOES aims at minimizing the cost of resources for all the available programmes/projects.		.656	
The Ministry takes bulk discounts by buying/procuring in large quantities.		.650	
The ministry always ensures that in every process, there is the best use of resources by getting it right first time or whether you have duplication.		.557	
In the MOES quality of the services is more significant than the costs.		.538	
I always ensure that there is proper and economical utilization of public funds.			.767
The procurement staff of the MOES always ensures that there is no loss or misappropriations in the process of procurement, storage, utilization, and disposal.			.669
MOES officials and Administrators always look forward to getting out much in relation to how much they put in.			.449
Eigen value	5.284	4.196	2.756
% of variance	24.020	19.074	12.528

Source: Primary Data

Three factors explaining 54% of the total variation of perceived performance were extracted. This implies that three Es are the dimensions of perceived performance.

Investigate the Relationship between Code of Conduct and Ethics and Perceived Financial Performance (Objective 3).

Table 4.8: Zero Order Correlation Matrix

	Accountability	Transparency	Conflict of interest	Trust	Code of conduct and ethics	Efficiency	Effectiveness	Economy	Financial performance
Accountability	1								
Transparence	.583**	1							
Conflict of interest	.467**	.173	1						
Trust	.264	-.048	.530**	1					
Code of conduct and ethics	.813**	.623**	.726**	.646**	1				
Efficiency	.449**	.592**	.285	.260	.578**	1			
Effectiveness	.379*	.451**	.382*	.419**	.593**	.539**	1		
Economy	.498**	.510**	.402*	.284	.604**	.462**	.569**	1	
Financial performance	.536**	.633**	.426**	.383*	.715**	.835**	.837**	.804**	1

** . Correlation significant at 0.01 levels

* . Correlation significant at 0.05 levels

Source: Primary data

There is a significant positive relationships between code of conduct and ethics and perceived performance ($r=.715$, $p\text{-value}<0.01$). This implies that code of conduct and ethics enhances on the performance of MOES in terms of efficiency, effectiveness and economy.

There are significant positive relationships between accountability and financial performance (efficiency, effectiveness and economy), ($r=.536, .449, .379, .498$, $p\text{-values}<0.01, 0.05$) respectively. This implies that accountability improves on the financial performance in terms of efficiency, effectiveness and economy of MOES.

There are significant positive relationships between transparency and financial performance (efficiency, effectiveness and economy), ($r=.633, .592, .451, .510$, $p\text{-values}<0.01$). This implies that transparency improves on the financial performance of MOES.

Conflict of interest had significant positive relationship with financial performance (effectiveness and economy), $r=.426, .382, .402$, $p\text{-values}<0.01, 0.05$, This implies that conflict of interest improved on the financial performance of MOES. However no significant relationship with efficiency ($r=.285$, $p\text{-value}>0.05$).

Trust had significant positive relationship with financial performance in terms of effectiveness only ($r=.383, .419$, $p\text{-value}<0.05, 0.01$). This implies that trust enhances on the financial performance of MOES.

Table 4.9 : Regression Model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	-.165	.615		-.268	.791		
Accountability	.035	.168	.034	.211	.834	.510	1.960
Transparency	.547	.131	.607	4.186	.000	.615	1.625
Conflict of interest	.170	.196	.127	.867	.392	.604	1.655
Trust	.279	.114	.336	2.443	.020	.684	1.463
R-Square =0.585, Sig=0.000, Adj R-Square=0.534, Durbin-Watson=1.706, F=11.299,							

Source: Primary data

Transparency and trust significantly predicted 53% financial performance of MOES (F=11.299, Sig=0.000). Transparency predicts more (beta=0.607) to financial performance than trust (beta=0.336). Improvement in transparency led to 0.607 increase in financial performance and change in trust led to 0.336 enhancement in financial performance. Accountability and conflict of interest were no significant predictors of perceived financial performance.

Results above are in line with the findings of Orlitzky et al. (2003), they indicate that the code of ethics has a positive impact on financial performance and that this is strongest in the UK context. Griffin and Mahon (1997) supported the theory of the positive code of ethics and financial performance relationship with findings from their research. They demonstrated this by studying and classifying the results of 62 studies, spanning 25 years of research, into three categories; positive, negative and no effect/inconclusive. They identified 33 results that found a positive relationship, 20 with negative results and 9 which found no relationship or were inconclusive.

With respect to the relationship between code of ethics and financial performance, Verschoor (1998) found that companies publicly committing to follow an ethics code as an internal control strategy achieved significantly higher performance measured in both financial and non-financial terms.

Conclusion and Recommendation

Code of conduct and ethics is a determinant of the financial performance of the Ministry of Education and sports in Uganda. Transparency and trust are paramount in the code of conduct and ethics in the Ministry of Education and Sports in Uganda. There is need for the employees to uphold to be more transparent and trust one another for the betterment of the Ministry financial performance.

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**CREDIT RISK MANAGEMENT AND PROFITABILITY OF COMMERCIAL BANKS IN
KENYA**

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**A Paper Presented at the ORSEA Conference at the Kenyatta International Conference
Centre, NAIROBI- KENYA**

October, 2011

1.0 INTRODUCTION

1.1 Background

The risk focused examination process has been adopted to direct the inspection process to the more risk areas of both operations and business. Skills in risk-focused supervision are continually being developed by exposing bank examiners to relevant training. By adopting this approach, the banking industry, are forced to embrace formal and documented risk management frameworks, De Juan (1991). Notably, the more complex a risk type is, the more specialized, concentrated and controlled its management is expected to be, Seppala (2000), Matz and Neu, (1998) Ramos (2000). Risk management is defined as the process that a bank puts in place to control its financial exposures. According to Bikker and Metzmakers (2005), and Buttimer (2001), the process of risk management comprises the fundamental steps of risk identification, risk analysis and assessment, risk audit monitoring, and risk treatment or control (Whereas a risk in simple terms can be measured using standard deviation, some risks may be difficult to measure requiring more complex methods of risk measurement. Good risk management is not only a defensive mechanism, but also an offensive weapon for commercial banks and this is heavily dependent on the quality of leadership and governance. Jorion (2009) observes that a recognized risk is less “risky” than the unidentified risk. Risk is highly multifaceted, complex and often interlinked making it necessary to manage, rather than fear. While not avoidable, risk is manageable – as a matter of fact most banks live reasonably well by incurring risks, Payle (1997) and Greuning and Bratanovic (1999).

Financial institutions are exposed to a variety of risks among them; interest rate risk, foreign exchange risk, political risk, market risk, liquidity risk, operational risk and credit risk, Yusuf (2003), Cooperman, Gardener and Mills (2000). In some instances, commercial banks and other financial institutions have approved decisions that are not vetted; there have been cases of loan defaults and non-performing loans, massive extension of credit and directed lending. Policies to minimize on the negative effects have focused on mergers in banks and NBFIs, better banking practices but stringent lending, review of laws to be in line with the global standards, well capitalized banks which are expected to be profitable, liquid banks that are able to meet the demands of their depositors, and maintenance of required cash levels with the central bank which means less cash is available for lending (Central Bank Annual Report, 2004). This has led to reduced interest income for the commercial banks and other financial institutions and by extension reduction in profits, De Young and Roland (2001), Dziobek (1998), Uyemura and Van Deventer (1992).

Credit risk is the possibility that the actual return on an investment or loan extended will deviate from that, which was expected, Conford (2000). Coyle (2000) defines credit risk as losses from the refusal or inability of credit customers to pay what is owed in full and on time. The main sources of credit risk include, limited institutional capacity, inappropriate credit policies, volatile interest rates, poor management, inappropriate laws, low capital and liquidity levels, directed lending, massive licensing of banks, poor loan underwriting, reckless lending, poor credit assessment., no non-executive directors, poor loan underwriting, laxity in credit assessment, poor lending practices, government interference and inadequate supervision by the central bank. To minimize these risks, it is necessary for the financial system to have; well-capitalized banks, service to a wide range of customers, sharing of information about borrowers, stabilization of interest rates, reduction in non-performing loans,

increased bank deposits and increased credit extended to borrowers. Loan defaults and non-performing loans need to be reduced, Bank Supervision Annual Report (2006), Laker (2007), Sandstorm (2009).

The key principles in credit risk management are; firstly, establishment of a clear structure, allocation of responsibility and accountability, processes have to be prioritized and disciplined, responsibilities should be clearly communicated and accountability assigned thereto Lindergren (1987). According to the Demirguc-kunt and Huzinga (1999), the overwhelming concern on bank credit risk management is two-fold. First, the Newtonian reaction against bank losses regards the realization that the losses are unbearable after they have occurred. Second, recent developments in the field of financing commercial paper, securitization, and other non-bank competition have pushed banks to find viable loan borrowers. This has seen large and stable companies shifting to open market sources of finance like bond market. Organizing and managing the lending function in a highly professional manner and doing so pro-actively can minimize the degree of risk assumed losses. Banks can tap increasingly sophisticated measuring techniques in approaching risk management issues, Gill (1989).

Technological developments, particularly the increasing availability of low cost computing power and communications, have played an important role in facilitating the adoption of more rigorous credit risk; however, implementation of some of these new approaches still has a long way to go for many of the banks. The likely acceleration of change in credit risk management in banks is viewed as an inevitable response to an environment where competition in the provision of financial services is increasing and, thus, need for banks and financial institutions to identify new and profitable business opportunities and properly measure the associated risks, is growing Lardy (1998), Roels et al. (1990). Inevitably, as banks improve their ability to assess risk and return associated with their various activities, the nature and relative sizes of the implicit internal subsidies will become more transparent. Brown and Manassee (2004) observe that credit risk arose before financing of business ventures. The Bible is hostile to credit by stating that one should not let the sun go down on an unpaid wage. Banks and other intermediaries can transfer the payment delays and the credit risk among producers, or between producers and outside investors, Demirguc-kunt and Huzinga (2000).

While the commercial banks have faced difficulties over the years for a multitude of reasons, the major cause of serious financial problems continues to be directly related to credit standards for borrowers, poor portfolio risk management or lack of attention to changes in the economic circumstances and competitive climate, Central Bank Annual Supervision Report (2000). The author observes that the credit decision should be based on a thorough evaluation of the risk conditions of the lending and the characteristics of the borrower.

Numerous approaches have been developed for incorporating risk into decision-making process by lending organizations. They range from relatively simple methods, such as the use of subjective or informal approaches, to fairly complex ones such as the use of computerized simulation models, Montes-Negret (1998), CBK Annual Supervision Report (2000). According to Saunders (1996), banks need to gather adequate information about potential customers to be able to calibrate the credit risk exposure. The information gathered will guide the bank in assessing the probability of borrower default and price the loan accordingly. Much of this information is gathered during loan documentation. The bank should however go beyond information provided by the borrower and seek

additional information from third parties like credit rating agencies and credit reference bureaus, Simson and Hempel (1999).

Credit extended to borrowers could be at the risk of default since as banks extend credit on the understanding that borrowers would repay their loans, some borrowers usually default and as a result banks income decrease due to the need to provision for the loans. Where commercial banks do not have an indication of what proportion of their borrowers will default, earnings will vary thus exposing the banks to an additional risk of variability of their profits. Every financial institution bears a degree of risk when the institution lends to business and consumers and hence experiences some loan losses when certain borrowers fail to repay their loans as agreed. Principally, the credit risk of a bank is the possibility of loss arising from non-repayment of interest and the principle, or both, or non-realization of securities on the loans.

Risks exposed to commercial banks threaten a crisis not only in the banks but to the financial market as a whole and credit risk is one of the threats to soundness of commercial banks. To minimize credit risk, banks are encouraged to use the “know your customer” principle as expounded by the Basel Committee on Banking Supervision as noted by Kunt-Demirguc and Detragiache, (1997), Parry (1999), Kane and Rice (1998). Subjective decision-making by the management of banks may lead to extending credit to business enterprises they own or with which they are affiliated. A solution to this may be the use of tested lending techniques and especially quantitative ones, which filter out subjectivity, Griffith and Persuad (2002).

Credit provision by foreign owned banks tend to be less sensitive to exogenously determined changes in interest rate margins than credit supply by domestically owned banks. In being more stable, credit supply by foreign owned banks may limit the magnitude and frequency of lending booms. Since this also reduces the rate of loan default, the operation of foreign owned banks is expected to stabilize the performance of the domestic banking system, Sailesh et al. (2005). Gizycki (2001) observe that the effect of real credit growth on bank’s credit risk is in line with the view that difficulties in monitoring bank performance can weaken their credit standards in times of rapid expansion of aggregate credit, Chirwa and Montfort (2004).

In the years before the Basle Accord, large banks in all but a few major countries seemed to hold insufficient capital relative to the risks they were taking, especially in light of the aggressive competition for market share in the international arena. The intention of the original Accord was clearly to arrest a slide in international capital ratios and to harmonize different levels of approaches to capital among the G-10 countries. The Basle II recognizes the common shareholders’ equity as the key element of capital; however ensuring maintenance of integrity of capital public disclosure is key since each component of capital need to be disclosed. The Accord applies to international states that ownership structures should not be allowed to weaken capital positions of banks, Federal Reserve Release (2002), The Basle Accord (2001), Conford (2000).

Several theories have been put forward which have implications on credit risk management. Interest rates theories recognize that interest rates have an effect on credit risk because the higher the interest rate the higher the risk that the loan might not be repaid and thus the higher the credit risk. The term structure of interest rate theories contends that the long term interest rates are more risky than short term interest rates, thus investors expect a higher return if they have to be motivated to hold instruments that are long term interest bearing instrument. Theories of financial crises contend that crises in the financial sector affect the ability of commercial banks to extend credit as well as the ability of the borrowers to service their loans. Portfolio theory in the banking sector is applied in constitution of loan portfolios of banks where there are guidelines on loans that banks should extend to their clients, such as limit in terms of credit that should be extended to third parties. The agency theory contends that many banks are managed by the managers and not by the owners. Banks that are managed by professional managers are expected to better analyze and monitor credit awarded to their clients. Commercial banks should be properly managed and management should be “fit and proper” to be able to make decisions on credit risk management and that which should steer banks to high levels of profitability.

Regulatory constraints may directly limit banks’ risk-taking as regulations may limit banks’ portfolio composition or may force banks to expand into areas that they previously would not have entered. Regulations may lower the credit standards applied by banks while enhancing rapid expansion of credit, Coyle (2000). Evolution of credit risk management in banking in the last decade from the point of view of the regulator was that of protecting the interests of depositors by promoting prudent business behaviour and risk management on the part of individual banking institutions though not to eliminate failure but to keep their incidences low. The pace of evolution can be linked to the realization that the techniques are developed for the measurement of credit risk, Laker (2007), McDonough (1998), Couhy (2005), Brown (2004). Adopting different credit risk management practices is meant to differentiate different banks in terms of credit evaluation.

Gizycki (2001) examined the overall variability of Australian banks’ credit risk taking in the 1990s and found out that the impaired asset ratios of smaller banks tend to be more variable than for the larger banks. Foreign banks with small assets bases within Australia experienced particularly high levels of impaired assets and low but variable profits between 1990 and 1992. The variance of the full panel data was decomposed to distinguish variation across banks and variation through time.

Berger(1995) argue that more capitalized banks are able to attract higher earnings because of lower expected bankruptcy costs, which enabled them to pay lower interest on unsecured debt. Hortlund (2005) argue that successful banks could tend to be both more capitalized and more profitable in the short run, which could obscure the fundamental positive relationship between leverage and returns. Hortlund (2005) uses data for Sweden in the year 1870-2001 and finds out that there is a strong positive long-term relationship between leverage and profitability in banking, where long-term is defined as a century.

Commercial banks are the foundation of the payment system in many economies by playing an intermediary role between savers and borrowers. They further enhance the financial system by

ensuring that financial institutions are stable and are able to effectively facilitate financial transactions. The main challenge to commercial banks in their operations is the disbursement of loans and advances. There is need for commercial banks to adopt appropriate credit appraisal techniques to minimize the possibility of loan defaults since defaults on loan repayments lead to adverse effects such as the depositors losing their money, loss of confidence in the banking system, and financial instability, Central Bank of Kenya (1997).

In Kenya, commercial banks play an important role in mobilizing financial resources for investment by extending credit to various businesses and investors. Lending represents the heart of the banking industry and loans are the dominant assets as they generate the largest share of operating income. Loans however expose the banks to the greatest level of risk. There are 44 licensed commercial banks in Kenya, one mortgage finance company and one credit reference bureau. Of the 45 financial institutions, 32 are locally owned and 13 are foreign owned. The credit reference bureau, Credit Reference Bureau Africa was the first of its kind to be registered in Kenya by the Central bank of Kenya aimed at enabling commercial banks to share information about borrowers to facilitate effectiveness in credit scoring.

1.2 Statement of the Problem

Weaknesses in the Kenya banking system became apparent in the late 1980s and were manifest in the relatively controlled and fragmented financial system. Differences in regulations governing banking and non-bank financial intermediaries, lack of autonomy and weak supervisory capacities to carry out the Central Bank's surveillance role and enforce banking regulations, inappropriate government policies which contributed to an accumulation of non-performing loans, and non-compliance by financial institutions to regulatory requirements among others posed a challenge to the Kenya banking system. Many banks that collapsed in the late 1990's were as a result of the poor management of credit risks which was portrayed in the high levels of non-performing loans, Central Bank Supervision Report (2005).

The liberalization of the Kenya banking industry in 1992 marked the beginning of intense competition among the commercial banks, which saw banks extend huge amounts of credit with the main objective of increasing profits. The low quality loans led to high levels of non-performing loans and subsequently eroded profits of banks through loan provisioning.

Management of credit by commercial banks is influenced by; ownership of the banks (privately owned, foreign owned, government influenced and locally owned), credit policies of banks, credit scoring systems, banks regulatory environment and the caliber of management of the banks. Looking at the emphasis that is laid on credit risk management by commercial banks the level of contribution by this factor to profits is essential. Rajan (1994) notes that expanding lending in the short-term boosts earnings, thus the banks have an incentive to ease their credit standards in times of rapid credit growth, and likewise to tighten standards when credit growth is slowing.

Using the amount of credit and the level of non-performing loans as proxies of credit risk, this paper analyses the relationship between the level of profits, amount of credit and the level of non-performing loans. A relationship is further established between the amount of credit and the level of non-performing loans.

1.3 Objective of the Study

This study seeks to establish the relationship between the amount of credit, level of non-performing loans and profitability of commercial banks in Kenya.

2.0 DATA ANALYSIS APPROACH

Data on the amount of credit, level of non-performing loans and profits were collected for the period 2004 to 2008 from the banking surveys. Amount of credit was measured by loan and advances to customers divided by total assets, non-performing loans was measured using non-performing loans/total loans, and profits were measured using ROTA (Return on Total assets). The trend of level of credit, non-performing loans and profits were established during the period 2004 to 2008. A regression model was used to establish the relationship between amount of credit, non-performing loans and profits during the period of study. R^2 and t-test at 95% confidence level were estimated. A second regression model was fitted to establish whether there was a relationship between the independent variables and r^2 was estimated to establish the strength of the relationship between the independent variables.

3.0 FINDINGS AND DISCUSSION OF THE RESULTS

3.1 Amount of Credit and Level of Non-performing Loans

Credit risk management which refers to identification, analysis and assessment, monitoring and control of credit has direct implications on the amount of loans and advances extended to customers as well as on the level of non-performing loans. Amount of credit as measured by loan and advances extended to customers and non-performing loans are used as proxies for credit risk. Amount of credit was expressed as a proportion of total assets to control for the size of the banks. Non-performing loans was expressed as a proportion of the total loans extended by the commercial banks. Analysis focused on the banking sector as well as banks categorized in their groups. Commercial banks in Kenya are categorized in three tier groups on the basis of the value of bank assets. Tier group one are banks with an asset base of more than Ksh40 billion, tier group two are commercial banks with asset base between Ksh40 billion and Ksh10 billion while tier group three are banks with asset base of less than Ksh10 billion. According to the 2009 Banking Survey, there are eleven commercial banks in tier group one, eleven commercial banks in tier group two and twenty one commercial banks in tier group three comprising of a total of forty three commercial banks.

Table 1: Tier Groups of Commercial Banks

Tier Group	Total Assets (billions)	Percentage of Total Assets
One	948.814	78%
Two	172.616	14%

One	93	8%
Total Assets	1214.43	100%

Source: Research Data

In terms of total assets in the banking sector, commercial banks in tier group one constitutes 78% of total assets of commercial banks, tier group two constitutes 14% of the total banking sector asset value while tier three commercial banks constitutes 8% of the total asset value of the banking institutions.

Table 2: Average Assets by Tier Groups for 2008

Tier Group	Average Assets (Billions)
One	86.25582
Two	15.69236
Three	4.411667
Average For All Banks	49.37933

Source: Research Data

The average value of assets in tier one category averaged Ksh86.25582 billion, tier group two averaged Ksh15.69236 billion while banks in tier group three averaged Ksh4.411667 billion in 2008 (Also see Appendix I). The average assets for all commercial banks was Ksh49.37933 billion in 2008, Ksh22.22574 billion in 2007, Ksh16.95755 billion in 2006, Ksh15.19133 billion in 2005 and Ksh13.5056 billion in 2004.

Credit extended by commercial banks averaged Ksh16.2087 billion in 2008, Ksh15.44379 billion in 2007, Ksh14.76513 billion in 2006, Ksh12.93275 billion in 2005 and Ksh10.5044 billion in 2004. Total loans and advances to total assets, which is a measure of level of credit averaged 64% for all commercial banks, 67.4% in 2007, 144.2% in 2006, 129.7% in 2005 and 115% in 2004. The observation is that the level of credit was high in the early years of the implementation of Basle II but decreased significantly in 2007 and 2008, probably when the Basle II was implemented by commercial banks. Notably Basle II came into being in 2004 but the impact of this Accord was not immediate explaining why there was a time lag in reduction of the amount of credit. When the amount of credit exceeds the level a bank assets as in the case of 2004, 2005 and 2006, banks are exposed to more risk of the credit ending up being non-performing.

The non-performing loans as a proportion of total loans which is another proxy for credit risk averaged 5.08% in 2008, 13.5% in 2007, stood at 14.3% in 2006, and further averaged 16.07% in 2005 and 19.64% in 2004. Notably, the level of non-performing loans given by non-performing loans to total loans decreased during the period 2004 to 2008. The requirement by the Basle II might have enabled commercial banks to control their level of non-performing loans thus reducing banks credit risk.

3.2 Profitability of the Banks

Profitability of the 43 commercial banks that were in operation in 2008 averaged Ksh1027.628 billion, while of the 42 banks in 2007 averaged Ksh818.19 billion as the First Community Bank started its operations in 2008. The operations of the 40 commercial banks that were in operation in 2006, 2005 and 2004 resulted to average profits of Ksh644.3 billion, Ksh465.75 billion and Ksh351.15 billion respectively. Net profits as a proportion of total assets for the banks averaged 0.0225 (2.25%) in 2008, 0.02434 (2.434%) in 2007, 0.02444 (2.444%) in 2006, 0.0182 (1.82%) in 2005 and 0.0132 (1.32%) in 2004. Thus on average the profits of the banking industry increased during the period 2004 to 2008 from 1.32% to 2.4%. Notably Gulf Africa Bank started its operations in 2007 while Family Bank converted to a commercial bank in 2007. The average figures for each year take into account the number of institutions that were in operation in each of the years.

3.3 Profitability, Level of Credit and Non-performing Loans

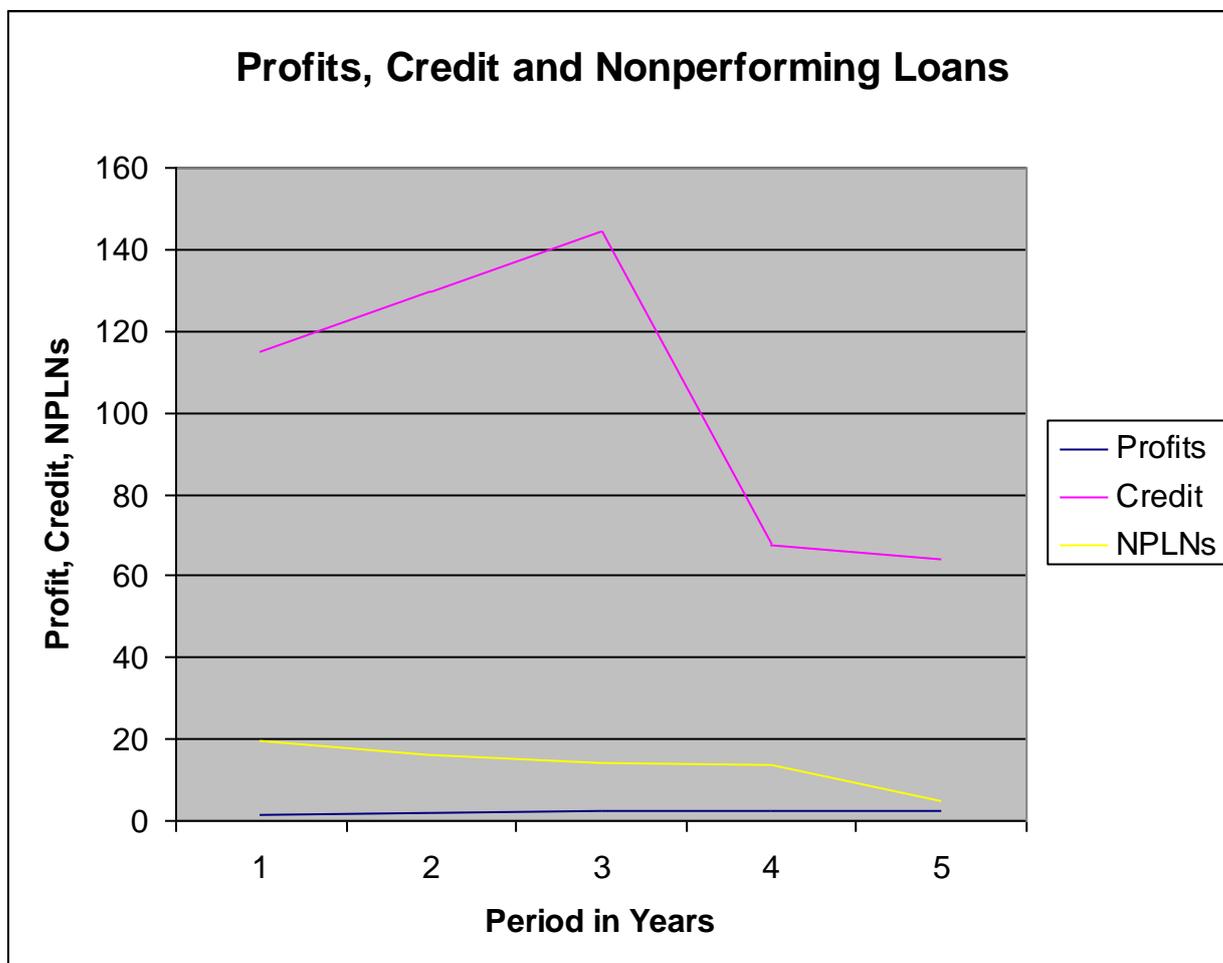
Table 3: Average Assets, Average Amount of Credit, Average Non-performing Loans and Average Profits for the Banks

Average for All Banks	2008	2007	2006	2005	2004
Amount of Credit/Total Assets	0.64	0.674	1.442	1.297	1.15
Non-performing loans/Total Loans	0.0508	0.135	0.143	0.1607	0.1964
Profits/Total Assets	0.0225	0.02434	0.02444	0.0182	0.0132

Source: Research Data

From the table above, the level of credit extended decreased during the period and so did the level of non-performing loans. However profitability of the commercial banks fluctuated during the period but on average increased during the period 2004 to 2008.

3.4 The Relationship between Profits, Amount of Credit and Non-performing Loans



Source: Research Data

The figure above indicates that profits of the banks were generally low during the period 2004 to 2008 while the level of non-performing loans decreased. The amount of credit extended to customers was relatively high but assumed a downward trend during the period. Whereas the level of credit and profits were relatively low and stable, the amount of credit was high and relatively volatile.

3.5 The Regression Model

3.5.1 Profits, Credit and Non-performing Loans

The regression equation was of the form $Y = a + b_1X_1 + b_2X_2$

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	NPLNs, credit(a)	.	Enter

a. All requested variables entered.

b. Dependent Variable: Profits

The independent variable was the level of profits while the independent variables were the level of non-performing loans and the amount of credit.

Coefficients (a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.676	.831		3.219	.084
	credit	.003	.009	.192	.266	.815
	NPLNs	-.065	.064	-.727	-1.009	.419

a. Dependent Variable: Profits

Source: Research Data

The regression model arising from the above data is of the form;

$$Y = 2.676 + 0.003X_1 - 0.065X_2$$

The model indicates that profits that are not dependent on the amount of credit and non-performing loans amount to Ks2.676billion. Thus even if no credit is extended commercial banks will still make some profits. The coefficient of credit extended is 0.003 indicating that the amount of credit extended

contributes positively to profits but marginally. Additionally, as the level of non-performing loans increase, profits decrease. There is therefore a positive relationship between the amount of credit extended and the amount of profits while there is a negative relationship between the level of non-performing loans and profits. The t-test indicates that the profits that do not depend on credit and non-performing loans are significant. The test of significance indicates that the coefficient of 0.003 in the case of credit and the coefficient of -0.65 in the case of non-performing loans are not significant or are due to chance. This means that there is no association between profits, amount of credit and the level of non-performing loans. Ordinarily, commercial banks should focus on other factors other than the non-performing loans if their objectives are to predict profits.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.622(a)	.387	-.226	.53078

a. Predictors: (Constant), NPLNs, credit

Source: Research Data

The R-Square indicates that only 38.7% of the profits are explained by amount of credit and the level of non-performing loans. The adjusted R-Square of -.226 however indicates that amount of credit and non-performing loans do not explain the level of profits made by commercial banks. This means that there is no relationship between the amount of credit, non-performing loans and the amount of profits.

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.356	2	.178	.631	.613(a)
	Residual	.563	2	.282		

Total	.919	4			
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a. Predictors: (Constant), NPLNs, credit

b. Dependent Variable: profits

Source: Research Data

ANOVA $F_{2,2}$ statistic of 0.631 is significant with a P-value > 0.05 . The model does not establish a relationship between profits, amount of credit and the level of non-performing loans.

3.5.2 Amount of Credit and Non-Performing Loans

A regression was run to establish whether there was any relationship between amount of credit and the level of non-performing loans of commercial banks.

Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	CR(a)	.	Enter

a. All requested variables entered.

b. Dependent Variable: NPLS

The dependent variable was the level of non-performing loans while the amount of credit was the independent variable.

Coefficients (a)

Model		Unstandardized Coefficients	Standardized Coefficients	t	Sig.

		B	Std. Error	Beta		
1	(Constant)	.039	.071		.550	.620
	CR	.094	.065	.640	1.442	.245

a. Dependent Variable: NPLS

The regression model established was of the form;

$$Y = 0.039 + 0.094X$$

This reveals that even when no credit is extended by, the level of non-performing loans would be Ksh0.039 billion, an indication that commercial banks in Kenya incur other credit other than on non-performing loans. The coefficient of 0.094 indicates that an increase in the amount of credit leads to an increase in the level of non-performing loans. Therefore there is a positive relationship between the amount of credit extended by commercial banks and the level of non-performing loans.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.640(a)	.409	.212	.04771

a. Predictors: (Constant), CR

The r^2 value of 40.9% indicates that there is a weak relationship between the amount of credit and the level of non-performing loans.

ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.005	1	.005	2.078	.245(a)
	Residual	.007	3	.002		
	Total	.012	4			

a. Predictors: (Constant), CR

b. Dependent Variable: NPLS

The ANOVA $F_{1,3}$ statistic of 2.078 is significant with a P-value > 0.05 . The model reveals that there is no relationship between the amount of credit and the level of non-performing loans of commercial banks in Kenya.

4.0 SUMMARY OF FINDINGS AND CONCLUSIONS

The findings reveal that the level of credit was high in the early years of the implementation of Basle II but decreased significantly in 2007 and 2008, probably when the Basle II was implemented by commercial banks.

Notably, the level of non-performing loans given by non-performing loans to total loans decreased during the period 2004 to 2008. The requirement by the Basle II might have enabled commercial banks to control their level of non-performing loans thus reducing banks credit risk.

Thus on average the profits of the banking industry increased during the period 2004 to 2008.

However, profitability of the commercial banks fluctuated during the period; conversely on average increased marginally during the period 2004 to 2008. The profits were generally low during the period of study. The amount of credit extended to customers was relatively high but assumed a downward trend during the period. Whereas the level of credit and profits were relatively low and stable, the amount of credit was high and relatively volatile.

The regression results indicate that there is no relationship between profits, amount of credit and the level of non-performing loans.

The R-Square indicates that only 38.7% of the profits are explained by amount of credit and the level of non-performing loans. The adjusted R-Square of -0.226 however indicates that amount of credit and non-performing loans do not explain the level of profits made by commercial banks. This means that there is no relationship between the amount of credit, non-performing loans and the amount of profits. ANOVA $F_{2,2}$ statistic of 0.631 is significant with a P-value > 0.05 . The model does not establish a relationship between profits, amount of credit and the level of non-performing loans.

Further analysis undertaken to establish whether there was any relationship between the amount of credit and the level of non-performing loans established that even when no credit was extended by commercial banks, the level of non-performing loans would be at the level of Ksh0.039 billion, an indication that commercial banks in Kenya incur other credit other than on non-performing loans. The coefficient of 0.094 indicates that an increase in the amount of credit leads to an increase in the level of non-performing loans. Therefore there is a positive relationship between the amount of credit extended by commercial banks and the level of non-performing loans. The r^2 value of 40.9% indicates that there is a weak relationship between the amount of credit and the level of non-performing loans. The ANOVA $F_{1,3}$ statistic of 2.078 is significant revealing that there is no relationship between the amount of credit and the level of non-performing loans of commercial banks in Kenya.

The findings reveal that the bulk of the profits of commercial banks is not influenced by the amount of credit and non-performing loans suggesting that other variables other than credit and non-performing loans impact on profits. Commercial banks that are keen on making high profits should concentrate on other factors, other than focusing more on amount of credit and non-performing loans. The implication is that an institution specializing in the collection of non-performing loans which could save the banking institutions the cost of collecting non-performing loans

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**CHARACTERISTICS OF SAVERS AND SAVING TYPE ON RURAL HOUSEHOLD
SAVING BEHAVIOUR**

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ABSTRACT

Savings can be referred to as part of disposable income that people can put aside after meeting their basic living expenses. The savings rate in Uganda of 4.8% of Gross Domestic Product is one of the lowest in the world compared to the African average of 17%. Most households' savings in Uganda are in kind and according to World Bank guidance estimates Uganda's non-monetised economy is about 30%. This study carried out an in-depth analysis of the saving behaviour of such households in relation to their saver's characteristics and type.

The study examined the significant characteristics of savers and saving type of rural households, and their effect on the saving behaviour of rural households. Findings indicate that the significant characteristics of saving type are liquidity, proximity, and safety as they showed moderate presence within rural households. Characteristics of savers are income level, education level, intergenerational links, and religious beliefs as they showed a positive moderate presence within rural households.

Characteristics of saving type and savers are determinants of saving behaviour among the rural households.

There is need to channel savings into the formal financial sector through provision of safe financial facilities within the rural communities.

**Key words: Saving behaviour, Characteristics of Saving type and Savers, Rural
Households, Uganda**

Background to the study

Savings can be referred to as whatever people can put aside after meeting their basic living expenses. The importance of savings as a catalyst in economic development of less developed countries is widely recognised by development economists e.g. McKinnon 1973, Shaw 1973. It's increasingly important to put greater emphasis on domestic savings and or resource mobilisation if a desired level of economic development is to be achieved (Miracle & Cohen, 1980). Savings as an alternative to consumption consists of a voluntary aspect subject to the economic actor's decision and an involuntary aspect subject to external factors. Although attention has been focused on income as a determinant of savings behaviour, it is believed that the low-income households do actually possess adequate savings potential. The focus on income alone has not provided much information on how to channel consumers' savings capacity (Dadzie, et al, 2003).

In Uganda, despite macroeconomic stabilisation efforts, the domestic savings ratio is still negligible. As a consequence of the low domestic savings effort, Uganda has had to rely to a great extent on foreign savings to help finance domestic investment and growth. The level of private savings in an economy depends on the saving behaviour of individuals, which in turn depends on factors that are explained by the long established theories on savings and demand for money. The theory for savings regards supply side factors as being most important in determining the level of savings (Ddumba, 1998). The theory establishes the ability and capacity of individuals to save, and includes the level of income both absolute and relative, the amount of wealth of an individual and the age of the saver. Whereas the theory for demand for money on the other hand regards demand side factors as being most important in influencing the savings behaviour of individuals. The theory identifies the issues that attract or entice individuals to save in an institution. These include availability and nearness of Savings Service Delivery Point (SDP), Rate of return and liquidity of the savings products. The World Bank guidance estimates Uganda's non-monetised economy to about 30 % of GDP yet Uganda is predominantly an agricultural country with up to 80% of her population living in rural areas with 95% of all rural households' incomes accruing largely from surpluses of their harvest.

Statement of the problem

According to the minister of Finance, Planning & Economic Development, the people of Uganda have known from time in memorial the importance of dividing their resources so as to provide not only for today but also for tomorrow...(Daily Monitor 18/6/2005.p14).

The savings rate in Uganda of 4.8% of Gross Domestic Product (GDP), (Bank of Uganda, 2002), is one of the lowest in the world compared to the African average of 17%. According to Ddumba, (1998), the level of private savings in an economy depends on the saving behaviour of individuals. This saving behaviour could be attributed to different factors including the characteristics of savers and saving type perceived by such households.

Therefore, this study carried out an in-depth analysis of the saving behaviour of such households in relation to their saver's characteristics and type by establishing whether saver's characteristics and type have a significant effect on the savings behaviour of rural households.

Objectives of the study

The study sought to achieve the following objectives;

1. To examine the significant characteristics of savers of rural households

2. To examine the significant characteristics of saving type of rural households.
3. To establish the effect of the characteristics of savers and saving type on the saving behaviour of rural households.

Research hypotheses

1. There are no significant characteristics of rural households' savers
2. There are no significant characteristics of saving type rural households
3. The characteristics of savers and saving type have no significant effect on the behaviour of rural households.

Scope of the study

The study covered 376 households as per UBOS, 2002 National Census results within Bungokho County in Mbale District which has a population of 16340 households. Snapshots data from 376 households was collected in 2005. The study examined the characteristics of savers, characteristics of saving type and their effect on the saving behaviour of households.

Significance of the study

The study would create knowledge about the different ways in which rural households in Uganda carry out their savings activities. It also exposes government to potential resources that can be mobilised domestically for development rather than over depending on external financing.

Literature Review

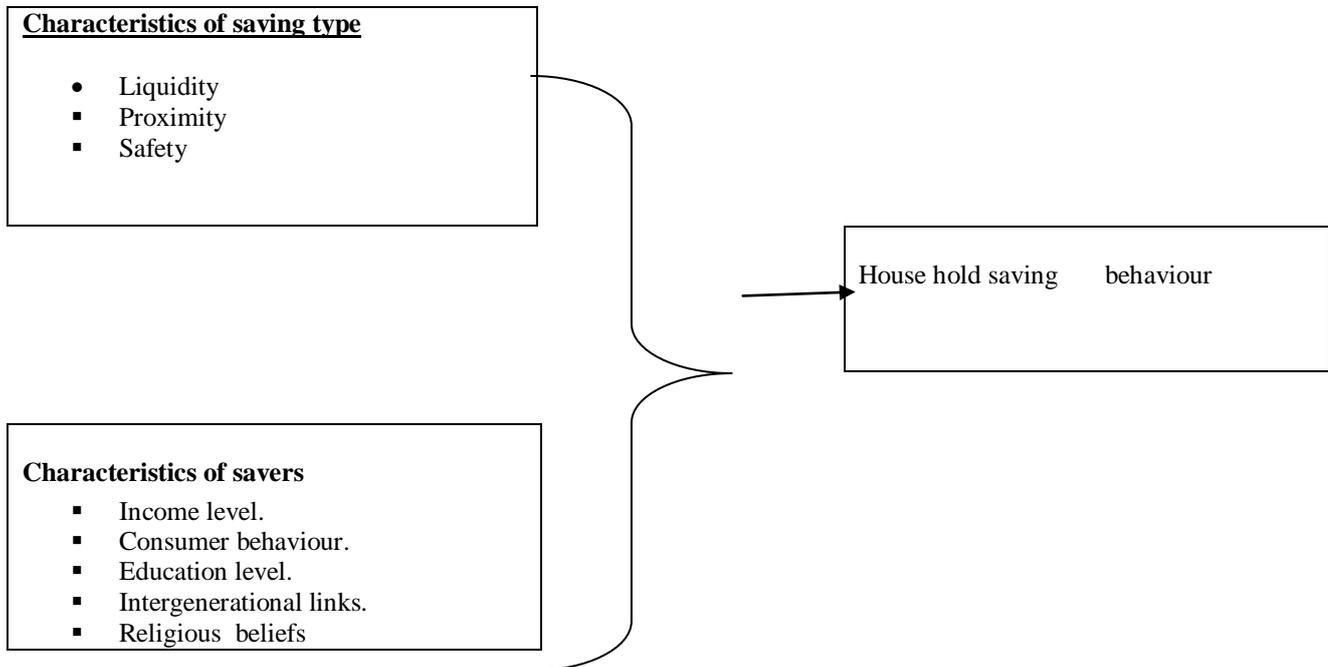
Conceptual framework

Savings can be referred to as whatever people can put aside after meeting their basic living expenses. Abstaining/deferring consumption is one way of saving. The saving behaviour of households largely depends on the characteristics of saving type and the characteristics of savers. It's a theoretical concept that when these factors are varied the saving behaviour will be varied as well. This conceptual framework was developed basing on the works of Ddumba, (1998), Dadzie (2003), Mashigo (2004) and Dauner, (2004:4)

Figure 1: Conceptual framework

Independent variables

Dependent variable



Savings decisions among low-income rural households

An important characteristic of the environment of the poor is risk and uncertainty to cover and protect themselves against calamities, illness, drought, loss of income etc; they take protection in insurance mechanisms that help them spread their financial risk (Bouman, 1994). Available evidence shows that the saving behaviour among the poor varies from country to country and even from culture to culture. But certain aspects of this behaviour are universal. They have the desire to turn small savings into large amounts and they will hence use whatever service available to them to achieve this objective (Aryeetey et al., 1991, Rutherford, 1998).

Rural households will save in a financial form if appropriate institutions and savings products are available (Robinson, 1994). When there is no financial institution available nearby, poor households tend to save in non financial forms such as a livestock but if they were given assurance that their savings would be securely held, maintain value and remain fairly liquid in a convenient location, they would prefer to save in a financial form as some of the most successful programs have shown (Rhyne & Otere, 1994).

The safety of savings is of paramount importance because of daily temptations of attractive consumption alternatives; the ever present possibility of theft, fire or other calamities and above all the potential demands from relatives who may discover that wealth has been accumulating at an individual's home.

Robinson and Vogel (2000) suggest three features about savings products which respond to specific needs of rural households and which are likely to influence their savings behaviour. These include convenience of location, positive real return, and liquidity.

Similar studies carried out in Bangladesh and Tanzania suggest that rural households do desire to save and what they need is a reasonable mechanism to enable them save and the assurance that they can access those savings when need arises (Wright, 2000). The Tanzanian study observes that most households are dissatisfied with modes of saving that are outside formal institutions. The study concludes that given an option most rural households would save in formal institutions but emphasises that such institutions would have to be accessible, and offer their clients a good combination of liquidity, convenience, safety and a fair rate of return (Musinga et al., 1997).

According to a study by Obwana and Ssentamu (1998), three factors were found to be determinants of the saving behaviour of households in Uganda these are, household disposable income and expenditure, socio-cultural and economic factors like the family obligation to educate children, the opportunity to save and returns on savings. This contradicts Rural SPEED (2000) and other studies pointed out earlier that access and security are the most important priorities for rural savers.

Theories of households saving behaviour

According to Mauri (1983), governments in many African countries neglected personal savings in the 1960s. In the wake of the "vicious circle" model (Nurske, 1953), aid programs were considered the only tool for fighting underdevelopment for more than three decades (Adams, Graham and Von Pischke, 1984)

The awareness that poor people are potential savers, resulting from studies of micro finance activities, is a leading paradigm in development issues (Adams, Vogel, 1997)

The role of financial markets in mobilising savings and in channelling funds into productive investments is central to a successful strategy for economic and human development (Musinguzi, 2000). However, it is noted that, LDCs a standstill in structural changes and easy access to development aid tend to discourage private savings mobilisation.

In the studies of saving, formal financial institutions frequently ask the question of how poor households save since they are the potential deposit receivers (Dauner, 2004:4). Poor households save in various forms, for reasons and purposes specific to their needs and entrust their monetary savings to different persons or places (neighbours, financial institutions, under mattresses).

Wright (2001:2) mentions that many emergencies or opportunities necessitate instant access to cash, and these explain why almost all low-income and poor families keep some amount of emergency savings in the home.

The theories discussed in this section attempt to explain how individuals save from their income. Commentary on the relevance of Keynesian's view for the present discussion is also provided at the beginning of this section. According to the literature, there are two major theoretical hypotheses explaining household saving behaviour, namely the permanent income and the life-cycle hypotheses. Keynes explained that income was the most systematic determinant of individual (household) saving behaviour. Individuals with low income cannot save. That is why the Keynesian savings function in its most common form is linear with a constant marginal propensity to save (MPS).

Therefore: $S = \alpha_0 + \alpha_1 YP$ (1)

Where:

S = gross domestic saving

YP = gross national product and

α_1 = Constant marginal propensity to save.

It is assumed that $\alpha_0 < 0$, and $0 < \alpha_1 < 1$, so that as the level of income rises, the average propensity to save will also increase (Mikesell and Zinser; 2001:3).

Permanent-income Hypothesis

Following on this innovative work by Keynes, Friedman (1957) postulated the Permanent –Income Hypothesis (PIH). This theory differentiates between permanent and transitory components of income as determinants of households saving behaviour.

The permanent –Income Hypothesis provided the first major breakthrough in the literature on household saving behaviour and received empirical support. According to Kelley and Williamson (1968), the marginal and average propensity to save tends to rise with a positive interaction between

wealth and income .Gupta (1970) found that marginal propensity to save is an increasing function of income at lower levels of development.

Based on Friedman’s version Campbell (1987) redefines disposable income as the total of earnings and asset income, and shows that saving is the difference between the disposable income and consumption. For Carroll and Summers (1991:300) “if income growth is anticipated, saving should be negative, so that the PIH is consistent with household savings (eg.Thailand, Japan, Korea, Hong Kong and Taiwan) only if the residents of those countries continue to be surprised by the growth of their incomes.

In its most simple form the linear equation is:

$$S_t = \alpha_0 + \alpha_1 Y_{Pt} + \alpha_2 Y_{Tt} \dots \dots \dots (2)$$

Where:

S_t = gross domestic saving in year t

α_1 = Constant marginal propensity to save

Y_{Pt} = Permanent income and

Y_{Tt} = transitory income in year t.

Equation (2) is the simplest specification of permanent income hypothesis. Friedman explained that at α_1 , the individual consumes nearly transitory income where marginal propensity to save on this transitory income will be unity ($MPS_t = 1$). The size of marginal propensities to save out of the permanent and transitory income as well as the effect of initial wealth on savings is relevant for empirical testing of the PIH. Nevertheless, changes in transitory income cannot generally be anticipated because it’s a result of occurrences such as an inheritance (Rousseas, 1972:173)

According to Modigliani (1986:299), a major limitation was that systematic variation in income and needs (i.e. maturing and retirement and or changes in family size), which occurred over the life-cycle of a household, was not specified.

Life-cycle Hypothesis

The life-cycle theory of savings behaviour was first formalised by Franco Modigliani and Richard Brumberg (1954) and Albert Ando and Modigliani in (1963). In its original formulation, the Life-cycle Hypothesis (LCH) presented a theory of saving behaviour focussing on the individual. The LCH analysed the saving behaviour of individuals who spread their lifetime consumption over their lives by accumulating savings during earning years and maintaining consumption levels during retirement .this theory assumes.

- That there are opportunities, in which income is constant until retirement and zero with zero interest rates, rates thereafter, with zero interest rates.
- Tastes and preferences to be constant over life, with no bequests(no children)

Later on Modigliani expanded the perspective of the hypothesis in a number of articles. As said previously this model has the basic assumption that most individuals are not prejudiced but rather take their expected lifetimes into account when deciding how much out of current income to save and how much to spend (Modigliani, 1986:303). According to him, most evidence on age –saving and or age –wealth profiles is based on the concept of disposable income that does not take into account the role of compulsory savings through pension schemes,

The life-cycle predicts that, in any given population, young people will save too little (because individuals initially earn relatively little and borrow to fulfil their high consumption needs) Middle aged people with high earnings tend to save the most .The elderly tend to have low or even negative savings rate (because once an individual reaches the retirement age, income drops to the level below consumption and dissaving occurs).In other cases, the individual must dissave in order to maintain his consumption close to his needs, until death (Modigliani 1986).

CHARACTERISTICS OF SAVING TYPE

Whether savings are made in real assets or in monetary form depends primarily on the degree of monetisation in the economy. The monetary form of holding wealth or capital formation, which a household chooses, depends on the return, risk, convenience and flexibility or liquidity of the alternative investment.Dumba, 1998, argues that poor households prefer physical assets to monetary savings. The savings mode people opt for and the savings behaviour that they display in particular are influenced by a number of factors among which the following:

Proximity

The nearness of a service delivery point (SDP) is one of the most important factors that affect the savings decisions of the rural savers.Ddumba, (1998) concurs that saving for instance in a financial institution is a function of ability, willingness and opportunity to save. Even where the ability and willingness to save are present, opportunity in the form of the nearness of an SDP may be absent and this remains the challenge of rural financial institutions (Temu, 1994).

The impact of nearness of SDPs on the saving behaviour of rural households was confirmed by a study in Ghana, which showed that almost 93% of the total deposits in the rural banks studied were made by individuals within easy walking distance of those banks (Aryeetey, 1991). Like other studies, this study observed that in rural areas the direct and indirect costs of travel have a higher impact on behaviour than they do in an urban setting.

The BRI Unit System in Indonesia is a good demonstration of the effect of the nearness of an SDP on the saving behaviour of rural households. The system offers a network of branch banks and service posts reaching villages throughout Indonesia. It uses village service posts, comprising two person teams, to extend services to villages that do not have sufficient transactions to justify the opening of a fully-fledged bank branch. A post collects savings deposits and loan repayments, and receives loan applications but does not make loans. At its peak, the Unit Desa system covered about one third of all the villages in Indonesia (Boomgard and Angell, 1994).

The experience of the BRI Unit Desa System confirms the popular view that the nearer an SDP is to rural savers the higher will be the number of rural savers making use of the savings service. However, it is not possible to tell from the analysis by Boomgard et al., to what extent variations in the level of

nearness can affect the usage of an SDP. In the Ugandan context therefore, the question remains as to whether a village (LC 1) network of SDPs can be more effective than a parish level (LC 11) in mobilising rural savings.

A study carried out in Ghana about the impact of nearness of SDPs on the saving behaviour of rural savers found out that almost 93% of the total deposits in the rural banks studied were made by individuals living within easy walking distance of those banks (Aryeetey, 1991). This study like many others, observed that in rural areas the direct and indirect costs of travel have a bigger impact on saving behaviour than they do in an urban setting. A similar study by Aryeetey et al., 1994, in Ghana, found out that rural savers were willing to pay a fee to save with deposit collectors, simply because this fee was much less than the transaction costs of saving directly in formal financial institutions. In Kenya, a K-Rep study found that most Kenyan savers prefer to save in an SDP located within a radius of one kilometre from their premises (K-Rep, 1996:10). The Tanzanian study, came to the conclusion that availability of a savings facility close by would be the most significant reason for rural households to change from their current mode of saving (cash and other non-bank forms of saving) to saving in financial institutions (Musinga et al., 1997). It found out that 96% of rural households save part of their income, and that 83% of their savings are placed in cash and other non-bank forms.

A study about the use and impact of savings services in Kenya, found that although Financial Services Associations (FSAs) had penetrated to some remote locations in rural areas, their services were not attracting the rural poor (Mugwanga, 1999). This finding contradicts the expectation that the nearer the SDP, the more would be the number of rural savers seeking to use its services. The failure by FSAs to attract rural savers in their neighbourhood thus throws this long accepted theory into question. A similar study in Uganda, found that there is no demand among rural households for savings services in formal banks because their SDPs are located too far away (Mutesasira et al., 1999). However the study never established what would be optimal distance. Another study in Moyo and Adjumani came up with similar findings. Almost all respondents covered indicated that they did not save in the bank because it's too far away (ACDI/VOCA, 1999) unfortunately, this study also failed to quantify the issue of distance and consequently the question of "how near is near enough?" remains unanswered.

Liquidity

The measured incidence of liquidity constraints was found to be substantially greater in developing countries (Rossi: 1988). Households in these countries often have a limited access to credit markets and credit is mostly rationed.

The amount of savings in the hands of rural households in Uganda is substantial, and the rural people do desire to save within the formal sector. One of the most important factors which affect the saving actions of such households is the type of saving products available to them. One of such important factors is the liquidity of the product i.e. how often can the savings be accessed after the account is opened and money deposited. Wright, 2000, observes from experiments with open access and compulsory locked in savings systems by Bangladesh micro finance institutions that most rural savers prefer open access (highly liquid) savings products to the illiquid locked in savings products. Open access products do not limit the number of times a saver carries out transactions on their accounts in a period. The experience of ASA a leading MFI in Bangladesh confirms this view that there was a clear preference for voluntary open access savings products among rural households (Christen et al, 2000).

Studies from East Africa paint a different picture. Contrary to the view held by Robinson and other authors that the liquid type of savings products is the most demanded by rural households' savers, the East African studies showed that there are equally many rural savers who demand illiquid savings products. One study by Wright (1999) observed that due to the varying nature of their needs, rural savers in East Africa demand different savings products simultaneously and prefer to target each need with a specific product.

However, according to another study by Mutesasira et al., 1999, most rural Ugandan households' savers seem to dislike the illiquid savings products and instead prefer highly liquid ones but also found evidence of growing demand for more illiquid products. Neither of these studies quantified the preferences for different products and it's therefore not possible to draw a clear 'map' of rural savers' demand for savings products nor to draw specific conclusions about their preferences among different types of savings products.

Safety

The safety of savings is of paramount importance because of daily temptations of attractive consumption alternatives; the ever present possibility of theft, fire or other calamities, and above all the potential demands from prying relatives who may discover that wealth has been accumulating at an individual's home.

CHARACTERISTICS OF SAVERS

Savings as an alternative to consumption consists of a voluntary aspect subject to the economic actor's decision and an involuntary aspect subject to external factors. Most low-income rural households are suspicious about the government's motives and interference in their lives and there has to be strategies and methods in place to change attitudes and beliefs towards savings

Income level

Empirical research recently underlines the fact that saving ratios are low where income is low or near to subsistence levels. In developing countries however, saving ratios differ partly because of the per capita income level. The magnitude of this effect is likely to decline as per capita income increases (Carroll and Weil, 1994). Therefore, the very low per capita incomes render it almost impossible for households in developing economies to save. Kraay (2000) finds that the savings ratios and levels of income per capita exhibit a modest positive correlation. He claims that average saving ratios rise as household income increases beyond the base minimum required for survival. For Chakravarthy and Patnaik (1970) consumption, savings and investment patterns may be related to income in at least two ways; firstly through the level of income and secondly through the trends of income change.

Deaton (1989) explains that household income in developing countries is uncertain and cyclical, making longer-term estimation difficult. He also suggests that saving behaviour of individuals may be directed by rules of thumb, and emphasized that short term increases and or decreases in income are the primarily causes of saving/dissaving. For Caballero (1990) the uncertainty of expected income would enhance the precautionary motive for saving in a stable macroeconomic environment.

Although attention has been focused on income as a main determinant of savings behaviour, it is believed that the low-income households do in fact possess adequate savings potential. The focus on income alone has not provided much information on how to channel consumers' savings capacity. The effect of income on savings will be moderated by an individual's attachment to social beliefs. Individuals who believe that financial institutions are incompatible with their savings norms are less likely to save with them. Dadzie et al., (2003) refers to such savings beliefs as prevailing savings norms, practices and attitudes as they pertain to rural consumers' traditional means of meeting their savings and investment needs.

Heikkila et al. (2009) found that individual-level social capital, which included a trust component, was found to have a positive and more pronounced effect in access to credit from financial institutions for poorer people.

Intergenerational links

Intergenerational links were found to be a significant determinant of saving behaviour in developing countries, where these links are particularly strong due to the large size of families. Gersovitz (1988) found that extended family links might lengthen the effective planning horizon over which households make saving decisions. Deaton (1989) agreed that households in developing economies are larger than in industrialised economies and more likely to consist of several generations. As a result there is less to save for retirement or for intergenerational transfers. Furthermore, Oberta (2006), in analysing the role of children and family size on household saving, stresses the negative and regressive effects that additional children have on both the saving ratios and levels of households saving.

In addition, in rural societies, the number of dependent children is also a good indicator of households' savings because a large number of children is a rational adaptation to the lack of social security for the elderly and high infant mortality. Thus households with a large number of children will have less to save because of high households expenses associated with children

Education level

The level of formal education attained by households' heads in rural areas is another variable that is likely to have an impact on the savings behaviour displayed by such households. The majority of them are illiterate and often intimidated by reading and writing skills required to interact with banks. In contrast the use of savings associations and keeping cash at home does not entail such risks.

The concentration of banks is biased in favour of urban areas. Among the reasons for this, is the fact that the established banks erroneously underrate the volume of savings seeking to be mobilised and channelled into productive investment in the informal or rural areas. It's often argued that since the rural economy operates a near subsistence level, there is very little that can be squeezed out of their income and consumption. Because of this perception, it has not been realised that large volumes of idle funds, though in small units per household exist in rural areas.

These instances of market failure and information asymmetry often distort the decision of individuals to save (Black et al., 2005:21)

Boring (2010), found that if the respondent had completed tertiary level of education or higher, they were more likely to save, similarly, higher levels of wealth and literacy were positively associated with active savings.

Cultural beliefs

In poor developing countries such as in Sub-Saharan Africa, Uganda inclusive, religious and cultural aspects are important in the decision to save. Granato et al., (1996:108) define culture as a “a system of basic common values that help shape the behaviour of the people in a given society”. Thomson (2001) defines culture as; “the total complex pattern of customary human behaviour, social forms and material traits embodied in thought, speech, action and artefacts, and dependant on human capacity for learning and transmitting knowledge and systems of abstract thought. This will include beliefs, morals, laws, customs, opinions, religion, and art”. For Ingham (2000), culture is “...best appreciated as a learned behaviour passed from one generation to another not as some exogenously determined endowment which facilitates or constrains development. Moreover, culture influences the environment through different channels, the main one being trust (Frederking 2001).

In addition to the above, age is another critical demographic variable that predicts the willingness to save. Its expected, from one perspective for older rural consumers to be more willing to save towards retirement and from the other perspective, they are less willing to save with financial institutions (banks) because they likely to be illiterate and attached to traditional savings institutions.

Savings also has a strong gender implication. A survey by Mashigo M (2004) revealed that most households that are headed by women showed a high degree of savings. Fiebig et al (1998) also found that women were reliable micro finance clients, demonstrating more discipline than men in making regular savings deposits and loan repayments. An adequate supply of savings facilities will therefore supply much needed services to women who represent a large share of the poorest segments of the population and often pursue independent economic activities and as it is widely recognised that funds managed by women have a greater effect on the welfare of the whole family.

Consumer Behaviour

Saving and consumption are mirror images, which mean that anything that increases consumption will reduce savings. If for example households increase their consumption expenditure (buy more luxury commodities), this will affect their ability to save. Household decisions on how much to consume and save are analyzed by models focusing on intertemporal optimization. In the absence of borrowing constraint, the first order condition of such models is: the ratio between marginal utilities in any two periods has to be equal to the expected discount rate. Individuals borrow and save as outlined above in order to smooth consumption over time.

Any change in the discount rate will change the opportunity cost of current household consumption. In the absence of market imperfections the level of consumption (and therefore saving) today will change in the future. However market failures are rife in developing economies and as a result the elasticity of substitution is unlikely unity. Poor households who are closer to the poverty line may have less flexibility to substitute consumption between periods. Thus their savings ratio is likely to be rather inelastic relative to that of the richer households.

Methods and Materials

Research design

A cross sectional survey and correlational design were used to establish the effect of characteristics of savers and saving type on saving behaviour of the rural household. Both primary and secondary data was used.

Study population

The study was carried out in Bungokho County in Mbale District with a population of 16340 households. The study was carried out in 3 sub-counties of Busiu, Busoba and Bukiende.

Sample Size and Sampling Procedure

A sample of 376 households was used, determined scientifically by Krejcie and Morgan (1970) table of findings. Proportionate stratified sampling and simple random sampling were used to obtain 376 households from the three sub-counties of Busiu, Busoba and Bukiende.

Table1.The sample size.

Sub-County	Population (Households)	Sample (Households)
Busiu	5,612	129
Bukiende	5,101	117
Busoba	5,627	130
Total	16,340	376

Source: Uganda Population and Housing Census Results (2002)

Measurement of study variables

Dependent variable

The dependent variable is saving behaviour which was measured using the existing literature relating to the study variable.

Independent variable

The independent variables, characteristics of saving type was measured by liquidity, proximity, and safety, while characteristics of savers was measured by age, income, education level, religion, intergenerational links, gender and occupation.

Validity and Reliability of the instruments

Validity

Content Validity Index (CVI) was carried out by giving a set of questionnaires to two experts to rate the relevancy of the instrument. A four (4) point scale of very relevant, relevant, quiet relevant and not relevant was used. The CVI from all the experts was found to be above 0.50 that is to say the instrument measuring the independent variables had their CVI of 0.56 for characteristics of saving type and 0.63 for characteristics of savers and dependent variable saving behaviour had CVI of 0.67.

Reliability

Reliability of the instruments was measured using Cronbach Coefficient Alpha test (α). Alpha values for all scales were above 0.50 ranging from 0.55 to 0.64 as shown in the table below thus representing the accepted standards for research (Nannally, 1978).

Table2. Showing reliability test results

Variables	Cronbach Alpha (α)
Characteristics of saving type	0.64
Liquidity	0.64
Proximity	0.63
Safety	0.65
Characteristics of savers	0.57
Income	0.61
Age	0.52
Religion	0.53
Education	0.54
Intergenerational links	0.63
Occupation	0.61
Gender	0.56
Saving Behaviour	0.55

Source: Primary data

Methods of data analysis

The data was analysed using descriptive and inferential statistics options provided by Statistical Package for Social Scientists (SPSS). Spearman Correlation Coefficient analysis was used to determine the strength and direction of the relationship between independent variables (characteristics of savers and saving type) and the dependent variable (saving behaviour). Binary Logistic regression was used to predict saving behaviour.

Presentation and interpretation of the findings

Forms of saving

The most predominant saving form is MFI (32%) followed by reciprocal lending (17%), deposit collectors (11%), cash at home (11%) and least being Bank Account (1%) as shown in table 3 below.

Table 3: Showing the different saving forms of the households

Form of saving	Frequency	Percent
Bank account (current a/c)	2	0.7
Bank account (savings a/c)	23	8.0
Micro Finance institution	93	32.4
Cash at home e.g. in tins, cupboard mattress etc,	31	10.8
Deposit collectors	32	11.1
Physical assets e.g. cattle,land,jewelry etc	24	8.4
Reciprocal lending	48	16.7
Money guards	26	9.1
No savings	8	2.8
Total	287	100

Source: Primary data

Findings on characteristics of saving type of rural households

The characteristics of saving type were liquidity, proximity, and safety as shown in table 4.2 below.

Table 4: Descriptive statistics of Characteristics of saving type

	N	Mean	Std. Deviation	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Liquidity	287	3.5865	1.11335	-.794	.144	-.314	.287
Proximity	287	3.3837	1.03608	-.624	.144	-.396	.287
Safety	287	2.7855	1.13486	.334	.144	-1.013	.287
Valid N (listwise)	287						

Source: Primary data

Liquidity, proximity, and Safety are fairly normally distributed with skewness and kurtosis statistics lying between -1 and +1 except for kurtosis statistic for Safety which is between -2 and +2. The liquidity mean value is 3.5865 which is above the scale of 3 implying that the rural household are liquid. The proximity mean of 3.3837 which is adequate for the rural households, the service delivery is within the proximity.

Level of liquidity of savings products preferred by rural households

The study established that the majority of rural household savers (85.50%) prefer a relatively illiquid savings product that permits withdrawals at a frequency of once a month or less, with 47.90 % preferring the highly illiquid type, and 37.60 % preferring illiquid type i.e. one that allows for monthly withdrawals. Only 14.50 % of rural savers interviewed expressed preference for savings products accessible for withdrawals at daily or weekly intervals, referred in here as highly liquid and liquid respectively, as shown in the table 4.3 below.

Table 5: Level of Liquidity preferred by rural households savers

Research category	Total
Highly liquid	4.10
Liquid	10.40
Illiquid	37.60
Highly illiquid	47.90

Total	100.0
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Source: Primary data.

These findings concur with observations made by other studies on East Africa, which showed that rural household savers demand relatively illiquid savings product (Wright 1999, Mugwanga, 1999).

The strength of the relationship between the liquidity of savings products and the number of rural households' savers demanding the products was found to be statistically significant at the **0.05** level of confidence. This implies that the number of savers demanding savings services increases with increasing level of illiquidity of the savings products on offer with the highest preference (37.0 %) desiring products accessible for withdrawals on a monthly basis. Regression analysis revealed that 25% of the variation in rural households' savers' preference for savings products can be explained by the liquidity of the products on offer.

Reasons for the choice of preferred level of liquidity

Table 6: Showing reasons for preferred level of liquidity.

Reasons	Frequency	Percent
Lifecycle needs	119	41.5
Emergency needs	93	32.4
Opportunities	62	21.6
Others	13	4.5
Total	287	100

(Chi-square= 13.236, DF=3, Sig=0.000).

The researcher found out that the majority of the research population (73.9 %) were influenced by lifecycle and emergency needs in choosing the type of savings service in which to save (table 4.5 above).It was also discovered that 21.6 % are influenced by expected future opportunities and 4.5 % were influenced by other factors.

Lifecycle needs are those needs that arise from human life cycle events such as birth,marriage,death,home making,widowhood,old age and the desire to leave behind something behind for one's heirs. Emergency needs arise from the possibility of calamities and misfortunes such as landslides, fires,accident,illness,floods,etc.Anticipated future opportunities also require large sums of money, like starting a business, acquiring productive assets, building a permanent house and acquiring life enhancing consumer durables (Rutherford et al.,1999). Rutherford observed that the poor require large sums of money to deal with these needs and opportunities and argues that finding these large sums of money is their main money management problem. Building large sums of money

out of small savings takes a long time and this explains why the preference for more illiquid savings products among rural savers is quite high.

Table 7: Analysis of Liquidity preference by reason for the choice

Product type	Analysis Criterion	Reasons for liquidity preference				Total
		Lifecycle needs	Emergency needs	Opportunities	Others	
Highly liquid (Daily)	Count	2	4	5	1	12
	% within Product	18.7 %	31.3 %	37.5 %	12.5 %	100 %
	% within Reason	1.7 %	4.3 %	8.1 %	7.7 %	4.2 %
Liquid (Weekly)	Count	7	13	8	2	30
	% within Product	24.4 %	43.9 %	26.8 %	4.9 %	100 %
	% Within Reason	5.9 %	14 %	13 %	15.4 %	10.5 %
Illiquid (Monthly)	Count	42	43	22	1	108
	% within Product	38.9 %	40.3 %	19.5 %	1.3 %	100 %
	% Within Reason	35.3 %	46.2 %	35.5 %	7.7 %	37.6 %

Highly illiquid (Quarterly & longer)	Count	67	33	29	8	137
	% Within Product	48.9 %	24.2 %	21.1 %	5.8 %	100 %
	% Within Reason	56.3 %	35.5 %	46.8 %	61.5 %	47.7 %
Total	Count	119	93	62	13	287
	% Within Product	41.5 %	32.4 %	21.6 %	4.5 %	100 %
	% Within Reason	99.2 %	100 %	103.4 %	92.7 %	100 %
		(0.8)		(3.4)	(7.3)	

(Chi-Square= 44.345, Sig=0.000)

Source: Primary data

The study established that of the rural households whose savings decisions are influenced by lifecycle needs, 91.6 % prefer illiquid products, with 56.3 % preferring the highly illiquid type and 35.3 % preferring the illiquid type of monthly withdrawals. The study also found that among the savers whose decisions were driven by emergency needs, the overwhelming majority (81.7 %) also preferred illiquid products with 46.2 % preferring the illiquid type and 35.5 % preferring the highly illiquid type. It was established that majority (82.3 %) of rural savers whose decisions were driven by future opportunities preferred illiquid products with 46.8 % preferring highly illiquid type and 35.5 % preferring the illiquid type. However, despite the driving force, the majority of the rural savers preferred illiquid savings products.

The gender of rural household savers and savings type

Table 8: Analysis of gender on preference of the saving type

Product type	Analysis criterion	Gender of respondent		Total
		Female	Male	
Highly liquid	Count	4	8	12
	% Within product	31.3 %	68.7 %	100 %
	% Within Gender	3.4 %	4.7 %	4.2 %
Liquid	Count	11	19	30
	% Within Product	36.6 %	63.4 %	100 %
	% Within Gender	9.5 %	11.1 %	10.5
Illiquid	Count	38	70	108
	% Within Product	34.9 %	65.1 %	100 %
	% Within Gender	32.8 %	40.9 %	37.6 %
Highly illiquid	Count	63	74	137
	% Within Product	46.3 %	53.7 %	100 %
	% Within Gender	54.3 %	43.3 %	47.7 %
Total	Count	116	171	287
	% Within Product	40.4 %	59.6 %	100 %
	% Within gender	100 %	100 %	100 %

(Chi-Square=76.283, Sig=0.000)

Source: Primary data

The research found out that 87.1 % of the women preferred savings services that permitted withdrawals of at least once a month as compared to 84.2 % for men. The study also found out that 3.4 % of women savers prefer highly liquid savings services and 4.7 % equivalent for men.

The influence of age of rural savers on liquidity preferred.

The study established that preference for savings products which permit withdrawals of once a month or less frequently was 82.7 % and 84.3 % among the age groups of 31 – 40 and 41 – 49 respectively (table 8). Rural savers falling in these age categories accounted for 28.2 % and 37.6 % respectively of all the households surveyed. Preference for the same product among other age group is all above 82 %. This finding suggests that age has no significant influence on the demand for the level of liquidity of a savings product among rural savers.

Table 9: Age of savers and liquidity preference

Liquidity level	Analysis criterion	Age of rural saver				Total
		< 30	31- 40	41 – 50	>50	
Highly liquid	Count	1	4	5	2	12
	% Within product	12.5 %	31.3 %	37.4 %	18.8 %	100 %
Liquid	Count	2	10	12	6	30
	% Within product	4.9 %	33.3 %	41.5 %	20.3 %	100 %
Illiquid	Count	10	26	49	23	108
	% Within Product	9.4 %	24.2 %	45 %	21.4%	100 %
Highly illiquid	Count	5	41	42	49	137
	% Within product	3.6 %	29.9 %	30.7 %	35.8 %	100 %
Total	Count	18	81	108	80	287
	% Within product	6.3 %	28.2 %	37.6 %	27.9 %	100 %

(Chi-square=65.237, Sig=0.000)

Source: primary data

Income of rural savers and liquidity preference

Table 10: Analysis of Influence of income of rural savers on liquidity choice

Product liquidity	Analysis criterion	Income				Total
		Very low	Low	Medium	Upper	
Highly						

liquid(daily)	Count	2	5	5		12
	% within product	16.7 %	41.7 %	41.7 %	-	100 %
	% within income	3.2 %	4.1 %	6.3 %	-	4.2 %
Liquid (weekly)	Count	7	10	12	1	30
	% within product	23.3 %	33.3 %	40 %	3.3 %	100 %
	% within income	11.1 %	8.3 %	15 %	4.3 %	10.5 %
Illiquid (monthly)	Count	30	51	27	-	108
	% within product	27.8 %	47.2 %	25 %	-	100 %
	% within income	47.6 %	42.1 %	33.8 %	-	37.6 %
Highly illiquid (quarterly & longer)	Count	42	63	31	1	137
	% within product	30.7 %	46 %	22.6 %	0.7 %	100 %
	% within income	66.7 %	52.1 %	38.8 %	0.4 %	47.7 %
Total	Count	63	121	80	23	287
	% within product	21.9 %	42.2 %	27.9 %	8.0 %	100 %
	% within income	100 %	100 %	100 %	100 %	100 %

(Chi-Square=54.932, Sig=0.000)

Source: Primary data

Analysis of liquidity preference by households' savers' economic activity

Table 11: Analysis of liquidity preference by households' savers' economic activity

Product Type	Analysis Criterion	Saver's main activity					Total
		Crop farming	Livestock keeping	Trader	Regular employment	Others	
Highly liquid	Count	8	0	1	2	1	12

	% Within Product	62.5 %	0	6.3 %	25.0 %	6.3 %	100 %
Liquid	Count	18	1	6	3	2	30
	% Within Product	61.0 %	2.4 %	19.5 %	9.8 %	7.3 %	100 %
Illiquid	Count	77	2	11	9	9	108
	% Within Product	71.8 %	2.0 %	10.0 %	8.1 %	8.1 %	100 %
Highly illiquid	Count	101	2	14	11	9	137
	% Within Product	73.7 %	1.6 %	10.0 %	7.9 %	6.8 %	100 %
Total	Count	204	5	31	25	21	287
	% Within product	71.2 %	1.8 %	10.9 %	8.8 %	7.3 %	100 %
	% within activity	99.9 %	100 %	103.3 %	100 %	100.1 %	100 %

(Chi-Square=65.23, Sig=0.000)

Source: Primary data

The study established that majority (87.2 %) of the rural households engaged in crop farming preferred savings products that allow withdrawals of a frequency of once a month or less, of these, 49.5 % preferred highly illiquid ones and 37.7 % preferring illiquid products as summarised in table 7 below. However, the researcher did not find any evidence that showed any relationship between economic activity and savings products required by these households as shown in the table above.

Characteristics of rural household savers

The characteristics of savers of rural households are income levels, consumer behaviour, education level, intergenerational links and religious beliefs as shown in table below.

Table 12: Descriptive statistics of Characteristics of rural household Savers

Variable	N	Mean	Std. Deviation	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Income level	287	3.1612	1.13265	-.282	.144	-1.166	.287
Consumer behaviour	287	3.3527	1.17209	-.643	.144	-.666	.287
Education level	287	3.6089	1.17154	-.725	.144	-.452	.287
Intergenerational Links	287	3.5055	1.17185	-.473	.144	-.957	.287
Religious beliefs	287	3.0218	1.23168	.014	.144	-1.039	.287
Valid N (list wise)	287						

Source: Primary Data

The income levels, consumer behaviour, education level, intergenerational links and religious beliefs are fairly normally distributed with skewness and kurtosis statistics between -1 and +1, except kurtosis for income level and religious beliefs.

The mean value of income level is 3.1612 which is moderate, consumer behaviour mean of 3.3527 which is moderate, education level mean of 3.6089 which is above average, intergenerational links mean of 3.5055, average and religious beliefs mean of 3.0218 being moderate.

Findings of rural household saving behaviour

The Overall saving behaviour is moderate for rural households as shown in table below.

Table 13: Descriptive statistics of saving behaviour

Variable	N	Mean	Std. Deviation	Skewness		Kurtosis	
		Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Saving Behaviour	287	2.7791	.76317	.359	.144	.134	.287

Source: Primary data

The saving behaviour is normally distributed with skewness statistic and kurtosis between -1 and +1.

The economic activity of households' savers and choice of savings.

The study established that only 8.7 % of the rural savers made their savings in the bank with 8.0 % having savings accounts and 0.7 % maintaining current accounts. Among these, 52 % of the households reported regular employment as main source of their income as compared to the equivalent 8 % for crop farming.

Also 32.4 % of the households kept their savings with micro finance institutions and out of these, households whose main source of income was crop farming were 74.2 %, 1.1 %, 3.2 %, 14% and 7.5 % for livestock keeping, trader, regular employment and others respectively.

Majority of the rural households surveyed (58.9%) reported keeping their savings either as cash at home, in physical assets, reciprocal lending, deposit collectors, or with money guards. The highest number of these households (78.7 %) was mainly engaged in crop farming compared to 1.2 % who reported their main source of income to be livestock keeping as shown in the table below.

Table 14: Analysis of saving form preference by households' savers' economic activity

Form of saving	Analysis criterion	savers' main economic activity					Total
		Crop farming	Livestock keeping	Trader	Regular employment	Other	
Bank account (current a/c)	Count	0	0	0	2	0	2
	% within form	0 %	0 %	0 %	100 %	0 %	100 %
Bank account (savings a/c)	Count	2	1	5	11	4	23
	% within form	8.7 %	4.3 %	21.7 %	47.8 %	17.4 %	100 %
MFI	Count	69	1	3	13	7	93
	% within form	74.2 %	1.1 %	3.2 %	13.9 %	7.5 %	100 %
Cash at home in tins, mattresses etc	Count	15	0	4	9	3	31
	% within form	48.4 %	0 %	12.9 %	29 %	9.7 %	100 %

Deposit collectors	Count	30	0	1	0	1	32
	% within form	93.8 %	0 %	3.1	0 %	3.1 %	100 %
Physical assets e.g. cattle,land,jewelry etc	Count	13	2	3	4	2	24
	% within form	54.2 %	8.3 %	12.5 %	16.7 %	8.3 %	100 %
Reciprocal lending	Count	41	0	2	4	1	48
	% within form	85.4 %	0 %	4.2 %	8.3 %	2.1 %	100 %
Money guards	Count	26	0	0	0	0	26
	% within form	100 %	0 %	0 %	0 %	0 %	100 %
Others	Count	8	0	0	0	0	8
	% within form	100 %	0 %	0 %	0 %	0 %	100 %
Total		204	4	18	43	18	287
	% within form	71.1 %	1.4 %	6.3 %	15 %	6.3 %	100 %

(Chi-Square=45.432, Sig=0.000)

Source: Primary data

Proximity of service delivery points to rural savers.

Generally, the study established that 95.8 % of the rural households savers surveyed would make use of an SDP if it were located nearer to their home. These findings confirm the observations made by many scholars like Musunga et al,that availability of a saving facility in a near enough location is the biggest factor that would make most rural households change from their current mode of saving (cash and other non-bank forms of saving),to saving in formal financial institutions.

Table 15: Would saver use SDP if it were located nearer to his home?

esponse	Frequency	percent
Yes	275	95.8
No	12	4.2
Total	287	100

(Chi-Square=3.145, df=1, Sig=0.000)

Source: Primary data

This findings imply that the further away an SDP is from rural savers, the fewer they will seek to use its services.

Table16: Preferred proximity of SDP to rural savers

Location of SDP	frequency	percent
within district	2	0.7
within county	42	14.6
within sub-county	228	79.4
within parish	12	4.2
within village	3	1.1
Total	287	100

(Chi-Square=2.25, DF=4, Sig=0.000)

Source: Primary data

This study established that the overwhelming majority (79.4 %) of rural savers would prefer to use an SDP located within their sub county and only 2 % preferred within the district as 1.1 % expressed their preference for SDP to be within the village.

Reasons for choice of proximity

The study found that most of the rural savers are influenced by transport costs, convenience and security considerations in their preferences for proximity, with 49.5 % giving transport costs, 19.5 % and 15 % respectively citing convenience and security considerations as their reasons for the preferred proximity. However in many cases, the savers gave a combination of preferences.

Table 17: Reasons for preferred proximity

Reason	Frequency	percent
Transport	142	49.5
Convenience	56	19.5
Security	43	15.0
Confidentiality	29	10.1

Increased awareness	11	3.8
Others	6	2.1
Total	287	100.0

(Chi-Square=8.233, df=5, Sig=0.000)

Source: Primary data

Transport costs cut across the categories of respondents as a reason for preferring the SDP to be located in the sub-county.

Convenience, which refers to the ease with which the savings transaction can be made was another reason given by many rural savers. In Busiu sub-county, the respondents argued that they have a local market *Kimwanga* every Tuesday where rural households go to sell their produce or buy goods/services needed. They therefore said that they would find it easy if an SDP was located in their sub-county trading centre where they can go and deposit their savings immediately after selling off their produce and also withdraw funds as when need arises.

How rural saver would use the SDP if it were located nearer home.

The majority of rural savers (82.9 %), showed that if the SDP was located nearer to their home, they would use it more by increasing the frequency of deposits, while 39% said would reduce the amount withdrawn each time they make a drawing (Table 4.17) Likewise 2.8 % said they would use it more by increasing the frequency of drawings.

Table 18: Response on how rural savers would increase use of SDP services

	frequency	percent
increase frequency of deposits	238	82.9
reduce amount withdrawn @ drawing	39	13.6
increase frequency of drawings	8	2.8
Others	2	0.7
Total	287	100

(Chi-Square=10.431, DF=3, Sig=0.000)

Source: Primary data

Gender of rural saver and location preference of SDP

The study established that 95.9 % of rural female savers would use an SDP to their satisfaction if it were located within the sub-county or county, with the former corresponding to 79.5 % and the latter 16.4 % (Table 17 below).

The men showed that 93.4 % would use SDP to their satisfaction if it were located either within the sub-county or county, with corresponding percentages of 79.4 % and 14 % respectively. Therefore, the study did not find any significant influence of gender on the preferred location of SDPs by rural savers.

Table 19: gender of rural saver and location preference of SDP

Gender of saver	Analysis criterion	location of SDP					Total
		District	County	Sub-county	parish	village	
Female	Count	-	12	58	1	2	73
	% within Gender	-	16.4 %	79.5 %	1.4 %	2.7 %	100
	% within location	-	28.6 %	25.4 %	8.3 %	66.7 %	25.4%
Male	Count	2	30	170	11	1	214
	% within gender	0.9 %	14 %	79.4 %	5.1 %	0.5 %	100 %
	% within location	100 %	71.4 %	74.6 %	91.7 %	33.3 %	74.6 %
Total	Count	2	42	228	12	3	287
	% within gender	0.7 %	14.6 %	79.4 %	4.2 %	1 %	100 %
	% within location	100 %	100 %	100 %	100 %	100 %	100 %

(Chi-Square=6.431, Sig=0.000)

Source: Primary data

Economic activity of rural saver and nearness of SDP preferred.

The study established that majority of the rural savers engaged in crop farming 85.8 % and 25 % engaged in livestock farming would use an SDP to their satisfaction if it were located within the sub-county.

The study also found that irrespective of the economic activity, the majority of rural savers would use an SDP to their satisfaction if it were located within the sub-county. This is reflected by 58.1 % of rural savers in regular employment, 72.2 % engaged in trading and 77.8 % engaged in other activities that would use an SDP to their satisfaction if it were located within sub-county.

Table 20: Preferred proximity against savers' main economic activity

economic activity	Analysis Criterion	Nearness					Total
		District	County	Sub-county	Parish	Village	
Crop farming	Count	-	23	175	4	2	204
	% within activity	-	11.3 %	85.8 %	2 %	1 %	100 %
	% within nearness	-	54.8 %	76.6 %	33.3 %	66.7 %	71.1 %
Livestock	Count	1	2	1	-	-	4
	% within activity	25 %	50 %	25 %	-	-	100 %
	% within nearness	50 %	4.8 %	0.4 %	-	-	1.4 %
Employment	count	1	12	25	4	1	43
	% within activity	2.3 %	27.9 %	58.1 %	9.3 %	2.3 %	100 %
	% within nearness	50 %	28.6 %	10.9 %	33.3 %	33.3 %	14.9 %
Trader	Count	-	3	13	2	-	18
	% within activity	-	16.7 %	72.2 %	11.1 %	-	100 %
	% within nearness	-	7.1 %	5.7 %	16.7 %	-	6.3 %
Other	Count	-	2	14	2	-	18
	% within activity	-	11.1 %	77.8 %	11.1 %	-	100 %
	% within nearness	-	4.8 %	6.1 %	16.7 %	-	6.3 %
Total	Count	2	42	228	12	3	287
	% within activity	0.7 %	14.6 %	79.4 %	4.2 %	1 %	100 %
	% within nearness	100 %	100 %	100 %	100 %	100 %	100 %

(Chi-Square=45.234, Sig=0.000)

Source: Primary data

Analysis of liquidity preference against choice of location of SDP

The study established that majority of the rural savers (95.4%) who preferred relatively illiquid products would use an SDP to their satisfaction if it were located within the sub-county as shown in table19.below.

Table 21: Analysis of liquidity preference against choice of location of SDP

Nearness	Analysis criterion	Product preferred				Total
		Highly liquid	Liquid	Illiquid	Highly illiquid	
District	Count	-	-	1	1	2
	% within nearness	-	-	50 %	50 %	100 %
County	Count	1	8	1	32	42
	% within nearness	2.4 %	19 %	2.4 %	76.2 %	100 %
Sub-county	Count	6	21	103	98	228
	% within nearness	2.6 %	9.2 %	45.2 %	43 %	100 %
Parish	Count	3	1	3	5	12
	% within nearness	25 %	8.3 %	25 %	41.7 %	100 %
Village	Count	2	-	-	1	3
	% within nearness	66.7 %	-	-	33.3 %	100 %
Total	Count	12	30	108	137	287

	% within nearness	4.2 %	10.5 %	37.6 %	47.7 %	100 %
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(Chi-Square=56.432, Sig=0.000)

Source: Primary data

The study further established that irrespective of the type of product preferred, the majority of rural savers would use an SDP to their satisfaction if it were within the sub-county with 50 % of those who preferred highly liquid products and 70 % for less liquid products.

Form of savings kept and proximity preference.

The study established that 90.3 % of savers who keep their savings at home would use an SDP instead if it were located within the sub-county as per table 20.below.

The study further found that irrespective of the form of savings kept, majority of rural savers would shift to depositing in an SDP if it were located within the sub-county,88.6 % of rural savers who maintain their savings in kind ,would consider monetising them and depositing them with an SDP if it were located within their sub-county. The equivalent ratios for savers who maintain their savings in the bank (savings & current accounts), MFIs, deposit collectors, reciprocal lending, money guards and others were, 62%, 66.6%, 81 %, 85.4%, 88.5 % and 87.5 % respectively.

Table 22: form of savings kept and proximity preference

Form of saving	Analysis criterion	Nearness					Total
		District	county	sub-county	parish	village	
Bank current a/c	Count	1	-	1	-	-	2
	% within nearness	50 %	-	0.4 %	-	-	0.7 %
	% within form	50 %	-	50 %	-	-	100 %
Bank savings a/c	Count	1	5	17	-	-	23
	% within nearness	50 %	11.9%	7.5 %	-	-	8 %
	% within form	4.3 %	21.7%	73.9 %	-	-	100 %

MFI	Count	-	28	62	2	1	93
	% within nearness	-	66.7%	27.2 %	16.7%	33.3%	32.4%
	% within form	-	30.1%	66.6 %	2.2 %	1.1 %	1.1%
Cash(home)	Count	-	1	28	1	1	31
	% within nearness	-	2.4 %	12.3 %	8.3 %	33.3%	10.8%
	% within form	-	3.2 %	90.3 %	3.2 %	3.2 %	100%
Deposit collectors	Count	-	1	17	2	1	21
	% within nearness	-	2.4 %	7.5 %	16.7%	33.3%	7.3%
	% within form	-	4.8 %	81 %	9.5 %	4.8 %	100%
physical assets	Count	-	2	31	1	-	35
	% within nearness	-	4.8 %	13.6 %	8.3 %	-	12.2%
	% within form	-	5.7 %	88.6 %	2.9 %	-	
reciprocal lending	Count	-	2	41	5	-	48
	% within nearness	-	4.8 %	18 %	41.7%	-	16.7%
	% within form	-	4.2 %	85.4 %	10.4%	-	100 %
money guards	Count	-	2	23	1	-	26
	% within nearness	-	4.8 %	10.1 %	8.3 %	-	9.1 %
	% within form	-	7.7 %	88.5 %	3.8 %	-	100 %
Others	Count	-	1	7	-	-	8
	% within nearness	-	2.4 %	3.1 %	-	-	2.8 %
	% within form	-	12.5%	87.5 %	-	-	100 %
Total	Count	2	42	228	12	3	287
	% within nearness	100 %	100 %	100 %	100 %	100 %	100 %

	% within form	0.7 %	14.6%	79.4 %	4.2 %	1 %	100 %

(Chi-Square=65.523, Sig=0.000)

Source: Primary data

Income of savers and preferred proximity of SDP

The study established that 96.8 % of the very low income group rural savers could satisfactorily use an SDP if it were located within their sub-county. The equivalent percentages for rural savers at low, middle and upper income levels were 87.6 %, 73.8 % and 8.7 % respectively. Hence with the exception of the upper level income group, the majority of rural savers within other categories would prefer to use an SDP if it were located within the sub-county. It was also found that majority of rural savers in upper level category (82.6 %) preferred an SDP to be within the county.

Table 23: The income of savers and preferred proximity of SDP

Nearness	Analysis	Income category of rural savers				Total
		Within	Criterion	very low	Low	
District	Count	-	-	-	2	2
	% within nearness	-	-	-	100 %	100 %
	% within income	-	-	-	8.7 %	0.7 %
County	Count	-	5	18	19	42
	% within nearness	-	11.9 %	42.9 %	45.2 %	100 %
	% within income	-	4.1 %	22.5 %	82.6 %	14.6 %
Sub-county	Count	61	106	59	2	228
	% within nearness	26.7 %	46.5 %	25.9 %	0.9 %	100 %
	% within income	96.8 %	87.6 %	73.8 %	8.7 %	79.4 %
Parish	Count	1	9	2	-	12
	% within nearness	8.3 %	75 %	16.7 %	-	100 %
	% within income	1.6 %	7.4 %	2.5 %	-	4.2 %
Village	Count	1	1	1	-	3

	% within nearness	33.3 %	33.3 %	33.3 %	-	100 %
	% within income	1.6 %	0.8 %	1.3 %	-	1 %
Total	Count	63	121	80	23	287
	% within nearness	100 %	100 %	100 %	100 %	100 %
	% within income	22 %	42.1 %	27.9 %	8 %	100 %

(Chi-Square= 45.737, sig=0.000)

Source: primary data

Relationship between characteristics of saving type and saving behaviour

Characteristics of saving type were correlated with the saving behaviour as shown in the table below.

Table 24: Spearman rank Correlation matrix

	1	2	3	4
Liquidity	1.000			
Proximity	.350**	1.000		
Safety	.254**	.036	1.000	
Saving Behaviour	.313**	.152**	.230**	1.000

** . Correlation significant at 0.01 level (2 tailed)

* . Correlation significant at 0.05 level (2 tailed)

Source: primary data

Results from table above indicate significant positive relationship between liquidity and saving behaviour ($r=0.313$, $p<0.01$). This implies that when liquidity increases, the saving behaviour improves.

There was a significant positive relationship between proximity and saving behaviour ($r=0.152$, $p<0.01$). This implies that when proximity improves, then saving behaviour improves.

There was a significant positive relationship between safety and saving behaviour ($r=0.388$, $p<0.01$). This implies that safety enhances on the saving behaviour of rural households.

Characteristics of savers and saving behaviour

The relationship between characteristics of savers and saving behaviour is shown in the correlation matrix table below.

Table 25: Spearman rank correlation matrix for characteristics of savers and saving behaviour

	1	2	3	4	5	6
Income level	1.000					
Consumer behaviour	.465**	1.000				
Education level	.306**	.477**	1.000			
Intergenerational Links	.205**	.468**	.676**	1.000		
Religious beliefs	-.099	.176**	.431**	.388**	1.000	
Saving Behaviour	.266**	.073	.468**	.345**	.284**	1.000

** . Correlation significant at 0.01 level (2 tailed)

* . Correlation significant at 0.05 level (2 tailed)

Source: Primary data

Results in the table above indicate significant positive relationship between characteristics of savers and saving behaviour except for consumer behaviour which is very weak with saving behaviour ($r=0.266, 0.468, 0.345, 0.284, p<0.01$ and $r=0.07, p>0.05$) respectively for income level, education level intergenerational links, religious beliefs and consumer behaviour. When the income levels, education level, intergenerational links, religious beliefs are high then saving behaviour also improves.

Binary Logistic regressions Analysis

The characteristics of saving type and savers significantly and linearly relates to the saving behaviour of the rural households Hosmer and Lemeshow Test (Chi-Square= 9.881, DF= 6, Sig=.436), this implied that the data fitted the model well.

The educational level, safety, consumer behaviour, liquidity, intergenerational links, income level of households that save significantly predicted saving behaviour by 36.5%. Proximity and religious beliefs did not significantly predict saving behaviour ($\text{sig}>0.05$).

Model Summary (-2Log likelihood =432.034; Cox & Snell R Square= .254; Nagelkerke R Square=.365).Higher education levels, safety, good consumer behaviour, liquidity, intergenerational links and income level of households improved the saving behaviour of rural households.

Table 26 : Binary Logistic Model

	B	Wald	Sig	Exp(B)
Liquidity	.189	2.048	.001	3.314
Proximity	.035	.040	.056	1.919
Safety	.198	2.034	.000	5.307
Income level	.143	1.039	.037	2.096
Consumer behaviour	.154	2.037	.000	4.515
Education level	.203	1.045	.000	6.589
Intergenerational Links	.132	1.056	.031	2.169
Religious	.010	1.036	.095	1.677
Constant	.463	2.180	.001	3.427

Source: Primary data

Discussion of the findings

Findings in section 4.7 and 4.8 above are supported by literature below.

An important characteristic of the environment of the poor is risk and uncertainty to cover and protect themselves against calamities, illness, drought, loss of income etc; they take protection in insurance mechanisms that help them spread their financial risk (Bouman, 1994).

Available evidence shows that the saving behaviour among the poor varies from country to country and even from culture to culture. But certain aspects of this behaviour are universal. They have the desire to turn small savings into large amounts and they will hence use whatever service available to them to achieve this objective (Aryeetey et al., 1991, Rutherford, 1998).

Rural households will save in a financial form if appropriate institutions and savings products are available (Robinson, 1994).When there is no financial institution available nearby, poor households tend to save in non financial forms such as a livestock but if they were given assurance that their savings would be securely held, maintain value and remain fairly liquid in a convenient location, they would prefer to save in a financial form as some of the most successful programs have shown (Rhyne & Otere,1994).

Similar studies carried out in Bangladesh and Tanzania suggest that rural households do desire to save and what they need is a reasonable mechanism to enable them save and the assurance that they can access those savings when need arises (Wright, 2000).

Wright (2001) further mentioned that many emergencies or opportunities necessitate instant access to cash and this explains why almost all low-income and poor families keep some amount of emergency savings in the home.

In the studies of saving, formal financial institutions frequently ask the question of how poor households save since they are the potential deposit receivers (Dauner,2004:4).poor households save in various forms, for reasons and purposes specific to their needs and entrust their monetary savings to different persons or places(neighbours, financial institutions, under mattresses.).

Wright (2001:2) mentions that many emergencies or opportunities necessitate instant access to cash, and these explain why almost all low-income and poor families keep some amount of emergency savings in the home.

The life-cycle theory of savings behaviour was first formalised by Franco Modigliani and Richard Brumberg (1954) and Albert Ando and Modigliani in (1963).

In its original formulation, the Life-cycle Hypothesis (LCH) presented a theory of saving behaviour focussing on the individual. The .LCH analysed the saving behaviour of individuals who spread their lifetime consumption over their lives by accumulating savings during earning years and maintaining consumption levels during retirement

Dumba, 1998, argues that poor households prefer physical assets to monetary savings. The savings mode people opt for and the savings behaviour that they display in particular are influenced by a number of factors.

The magnitude of this effect is likely to decline as per capita income increases (Carroll and Weil, 1994).Therefore, the very low per capita incomes render it almost impossible for households in developing economies to save.Kraay (2000) finds that the savings ratios and levels of income per capita exhibit a modest positive correlation .He claims that average saving ratios rise as household income increases beyond the base minimum required for survival. For Chakravarthy and Patnaik (1970) consumption, savings and investment patterns may be related to income in at least two ways; firstly through the level of income and secondly through the trends of income change.

Deaton (1989) explains that household income in developing countries is uncertain and cyclical, making longer-term estimation difficult. He also suggests that saving behaviour of individuals may be directed by rules of thumb, and emphasized that short term increases and or decreases in income are the primarily causes of saving/dissaving. For Caballero (1990) the uncertainty of expected income would enhance the precautionary motive for saving in a stable macroeconomic environment.

Intergenerational links were found to be a significant determinant of saving behaviour in developing countries, where these links are particularly strong due to the large size of families. Gersovitz (1988) found that extended family links might lengthen the effective planning horizon over which households make saving decisions. Deaton (1989) agreed that households in developing economies are larger than in industrialised economies and more likely to consist of several generations. As a result there is less to save for retirement or for intergenerational transfers. Furthermore, Oberta (2006), in analysing the role of children and family size on household saving, stresses the negative and regressive effects that additional children have on both the saving ratios and levels of households saving.

The concentration of banks is biased in favour of urban areas. Among the reasons for this, is the fact that the established banks erroneously underrate the volume of savings seeking to be mobilised and channelled into productive investment in the informal or rural areas. It's often argued that since the rural economy operates a near subsistence level, there is very little that can be squeezed out of their income and consumption. Because of this perception, it has not been realised that large volumes of idle funds, though in small units per household exist in rural areas.

These instances of market failure and information asymmetry often distort the decision of individuals to save (Black et al., 2005:21)

In poor developing countries such as in Sub-Saharan Africa, Uganda inclusive, religious and cultural aspects are important in the decision to save. Granato et al., (1996:108) define culture as a "a system of basic common values that help shape the behaviour of the people in a given society". Thomson (2001) defines culture as; "the total complex pattern of customary human behaviour, social forms and material traits embodied in thought, speech, action and artefacts, and dependant on human capacity for learning and transmitting knowledge and systems of abstract thought. This will include beliefs, morals, laws, customs, opinions, religion, and art". For Ingham (2000), culture is "...best appreciated as a learned behaviour passed from one generation to another not as some exogenously determined endowment which facilitates or constrains development. Moreover, culture influences the environment through different channels, the main one being trust (Frederking 2001).

Savings also has a strong gender implication. A survey by Mashigo M (2004) revealed that most households that are headed by women showed a high degree of savings. Fiebig et al (1998) also found that women were reliable micro finance clients, demonstrating more discipline than men in making regular savings deposits and loan repayments. An adequate supply of savings facilities will therefore supply much needed services to women who represent a large share of the poorest segments of the population and often pursue independent economic activities and as it is widely recognised that funds managed by women have a greater effect on the welfare of the whole family.

Conclusion

In the build up to this research, it was clear that the traditional theories of household saving behaviour do not really explain the saving behaviour of low-income households in developing countries. It is

also clear that the majority of rural households have the potential to save but do not have access to formal financial institutions due to the conditions governing the financial services offered.

Characteristics of saving type are liquidity, proximity, and safety as they showed moderate presence within rural households.

Characteristics of savers are income level, education level, intergenerational links, religious beliefs as they showed a positive moderate presence within rural households.

Characteristics of saving type and savers are determinants of saving behaviour among the rural households.

It was established during the research that 85.4% of the rural savers interviewed would prefer savings that permits withdrawals of once a month or less frequently. According to the statistical analysis, the number of savers demanding savings services increases with increasing illiquidity of the services from daily to monthly withdrawal rights, and then off tangent as illiquidity increases. At a correlation coefficient of 0.0901, the relationship between these variables has been found to be significant at the 0.05 level of confidence.

The savings behaviour of most rural households are influenced by lifecycle and emergency needs, and of the rural savers whose savings decisions are driven by lifecycle needs, the overwhelming majority (85%) prefer the relatively illiquid savings. This implies that rural savers could be a dependable source of stable savings for term financing in formal financial institutions

No significant difference was found between men and women in their preference of the level of illiquidity. And likewise no evidence was established to show that the nature of the economic activity of rural savers changes the pattern.

Whereas the number of savers demanding savings services increases as proximity increases from the district level to the sub-county level, notably the reverse was found to be the case as proximity increases from sub-county to village level. However majority of the rural savers would use an SDP located within their sub-county by increasing the frequency of their deposits.

It was mentioned that most empirical evidence emphasized that income is the main determinant of saving which seems unlikely in the context of a developing Sub-Saharan African economy like Uganda. Empirical investigations also show that the dominance of other factors than income, informal institutions coupled with their motives and a social financial exclusion, contribute to the low saving ratios of rural households

Some countries (Singapore, Malaysia and China) have successfully created a culture of saving amongst poor households and continue to enjoy the benefits associated with a high saving ratio by the households through the use of combined policy approaches.

An important question that emerges from these findings is why informal savings continue to be ignored by the formal financial institutions. This possible complementary relationship between informal and formal saving is suggested as a topic for future research.

Recommendations

In light of the set study objectives, findings and conclusions thereof, it was established that the volume of savings in rural areas is substantial but remains outside the formal sector. Most rural households prefer keeping their savings in the informal sector and This was attributed to lack of formal sound financial institutions to mobilise such savings in the rural areas. There is need of channelling such savings into the formal financial sector to create capital accumulation.

Individuals require different types of savings products because they have different needs. Much as there is literature on about factors affecting savings behaviour of individuals, literature about the preferences for specific product is still lacking.

The saving behaviour of most of these households is influenced by lifecycle and emergency needs. This requires them to have easy access to such savings as and when the need arises.

AREA OF FUTURE RESEARCH

This study was carried out in Bungokho county Mbale District. The findings of the study therefore may not apply to other areas of the country; similar studies should be carried out so as to come up with a more representative national outlook.

Further to complete the picture as articulated in the opening quote from Fiebig et al....,an additional study to establish how institutions should be structured in order to adequately meet the needs of rural savers on a sustainable basis may also be necessary.

Further a study can be carried out to establish the relationship between the characteristics of saving type and characteristics of rural household savers.

**An Empirical Analysis of Risk and Size Factors in Momentum Profitability at
the Nairobi Stock Exchange**

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**A paper submitted for presentation at the Operation Research Society of East
Africa (ORSEA) Conference, University of Nairobi, 2011.**

Abstract

A generation ago, the intellectual dominance of the efficient markets hypothesis as the accepted asset pricing paradigm was unchallenged. By the start of the twenty-first century, however, the acceptance of the efficient market hypothesis had become far less universal. Many financial economists and statisticians began to believe that stock prices are at least partially predictable. The profitability of the momentum strategy - the strategy of buying recent winning stocks and shorting recent losing stocks- as first documented in Jegadeesh and Titman (1993) remains one of the anomalies that continue to confound the efficient markets theory. This study sought, first, to establish whether the NSE experienced price momentum in the period covered. Next we tested whether momentum profitability could be explained by, and was compensation for, risk. Finally, we investigated any relationship between price momentum and the well documented size anomaly. We found out that the NSE experienced significant degree of price momentum in the

period covered. And that this momentum profitability could not be explained by the three factor risk factors of Fama-French, and that there was no size effect to momentum.

Terms: price momentum, size effect, risk, winners losers.

1. Introduction

The profitability of the momentum strategy- the strategy of buying recent winning stocks and shorting recent losing stocks- as first documented in Jegadeesh and Titman (1993) remains one of the anomalies that cannot be explained by the otherwise very successful Fama-French three factors model, and is thus very puzzling (Fama and French (1996). Jegadeesh and Titman (2001) show that momentum profits remain large even subsequent to the period of their 1993 study. Rouwenhorst (1998), and Griffin, Ji, and Martin (2003), report economically significant and statistically reliable momentum profits in areas outside the US. These studies suggest that the momentum phenomenon is not a product of data mining or snooping bias, and neither is it market specific.

Although the momentum phenomenon has been well accepted, the source of the profits and the interpretation of the evidence are widely debated. Two possible explanations for momentum are size and market wide risk.

Ever since the publication of Banz (1981) findings, size of stock has been recognised as one of the anomalous determinants of stock returns. In recent years, size together with book-to-market price and dividend-to-price has been used to distinguished value from glamour stocks. Fama and French (1992) find that size and book-to-market predict future returns. Fama and French (1993), Daniel and Titman (1997), and Davis et al (2000) provide evidence that sorting stocks according to market capitalisation and book-to-market explains a big proportion of stock returns. Hong, Lim, and Stein (2000) find that the momentum effect in the U.S. securities is strongest in small firms and declines sharply as market capitalisation increases. Hong, Lim, and Stein argue that, since price momentum results from gradual information flow, there should be relatively stronger profits in those stocks for which information gets out slowly, that is, the small stocks. Lakonishok, Shleifer and Vishny (1992) find evidence of pension fund managers either buying or selling in herds with evidence that they herd around small stocks. To the contrary, Hameed and Kusnadi (2002) find no size influence in momentum profits in five of the six Asian markets they studied.

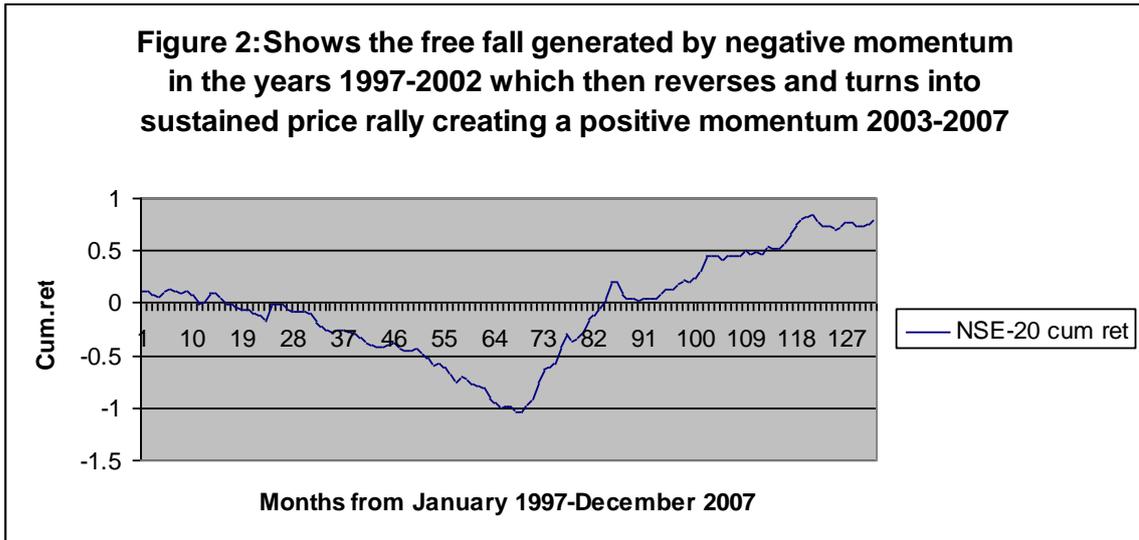
Other studies have suggested that the profitability of momentum strategies may simply be compensation for risk. Conrad and Kaul (1998) argue that the momentum profit is attributed to the cross-sectional dispersion in (unconditional) expected returns. Lewellen (2002) finds that the negative cross – serial correlation among stocks, not underreaction, is the main source of momentum profits⁴. Using the frequency domain component method to decompose stock returns, Yao (2003) provides strong evidence that momentum is a systematic phenomenon.

Models have been developed that are based on momentum on economic risk factors affecting investment life cycles and growth rates. Berk, Green and Naik (1999) illustrate that momentum profits arose because of persistent systematic risk in a firm's project portfolios. Johnson (2002) posits that momentum comes from a positive relation between expected returns and firm growth rates. Chordia and Shivakumar (2002) report that the profits to momentum strategies are completely explained by predicative returns using the lagged common macroeconomic variables (e.g. dividend yield, term spread, default spread, and short term rate). The momentum profits are related to the business cycles and mainly reflect the persistence in the time varying expected returns.

Momentum strategies are part of the bigger universe of technical trading rules that posit predictability of stock returns using past trends in prices and trading volumes. Studies using the NSE data base are just beginning to trickle in. Lishenga et al. (2011) report the existence of significant price momentum at the NSE that could be the basis of profitable trading strategies. Atiti (2003) also documents evidence of price momentum in the short to medium term, while Ndungu (2005) finds the existence of a size effect at the NSE.

A scrutiny of the NSE-20 index shows trends that attest to both reversal and continuation in returns that can be predictable. Over the past decade, the Nairobi Stock Exchange-20 Index has swung like a pendulum from a peak of 3784 in 1996, then to a low of 1384 in 2003 followed by a tremendous rally that reached an all time high of 5679 in 2007. What is remarkable is that, between the peaks and lows, there is a sustained momentum in a given direction of change of the index. Whenever a downward spiral sets in (as happened in 1996) it continues until it bottoms up 4 to 5 years later. This is followed by an upward recovery that is also unbroken until the high of 5679 of 2007 is reached. This is clear in the Figure 2 below.

⁴ Both Conrad and Kaul (1998), and Lewellen (2002), employ Lo and MacKinlay's (1990) statistical framework to decompose the profits of an investments strategy.



The current study builds on Lishenga (2011) and investigates the influence of two firm-level characteristics on the propensity of a stock to exhibit price momentum. We will investigate whether the market wide risk and size stories can explain the phenomenon.

The rest of the paper is arranged as follows; Section 2 reviews related literature on the momentum anomaly. Section 3 describes the data and the methodology used to test existence of momentum and how momentum is influenced by risk and size factors. Section 4 presents and discusses the results and Section 5 concludes.

2. Review of Related Literature

Momentum in prices has been recognized as the most robust market efficiency anomaly. It has been documented in stock exchanges the world over and has persisted even after wide publication. Fama (1998), indeed, recognizes the momentum phenomenon as constituting the chief embarrassment to EMH.

The first and most impressive examples of return momentum (continuation in price movement) came from cross-sectional returns of individual stocks seminal study of Jegadeesh and Titman's (1993) whose findings are the first in the copious body of momentum literature. Using a U.S. sample of NYSE/AMEX stocks over the period from 1965 to 1989, they find that a strategy that buys six-months winners and shorts past six-month losers earns approximately one per cent per month over the subsequent six months. Chan, Jegadeesh, and Lakonishok (1996) show that

momentum strategies yield spreads in returns of extreme deciles of 8.8% over the subsequent six months suggesting a price momentum effect, which is due to underreaction. Hong, Lim and Stein (1999) attribute the underreaction of stock prices to analysts' coverage, which is more pronounced in the case of bad news.

Rouwenhorst (1998) obtains similar numbers as those of Jegadeesh and Titman in a sample of 12 European countries over the period 1980 to 1995. Strong and Xu (1999) document profitable price momentum strategies in the U.K. market that are consistent with market underreaction to industry- or-firm specific news. Ryan and Overmeyer (2004) adduce evidence from Germany showing that relative strength (momentum) strategies based on the constituents of the DAX 100 index are "extremely profitable. Haugen and Baker (1996) and Daniel (1996) show that, although there is evidence of strong book-to-market effect in Japan, there is little or no evidence of a momentum effect.

In the event study area, it has been observed that, stocks tend to experience post-event drift in the same direction as the initial event impact. The most studied events in this genre include earnings announcements (Bernard and Thomas (1989, 1990)), stock issues (Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995)); repurchases (Ikenberry, Lakonishok, and Vermaelen (1995)), dividend initiation and omissions (Michaely, Thaler, and Womack (1995)), and analyst recommendations (Womack (1996)).

Bernard (1992) and Chan *et al.* (1996) find that stocks with higher earnings surprises also earn higher returns in the period after portfolio formation. Chan *et al.* (1996) found spreads of 4.2% in returns of extreme deciles formed on the basis of standardized unexpected earnings (SUE). The findings support the hypothesis of drift to earnings announcements.

Ikenberry *et al.* (1995) find that stock prices rise on the announcement of share repurchases but then continue to drift in the same direction over the next few years. Michaely *et al.* (1995) documents drift evidence following dividend initiation and omission. Ikenberry (1990) finds evidence of drift following stock splits while Loughran and Ritter, and Spiess and Affleck-Graves (1995) find evidence of drift following seasoned equity offerings.

Analysis of aggregate stock market indices has also produced evidence of underreaction. Cuttler et al. (1991) examine auto-correlation in excess returns on various indexes and generally find positive auto-correlation in excess returns of around 0.1 for stocks, and in bonds of 0.2. This auto-correlation is statistically significant and consistent with the underreaction hypothesis. Chan, Hameed, and Tong (2000) implement momentum strategies on stock markets of 23 countries and find that a great proportion of momentum profits come from price continuation in stock indices, and very little from movements in exchange rates.

A common belief noted by Chan et al. (2000) is that, 'it takes volume to move prices.' Conrad *et al.* (1994) find that high volume securities experience more price continuation, Gervais *et al.* (1998) show that individual stocks whose volumes are unusually large (small) tend to experience large (small) subsequent returns and Lee and Swaminathan (1998) illustrate that past trading volume predicts both the magnitude and persistence of future price momentum..

Chan *et al.* (2000) found that when momentum strategies were implemented on markets that experienced increases in volume in the previous period, the profits were higher than average. Hong *et al.* (1999) find that the underreaction of stock prices depends on the analyst coverage of the stock: less coverage means underreaction is severe and the opportunities for profitable trading are enhanced.

While momentum is associated to a large extent with underreacting markets, overreaction could also generate momentum. One of the first and influential papers in the overreaction category is DeBondt and Thaler (1985) who find that stock returns are negatively correlated at the long horizon of 3 to 5 years. Chopra, Lakonishok, and Ritter (1992) support DeBondt and Thaler. Other contributions have been made by Fama and French (1996), Poterba and Summers (1998), Richards (1997) and Carmel and Young (1997) among many others.

Emerging market⁵ evidence on price momentum is now trickling in. Rouwenhorst (1999) documents evidence to the effect that stocks returns in emerging markets exhibit momentum. Bekaert et al. (1997) find momentum strategies implemented in emerging markets are consistently profitable, though they perform better when only the investable indexes are examined. More

⁵ The data for these studies were drawn from the Emerging Markets Data Base (EMDB) of the IFC and included Argentina, Brazil, Chile, Colombia, Greece, Indonesia, India, Jordan, Korea, Malaysia, Mexico, Nigeria, Pakistan, Philippines, Portugal, Taiwan, Thailand, Turkey, Venezuela and Zimbabwe.

recently, contradictory evidence has been documented by Hameed and Kusnadi (2002) who investigated the profitability of momentum investment strategy in six Asian markets. Hameed and Kusnadi find that unrestricted momentum strategies do not yield significant profits and conclude that factors that contribute to the momentum phenomenon in the United States are not prevalent in the Asian markets.

3. Data Analysis

3.1 Measuring the Returns to Momentum Strategies

This research used the causal comparative design (a.k.a. *ex-post-facto* design.). We analyzed the returns of the portfolio strategies for the period 2000 to 2007 on data from the NSE. To test the significance of momentum profitability, we first formed the relative strength portfolios as described in Jegadeesh and Titman (1993). At the end of each month t , all stocks are ranked in descending order on the basis of their past J months' returns ($J = 3, 6, 9, \text{ or } 12$). Based on these rankings, the stocks are assigned to one of five quintile portfolios. The top quintile portfolio is called the "Winner", while the bottom quintile called the "Loser". These portfolios are equally weighted at formation, and held for K subsequent months ($K=3, 6, 9, \text{ and } 12$).

To minimize small-sample biases and to increase the power of the test, we implement trading strategies for overlapping holding periods on a monthly frequency. Therefore, in any given month t , the strategies hold a series of portfolios that are selected in the current month as well as in the previous $K-1$ months. This is equivalent to a composite portfolio in which $1/K$ of the holding is replaced each month. To avoid the potential "survival biases", we do not require all securities included in a particular strategy in the formation period to survive up to the end of the holding period. If a security survives for less than J periods, we use a $(J-j)$ period in calculating returns, where j is the period of delisting. If a security does not survive the formation period, it is dropped from the particular strategy.

Having analyzed the momentum effect for all the sixteen strategies and arrived at general conclusions, the investigation of the risk and size effects were pursued by employing the *standard* **$J=6\text{month}$, $K=6\text{month}$** strategy. This is consistent with JT (1993), Rouwenhorst (1997), and Hameed and Kusnadi (2002) who focus only on this one representative strategy. This is the strategy formed on the basis of the preceding 6 month ranked returns, formed immediately at the end of the ranking period, and held for next 6 months.

3.2

Size and Momentum Profits

Ever since the publication of Banz (1981) findings, size of stock has been recognised as one of the anomalous determinants of stock returns. In recent years, size together with book-to-market price and dividend-to-price has been used to distinguished value from glamour stocks. Fama and French (1992) find that size and book-to-market predict future returns. Fama and French (1993) provide evidence that sorting stocks according to market capitalisation and book-to-market explains a big proportion of stock returns. Daniel and Titman (1997), Davis et al (2000) corroborate Fama and French studies. Hong, Lim, and Stein (2000) find that the momentum effect in the U.S. securities is strongest in small firms and declines sharply as market capitalisation increases. Hong, Lim, and Stein argue that, since price momentum results from gradual information flow, there should be relatively stronger profits in those stocks for which information gets out slowly, that is, the small stocks. Hameed and Kusnadi (2002) find no size influence in momentum profits in five of the six Asian markets they studied. Ndung'u (2004) reports that the size effect is present at the NSE.

To examine whether the small firm price momentum holds at the NSE, we considered a size-neutral strategy, comprising of 15 portfolios of 3 size sorted, and 5 momentum based. Firm size is measured by the market capitalization of equity at the beginning of each year under consideration while momentum is measured by a stock's past six-month's performance. Consequently size portfolios were categorized into "Big" stocks which made up of 30% of the largest capitalization stocks; The "medium" which made up the 40% medium capitalization stocks, while the remaining 30% made up the "Small" stocks.

The momentum sorted stocks were made up of *Loser* (P5) portfolio which consisted of twenty percent of stocks with the lowest past six-month performance from each size group, while the *Winner* (P1) portfolio consisted of twenty percent of stocks with the highest past six-month performance from each size group. The P2, P3, and P4 will be similarly constituted. . Both the *Winner* and *Loser*, and the three intermediate portfolios therefore contained the same number of stocks for the three size classifications, and were in that sense size-neutral. The summary statistics of returns for each classification were established. Any evidence observed of significant differences in the winner and loser portfolios would confirm that continuation effect was not a mere reflection of the effect of firm size.

3.3 Risk-Adjusted Momentum Returns

To date, there is no risk-based explanation that completely accounts for momentum returns. Although a number of authors have found that long term reversals are not robust to risk adjustment (Fama and

French (1996), Lee and Swaminathan (2000), and Grinblatt and Moskowitz (2003), the intermediate return continuation has been a more resilient anomaly. Fama and French (1998) cannot explain the phenomenon using a three factor pricing model. Grundy and Martin (2001), studying the risk of momentum strategies, conclude that factor models cannot explain mean returns. Indeed the unexplained persistence of intermediate term momentum returns is viewed as one of the most serious challenges to asset pricing literature (Korajczyk and Sadka (2004). Nevertheless, despite the burgeoning to the contrary, proponents of risk-based explanation still harbour hopes of finding a risk-based explanation for momentum profitability (Conrad and Kaul (1998) and Moskowitz and Grinblatt (1998)).

This subsection explored the relationship between the returns of momentum portfolios and risk factors. First we employed a market version of the CAPM, and secondly the broader Fama-French three factor model.

The testable version of the CAPM can be rendered in the form,

$$R_{RSS,t} - rf_{,t} = \alpha + \beta_m (R_{M,t} - rf_{,t})$$

Where,

$R_{RSS,t}$ = Average return of momentum strategy for the month t.

$rf_{,t}$ The risk free rate of return observed at the beginning of the month, t.

$R_{M,t}$ Average monthly return on the overall market factor

α The intercept in the regression equation

We posited that excess momentum profits can be fully explained by their co variation with the returns from the market as whole (The market is proxied by the NSE-20 Index returns).

Subsequently, the relationship between the returns of momentum portfolios and Fama-French risk factors, namely, the overall market factor (the value-weighted NSE20 index minus the risk-free rate), the size factor (SMB, small stocks minus big stocks), and the book-to-market factor (HML, high

minus low book-to-market stocks) was explored. We regressed the monthly returns of the momentum strategy in excess of the risk-free interest rate, on the excess return of the NSE-20 index over the risk-free interest rate, and the Fama-French SMB and HML factors over the sample periods. The regression took the form below:

$$R_{RSS,t} - rf_{,t} = \alpha + \beta_m (R_{M,t} - rf_{,t}) + \beta_{smb} SMB_t + \beta_{hml} HML_t + \varepsilon_t \quad (3.1)$$

Where

$R_{RSS,t}$ = Average return of the relative strength strategy for the month t.

$rf_{,t}$ = The risk free rate of return observed at the beginning of the month, t.

$R_{M,t}$ = Average monthly return on the overall market factor

SMB_t = The monthly difference between the returns of a portfolio of small stocks and the portfolio of big stocks

HML_t The monthly difference between the returns of a portfolio of high BE/ME stocks and the portfolio of low BE/ME stocks

α The intercept in the regression equation

β_{SMB} The sensitivity of the size factor to relative strength strategy (RSS) profits

β_M The sensitivity of RSS profits to the overall market factor

β_{HML} The sensitivity of RSS profits to the B-M factor

ε_t The error term of the regression

From the regression of the three factor model, the coefficients (the betas) were analyzed and tested to ascertain the explanatory powers of the factors for momentum profits. The alphas and the *R-squared* were determined and interpreted in light of the evidence from the coefficients.

4. Results and Discussions

4.1 Profitability of Momentum Strategies

Table 1 shows the average monthly buy-and-hold returns on the composite portfolio strategies implemented during different periods at the NSE. For each strategy, the table lists the returns of the “Winner” and the “Loser”, as well as the excess returns (and *t*-stat) from buying “Winner” and selling “Loser”. For instance, during the period, buying “Winner” from a 3-month/3-month strategy earns an average return of 2.68 percent per month, 1.59 percent higher than buying “Loser” in the same strategy, which returns 1.09 percent. The excess return is significant at the 1 percent level, with a *t*-statistic of 2.36.

Table 2 (a): Average Monthly Returns to Momentum Strategies for the Period 2000 to 2007					
Formation Period (J)- months	Portfolio	2000-2007 Holding period (K)- months			
		3	6	9	12
3	Winner(W)	.0268	.0272	.0262	.0258
	Loser(L)	.0109	.021	.0234	.0283
	W-L	.0159	.0062	.0028	-.0025
	(t-stat)	2.36**	1.11*	0.54*	-0.46*
6	Winner(W)	.0435	.0293	.0290	.0293
	Loser(L)	.0221	.0149	.0244	.0269
	W-L	.0214	.0144	.0046	.0025
	(t-stat)	2.44**	2.58**	0.78*	0.4*
9	Winner(W)	.0252	.0426	.0313	.0326
	Loser(L)	.0221	.0230	.0081	.0240
	W-L	.0031	.01196	.0232	.0086
	(t-stat)	0.41	2.31*	4.2**	1.42**
	Winner(W)	.0227	.0411	.0201	.0326
	Loser(L)	.0209	.0218	.0177	.0221

12	W-L	.0018	.0193	.0024	.0103
	(t-stat)	0.24	2.26*	0.35	1.88**

Key: J =Formation Period , K= Holding Period

The table shows average monthly profits to relative strength (or momentum) strategies (RSS) mounted at the NSE from 2000 to 2007. At the end of each month t , all stocks at the stock market are ranked in descending order on the basis of their J-months' past returns. Based on these rankings, the stocks are assigned to each of the equally weighted 5 (quintile) portfolios. The top quintile portfolio is called the "Winner", while the bottom quintile portfolio is called the "Loser". These equally weighted portfolios are held for K subsequent months. T-statistic is the average return divided by its standard error.

* represents significance at the 5% level and ** significance at 1% level.

Significantly positive excess returns are observed at the 5 percent level for seven strategies, and at 1 percent level for six, of the sixteen strategies implemented. In all 13 out of the 16 strategies implemented are significantly profitable at or below the 5 per cent level. Specifically, the excess monthly returns of buying "Winner" over buying "Loser" range from -0.25 per cent for the 3-by-12 strategy to 2.32 percent for the 9-by-9 strategy (indeed the only negative return is the -0.25 percent of the 3 by 12 strategy). The 6-by-6 strategy that is standard for most studies registers a mean return of 1.44 percent per month which is statistically and economically significant at the 1 percent level. The average Winner-Loser return for the entire sample was 0.91 percent with a standard deviation of 0.78 percent.

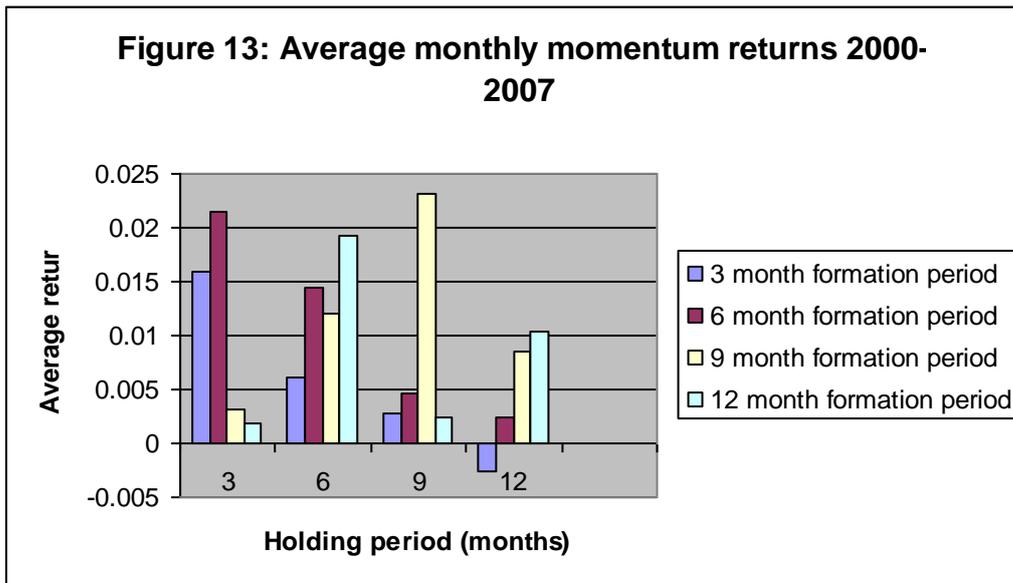


Figure 13 is a chart constructed from Table 1. During the sub-period analyzed, momentum was evidently widespread. Twelve of the sixteen strategies exhibit significant momentum (6 at the 1% level and the remaining 6 at 5% level of significance). Average monthly returns were as high as 2.32% for the 9 by 9 strategy, with the only negative return at -0.25% (significant at 5% level) being registered in the 3 by 12 strategy.

	Momentum	T-Value	Sample	Weight	Percentage
Jegadeesh and Titman (1993)	0.95	3.07	1965-1989	EW	10
Conrad and Kaul (1998)	0.36	4.55	1962-1989	WRSS	N/A
Moskowitz and Grinblatt (1999)	0.43	4.65	1973-1995	VW	30
Lee and Swaminathan (2001)	1.05	4.28	1965-1995	EW	10
Jegadeesh and Titman (2001)	1.23	6.46	1965-1998	EW	10
Chordia and Shivakumar (2002)	1.51	6.52	1963-1994	EW	10

In the first column of the table, the references are listed and the second and third columns report the excess returns on winner minus loser strategies with corresponding t values. The last three columns indicate the sample period, the weighting scheme (EW= equally weighted, VW=value weighted, and WRS=weighted

relative strength) and the percentage of the sample stocks in the portfolio

.Considering the results for all the 16 strategies implemented, there is concrete evidence of momentum in individual stocks at the NSE. Comparing the findings of the current study with those of studies from the US (See Table 2) most of which report the existence of momentum, it is clear the NSE is in the same league. The conclusion that appears inevitable from our test findings is that a significant degree of momentum is present in stock prices at the NSE.

4.2 Size and Momentum Profits

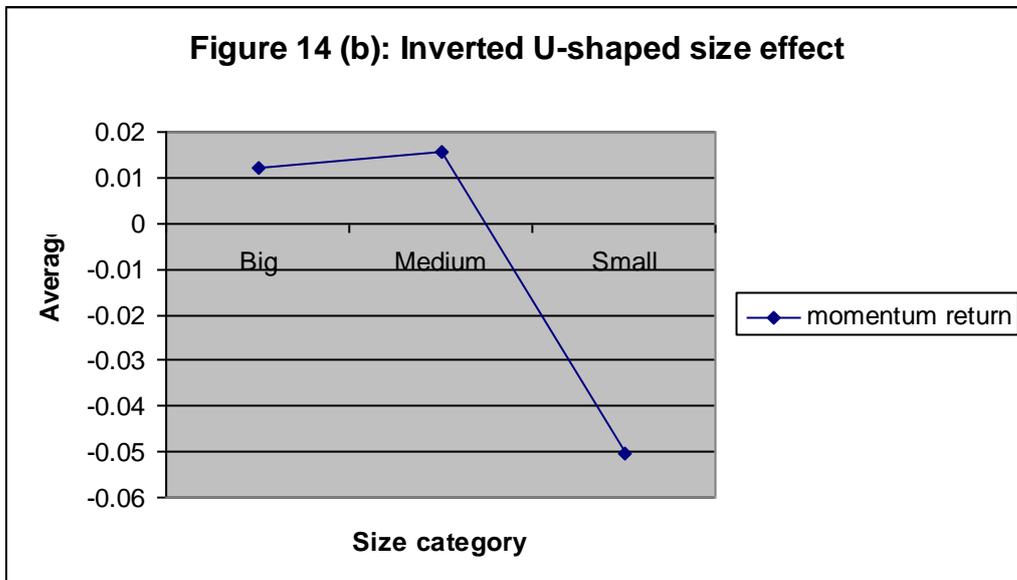
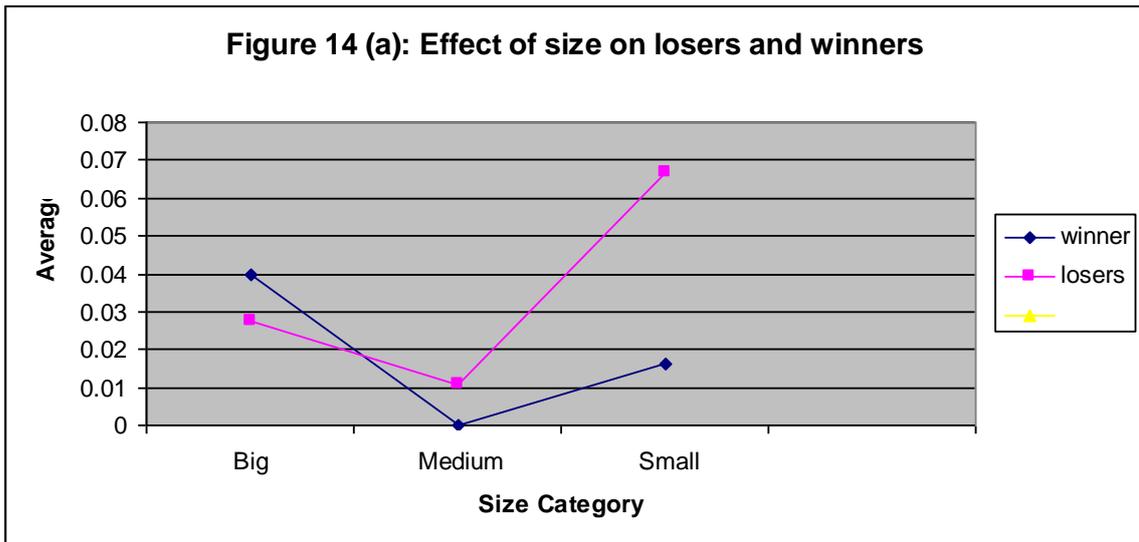
The first column in Table 4 confirms that there is significant momentum, in the full sample. A strategy that goes long in the best performing quintile and short in the worst performing quintile generates 1.44 percent per month. The next columns break the momentum effect down by size: the “Big” stocks, the “medium” stocks, and the “Small” stocks, as defined in the preceding paragraph.

Figures 14(a) and 14(b) illustrate the results, plotting the relationship between size and the magnitude of the winner, loser and momentum effects. Figure 14(a) shows that in size extremes there is reversal in returns. Losers outperform winners in the small and the big capitalization categories; only for the medium category do continuation in returns manifest. From Figure 14(b), it is apparent that momentum profits follow a hump shape (an Inverted U-shape) with respect to size. Considering the small sub-sample with a mean capitalization of Sh.486 million, momentum effect is virtually absent: in fact it is marginally *negative*. The momentum effect reaches a peak of 1.55 percent per month among the medium cap stocks, whose mean capitalization is Sh. 2,404 million. The momentum return of the medium sub-sample is more than 3 times the return for the whole sample. The momentum effect then dissipates when one moves to the big capitalization sub-sample, registering an average return of 1.14 percent per month. Overall, however, momentum profits reported for all three size portfolios are not significant at conventional levels.

Table 3: Returns to size-based momentum portfolios

MOMENTUM PORTFOLIOS	SIZE CLASS				
	All stocks	Big	Medium	Small	Small <i>minus</i> Big
$P_1(\text{winners})$	0.0293	0.0352	0.0264	0.0183	-0.0169

	(3.31)	(2.57)	(1.90)	(1.35)	
P_2	0.0380 (3.33)	0.0182 (1.51)	0.0459 (2.24)	0.0479 (2.05)	0.0297
P_3	0.0246 (2.39)	0.0201 (1.65)	0.0268 (1.16)	0.0250 (1.59)	0.0049
P_4	0.0192 (2.84)	0.0172 (1.30)	0.0065 (0.83)	0.0292 (2.55)	0.0119
P_5 (losers)	0.0149 (2.25)	0.0238 (1.58)	0.0111 (1.21)	0.0192 (1.06)	-0.0046
$P_1 - P_5$	0.0144 (0.38)	0.0114 (0.63)	0.0155 (1.27)	-0.0008 (-0.05)	-0.01228
$\frac{P_3 - P_5}{P_1 - P_5}$		-0.3247	1.0151	-6.9754	
Mean size (Sh. millions)		16791	2404	486	
Median (Sh. millions)		6938	1617	289	
<p>In this table, equally weighted quintile momentum portfolios were formed on the basis of 6 months lagged returns and held for 6 months. The winner –portfolios comprised the top performing quintile P_1, while the loser portfolio comprised worst performing quintile, P_5. The stocks were next ranked independently on the basis of size (market capitalization at the beginning of the year). “Big” comprised 30% of the large cap stocks, “Medium”, 40% of medium stocks, and “Small”, 30% of the small cap stocks. Average monthly returns of the resultant sub-samples are reported here. The sample period is January 2000 to December 2007.</p>					



The asymmetric effect of size may be explained, on one hand, by the thin trading that characterizes most of the small cap stocks leading to supply shock induced reversals, while on the other hand, the decline of the momentum effect in the big cap stocks may be testament to the hypothesis that such stocks with more analyst and investor attention are subject to faster information diffusion and hence have less momentum.

Some past research⁶ has found that most of the return to a long/short momentum trading strategy is due to the short position in *losers* rather than the long position in the *winners*. In Table 4, the row 7,

⁶ Hong, Lim, and Stein (2000) find that between 73% to 100% of the returns of the winner/ loser strategy is attributable to losers. Grinblatt and Moskowitz (2003) find a stronger relationship between

$(\frac{P_3 - P_5}{P_1 - P_5})$, measures the proportion of momentum profits that is attributable to the short position

in the zero-cost winner/ losers strategies. The results of the big and small cap stocks are inconsistent with prior research findings⁷. Our findings (in Table 4) indicate a negative impact on momentum profitability by the big and small cap losers (-32.5% for big and -698% for small). Evidently, size extremes (be it on the high or low side) seem to dissipates the momentum effect. For the medium capitalization stocks, indeed the short position contributes the preponderance of momentum profits, i.e. 102% of the profits. In contrast, Hameed and Kusunadi (2002) find no size influence in momentum profits in five of the six Asian markets they studied.

In sum, our results fail to confirm the hypothesis that momentum is more pronounced in small stocks than in other size categories. Possible explanations could include the fact that small stocks at the NSE are closely held, are thinly traded and consequently are insulated from market forces that drive momentum.

4.3 Risk-Adjusted Momentum Returns

We posited that excess momentum profits can be fully explained by their covariation with the returns from the market as whole (The market is proxied by the NSE-20 Index returns).

	α	$t(\alpha)$	β_m	$t(\beta_m)$
1996-2007	0.00	4.5**	-0.308	-5.51**
1996-2002	0.00	0.653	-0.576	-10.01**

momentum return and past returns for losers than winners. Jegadeesh and Titman (2001) find larger abnormal returns for loser portfolios than for winner portfolios. Lesmond et al. (2003) find 53% to 70% of profits of long/short trading strategy come from the short side.

⁷ Fama and French (1993) provide evidence that sorting stocks according to market capitalisation and book-to-market explains a big proportion of stock returns. Daniel and Titman (1997), Davis et al (2000) corroborate Fama and French studies. Hong, Lim, and Stein (2000) find that the momentum effect in the U.S. securities is strongest in small firms and declines sharply as market capitalisation increases. Hong, Lim, and Stein argue that, since price momentum results from gradual information flow, there should be relatively stronger profits in those stocks for which information gets out slowly, that is, the small stocks.

2003-2007	0.00	3.83**	-0.244	-1.846
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The table reports the results of regressing excess momentum returns ($R_{RSS,t}-r_{f,t}$) against the excess returns on the market portfolio ($R_{M,t}-r_{f,t}$), $R_{RSS,t}-r_{f,t}=\alpha+\beta_m(R_{M,t}-r_{f,t})$. Data was available for the test between 1995 and 2007 and the sub-samples were influenced by the perceived momentum in the NSE-20 stock index. $t(\alpha)$ and $t(\beta_m)$ are t-statistics for α and β_m . ** significant at 1 percent level.

The Table 4 shows the results of the test of the ability of CAPM's beta to explain momentum returns. The findings are not reassuring. First the alphas are significant for the whole sample and for the sub-period 2002-2007. The 2002-2007 was the period that exhibited a sustained degree of momentum. The significant alphas can be interpreted as evidence that momentum is an anomaly that defies risk explanations (Or it could be that the CAPM is mis-specified). The second confounding fact from Table 4 is that all the beta values, though significant are negative, implying illogically that returns and risk have a negative relationship. It is clear that risk as measured by the CAPM beta cannot be responsible for the momentum phenomenon in returns at the NSE.

We alternatively employed the broader model of Fama and French (1993,

$$R_{RSS,t}-r_{f,t}=\alpha+\beta_m(R_{M,t}-r_{f,t})+\beta_{smb}SMB_t+\beta_{hml}HML_t+\varepsilon_t$$

Table 5: Risk Adjusted Excess Returns of Momentum Portfolios									
	α	$t(\alpha)$	β_m	$t(\beta_m)$	β_{SMB}	$t(\beta_{SMB})$	β_{HML}	$t(\beta_{HML})$	R^2
1996-2007	0.00	4.5**	-0.308	-5.51**	0.026	0.756	0.016	0.685	0.203
1996-2002	0.00	0.653	-0.576	-10.01**	0.018	0.646	0.11	0.597	0.627
2003-2007	0.00	3.83**	-0.244	-1.846	-0.072	-1.015	-0.035	-0.467	0.082

The table the results from regression the monthly returns of the 6-month/6-month momentum strategy in excess of the risk-free interest rate on Fama-French three-factors: $(R_m - r_f)$, R_{SMB} , and R_{HML} over the sample period:

$$R_{RSS,t} - r_{f,t} = \alpha + \beta_m (R_{M,t} - r_{f,t}) + \beta_{smb} R_{SMB,t} + \beta_{hml} R_{HML,t} + \ell_t$$

R^2 is the coefficient of determination adjusted for degrees of freedom; $t(\bullet)$ is the related coefficient divided by its standard error. T-statistics are in parenthesis. **significant at 1%; * significant at 5%.

Table 5 reports the results of the regression for the whole period and the two sub-periods. As is shown in column 4, all the market factor coefficients (β_m) are negative, indicating that market wide risk factors far from explaining excess returns instead confound them. It also reflects that losers are somewhat more sensitive to the market risk factor than the winners. A closer look at column 5 shows that coefficients for the whole sample and 1996-2002 sub-period are significantly different from zero, meaning that market betas for winners and losers differ significantly.

Columns 6-9 reveal the effect of the size factor coefficients (β_{SMB}) and book-to-market factor coefficients (β_{HML}). The signs are positive for the entire sampled period, and the period 1996-2002; but negative for the sample sub-period 2003-2007. Tests of significance reveal that the coefficients are not significantly different from zero. This leads to the inference that size and the value factor have some, but marginal explanatory power for momentum profits

Columns 2 and 3 of Table 5 report the alpha (α) of the various momentum portfolios as estimated by regressing the monthly excess momentum returns on the Fama-French factors. The alphas for these risk-adjusted portfolios are positive and significantly different from zero. This means that the three factor model is not adequate to explain the sources of momentum profits. This begs the question whether or not there may be other variables with more correlation with momentum profits not specified in the three factor model.

The last column of the table presents the *R-square* of each regression, ranging from 0.082 to 0.0627. This means the Fama-French factors can only explain 6% to 8% of the momentum profits. We are left to conclude that momentum profits cannot be explained by the risk factors contained in the Fama-

French three-factor model. We therefore, fail to confirm the hypothesis that momentum profitability is a compensation for additional risk inherent in the momentum strategies.

5. Conclusions

The striking finding from our test is that one can earn abnormal returns by implementing momentum-based trading strategies at the NSE. This momentum is caused by investors underreacting, trading in herds, or the limitations of the arbitrage process. Investor education, institutional, legislative, regulatory strengthening and improvement in operational efficiency could reduce the misevaluation in stocks at the bourse.

We did not find a size effect in the momentum profitability. This contrasts findings in prior studies. The discrepancies in the findings on NSE data may be the result of the differences in what constitutes small or big stocks in the different markets. For instance the typical small capitalization in NSE will be the stocks that are excluded from samples using NYSE data as being outliers that could distort results. A future study should exclude the typical small and infrequently traded stocks in the alternative segment, and concentrate only on the main segment. A size investigation confined to the main segment would reduce the operation of omitted variables and allow the size effect to stand out.

As regards the explanatory power of risk, the analysis revealed that the market wide co-variation, the book-to-market and the size factors cannot explain the out-performance of momentum stock selection strategies at the Nairobi Stock Exchange. Consistent with the findings of a majority of extant studies, our tests failed to explain momentum profits within the framework of two risk motivated models. Thus we are led to conclude that investors and markets do not react only to risk in pricing assets. We are led to conclude that, perhaps, behavioural factors and psychological biases are a major influence on the demand and supply forces at the NSE. Additionally, the restrictions on short selling and the limitations in the operation of arbitrage forces can lead to the persistence of profitable arbitrage opportunities unexploited.

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DEBT FINANCING AND RETURN ON EQUITY

A CASE OF LARGE CORPORATE TAXPAYERS IN UGANDA

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ABSTRACT

This study examined the relationship between debt equity ratio and return on equity for large corporate taxpayers in Uganda. It addressed the question of whether debt financing magnifies return on equity. The research also established the capital structure of large taxpayer companies and confirmed that the theories on the advantages of debt financing are valid for a developing economy like Uganda's.

The study established that all sectors under study employed debt in their capital structure during the study period and had an overall positive correlation ($r = 0.322$, p -value < 0.05) between debt equity ratio and return on equity. Sector by sector analysis showed that the manufacturing sector had the strongest relationship between debt equity ratio and return on equity ($r = 0.835$, p -value < 0.05) and the construction sector had the weakest correlation between debt and equity ($r = 0.128$, $p > 0.05$). The construction sector had a high probability of leverage chance ($r = 0.76$). Empirical evidence shows that debt financing improves return on equity. The findings for all the sectors were in line with the theory that debt financing magnifies shareholders' return.

Keywords: Debt financing, Return on Equity, Uganda

Background to the Study

Many firms use debt as a major source of financing. A research by Booth *et al.*, (2000) of 5,281 firms in Europe, Asia and USA revealed that the debt to equity ratio ranged from a low of 30.3% in Brazil to a high of 73.4% in South Korea. In theory, the primary motive of a company using financial leverage was to magnify the shareholders' return (Pandy, 1997). According to Paraque (1992), the capitalization of a given firm is closely connected to its return on equity and highly profitable but slow-growing firms should generate cash and finance their operations by internally generated funds. On the other hand, less profitable but fast-growing firms need significant external financing. Paraque and Pandy's theories did not show the extent to which financial leverage could magnify shareholders' return; an aspect this research sought to establish.

Divya *et al* (2011), in their study on Inside Debt and the Design of Corporate Debt Contracts found that a higher CEO relative leverage, defined as the ratio of the CEO's inside leverage (debt-to-equity compensation) to corporate leverage, was associated with lower cost of debt financing and fewer restrictive covenants. Additional analysis on a sample of new public bond issues also showed a negative relation between CEO relative leverage and bond yield spread. The evidence supports the notion that debt holders recognize the incentive effects of executive debt-like compensation and adjust the terms of corporate debt contracts accordingly.

Hull (2011), in his non-empirical study of Debt-equity decision-making with and without growth attempted to instill knowledge and skills to students when making debt-equity and plowback-payout choices.

According to Nadeem (2011), an empirical study of firms in the manufacturing industry in Pakistan suggested that profitability, liquidity, earnings volatility, and tangibility (asset structure) are related negatively to the debt ratio whereas firm size was positively linked to the debt ratio. Non-debt tax shields and growth opportunities do not appear to be significantly related to the debt ratio. The findings of this study are consistent with the predictions of the trade-off theory, pecking order theory, and agency theory which showed that capital structure models derived from Western settings do provide some help in understanding the financing behavior of firms in Pakistan.

Abimbola (2004) tested the endogenous relationship between financial leverage and bank debt's use in the UK. The study's findings indicated that industry classification has a significant effect on reliance on bank debt. Although firms that used bank debt seemed to have higher agency cost potential than firms that did not use debt, long term leverage did not have a significant relationship with long term bank debt's use in the evidence.

Elliott *et al.* (2007) did a study on the impact of equity mispricing on target debt ratios. The study found that the reported portion of variance was caused by two factors. First, firms faced a 'hard' boundary when over levered. This was due to the present value of bankruptcy costs increasing at an increasing rate. These firms will adjust towards a target debt ratio more rapidly than under leveraged firms which face a 'soft' boundary. Second, if a firm's equity was mispriced, the cost of issuing equity could be reduced or increased.

A study by Nishat (2000) entitled "The Systematic Risk and Leverage Effect in the Corporate Sector of Pakistan," indicated that the debt-equity ratios across industries are higher throughout the study period, except for a few industries like tobacco and vanaspati and allied.

Jiming *et al.* (2010) studied the impact of debt financing on firm investment behavior in China. The study established that there was a negative relation between debt financing and

investment behavior in firms with both low-growth opportunities and high-growth opportunities and a negative effect was more significantly stronger for firms with low-growth opportunities than those with high-growth opportunities.

Chava. S., and Micheal R. R. (2008) studied the role of debt covenants and how these impact financing investment. Their study found that capital expenditures declined by approximately 1% of capital per quarter in response to covenant violations with a 13% decline relative to the pre-violation level of investment. Additionally, this decline was concentrated among firms in which agency and information problems were relatively more severe. Thus, the results highlighted how the state-contingent allocation of control rights mitigated investment distortions arising from financing frictions.

A study by Adamia *et al* (2010) on the effect of leverage on stock returns indicated that returns decreased with firm leverage. The study tested the relationship empirically with other risk factors and found that the results remained robust. Further, it was found that leverage was a firm characteristic that loaded on a risk factor. This suggested that leverage should be priced as a risk factor and required adequate incorporation into common asset pricing models.

In trading, when a firm employs debt in its capital structure, it has to pay fixed charges on the debt regardless of the firm's income generating capacity. There was a risk of making low profits or even losses and the risk of liquidation when the expected return on investment fell short of the cost of borrowed funds. However, management of business enterprises usually enter into loan covenants using financial projections that assume favorable or optimistic economic conditions and hope that the fixed charge on debt would remain lower than the firms' expected rate of return on capital employed.

Statement of the Problem

Capital structure theories depict debt financing as a double-edged sword. That is, it is the cheapest source of capital when a firm has income generating capacity to meet the debt obligations but when the return on capital slips below the cost of debt, businesses will make losses and may gradually be liquidated on failure to meet the debt obligations.

The theories on debt financing were developed premised on developed country case scenarios. It is not clear whether debt-financing effects are relevant and true in a developing economy like Uganda's. This study set out to establish the relationship between debt equity ratio and return on equity for the targeted sectors of the study.

Purpose of the Study

The study set out to establish the relationship between debt equity ratio and shareholders' return for various business sectors in the Ugandan economy.

Objectives of the Study

The study had the following objectives:

- d) To establish the capital structure of the two large tax paying business entities in Uganda.
- e) To establish the effect of leverage chance and leverage risk on return on equity of the two sectors of large taxpayers.
- f) To examine the relationship between capital structure and return on equity.

Research Questions

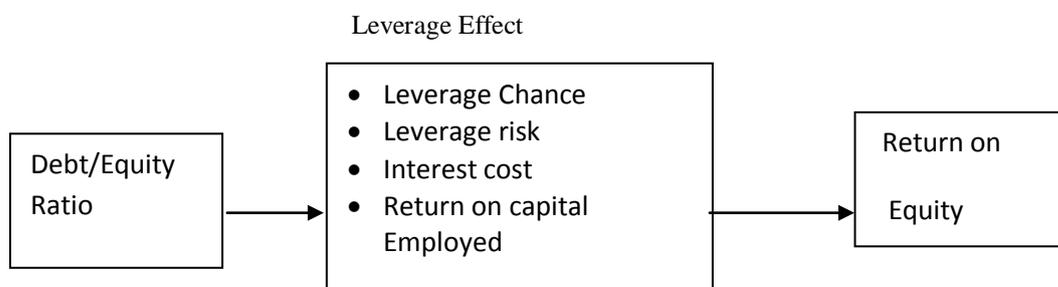
The study focused on answering the following questions:

- d) What is the capital structure of the two large corporate taxpaying entities in Uganda?
- e) What is the effect of leverage chance and leverage risk on return on equity of the study population?
- f) To what extent does debt financing magnify shareholders' return on equity in Uganda?

The conceptual framework

The researcher discusses research findings in the subsequent chapters based on the conceptual framework as follows:

Fig.1 Conceptual Framework (adapted from Du Pont Model)



The common and direct ratio for calculating a firm's return on equity is the ratio of retained earnings to owner's equity. However, the Du Pont's model (<http://www.uic.edu>) decomposes the ratio as a function of three factors; the firm's profitability, assets turn over and leverage summarized as:

Profit Margin X Asset Turnover X Leverage = Return on Equity

- Profit Margin = Net income/Net Sales
- Asset Turnover = Net Sales / Average Total Assets
- Leverage = Average Total Assets/Average Owner's Equity

Profit margin shows the percentage of each shilling in sales that results in net income, asset turn over measures how efficiently assets are used to generate sales and the leverage indicates how the assets used in generating sales are financed. The Du Pont model return on equity decomposition formed the basis for the choice of the independent variables in this study.

Significance of the Study

The findings will benefit the following:

Shareholders

The study will enable shareholders appreciate the contribution of debt financing to the return on their funds. It will also enable them examine those sectors that give a higher return on equity for a given combination of debt and equity.

Managers of business enterprises

The study will enable managers ascertain the proportion of debt that has a high contribution to the shareholders' funds. It will also provide information on the various costs associated with debt financing and provide a guide for the choice of capital structure for certain business sectors.

Tax Administrators

The study will provide a basis for assessing the earning capacity of equity holders in the various business sectors.

Scope of Study

The scope of the study was in terms of geographical scope, subject matter, and time.

Geographical Scope

The study covered a sample of 43 large taxpaying companies in construction and manufacturing in Uganda that submit financial statements to Uganda Revenue Authority at Crested Towers Kampala.

The major reasons for choosing large tax paying companies was that their business operations were centrally monitored by the Large Tax Payer Unit of the Uganda Revenue Authority and their financial statements were prepared by reputable audit and accounting firms like PriceWaterhouseCoopers, Ernest and Young, and KPMG. The large taxpayers were frequently audited or monitored by Uganda Revenue Authority.

Subject Matter

The study aimed at finding out:

- (b) The composition of capital structure of the selected companies
- (b) The relationship between return on equity and the various combinations of debt and equity for the selected companies.

Time

The study covered a period of 11 years (2000-2010).

Literature review

Relevant materials were drawn from various literature sources related to debt financing and return on equity regardless of the time or place. Materials were reviewed along the major theme of debt financing and return of equity and under the sub-themes of leverage chance and leverage risk.

Debt and Equity

Theories on proportions of debt and equity in the capital structure of business enterprises were developed and the relevance of some of the theories was studied. Modigliani and Miller (1958) theorized that the capital structure of a firm does not affect its value. The Modigliani and Miller (MM) theory was based on ideal assumptions that do not exist in many countries. The MM theory did not put into perspective the reaction of lenders as capital shifts from equity to debt, a factor Smith and Watts (1992) examined and established that when capital structure shifts from equity to debt, lenders restrict borrowers in the usage of working capital, capital expenditure for fixed assets and equity re-investments.

This study focused on what happens to the value of shareholders as the proportions of debt and equity in the capital structure vary. Other theories or models reviewed are the Capital Asset Pricing Model (CAPM), the Fama-French three factor model, and the Fama-French plus Carhart four factor model.

Govindasamy (2010) analysed the impact of leverage on profitability in cement companies in India. This study established that leverage, profitability and growth are related and leverage has an impact on the profitability of the firm. Hasanhodzic, J. & Lo, A. W., (2010), in their study of a sample of all-equity financed companies found that the leverage effects were just as strong, if not stronger, implying that the inverse relationship between price and volatility was not based on leverage, but was more likely driven by time-varying risk premiums or cognitive mechanisms of risk perception.

Riddiough (2004), in a study of optimal capital structure articulated the economics underlying the market for outside finance in commercial real estates and established that mortgage debt is typically the optimal form of finance as it economizes on transaction costs and provides proper incentives for the property owners. An inside equity-outside mortgage financing maximizes comparative advantage. He concluded that for commercial real estate, debt financing was cheaper than equity. His study, however, did not involve numerical figures to show the contribution of debt financing to shareholders.

Brounen and Eichholtz (2001) examined the stock price reaction on announcements of additional equity and debt on European property companies' capital offerings. They established a positive reaction on employing more debt than equity as a result of perceived tax shield benefit from debt financing. The study justified the use of more debt than equity in an environment where capital markets are perfect. It is, however, not known whether the same results are true for unlisted

companies operating in an environment of developing imperfect capital markets as in the case of Uganda.

Theory on debt financing

The advantage of debt financing in taxation of business enterprises is that interest payments are tax deductible. They elude taxation at the corporate level, whereas dividends or retained earnings associated with stock are not deductible for corporation tax purposes. Debt financing improves the total amount of payments available for stockholders, Van Horne (2002).

Pandy (1997), states that the role of debt financing is to magnify the shareholders' return. The assumption that the fixed charge funds are obtained at a cost lower than the firm's rate of return on the assets was the basis for the magnifying impact of debt financing. Kakuru (2000), observed that whereas debt could be beneficial especially in times of economic boom, excessive debt financing will mean that business enterprises have high interest obligations and the burden of repayment of principal amounts periodically. Firms enter into agreements to borrow funds with a view to boosting their capital base, asset turnover and to enable them expand their operations. Debt financing was desirable when cost was lower than the expected rate of return on investment.

Elliott, B., W., Koëter-Kant, J., & Warr. R., S. (2008) found that the average book debt ratio for all firms was about 23%, compared to a market debt ratio of approximately 28%. On average, sample firms had earnings 6.7% of assets, before interest and taxes.

Omole. D. A., and Falokun. G. O., (1999) found a link between interest rates, corporate financing strategies, and the profitability of firms. Their study also revealed that interest rate liberalization had a link with the growth of the equity markets. On sectoral analysis, their study indicated that the interest rate liberalization does not seem to have similar effects on all the investigated quoted companies

Leverage Chance and Leverage risk

Pandy (1997), states that debt financing provides a potential of increasing shareholders' earnings only when the interest rate charged on borrowed funds is than the rate of return on assets financed by debt. When the rate of return falls below the cost of borrowed funds, the firm stands a risk of making a loss. Risk averse managers, under such circumstance, opt for increased equity financing.

This study used data from financial statements of business enterprises for specific sectors in Uganda, examined the changes in return on equity, and established that sectors that had the highest or lowest potential of maximizing shareholders' return from assets were financed by debt. This study found that volatility risk alone predicted 50% of credit default swap (CDS) spread variation, while jump risk alone forecast was 19%. After controlling for credit ratings, macroeconomic conditions, and firms' balance sheet information, it explained 77% of the total variation. Moreover, the marginal impacts of volatility and jump measures increased dramatically from investment grade to high-yield entities. The estimated nonlinear effects of volatility and jumps were in line with the model implying

that there was a relationship between equity returns and credit spreads (Benjamin Yibin Zhang, Hao Zhou, Haibin Zhu 2005).

In Uganda, firms that bring into use eligible property for the first time during the year of income enjoy initial capital allowance at the rate of 50%, 70% or 20% of the cost base (Section 29 of Income Tax Act 1997 and Sixth Schedule) depending on the location of the investment.

Capital structure and Return on Equity

Cohen (2004), in his illustration of the effect of Modigliani and Miller theorem on capital structure, used simplified financial statements and arrived at a generic conclusion that as the ratio of debt to equity in the capital structure of the firm increases, return on equity also increases. He assumed constant earnings before interest and tax (EBIT), and a constant cost of capital for all periods. In practice, EBIT cannot be constant within a firm or industry. Different firms apply different accounting policies (for example in the computation of depreciation of fixed assets). The rates and method of calculation vary from firm to firm. Operational expenses and sales volume may vary in response to changes in economic factors of a given country. In this study, empirical data from financial statements of business enterprises in Uganda was used to establish whether the same relationship as in Cohen's conclusion exists.

McDonald (2004) examined a number of factors that drive return on equity. He examined in detail profit margins of Corporate America in relation to the lowest long term interest rates, inflation rate and return on equity, Just in Time inventory management and turnover, restructuring and accounting charges (using Dow Jones Industrials) and return on equity. His study provided details establishing the extent to which leverage drives return on equity.

METHODS AND MATERIALS

Research Design

The purpose of this study was to establish the relationship between debt financing and return on equity. A longitudinal research design was used to analyze secondary data based on financial statements for the selected corporate taxpayers in Uganda. A descriptive survey research design method of investigation was used given the nature of the study which called for adequate description of the different combinations of debt and equity and the resultant return on equity.

Area and Survey Population

The survey population for the study was 99 large corporate taxpayers in construction and manufacturing classified by Uganda Revenue Authority and distributed as:

Table 1: Distribution of Large Taxpayers by Sector

SECTOR	CONSTRUCTI	MANUFACTURI	TOTAL
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	ON	NG	
NO. OF TAXPAYERS (n)	18	81	99

Source: URA Large Taxpayer Register, 2010

Each sector represented a stratum and from each stratum sampling units proportionate to stratum size were selected randomly.

Sample size and selection

Sample size determination

The researcher set confidence level at 95% and error term of ± 1 such that from table 1 and using the Z-distribution tables, the sample size was determined using the formula

$$n = \frac{NZ^2S^2}{NE^2 + Z^2S^2}$$

(Adapted from Kiregyera, 1999)

Where

N = Total number of companies

Z = 1.96 (for 95% confidence interval)

E = 1

S² = population variance

$$= \frac{\sum (x_i - \mu)^2}{N} = \frac{32^2 + 31^2}{99} = 20$$

$$\mu = \frac{99}{2} = 50$$

$$n = \frac{99 * 1.96 * 1.96 * 20}{99 * 1 + 1.96 * 1.96 * 20} = 7606.368 / 175.832 = 43$$

Sample selection

Sample size of 43 was obtained using Simple random sampling.

The response rate was as shown in table 2 below;

Table 2: Number of sample units per stratum

<i>Sector</i>	<i>Construction</i>	<i>Manufacturing</i>	<i>Total</i>
Sample units	5	20	25

Source: URA large tax payers register, 2011

Data collection

Research Instruments

The study used Uganda Revenue Authority Large Taxpayer registry document analysis, observation and taxpayer profile schedules that served as questionnaires. The URA staff working in the registry served as local agents through whom the information was collected. Each staff was given taxpayer profile schedules detailing the specific fields of data records.

Source of Data

The study involved the use of secondary data from financial statements of the selected companies and documents, textbooks and journals with data related to debt financing and return on equity.

Measurement of variable

Capital structure

The study used the ratio of total debt in the balance sheet to the total of ordinary share capital, retained earnings and other equity instruments to determine debt/equity fraction for all sectors of study.

Imputed interest rates

This was obtained by dividing total finance costs excluding foreign exchange movements with total short term and long term borrowed funds extracted from the balance sheets.

Return on equity

This was computed by dividing retained earnings for the year with ordinary share equity.

Leverage risk/ chance

Leverage risk and leverage chance were measured by comparing return on capital employed with imputed interest rate. Leverage chance was measured by the excess of return on capital employed over imputed interest rate and leverage risk was measured by the excess of imputed interest rate over return on capital employed.

Quality Control

Quality control was done by ensuring that data was obtained from the two sectors of the population eligible for the study. Data was cross checked for completeness and accuracy by the help of audited and published financial statements. Data schedules had a provision of coding each sample unit for purposes of editing the extracted data in the event of incorrect data capture by the local agents.

Model specification and estimation

Expanding on Modigliani and Miller's (1958) Proposition II, abnormal returns are estimated using the asset pricing models of Sharpe and Lintner (the traditional Capital Asset Pricing Model, Fama and French and of Carhart).

The estimated model is given by: $ROE = a + b_1 DER + b_2 LE$

Where:

a = represents factors other than Debt Equity Ratio and Leverage effect

b_1 = the regression coefficient of DER

b_2 = the regression coefficient of Leverage effect.

DER= Debt equity ratio

LE= leverage effect

Data Analysis

The study used a combination of Microsoft Excel and SPSS for analysis. Microsoft Excel was used to capture the financial statements and compute the debt equity leverage and return on equity ratios. Figures or graphs showing ratio trends were generated from the Microsoft Excel. Correlation and regression analysis were generated from SPSS to determine the magnitude of the relationship between study variables and to fit the debt financing model.

RESULTS/FINDINGS

Basis of categorization of firms in the sample

A total of 43 out of 99 large corporate tax payers in construction, manufacturing, oil industry, general trade, financial services and those in other services other than financial services were selected for the study. For each company data was extracted from financial statements for the period (2000 – 2010). The study used the list of the Large taxpayer Department that has been in use since the year 2000 with a distribution of the large taxpayer companies distributed as follows:

Table 3: Distribution of Large Taxpayers

<i>Sector</i>	<i>Number of companies</i>	<i>Sample size per sector</i>
Construction	18	5
Manufacturing	81	20
Total	99	25

Source: Large Tax Department tax payer List 2000-2010

Descriptive Analysis of findings

To answer the research questions and to achieve the objectives of this study, return on equity ratios, debt equity ratios, return on capital employed, leverage chance/risk and imputed interest costs were calculated for the construction and manufacturing sectors. The average ratios for the sectors under study were used to generate line graphs to depict trends of behavior of the study variables as shown in tables 4 and 5 and in figures 1 to 2 discussed in the subsequent sections of this report.

It was established that firms in these two sectors employed debt financing in their capital structure. The manufacturing sector had a higher debt proportion in its capital structure compared to construction. The study also performed analysis of variance (ANOVA) to determine whether there were significant differences among the various sample means for purposes of identifying those sectors that experienced high or low variations in the study variable. The results are summarized below:

Table 4: Mean and standard deviation scores for the study variables

	Minimum	Maximum	Mean	Std. Deviation
DEBT EQUITY	.1211	.8900	.4324	.3014
LEVERAGE CHANCE RISK	-.1430	.2030	.0272	.1081

IMPUTED INTEREST RATE	.1166	.3052	.1902	.0451
ROCE	-.0268	.3615	.2174	.1023
ROE	-.1858	.3069	.1328	.1151

Source: URA financial statements for selected large taxpayer companies 2000-2010

From table 4 and 5 the results were significant at 5% significance level ($\alpha = 0.05$). The computed values of F , in the F column in table 5 and the critical values F_c in the footnote to table 5 revealed that the computed F for ROCE, imputed interest rates, debt equity ratio and leverage chance and leverage risk was greater than the critical value of F . The F test for ROE showed that there were no significant differences between ROE of the two sectors of the study (the computed $F = 1.750 < F_c = 2.49$)

Table 5: ANOVA for study variables

		SUM OF SQUARES	MEAN SQUARES	F-COMPUTED	SIG
ROCE	Between groups	.381	0.07621	4.436	0.003
	Within groups	.618	0.00172		
	Total	.999			
ROE	Between groups	.010	0.00199	1.750	0.148
	Within groups	.409	0.00114		
	Total ROE	.509			
IMP. INT RATE	Between groups	.205	0.00410	19.296	.000
	Within groups	.008	0.00021		
	Total	.282			
DEBT/ EQUITY	Between groups	297.676	59.535	111.238	.000
	Within groups	19.267	.535		

	Total	316.943			
Leverage chance/leverage risk	Between groups	.536		6.145	.000
		.628			
	Within groups	1.164			
	Total				

Source: URA financial statements for selected large taxpayer companies 2000-2010

Table 6 shows sample means for each study variable per sector. The highest variations were realized in the debt- equity means with computed $F = 111.238$, p -value < 0.05 , compared to the critical $F=2.49$. Comparing the sector means with the population means in Table 4, the manufacturing sector controlled its debt equity ratio at an average of 0.0001 far below the industrial mean of 0.1773. Imputed interest rate, leverage chance and leverage risk and ROCE with computed F -values of 19.296, 6.145 and 4.436 respectively registered significant variations in their means.

Table 6: Summary of sector by sector means for each study variable

VARIABLE	SECTOR	N	Mean	F	Sig.
ROCE	Construction	7	.247148	4.436	.003
	Manufacturing	7	.187644		
	Total	14	0.434792		
ROE	Construction	7	.102404	1.750	.148
	Manufacturing	7	.163195		
	Total	14	.265599		
IMP.INT. RATE	Construction	7	.158460	19.296	.000
	Manufacturing	7	.221847		

	Total	14	.379307		
DEBT/EQUITY	Construction	7	.179727	111.238	.000
	Manufacturing	7	.685143		
	Total	14	.864870		
LEVERAGE - CHANCE/(RISK)	Construction	7	.008868	6.145	.000
	Manufacturing	7	.000034		
	Total	14	.008902		

Source: URA-financial statements for selected Large Taxpayer companies 2000-2010

Construction sector analysis

Average financial ratios for five construction companies for the years 2000 to 2010 were computed and summarized as in table 7.

Table 7: Financial Ratios for Construction Companies, 2000-2010

YEARS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ROCE	0.3615	0.3123	0.3306	0.3252	0.1492	0.2781	-0.0268	0.2471	0.2308	0.2192	0.2033
ROE	0.1448	0.3069	0.0877	0.0398	0.0637	0.2598	-0.1858	0.1024	0.0964	0.0663	0.0632
IMP.INT. RATE	0.1585	0.1410	0.1630	0.1963	0.1638	0.1700	0.1166	0.1585	0.1585	0.1610	0.1607
DEBT/EQUITY	0.1211	0.2031	0.2392	0.1546	0.1969	0.1743	0.1689	0.1797	0.1881	0.1860	0.1784
LEVERAGE - CHANCE/(RISK)	0.2030	0.1712	0.1675	0.1289	-0.0147	0.1082	-0.1434	0.0887	0.0723	0.0582	0.0426

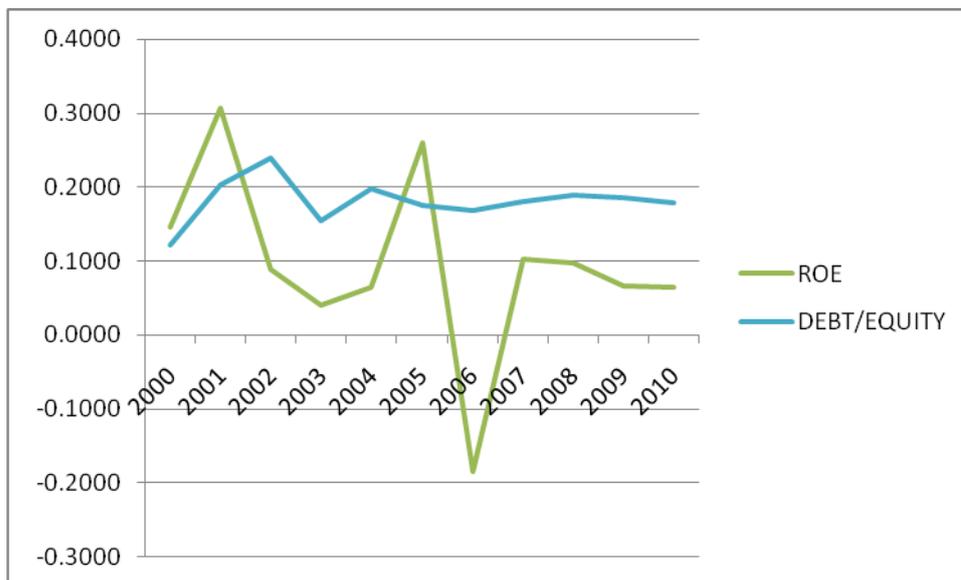
Source: URA -Construction company financial statements 2000-2010.

Capital structure of construction sector

Table 7 shows that debt to equity ratio was highest in 2002 at a rate of 24% and lowest in 2000 at 12%. This implies that over 76% of the capital structure of large corporate taxpayers in the construction sector in Uganda in the period of study was equity. Return on equity was highest at 31% in 2001 in the construction sector when debt-equity ratio was at 20%. The return on equity was lowest at 14% in 2003 when debt equity ratio reduced to 15% respectively. This trend is depicted by the line graphs in figure 4.1 that showed a general decline in return on equity as debt on equity declined over the years (2000 -2010).

A correlation analysis revealed a positive relationship between debt equity ratio and return on equity ($r = 0.125$, p - value > 0.05). This implied that as debt equity ratio increased in the construction sector during the period of study, return on equity increased respectively.

Fig 1: Debt/ equity and ROE trends for 2000-2010



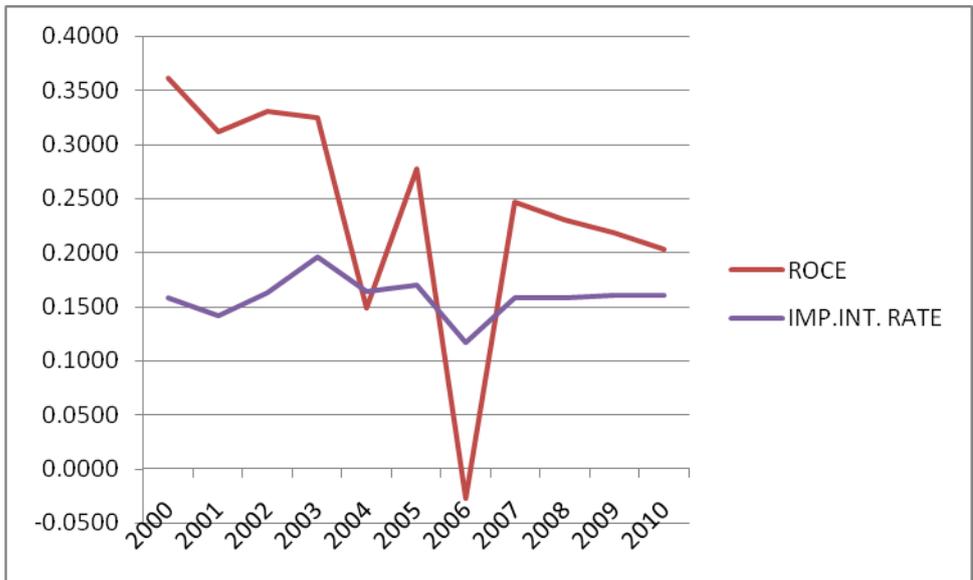
The coefficient of determination, r^2 , for debt equity ratio and return on equity indicated that the changes in debt equity ratio accounted for 2% of the changes in return on equity. Other factors accounted for 98% variation in return on equity. The positive correlation between the two study variables implied that shareholders' return increased or decreased with increase or decrease in debt proportion in the construction sector.

Leverage effect on return on equity in the construction sector

When debt is introduced in the capital structure, it introduces interest cost and other loan-related charges like commitment fees and insurance costs which have to be paid together with the principal loan repayments regardless of cash flow generating capacity of the firm. The total financing cost in the financial statements was attributed to debt financing. Imputed interest rate for construction sector was derived as the ratio of total finance costs to total borrowed funds in the balance sheet and the results were as shown in Table 3. Leverage chance and leverage risk was computed as the difference between return on capital employed (ROCE) and the imputed interest rate for each year. It was established that the construction sector experienced a leverage risk exposure in 2004 when ROCE fell below the imputed interest rates.

The general trend of leverage chance and leverage risk position of the construction sector is as illustrated in figure 2. The figure shows that construction sector had an advantage of leverage chance for all the years of the study except in 2004 and 2006. The figure shows that the greatest leverage chance effect was achieved in the period (2000 – 2003) and 2005 to 2006. In theory return on equity would follow a similar trend on the assumption that the managers of those companies deployed fixed assets profitably and did not revalue or change the depreciation policies to ensure a favorable return on capital employed against the imputed interest.

Fig.2: Leverage Chance and Leverage Risk trends for Construction sector for the period 2000-2010



A further analysis of leverage effect on return on equity using the ratios in table 7 revealed that at lowest imputed interest rate of 12% in the year 2006, return on equity was 19% and at the highest imputed interest rate of 20% in 2003, ROE was 3%. This was a prima-facie demonstration that the higher the imputed interest the lower the ROE. However, the study extended the analysis to cover other years in table 3. A correlation analysis of the study variables revealed a positive relationship between leverage chance and leverage risk and return on equity ($r = 0.76$, p -value < 0.05).

The coefficient of determination showed that the leverage effected accounted for 58% of the variations in return on equity while other factors accounted for 42%. This analysis confirmed the double-edged sword theory of debt financing. That is, shareholders would benefit from debt financing as long as the return on capital employed remained higher than the imputed interest rate and vice versa.

The extent to which debt financing magnifies return on equity (ROE)

To assess the extent to which changes in debt /equity proportion affects the shareholders return, the researcher performed a correlation analysis of debt/equity ratio and return on equity and

established that there was a positive correlation between the two variables ($r = 0.125$, p -values > 0.05). However, the relationship was weak. That is, the coefficient of determination, r^2 , demonstrated that changes in debt financing accounted for 2% of the changes in ROE. This implied that 98% of the variations in return on equity for the construction company were accounted for by other factors other than changes in debt to equity ratio during the period 2000 to 2010.

Considering these results above, this can be deduced that the mix of debt and equity in the capital structure in Uganda during the study period did not have a significant magnifying effect on return on equity instead the rate at which the funds were borrowed and other factors had a significant effect. These findings matched the Modigliani and Miller theory stated earlier in the literature review.

Manufacturing sector analysis

Financial statements for 20 out of 81 manufacturing companies in the large taxpayers unit of the Uganda Revenue Authority were examined in accordance with the research objectives and questions. Average financial ratios were computed and are summarized in table 8.

Table 8: Manufacturing Sector Computed ratios

YEARS	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
ROCE	0.1305	0.1574	0.1737	0.2094	0.2195	0.1937	0.2293	0.1876	0.1958	0.2013	0.2052
ROE	0.1757	0.1667	0.1689	0.1860	0.1660	0.1272	0.1518	0.1632	0.1614	0.1607	0.1595
IMP. INT. RATE	0.1931	0.2088	0.2067	0.2191	0.1982	0.2219	0.3052	0.2218	0.2260	0.2284	0.2315
DEBT/EQUITY	0.6500	0.8900	0.7270	0.8250	0.8430	0.2580	0.6030	0.6851	0.6902	0.6616	0.6523
LEVERAGE - CHANCE/(RISK)	-0.0626	-0.0514	-0.0330	-0.0097	0.0213	-0.0281	-0.0759	-0.0342	-0.0301	-0.0271	-0.0263

Source: URA-financial statements for manufacturing companies 2000-2010

Capital structure of manufacturing sector

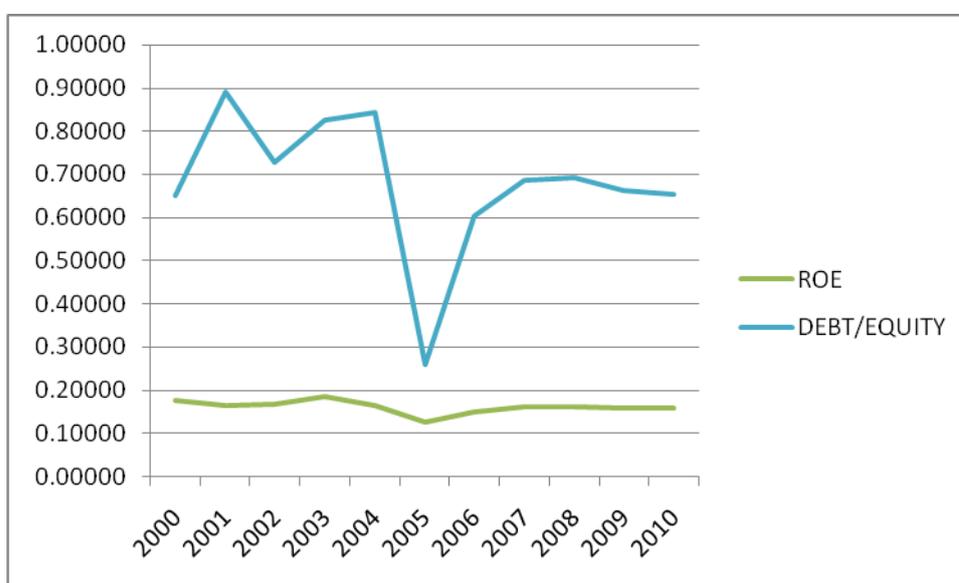
The computed debt to equity ratio for the manufacturing sector in table 8 shows that for the period 2000 to 2010, the ratio was highest in 2001 at 89% and lowest in 2005 at 25%. Apart from

2005, the debt equity ratios in this sector were above 60% indicating that the capital structure of manufacturing large corporate taxpayers in Uganda, for the period under study, was mainly debt.

Capital structure and return on equity for manufacturing sector

The line graph for debt equity ratio and return on equity in figure 3 shows that debt equity ratio ranged between a low of 26% in 2005 and a high of 89% in 2001 and ROE was 13% and 16% respectively. Figure 3 further shows that fluctuations in debt equity ratio were not proportionate to those in the ROE.

Fig 3: Manufacturing Company Trends



A correlation analysis of debt equity ratio and return on equity established that there was a positive correlation between debt equity ratio and return on equity ($r = 0.84$, p -value < 0.05). The coefficient of determination showed that 71% of the changes in return on equity in the manufacturing sector of large tax payers were attributable to changes in debt equity ratio. This implies that that for a 100% increase in return on equity, 71% was brought about by increase in debt equity ratio.

Leverage effect on return on equity in the manufacturing sector

In assessing the leverage effect on return on equity in this sector, the researcher compared ROCE and imputed interest rate. It was established that the manufacturing sector was exposed to a leverage risk throughout the study period with exception of the year 2004 when ROCE was greater

than the imputed interest rate. Figure 4 shows the general trend of ROCE and imputed interest rates during the period of study.

Fig. 4: Leverage chance and leverage risk trends for manufacturing sector for the period 2000 -2010

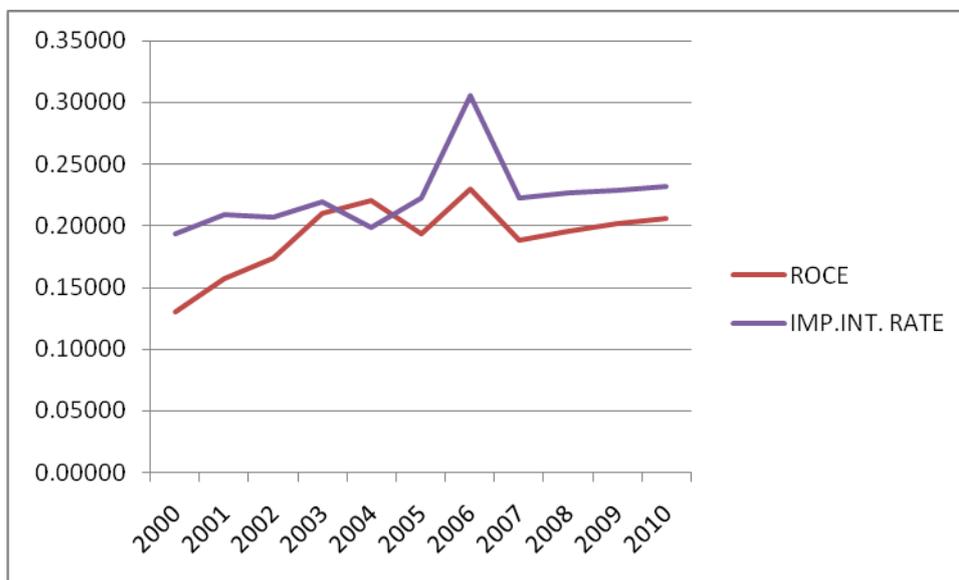


Figure 4 demonstrated that, apart from the year 2004, return on capital employed was above the imputed interest rate. The changes in imputed interest rates were in tandem with changes in ROCE. Imputed interest rate ranged higher than the ROCE for the period 2001 to 2010. This implied that firms that employed debt financing in this sector were exposed to a high risk of low return on equity for the period 2001 and 2010. The fluctuations in ROCE were an indication of fluctuations in cash flows in this sector.

The magnitude of imputed interest rate impact on return on equity was assessed using correlation coefficient analysis. The results of the analysis revealed that there was a negative correlation between return on equity and imputed interest in the manufacturing sector ($r = -0.36$, $r^2 = 13\%$, p -value >0.05). This implied that imputed interest accounted for 13% of the changes in return on equity. Other factors accounted for 87% of the variations in the return on equity in the period of study.

Debt equity ratio and return on equity in the manufacturing sector.

A correlation between debt equity and return on equity was computed. It was established that there was a positive correlation between the two variables ($r = 0.84$, p -value <0.05). The coefficient of determination for debt equity ratio and ROE showed that changes in debt equity ratio accounted for 71% of the changes in ROE. Other factors account for only 29% of the changes in

return on equity. This shows that debt equity ratio has a significant effect on return on equity in the manufacturing sector.

INFERENCEALANALYSIS

Sector suitable for debt financing

The study adopted the criteria of comparing debt equity ratio and the return on equity as a basis for establishing that sector suitable for more debt financing.

Table 9: A comparative view of the relationship between return on equity and the independent variables

Sector	Variables	Correlation coefficient r	Coefficient of determination r^2
Manufacturing	Debt equity Vs ROE	0.835	0.697
	Imputed Interest Vs ROE	-0.362	0.131
	Leverage Vs ROE	0.150	0.023
Construction	Debt equity Vs ROE	0.125	0.016
	Imputed Interest Vs ROE	0.319	0.102
	Leverage Vs ROE	0.763	0.582

Source: URA Financial statements for all sectors under study for 2000 to 2010.

The results in table 9 show that all sectors had a positive correlation between debt and equity. Manufacturing sector had the strongest positive correlation ($r = 0.84$) between debt equity ratio and return on equity and therefore more suitable for debt financing. This was followed by the construction sector as listed in a descending order.

Correlation matrix for all the study variables

Table 10: Pearson Correlation matrix for relationships between ROE and other independent study variables

Variables	ROE	ROCE	Imputed interest rate	Debt/Equity	Leverage chance/risk
ROE	1.000				
ROCE	.258	1.000			
IMPUTED INTEREST RATE	-.060	.111	1.000		
DEBT/EQUITY	.322*	-.527**	-.343*	1.000	

LEVEREGE CHANCE/RISK	.268	.872**	-.390*	-.320*	1.000
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*. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed)

Results in table 10 indicate a significant positive relationship between Debt to Equity Ratio and Return on Equity ($r = 0.322$, $p\text{-value} < 0.05$). This implies that high Debt to Equity ratio had a positive contribution to return on equity for all sectors and on average, changes in the proportion of debt equity in the capital structure accounted for 10% of changes in return. There was a negative weak relationship between imputed Interest rate with Return on Equity ($r = -0.060$, $p\text{-value} > 0.05$). This implies that high Imputed Interest rate reduced Return on Equity.

There was a positive relationship between ROCE and ROE ($r = .258$, $p\text{-value} > 0.05$). This revealed that ROCE positively enhanced ROE for the sectors under study.

Multiple Regressions

There was a linear relationship between Debt to Equity Ratio, Imputed Interest Cost, ROCE and ROE ($F = 7.340$, 0.001). This was derived from analysis of variance as summarized in the ANOVA table 11.

Table 11: ANOVA^b

MODEL	SUM OF SQUARES	MEAN SQUARE	F	Sig.
Regression	.187	0.00622	7.340	.001 ^a
Residual	.322	0.00084		
Total	.509			

a. Predictors: (Constant), Leverage chance/risk, Debt/Equity, Imp. Int rate

b. Dependent variable: ROE c. $F_c = 2.49$

The results in table 11 revealed a high correlation between ROCE and leverage chance/ risk.

The multiple regression analysis of the selected study variables was as summarized in the table 12.

Table 12: Multiple Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.0019	.043		.433	.667
IMP.INT. RATE	.571	.223	.425	2.563	.014
DEBT/EQUITY	0.0027	.006	.676	4.190	.000
LEVERAGE - CHANCE/(RISK)	.430	.109	.650	3.952	.000

Dependent var.=ROE; R = 0.606; R² = 0.367; Adjusted R²= .317

The regression analysis indicated that debt Equity Ratio, Imputed Interest Cost and Leverage chance explain 31.7% of the total variance of ROE for the whole population. Debt Equity Ratio explains more of the changes in ROE (Beta =.676) followed by Leverage Chance (Beta = 0.650) and Imputed Interest rate (Beta = .425). That is, the Beta coefficient shows that Debt to equity ratio had a significant effect of 68% on the changes in return on equity. All sectors had a positive relationship between return on equity and debt equity ratio.

The results imply that return on equity for all sectors would increase by shs.68 as debt proportion increased by shs.100. Imputed interest rate and leverage chance also had a significant impact on return on equity of 43% and 65% respectively. However, imputed interest had a weak negative 6% relationship with return on equity.

CONCLUSIONS

The study showed that all large corporate tax paying companies in Uganda used debt financing in their capital structure during the period of study. The manufacturing sector registered 0.89:1 in the year 2001.This showed that companies in Uganda combined debt financing with equity financing just like firms in Europe, Asia and USA as established by Booth et al., (2000). The debt equity ratio in Uganda was found to be higher (9.83:1) than that in Europe Asia and USA (0.734:1) as reported by Booth et al., (2000).

There was a positive correlation between debt equity ratio and ROE for all sectors. The manufacturing sector had the highest debt equity ratio and highest return on equity followed by the construction sector. These results conformed to Pandey's (1997) statement that debt financing magnifies shareholders' return. They also agreed with Brounen and Eichholtz (2001) conclusion that employment of more debt in the capital structure results in higher return to the equity holders.

The correlation between imputed interest and return on equity indicated a positive correlation between these two variables for all sectors. The results agreed with Van Horne (2002) statement that equity shareholder get a higher return on their funds when more debt is employed in the capital structure.

The findings in this study revealed that debt financing significantly magnified return on equity for all sectors. However, the magnifying effect was greatest in the manufacturing sector followed by the construction sector. This signified that the Manufacturing sector was more suitable for debt financing compared to the construction sector. Shareholders in those sectors would realize significant growth in the return on equity when debt financing is employed.

RECOMMENDATIONS

The research finding showed that for desirable growth in shareholder value, business entities should mix debt financing with equity financing provided the cost of the borrowed funds does not exceed the actual return from assets financed by debt. Sectors that had a positive correlation between debt ratio and return on equity with a coefficient of determination of 30% or more could blend equity financing with debt financing for a better return to the shareholders.

However, management of business enterprises in Uganda should cautiously consider other factors that accounted for 90% in changes in ROE, when choosing the mix of debt financing equity financing that would maximize equity holders' value. Over reliance on ROE may result into loss of investment in sectors (such as construction sector) that require a lot of initial capital for investments.

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**CODE OF CONDUCT AND ETHICS ON PERCEIVED FINANCIAL PERFORMANCE IN
UGANDA PUBLIC SERVICE: A CASE OF MINISTRY OF EDUCATION AND SPORTS IN
UGANDA**

BY:
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Abstract

The study examined the code of conduct and ethics and financial performance of the Ministry of Education and Sports in Uganda. There was deteriorating situation in financial performance as per audits of the Ministry despite having a code of conduct and ethics in place. A cross-sectional design followed by descriptive and correlation methods were used to examine and determine the relationship between the code of conduct and ethics with financial performance. The study found that the code of conduct and ethics positively explained 53.4% of the financial performance. There is ongoing need to focus on trust and transparency for improved financial performance of the Ministry.

Keywords: *Code of conduct and ethics, financial performance, Uganda.*

Background to the Study

The code of conduct and ethics for Uganda Public Service sets out standards of behaviour for public officers in the Public Service. It is designed to ensure the impartiality, objectivity, transparency, integrity and effectiveness of public officers when performing their duties (Lwamafa, 2004). It is intended to guide public officers in their behaviour and how they relate to each other and the public.

There are various forms of violation of the code of conduct and ethics by the public officers directly charged with accounting and financial management in the Ministry of Education and Sports (MoES). These include bribery, illegal use of public assets for private gain, payment of salaries to non-existent workers (ghost workers), payment for goods and services not supplied, fraud and embezzlement, ten percent commissions, misappropriation of public assets, removing documents from case files or even carrying off the whole file (Bertucci, 2006).

Statement of the Problem

The existence of a Code of Conduct and Ethics for public officers to enhance performance and reflect a good image of the public service and promote good governance has not stopped occurrence of financial malpractices in the Ministry of Education and Sports (Lwamafa, 2004). Although public officers are supposed to be accountable to the public for their financial dealings, they, however, rarely account for all resources under them. In the execution of official government business, the public officers directly charged with accounting and financial management have put themselves in a position where their personal interests conflict with their duties and responsibilities as public officers. They directly or indirectly enter into contracts with Government. This is unethical since it affects their impartiality. This research focuses on the effect of violations of the code of conduct and ethics on the financial performance in the Ministry of Education and Sports.

Purpose of the Study

The study seeks to establish the effect of the code of conduct and ethics on the financial performance in the Ministry of Education and Sports in Uganda.

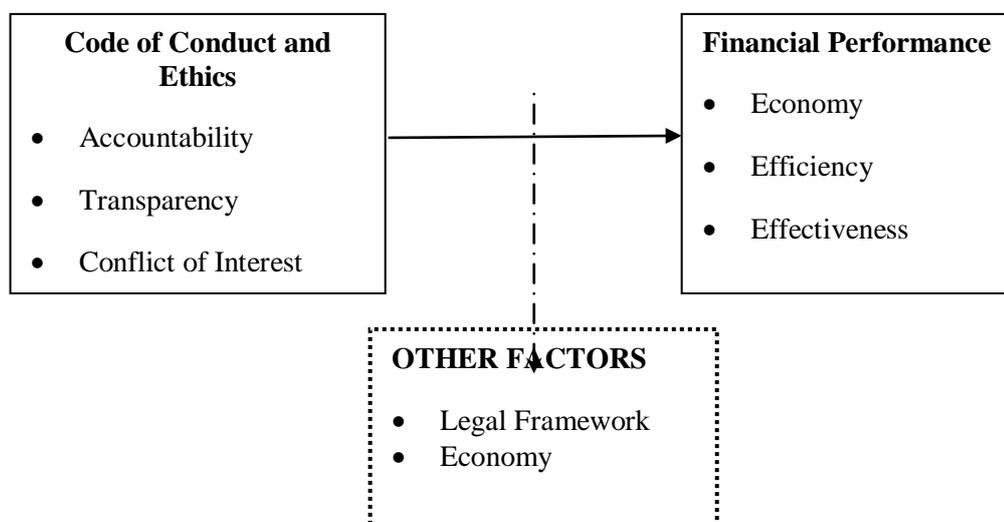
Objectives of the Study

- iv. To examine the structure of Code of Conduct and Ethics for the Ministry of Education and Sports.
- v. To examine the perceived financial performance in the Ministry of Education and Sports.
- vi. To examine the relationship between the Code of Conduct and Ethics and the perceived financial performance of the Ministry of Education and Sports.

Research Questions

- iv. What is the structure of the Code of Conduct and Ethics for the Ministry of Education and Sports?
- v. What is the level of perceived financial performance in the Ministry of Education and Sports?
- vi. What is the relationship between the Code of Conduct and ethics and the perceived financial performance of the Ministry of Education and Sports?

Conceptual Framework



Source: Authors

A code of conduct is a principle that sets out standards of behavior for public officers. It is designed to ensure the impartiality, transparency, integrity, efficiency and effectiveness of public officers when performing their duties. It is intended to guide public officers in their behavior and how they relate to each other and the public, (Lwamfa, 2006).

The conceptual framework demonstrates that the Code of Conduct and Ethics is instrumental in ensuring good financial performance management. In the same way accountability, transparency and conflict of interest make the operation of controls in financial management possible. In so doing, financial management is smoothly carried out. However there are other factors that seem to influence the effectiveness of accountability, transparency and conflict of interest. In the conceptual framework, they are shown to be the economy and the legal framework.

LITERATURE REVIEW

Code of Conduct and Ethics

According to Baron (2000), ethical standards in major corporations are coming under scrutiny, and financial institutions have been challenged about conflicts of interest and their investment advice. Considering that ethical scandals have been exposed even in the very large corporations, e.g. Enron, WorldCom etc., managers are becoming more conscious of how they are perceived by the public, and want to be seen as 'ethical'. Corporate codes of business ethics studies generated evidence of a positive relationship between ethics/ CSP and financial performance (Orlitzky, Schmidt and Rynes, 2003).

Although quite a number of researchers have revealed that there is a positive relationship between ethics and financial performance, a few others have found that this said link could neither be proved nor disproved. Barnett and Salomon (2003) supported the inconclusiveness of these previous studies when they said that despite the intensity of study directed at it, the relationship between Code of ethics and financial performance remains in dispute.

Orlitzky, Schmidt and Rynes (2003) describe business ethics as the application of moral philosophies to issues in business. Its goal is to describe morally good behaviour for managers and corporations as a whole. It can also be defined as the study of business situations, activities and decisions where issues of right and wrong are addressed and it deals with those issues not explicitly covered by law. In some cases, ethical and /or socially responsible behavior can be considered an investment in transparency and trust, and consequently, help reduce transaction costs within and

across an organisation. Ethical Investment Research Services (EIRIS) (2005) defines business ethics as how a company conducts its business and the behaviour of its employees.

Constructs of Code of ethics

The values of integrity, transparency and accountability in public administrations have enjoyed resurgence within the past three decades or so. Sound public administration involves public trust. Citizens expect public servants to serve the public interest with fairness and to manage public resources properly on a daily basis. Fair and reliable public services and predictable decision-making inspire public trust and create a level playing field for businesses, thus contributing to well-functioning markets and economic growth (Elia, 2005).

Accountability

According to Elia (2005), accountability refers to the obligation on the part of public officials to report on the usage of public resources and answerability for failing to meet stated performance objectives. In leadership roles, accountability is the acknowledgment and assumption of responsibility for actions, products, decisions, and policies including the administration, governance, and implementation within the scope of the role or employment position and encompassing the obligation to report, explain and be answerable for resulting consequences.

Recently, accountability has become an important topic in the discussion about the legitimacy of international institutions. Because there is no global democracy to which organizations must account, global administrative bodies are often criticized as having large accountability gaps. One paradigmatic problem arising in the global context is that of institutions such as the World Bank and the International Monetary Fund who are founded and supported by wealthy nations and provide aid, in the form of grants and loans, to developing nations (Hunt, 2008).

Schedler (1999) urged that internal rules and norms as well as some independent commission are mechanisms to hold civil servant within the administration of government

accountable. A strong accountability regime ensures public resources are used effectively and efficiently, promotes ethical and policy-based decisions, rewards good performance and carries consequences when rules are knowingly broken (Ben and Anderson, 2007). Aucoin and Jarvis (2008) maintain that there is another side of accountability which should allow for and support decision-making, and provide feedback to inform program delivery and outcomes performance.

Transparency

Transparency refers to unfettered access by the public to timely and reliable information on decisions and performance in the public sector (Elia, 2005). Winkler (2002) emphasizes the idea that transparency needs to be better defined before it can be debated.

Geraats (2001) created taxonomy of five categories of transparency in the public service, namely: political, economic, procedural, policy, and operational.

Conflict of interest

A conflict of interest occurs when an individual or organization has an interest that might compromise their actions. The presence of a conflict of interest is independent from the execution of impropriety (Thacker, 2006). More generally, conflict of interests can be defined as any situation in which an individual or corporation (either private or governmental) is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit.

Depending on the law or rules related to a particular organization, the existence of a conflict of interest may not, in and of itself, be evidence of wrongdoing. A conflict of interests can, however, become a legal matter for example, when an individual tries (and/or succeeds in) influencing the outcome of a decision, for personal benefit (McDonald, 2006). Davis and Andrew (2001) noted that there often is confusion over these two situations. Someone accused of a conflict of interest may deny that a conflict exists because he/she did not act improperly. As codes of ethics cannot cover all situations, some governments have established an office of the ethics commissioner (Porter and Thomas, 2002).

Constructs of Financial Performance in the Public Sector

According to Belli, Anderson, Barnum, Dixon, & Tan (2001), Value for Money (VfM) is the term used to assess whether or not a government agency has registered a good or bad financial performance.. Achieving VfM may be described in terms of the 'three Es' - economy, efficiency and effectiveness.

Relationship between Code of Ethics and Financial Performance

The relationship between code of ethics and financial performance has been a primary issue in the field of business and society over the past 25 years. Significant research has been carried out in several geographical locations, with different parameters for defining 'ethical' and 'corporate social responsibility' and using numerous proxies for financial performance. According to the findings of Orlitzky *et al* (2003), the code of ethics has a positive impact on financial performance and is strongest in the UK context.

Griffin and Mahon (1997) supported the theory of the positive code of ethics and financial performance relationship. They demonstrated this by studying and classifying the results of 62 studies, spanning 25 years of research, into three categories; positive, negative and no effect/inconclusive. They identified 33 results that found a positive relationship, 20 with negative results and 9 which found no relationship or were inconclusive. With respect to the relationship between code of ethics and financial performance, Verschoor (1998) found that companies publicly committing to follow an ethics code as an internal control strategy achieved significantly higher performance measured in both financial and non-financial terms. Similarly, Berrone, Surroca and Tribo (2005) found that firms with a strong ethical identity achieve greater degree of stakeholder satisfaction, which in turn, positively influence the firm's financial performance.

However, in contradiction to the studies above, there have been a few studies such as Abbot and Monsen (1979), Ingram and Frazier (1983) and Freedman and Jaggi (1986) which found no

relationship between code of ethics and financial performance, and furthermore, others such as Vance (1975), Shane and Spicer (1983) and Hill, Kelley and Agle (1990) have shown that a negative code of ethics and financial performance relationship exists.

METHODOLOGY

Research Design

A cross sectional research design was used and selected because it ably facilitated the collection of data from the different strata of respondents namely accounting officer, accountants, auditors, accounts assistants and department heads.

Study Population

The study population was employees from middle to top level managers in departments of Accounts, Audit, Procurement, Finance and Administration at the Ministry's headquarters in Kampala who are 140 permanent staff in total.

Sample Size

As Ministry of Education and Sports maintains a total of 140 staff at the top and middle level as managers, the sample size for this study will be 60 respondents. This has been determined in line with Roscoe's (1970) rule of thumb that states sample size between 30 and 500 as sufficient. This number is considered to be large enough to yield reliable data and to guard against non-responses.

Sampling Design and Procedure

Simple random sampling and purposive sampling designs were used to select the 60 respondents and managers respectively.

Measurement of Variables

The independent variable had three major constructs that included accountability, transparency and conflict of interest, while the dependent variable had constructs which mainly summarised the Value for Money concept (Effectiveness, Efficiency, and Economy).

e) Accountability

This was measured by identifying its attributes such as rules, procedures and regulations. These were measured in terms of the degree of divergence between the accepted standards and the actual prevailing practices. Therefore, to test perceived accountability, a set of statements were used and applied to a five-point Likert scale ranging from strongly agree (5), Agree (4), Not sure (3), Disagree (2) to strongly disagree (1).

f) Transparency

This construct was measured by examining the degree of regression of the current practices on the required practices. The attributes to be used in measurement included adherence to transparency regulations, policies, procedures and rules. These were measured on a five-point likert scale ranging from strongly agree (5), Agree (4), Not sure (3), Disagree (2) to strongly disagree (1).

g) Conflict of Interest

This was measured by looking at the extent to which individuals have interest that might compromise their actions by using a five-point Likert scale that range from strongly agree (5), Agree (4), Not sure (3), Disagree (2) to strongly disagree (1).

h) Financial Performance

This was measured using the three indicators of Value For Money (VFM) for financial performance in the public sector, namely: economy, efficiency, and effectiveness.

Data Collection Sources and Instruments

The study used both primary and secondary sources. Secondary data was acquired from existing literature such as internal reports, previous research done on the company, internal memos, minutes of meetings, journals, textbooks and the Internet

Validity

The validity of an instrument is defined as the ability to an instrument to measure what it is intended to measure. Content validity index was used to determine the relevancy of the questions. A four point scale of relevant, quite relevant, somewhat relevant and not relevant was applied and two experts rated the instrument as follows; expert one CVI was 0.7395 and expert two CVI was 0.7175. This implied that all questions were relevant to study variables.

Reliability

The reliability of an instrument is defined as the consistency of the instrument in picking the needed information. Reliability (Internal consistency and stability) of the instruments was tested using Cronbach's Alpha (α) coefficient (Cronbach, 1946), to ensure that there is the consistency of respondents' answers to all items in the measure.

Variable	Cronbach alpha
Accountability	.6753
Transparency	.7459
Conflict of Interest	.6165
Code of conduct and ethics	.6987
Economy	.7597
Efficiency	.7865
Effectiveness	.8548
Financial Performance	.7869

Source: Primary data

All Cronbach coefficients are above 0.60, implying the scales used to measure study variables were consistent and therefore reliable.

Data Processing, Analysis and Presentation

Data collected was compiled, sorted, edited, classified, coded into a coding sheet and analysed using a Computerized Data Analysis tool/package called SPSS 17. This package generated descriptive statistics about the study variables and regression analysis was used to predict the relationship between the study variables. Pearson's correlation analysis determined the existence and significance of the relationship between the study variables.

DATA PRESENTATION, ANALYSIS AND INTERPRETATION

Data analysis

Data was analyzed by using descriptive statistics, factor analysis, and correlation and regression analysis.

Examining the structure of code of conduct and ethics

Most of the items means were approximately 4 and above which is the score for agree and strongly agree, implying that the code of conduct and ethics largely exists in the MOES. The Ministry officials have an obligation to report on the usage of public resources and answerability for failing to meet the stated performance objectives (mean score 4.3810), are answerable for failing to meet the stated performance objectives (mean score = 4.3952), acknowledge and assume responsibility for actions within the scope of their employment under the reporting obligations (mean score = 4.0952) and acknowledge and assume responsibility for decisions within the scope of their employment under the reporting obligations (mean score = 3.9048).

The study also found that MOES officials acknowledge and assume responsibility for their policies within the scope of their employment (mean score = 4.0476), there are internal rules and norms that hold Civil Servants accountable (mean score = 4.5238) and there are independent commissions that hold Civil Servants accountable (mean score = 3.5714).

The government of Uganda has a strong accountability regime that ensures that public resources are used "effectively and efficiently"(mean score = 3.9524), promotes ethical and policy-based decisions, motivated by a concern for the public interest (mean score = 3.8095) and has a mechanism that carries consequences when rules are knowingly broken (mean score = 3.8571) and also has a mechanism that embraces accountability (mean score = 4.0952).

The study found that the MOES supports the participation of citizens and organizations in public policy development issues (mean score =4.0000), created a relationship that allows for and

supports decision making (mean score = 3.7143), and created a relationship that allows for and supports feedback that informs delivery and outcomes performance (mean score =3.666).

Examining the relationship between code of conduct and perceived financial performance

Most of the items under this public service objective have means above 3.5 indicating that respondents that MOES officials meet the minimum performance targets set out in their performance contracts.

The ministry always ensures that in every process, there is the best use of resources by getting it right first time (mean score = 4.1852), and every staff in the MOES endeavors to optimally use resources in the attainment of the ministry's objectives (mean score = 3.6296).

Examining the relationship between code of conduct and ethics and perceived financial performance

The study found a significant positive relationships between code of conduct and perceived performance ($r=.715$, $p\text{-value}<0.01$). This implies that code of conduct and ethics enhances the performance of MOES in terms of efficiency, effectiveness and economy.

Further, the study found significant positive relationships between accountability and financial performance which implies that accountability improves financial performance. There are also significant positive relationships between transparency and financial performance implying that transparency improves the ministry's financial performance. Analysis of the relationship between conflict of interest and financial performance showed no significant relationship with efficiency ($r=.285$, $p\text{-value}>0.05$). Trust had a significant positive relationship with financial performance ($r=.383$, $p\text{-value}<0.05$).

The study found that transparency and trust significantly predicted 53% financial performance of MOES ($F=11.299$, $Sig=0.000$). However, accountability and conflict of interest did not have a significant predictive relationship with respect to financial performance. The results

obtained and described above are in line with the findings of Orlitzky *et al* (2003), which indicate that the code of ethics has a positive impact on financial performance.

Conclusion and recommendation

The study concludes that the code of conduct and ethics is a determinant of the financial performance of the Ministry of Education and Sports in Uganda. Transparency and trust are the most important aspects of the code of conduct in the Ministry. It is, therefore, concluded that there is need for public servants in Uganda in general, and those of the Ministry of Education and Sports in general, to uphold transparency and trust in the performance of their duties. This has a positive impact on the government's financial performance.

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AGENT BASED REALTIME CONTINUOUS AUDITING

By

Tirus Mutoru, Elisha Opiyo and William Okello-Odongo

Abstract

Within the industry there is a lack of some monitoring decision support systems that enable the implementation of continuous auditing. This leads to the lack of a reliable process to ensure that the real time transactions also benefits from real time monitoring so that financial losses are prevented. The distinctive character of continuous auditing is the short time lapse between the facts to be audited and the correction of evidence and audit reporting. Software packages exist which offer batch processing of extracted data and they can perform powerful examination of transactions. These Computer Assisted Audit Tools (CAATS) are routines that are common among auditors around the world, but they only exist in the batch mode and depend upon the creativities of the operators utilizing them. They also to some extent depend on the speed, integrity and willingness of Information Technology department to extract and provide data from the databases. A solution to this problem is suggested through an audit approach that guarantees a better monitoring of controls within an organization. It is based on a distributed problem solving multi-agent systems (MAS) technique. A system, multi-agent system for continuous auditing (MASCA) is presented. The system is characterized by group of individual agents cooperating to identify audit exceptions and report in a timely manner. Automated processes which are usually monitored and reviewed by human auditors are automatically monitored real-time and reported by the group of agents within the system. We report a successful implementation of a multi-agent system for continuous auditing. The professional users who evaluated the system, found it useful and acceptable. The system performs the continuous monitoring and reporting to a level that is acceptable to the audit professionals.

1 Introduction

Within the industry there is a lack of some monitoring decision support systems that enable the implementation of continuous auditing. This leads to the lack of a reliable process to ensure that the real time transactions also benefits from real time monitoring so that financial losses are prevented.

The distinctive character of continuous auditing is the short time lapse between the facts to be audited and the correction of evidence and audit reporting. Software packages exist which offer batch processing of extracted data and they can perform powerful examination of transactions. These Computer Assisted Audit Tools (CAATS) are routines that are common among auditors around the world, but they only exist in the batch mode and depend upon the creativities of the operators utilizing them. They also to some extent depend on the speed, integrity and willingness of Information Technology department to extract and provide data from the databases. A solution to this problem is suggested through an audit approach that guarantees a better monitoring of controls within an organization. It is based on a distributed problem solving multi-agent systems (MAS) technique. A system, multi-agent system for continuous auditing (MASCA) is presented. The system is characterized by group of individual agents cooperating to identify audit exceptions and report in a timely manner. Automated processes which are usually monitored and reviewed by human auditors are automatically monitored real-time and reported by the group of agents within the system. We report a successful implementation of a multi-agent system for continuous auditing. The professional users who evaluated the system, found it useful and acceptable. The system performs the continuous monitoring and reporting to a level that is acceptable to the audit professionals.

Depending on the risk levels and impact of findings, the Board authorizes senior management to oversee implementation of corrective action which could be; strengthening/addition of controls, insuring the risk, or ignoring the risk. The audit reports are tabled in the Board audit committee.

According to Institute of Internal Auditors' Global Technology Audit guide 3 (Coderre 2007), continuous auditing is defined as the automatic method used to perform control and risk assessments on a more frequent basis. As the guide states, technology plays a key role in continuous audit activities by helping to automate the identification of exceptions or anomalies, analyze patterns within the digits of key numeric fields, review trends, and test controls, among other activities.

Audit work is guided by an organization's policies and the regulatory requirements. The Audit charter forms the contract between the Audit function and the Board of Directors to which auditor's report to.

Audit work involves review of computer system controls, financial controls and process/transaction controls. The frequency of the review in a continuous auditing (CA) environment differentiates continuous auditing from periodic traditional auditing. In continuous auditing the controls, transactions and financial reports are reviewed as soon as the data/evidence becomes available. The "continuous" aspect of continuous auditing and reporting refers to the near real-time capability for financial information to be checked and shared.

The interval management choices for evaluation depend on the frequency of updates within the accounting information systems. Analysis of the data may be performed hourly, daily, weekly, monthly, etc. depending on the application. The controls and process are owned by specific individuals within an organization. The responsible individuals (Auditees) are answerable to the audit findings that may be raised within their operational environment.

The need for continuous auditing thus arises.

2 Need for Continuous Auditing

2.1 Why Employ multi-agent systems in Continuous Auditing?

Auditing domain lacks a monitoring decision support system enabling implementation of continuous auditing was the main driver. Thus there is need for a reliable process to ensure real time transactions also benefits from real time monitoring and thus prevents financial losses. The distinctive character of continuous auditing is the short time lapse between the facts to be audited and the correction of evidence and audit reporting.

Ways are sought to provide an audit approach guaranteeing a better monitoring of controls within a company.

2.2 Issues in Continuous Auditing

The following are the key domain issues.

First there is need to have an efficient continuous controls monitoring approach. Secondly there are different people with different (some possibly conflicting) goals. Auditees want zero reporting; auditors have to report while the board requires the position as is. Thirdly, having multiple agents could speed up a system's operation by providing a method for parallel computation. Since multi-agent systems are inherently modular, it should be easier to add new agents to a multi-agent system than it is to add new capabilities to a monolithic system. Finally elucidation of intelligence can be done to study intelligent patterns in continuous auditing. As Weiß (1996) put it: Intelligence is deeply and inevitably coupled with interaction''. Intelligence patterns in continuous auditing can be studied.

2.3 Sample Scenario

A bank's branch has a cash holding limit (say Kshs. 20 million) which is defined for each branch in accordance to Central Bank of Kenya guidelines. At close of business at 4:30pm the branch tellers collate their cash which is summed together with the cash in the vault to determine current branch cash holding limits. If the cash exceeds 20 million Insurance companies cannot pay for any losses recorded, Central Bank may impose a fine as well. To prevent this kind of a scenario periodic reviews are done by the branch manager during the day. These cash position reviews are time consuming and prone to errors. The branches are often caught unawares with excess cash and penalties are paid to Central Bank.

3 System's Architecture

Multi-agent based technologies were used in developing the system for decision support in continuous auditing.

Continuous auditing is a distributed problem and it's dynamic. A distributed problem solving multi-agent based system was designed for this problem domain. The system was characterized by group of individual agents cooperating to identify audit exceptions and report in a timely manner. Automated processes which are monitored and reviewed by human auditors was monitored and reported by the group of agents within the multi-agent system. Essentially multi-agent system for continuous auditing removes the need to have a huge number of auditors within an organization.

Below is the architecture of the multi-agent system for continuous auditing.

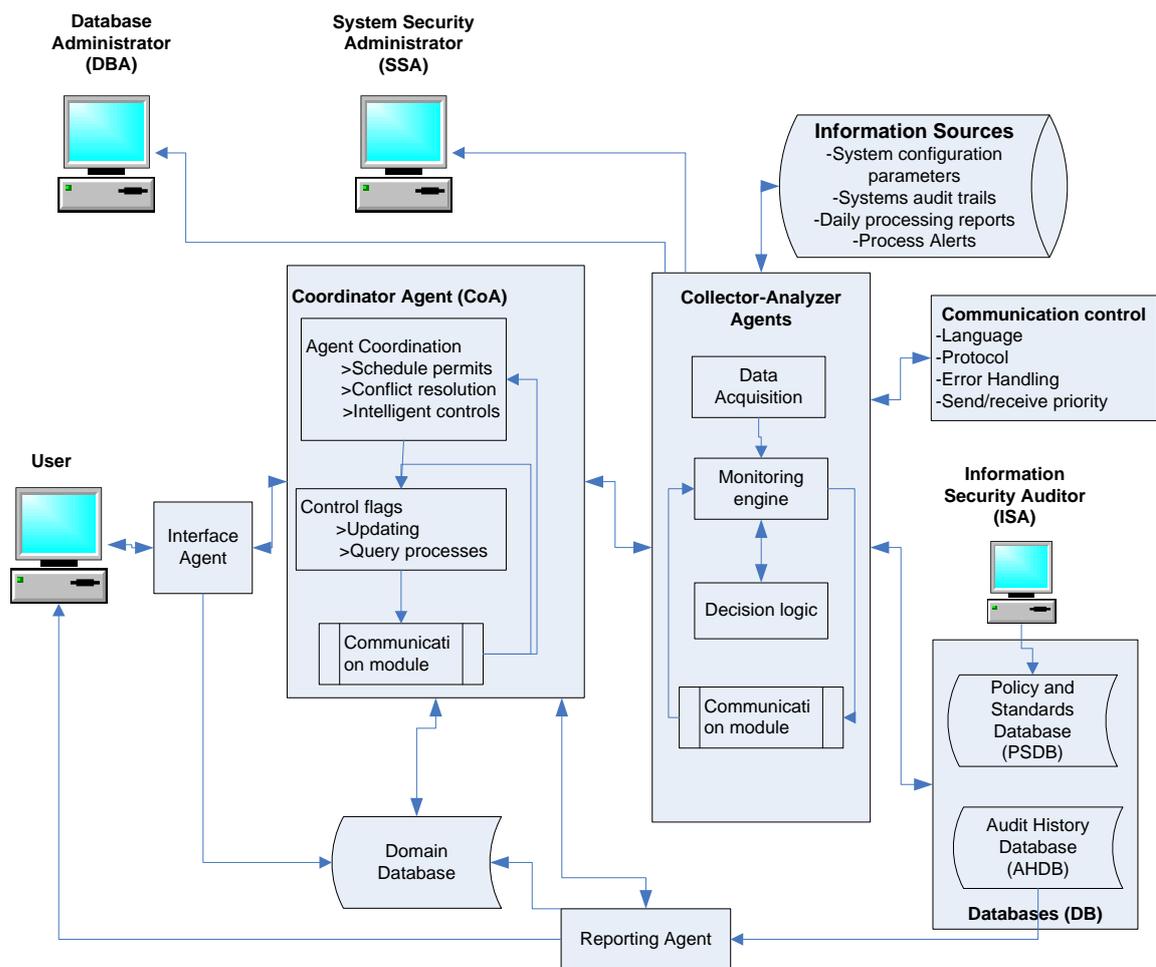


Figure 1: Architecture for the multi-agent system for continuous auditing

The agent design was generally based on the following:

Agent reviews the policy database to determine violation criteria for its tasks, then reviews the target (text file, database entries, and system setting) for task identifiers and finally if there are exceptions the exceptions is reported into the audit history database.

4 Experimentation

The PC running the application system was setup in the banking environment as a system demo. This PC together with other PCs and check/audit variables within the banking environment were used as the test environment and were presented to prospective users who included: IS auditors, Internal Auditor and IT Systems Administrators. Each Agent's tasks were tested over a period of 5 days (15th to 19th November 2010).

Below is a summary of the multi-agent system for continuous auditing review by auditors from various banks within Kenya.

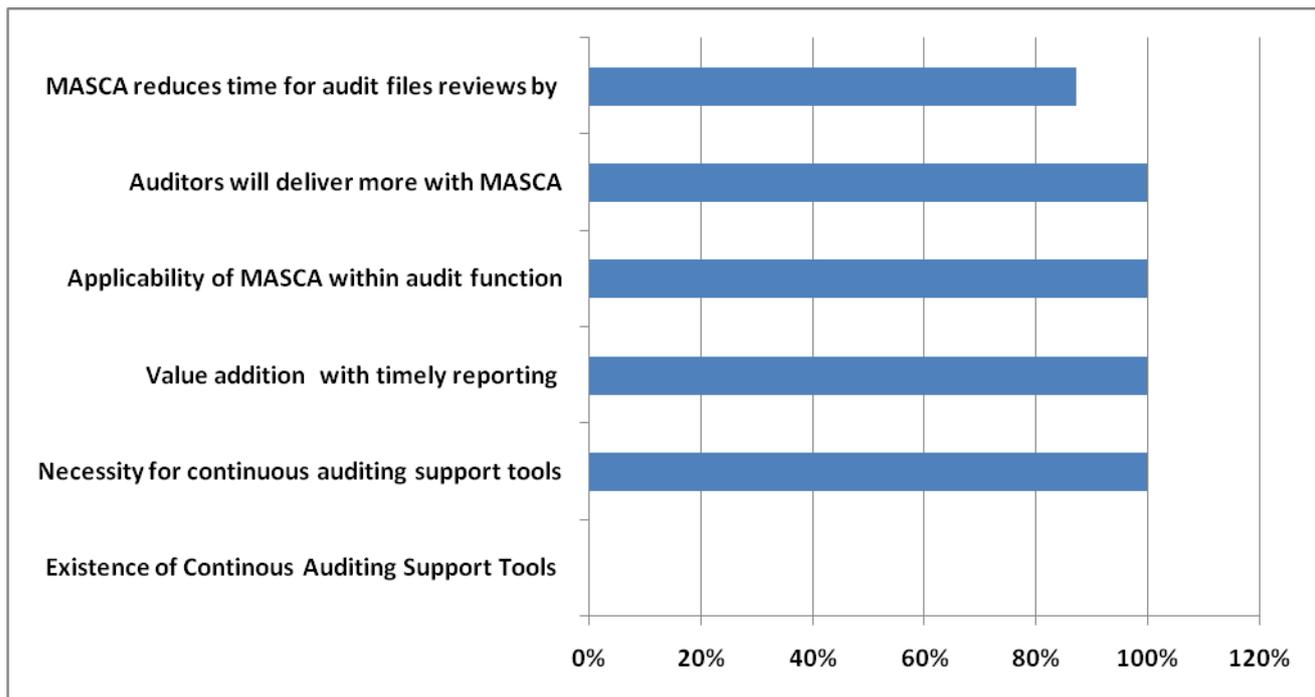


Figure 2: Test results by audit professionals

5 Related Works

Software packages exist which offer batch processing of extracted data and they can perform powerful examination of transactions. These Computer Assisted Audit Tools (CAATS) routines are common among auditors around the world, but they only exist in batch and depend upon the whims of operators utilizing them. They also to an extent depend on the speed, integrity and willingness of IT department to extract and provide data from the databases. The alerts sent (emails and text to mobile phones) may be triggered by fairly primitive events and are certainly not rule based.

6 Conclusions

A multi agent approach in continuous auditing support was successfully implemented and demonstrated. User acceptance test feedback ascertained the following:

Multi-agent system for continuous auditing was able to identify exceptions faster than in traditional auditing. I.e. agents recognized an exception close to the time of its occurrence by analyzing large data files far much faster than human based analysis. The system of agents reported audit findings as soon as they were identified.

Information System Auditors output would be increased since there was no time-consuming reviews of large files.

With the multi-agent system for continuous auditing implementation there is increased value in audit reports since, the findings are recent and thus relevant to management.

Multi-agent system for continuous auditing implementation enabled the distinctive character of continuous auditing; short time lapse between an audit-incidence occurrence and identification of the incidence to be attained. An enterprise can thus accrue the benefits of continuous auditing by deploying the multi-agent systems based system. Since multi-agent systems are inherently modular, it was easier to add new agents to the multi-agent architecture to address future needs. The research project demonstrated that through a multi-agent based system for continuous audit support, leveraging on technology offers continuous audit considerable advantages over traditional auditing.

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Analysis of Price Fluctuations Using a Markov Chain Model: A Case Study of Dar es Salaam Stock Exchange (DSE).

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Abstract

Price movements are normal phenomena in the market. However, if the nature or trends of fluctuations are known, they will help to measure the efficiency of the market for the decision making in the future development of the firm concerned. In this study price fluctuation at the DSE in Tanzania is analysed. Three levels or states of price movements are identified as “Unchanged price”, “Gain in price” or “Loss in price” with reference to the immediate price. Six years secondary data collected from DSE records are analysed and found to satisfy the randomness test, a requirement for Markov chain modelling. The matrix approach of the Markov chain model is used such that the transition probability matrix and steady state vectors of different periods are obtained using Maple software. Findings of the study reveal that using the steady state vectors, (0.5177, 0.2820, and 0.2003); about 52% of the time, the price remained unchanged, 28% of the time the price increased and 20% of the time the price decreased. The results of this work should be taken into consideration by all partners as suggested in the conclusion section so as to improve the future performance of their firms.

Keywords: Price fluctuations, Markov chain model, transition probability matrix.

1. Introduction

Many processes in nature, industry, environment, human behaviour and stock market can be modelled mathematically. Price variation in the stock exchange can be studied and modelled using a stochastic model known as the Markov chain. Through this model, it is possible to explain the current and future behaviour of the market through prediction as long as the market is efficient, Sundararajan et al. (2009) and Vasanthi et al. (2011). The price fluctuation is the price change for a given future contract in a single day as determined by the exchange. In this study, price fluctuations in the Dar es Salaam Stock Exchange (DSE) are analysed. Prices of stocks also fluctuate from day to day, and even from hour to hour. It is obvious that they must also be affected by some factors. In the book by Hirst (1912), possible factors are the seller's or buyer's limits on the price orders, bad or good information about the company with listed stocks, sudden impact of national or/and international political events.

A study by Ahmed (1989) on *Rice Price Fluctuation and an Approach to Price Stabilization in Bangladesh* revealed the main causes of fluctuations as demand and supply forces, and the expectation of the market actors concerning future prices. Mason (1971) in his study revealed that the nature of prices of commodities and services for any period of time would be rising, falling or remaining at about the same level. This gave rise to three possible states of transition probability matrix in the prediction model. Seiler (1997) did a study to examine the degree of random walk in daily stock prices for all stocks listed by the New York Stock Exchange from July 1962 to February 1985. The results showed that the confidence intervals associated with each of the analyzed listed stock data were consistent. Furthermore, changes in historical stock prices were completely random for each forecasting period indicated. However, monthly and weekly return patterns were found to be significant and were still unsuccessful in predicting future price movements.

A stochastic process is a collection of random variables $\{X(t), t \in T\}$, where T is the index set of the process and t denotes time. $X(t)$ is the state of the process at time t . The set of all possible values that $X(t)$ can take is called the state space of the process and is denoted by S . The stochastic process is classified as discrete in time when the index set is finite or countable infinity, i.e.: $T = \{X(t), t = 0, \pm 1, \pm 2, \dots\}$ or $T = \{X(t), t = 0, 1, 2, \dots\}$, e.g. time in months, years, decades etc. Otherwise it is continuous where T is defined as $T = \{X(t) : -\infty < t < \infty\}$ or $T = \{X(t) : t \geq 0\}$.

A Markov chain, which uses the theory of conditional probability, is the stochastic process whose state space is discrete and defined as:

$$\begin{aligned} P(X(t_n) \leq x_n \mid X(t_1) = x_1, X(t_2) = x_2, \dots, X(t_{n-1}) = x_{n-1}) \\ = P(X(t_n) \leq x_n \mid X(t_{n-1}) = x_{n-1}) \end{aligned} \quad (1)$$

where x_1, x_2, \dots, x_n are any real numbers for all $t_1 < t_2 < \dots < t_n$.

This implies that, in order to compute the probability of an event in the future given the knowledge of the past and present, one needs to be concerned about the present and not the history. A Markov chain can be expressed by the use of the matrix called transition probability matrix. It can be assumed that for all i and j and all t $P(x_{t+1} = j | x_t = i)$ is independent of t , then we can write

$$P(x_{t+1} = j | x_t = i) = p_{ij}. \quad (2)$$

Any Markov chain that satisfies (2) is called a stationary Markov chain, Stone (1972). It is also known as a stationary first order Markov chain (Sundararajan et al. (2009) and Vasanthi et al. (2011)). So p_{ij} is the probability that the state value undergoes a transition from i to j in one trial.

In the trading mechanism, the prices are expected to remain unchanged, increase or to decrease by chance depending on the sellers' and buyers' order as supervised by the broker. Stock prices can be considered to reflect Markovian model in their variations. Three identified states are:

State i to state i (no change in price from the previous time).

State i to state $i - 1$ (decrease in price from the previous time)

State i to state $i + 1$ (increase in price from the previous time)

In other words the transition is from i to j , where $j = \{i, i - 1, i + 1\}$.

In the trading process, sometimes there occurs some bad news about a company with listed stocks that would make the stocks worth substantially less, Pike (1983). In this situation the broker will let the stock fall to its own level. If the situation prevails for a long time, it is possible for the company to drop out of business. Such cases can be considered in state classifications as the absorbing state in Markov model. Therefore, by considering the DSE as the stock market in Tanzania, the business process is similar as discussed above. Price variations in the DSE have never been modelled as a Markov chain before. In this case study, price variations are observed and mathematical modelling of these prices is constructed to fit the Markov model. Hence, efficient estimation functions of the Markov chain transition probability matrix are derived for the DSE from which stationary states of DSE price variations probabilities are established.

The main objective of the study is to investigate the nature of price variations in the DSE and to examine the possibility of predicting price variations using the Markov chain transition probabilities.

Assuming that the market is efficient, the specific objectives are: -

- (i) To determine the probabilities of price variations in the future years using current year's prices.
- (ii) To establish the cause of the price variations.
- (iii) To determine the accuracy of the Markov chain model developed with the DSE known data.

The rest of the sections are organized as follows: In the next section we present the mathematical model. Section 3 presents methodology and data analysis and last section presents conclusion and recommendations.

2. Mathematical Model

The mathematical model developed is used to show the nature of price movements at the DSE in the given duration. Through the observed price variations by transition probability matrices, it is possible to establish the cause of the movements under specified periods of time. The initial transition probability matrix offers a convenient way of predicting the price variations due to the fact that matrix multiplication provides the Markovian system at some period beyond a given reference time. It is assumed that the Markov chain is stationary and the market is efficient.

In the model formulation, the first day's price of trading is considered as the reference price "R" at that particular time in formulating the matrix. By referring to the first day, the second day price can be interpreted into three possible results that form three states (variables). These are:

1. Price remains the same-"Unchanged" denoted by ' U '
2. Price increases-"Gain"- denoted by ' G ' or
3. Price decreases-"Loss"- denoted by ' L '.

So the state space $S = \{U, G, L\}$ (finite set).

The 3×3 matrix of transitions will have the following combinations: $UU, UG, UL, GU, GG, GL, LU, LG$ and LL where UU is the transition from state U to another state U , UG is the transition from state U to state G and so on.

The pictorial model representation is shown in Figure 3.1 below.

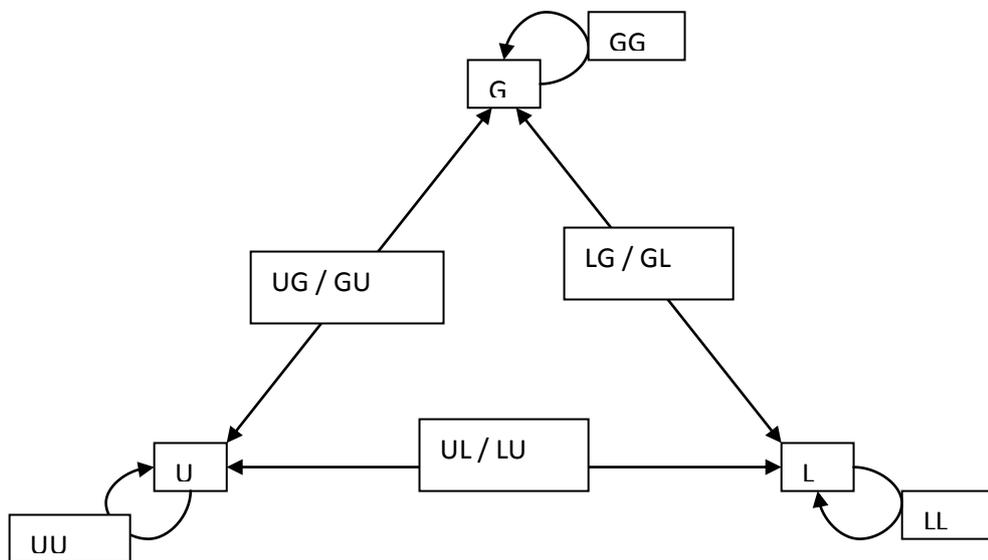


Figure 2.1: The model for the possible states of price movements in the DSE.

The analysis of the three states is in a discrete time of 3 months interval (quarterly), semi-annually (6 months), annually or any duration as far as the Markovian model possibilities. Thus the matrix formed is of the order 3×3 .

The first matrix to be formed is one with entries whose elements are called states, obtained from tallying 3 states in a given duration ($N = N_{ij}$).

$$N = \begin{bmatrix} N_{11} & N_{12} & N_{13} \\ N_{21} & N_{22} & N_{23} \\ N_{31} & N_{32} & N_{33} \end{bmatrix}$$

The N_{ij} in the above matrix is the number of transitions from state i to j for a specified time and $i, j = U, G, L$. E.g. N_{11} = Number of transitions made from state U to state U in a given interval time. The rows and columns are both of Unchanged, Gains and Losses. The second matrix is a stochastic matrix with entries called transition probabilities obtained from the first matrix

$$P_{ij} = \frac{N_{ij}}{N_i}. \quad (4)$$

Where $N_i = \sum_{j=1}^3 N_{ij}$, for $i = 1, 2, 3$ and $P_{ij} \geq 0$, $\sum_{j=1}^3 P_{ij} = 1$ for $i = 1, 2, 3$.

The probabilities P_{ij} 's are displayed in a transition probability matrix P as shown in the next section.

2.1 Transition Probability Matrix (TPM)

In this case a transition matrix P of the order 3×3 with entries P_{ij} 's represents the probabilities of moving from state i of price change at t to another price state j at $t + 1$ where t is the first day of trade after the reference day price. The three states are Unchanged, Gain and Loss. Given that the state at time t is i , the process must be somewhere at time $t + 1$. This means that for each i ,

$$\sum_{j=1}^{j=S} P(X_{t+1} = j | X_t = i) = 1$$

and

$$P(X_{t+1} = j | X_t = i) \geq 0$$

where S is a state space.

The structure of transition probability matrix P is as follows:-

$$P = \begin{bmatrix} P_{11} & P_{12} & P_{13} \\ P_{21} & P_{22} & P_{23} \\ P_{31} & P_{32} & P_{33} \end{bmatrix}.$$

It is possible for values $N_{ij} = 0$ and hence $P_{ij} = 0$ if no transition occurred over that period and again we can have $P_{ij} = 1$. All the two cases can be explained in business terms. By determining the unknown parameters of P_{ij} 's, the behaviour of the transitions (dominance, rare) can be identified and the interpretations in business terms can be stated. For example, the value P_{12} in the matrix represents the probability that a price in the "Unchanged state, U" at time t will move to the "Gain state, G" at time $t + 1$. Again the value P_{33} represents the probability that a price in the "Loss state, L" at time t will remain in the same state at time $t + 1$. The transition probability matrix P or P^1 will be used to find the other next matrices such as $P^2, P^3 \dots P^n$ by matrix multiplication where $n = 1, 2, 3, \dots$ and n is a discrete value that can represent the number of days, weeks, months or years. This can be explained by the concept of n-step transition probability matrix.

2.2 n-Step Transition Probability Matrix

A Markov Chain will be constructed under the assumption that it is stationary.

The n-step probability of transition from state i to state j is given by

$$P(X_{m+n} = j | X_m = i) = P(X_n = j | X_0 = i) = P_{ij}^n \quad (5)$$

The probability is independent of m as we are dealing with the stationary Markov chain. Using the definition of P , equation (5) can be written as

$$P_{ij}^n = \sum_{k=0}^{k=n} P_{ik} P_{kj}^{n-1} \quad \forall i \text{ and } j. \quad (6)$$

where

$$P_{ij}^0 = \begin{cases} 1 & \text{if } j = i \\ 0 & \text{if } j \neq i \end{cases}$$

Equation (6) gives the probability of transition from state i to state j in one time period n where $n > 1$.

2.3 Steady-State Probabilities

If it happens that the transition probability matrix P obtained is regular (with only positive elements), then after a long time period n the matrix P^n will have identical rows. Each of these rows gives the steady-state probabilities and is given by a vector $\pi = [\pi_1 \ \pi_2 \ \pi_3]$. These can also be obtained by solving the system

$$\pi = \pi P \quad (7)$$

But the system in (7) has infinitely many solutions. To get a unique solution, we impose the constraint.

$$\pi_1 + \pi_2 + \pi_3 = 1 \quad (8)$$

Then the steady-state probabilities are obtained using these probabilities, and thus the prediction (in the long run) of the number of possible transitions before the matrix settled can be identified.

3. Methodology and Data Analysis

3.1 Source of Data

The secondary data are collected from DSE management in a softcopy form. These are daily securities prices (high and low) from April 1998 to November 2004. DSE is stock market in Tanzania located in Dar es Salaam city.

The listed companies by 2004 whose stocks were traded in the DSE with listing date in brackets are Tanzania Oxygen Limited - TOL (April 1998), Tanzania Breweries Limited - TBL (September 1998), Tanzania Tea Packers Limited - TATEPA (December 1999), Tanzania Cigarette Company Limited - TCC (November 2000), Tanga Cement Company Limited - SIMBA (September 2002) and Swissport Tanzania limited- SWISSPORT (June 2003). Other listed companies by 2011 are Tanzania Portland Cement Company Limited (TWIGA), National Investment Company Limited (NICOL), Dar Es Salaam Community Bank (DCB), National Microfinance Bank Plc (NMB), Kenya Airways Limited (KA), East African Breweries Limited (EABL), Jubilee Holdings Limited (JHL), Kenya Commercial Bank Limited (KCB), CRDB Bank Public Limited Company (CRDB) and Nation Media Group Limited (NMG). These make a total of 16 companies.

3.2 Data Analysis and Presentation

The data obtained are analyzed to fit a mathematical model known as Markov chain. The data are as presented in Table 3.1.

Table 3.1: DSE 2004 - listed companies and their respective number of days traded per month.

Company	Year Listed	Jan	Feb	Mar	Apr.	May	June	July	Aug.	Sept	Oct	Nov	Dec
TOL	1998				3	4	4	4	4	1	1	2	4
	1999	2	2	6	1	4	3	2	4	7	1	2	0
	2000	1	1	1	1	2	2	2	2	1	8	1	2
	2001	2	5	7	4	3	0	2	1	6	2	3	3
	2002	12	5	8	7	4	4	8	7	3	4	5	5
	2003	5	5	5	9	11	4	9	6	5	6	0	1
	2004	6	8	12	9	8	7	9	10	9	1	1	-
TBL	1998									4	5	3	6
	1999	7	8	10	9	8	9	9	9	9	8	9	6
	2000	11	12	14	11	14	13	12	13	12	13	10	7
	2001	13	12	13	11	13	12	13	13	12	13	13	7
	2002	14	12	12	12	13	11	12	12	12	14	12	7
	2003	12	11	12	14	11	11	15	12	10	12	13	10
	2004	13	15	16	16	15	16	16	17	17	16	7	-
TATEPA	1999												4
	2000	5	4	2	5	6	8	4	7	7	7	5	0
	2001	5	2	12	6	4	1	2	2	1	3	2	3
	2002	3	6	7	5	5	7	7	2	4	4	4	0
	2003	2	1	4	0	0	4	1	2	5	3	5	3
	2004	9	9	5	2	4	5	1	1	3	3	1	-
TCC	2000											7	7
	2001	8	10	11	9	13	11	10	9	9	10	12	6

	2002	13	12	10	12	12	10	13	10	12	13	11	8
	2003	9	8	11	12	11	11	14	11	10	7	8	9
	2004	16	15	14	12	15	15	15	10	16	14	6	-
SIMBA	2002									1	14	12	9
	2003	12	11	7	13	11	12	13	13	11	13	11	11
	2004	15	15	15	15	13	18	14	17	16	14	4	-
SWISS PORT	2003						12	15	12	11	13	13	11
	2004	16	16	18	17	16	18	17	17	15	15	4	-

Source: DSE (Overall Daily Trading Time Series' Data)

The most reliable data collected from the DSE is from TBL as shown clearly in Table 3.1. The TBL data covered a period of 6 years from October 1998 to September 2004, the period which is long enough (more trading days in a month) for modelling by Markov chain compared with other companies. For this reason data from TBL was used for modeling. The daily mean prices which are the average of highest and lowest daily prices are computed. Using the Maple tool (Matrix - numerical computations), the steady state vectors are obtained.

3.3 The Study of Annual Prices Behaviour

From the first day of trading of TBL's shares, there were remarkable price changes for each month in a given year. The general trend of price changes in each year was summarized in the Tables 3.2 in which average annual prices, variances and standard deviations are displayed. The variance δ^2 of the prices was computed using equation (9),

$$\delta^2 = \frac{n \sum x_i^2 - (\sum x_i)^2}{n^2} \quad (9)$$

where index $i = 1, 2, 3, \dots, n$ and $n = 12$. The standard deviation is δ .

Table 3.2: The variance and standard deviations of the annual prices

Year	Average Annual Price	Variance	Standard Deviation
1998/99	595	1142.6	33.8
1999/00	564	247.9	15.7
2000/01	590	3997.2	63.2

2001/02	1288	65261.0	255.5
2002/03	1583	2643.0	51.4
2003/04	1410	5006.9	70.8

Tables 4.3 (1998/99) show the sample of monthly prices for different years. The other entries were obtained as follows: row three (mean price) is the annual average price computed as the average of all monthly prices within a year. Row four was obtained by summing the mean monthly price and three times the standard deviation ($+3\delta$) while row five was obtained by subtracting three times the standard deviation (-3δ) from the mean monthly prices. Other monthly prices for the rest years are obtained in a similar way.

Moreover, the values in Tables 3.3 and others are used to draw the graphs depicted in Figures 3.1 to 3.6 in order to display the nature of the prices. The graphs drawn have several parameters that can be used in the interpretation of the price behaviour. The mean price line in the graphs helps to study the movements of the prices by observing the values which are below and above it. Lines for the mean price $\pm 3\delta$ are used to test whether values are within accepted ranges from the mean (process not to be out of control). The linearity trend line helps in studying overall price changes as increasing, decreasing or remaining the same. Generally, all the graphs are also helpful in investigating the randomness of the data.

Table 3.3: Monthly Prices for Year 1998/99

MONTH	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug.	Sept.
PRICE (Tshs)	665	643	615	598	609	595	566	566	566	611	557	554
MEAN PRICE	595	595	595	595	595	595	595	595	595	595	595	595
MEAN PRICE+3 δ	696	696	696	696	696	696	696	696	696	696	696	696
MEAN PRICE-3 δ	494	494	494	494	494	494	494	494	494	494	494	494

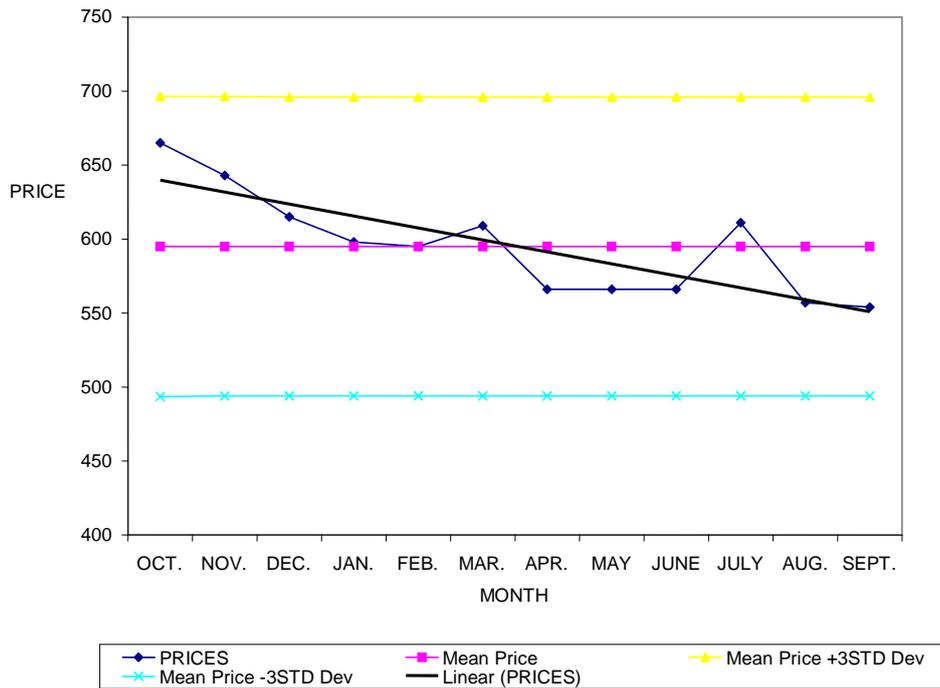


Figure 3.1: Monthly Prices for the Year 1998/99



Figure 3.2: Monthly Prices for the Year 1999/2000

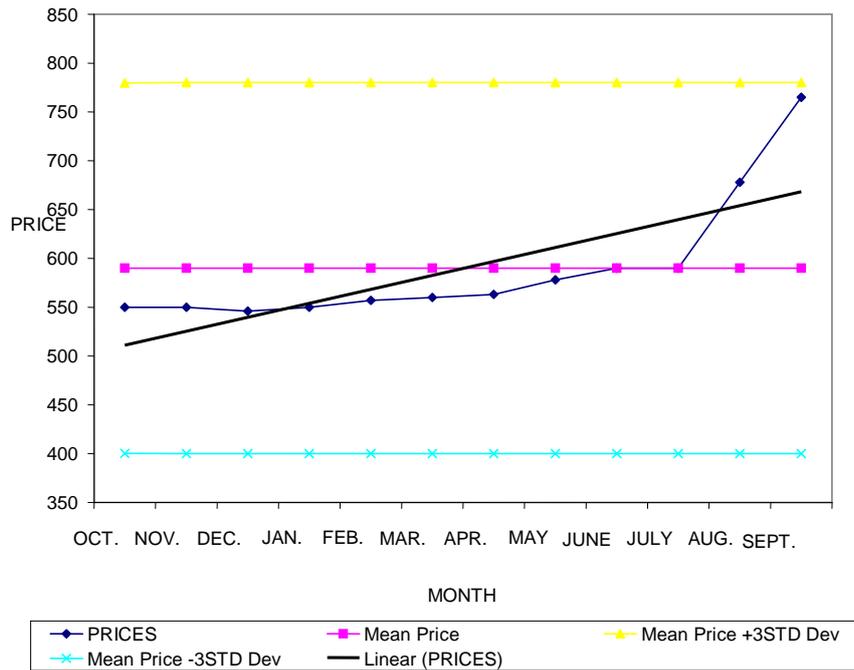


Figure 3.3: Monthly Prices for the Year 2000/2001

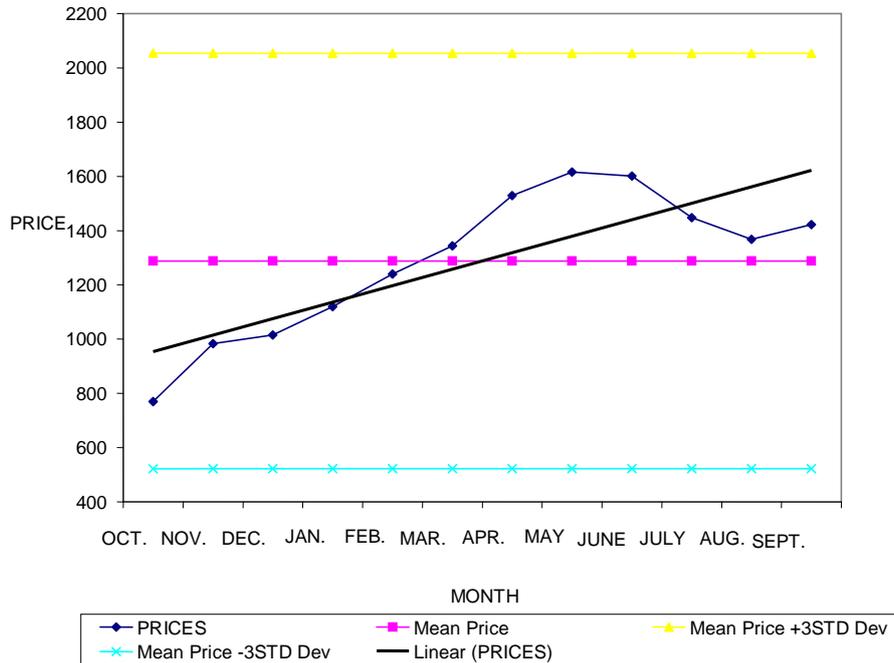


Figure 3.4: Monthly Prices for the Year 2001/2002

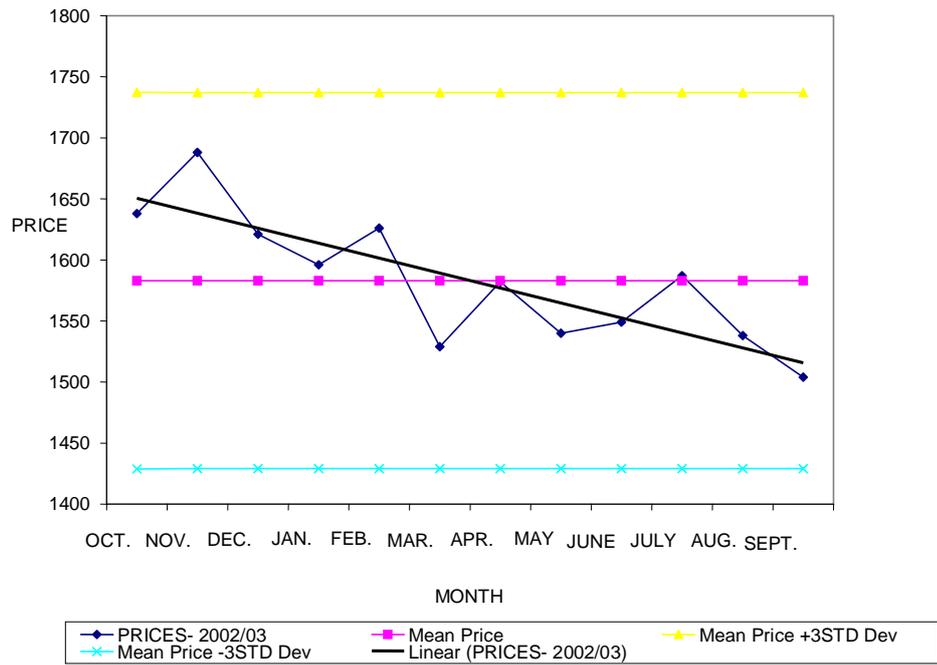


Figure 3.5: Monthly Prices for the Year 2002/03

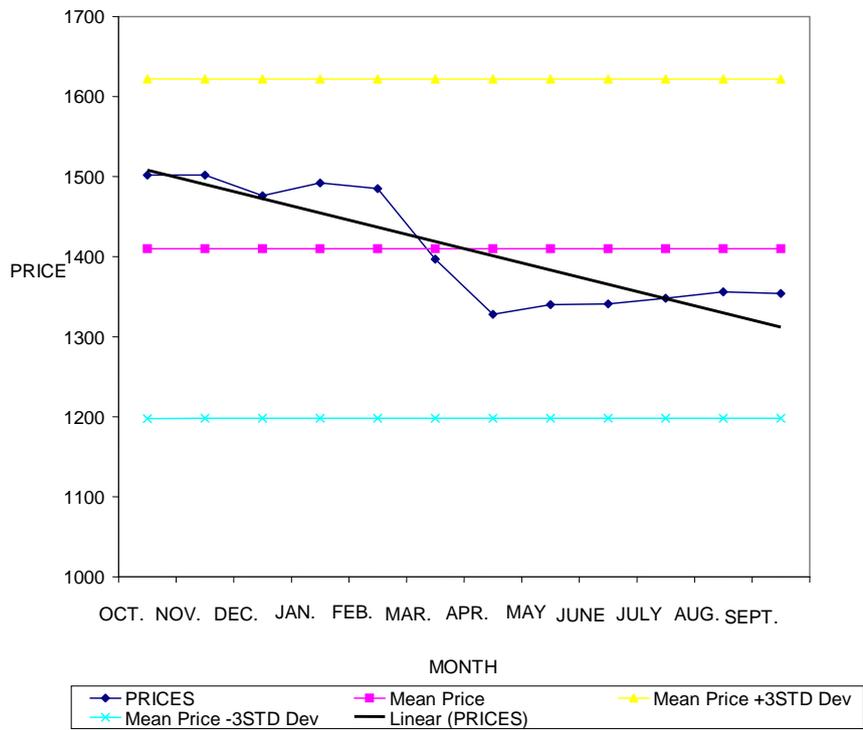


Figure 3.6: Monthly Prices for the Year 2003/04

3.4 Interpretation of the Graphs

Graphs from the Figures 3.1 to 3.6 are the monthly prices in their respective years. The natures of the graphs have their interpretations depending on the time and event that happened over that time. However, all graphs are within “mean price $\pm 3 \times$ Standard deviation” (Control Chart). This shows that the fluctuations are within the acceptable ranges and hence the process is in control as stated in Chandan (1998). The randomness of the data is also displayed in Figures 3.1, 3.5, 3.4 and 3.6 with respect to mean value and linear trend lines.

From the stock market point of view, if the market is efficient then the price movements always obey the stochastic process and hence the Markov chain model (randomness property). The Figures 3.1 and 3.5 have shown randomness since the values above and below the mean price line are equal, i.e. five values in each. Also within the linearity the randomness exists although it decreases instead of increasing. Particularly the graph in Figure 4.5 is typical of the stock prices model except that it decreases.

The general picture that can be drawn from the graphs in Figures 3.1 – 3.6 is that the monthly prices are decreasing with time except those in Figures 3.3 and 3.4 which are clearly increasing with time. The reason for the increase in the monthly average prices for the periods 2000/01 and 2001/02 is not known for sure but it may be attributed to some historical events and, in this particular case, the increase could have been due to the 2000 National elections (Presidential, Parliamentary and Council). The September 11, 2001 bomb blast in New York, USA could also have contributed to the increase in the monthly prices in 2001/02 through the appreciation of the dollar, thereby pushing up the price in Tanzanian shillings.

However, monthly price’s randomness was tested by Run’s test and the results, p-values in the brackets show that: 1998/1999 (0.0346), 1999/2000 (0.0537) and 2002/2003 (0.0346) are moderate random and 2000/2001 (0.0014), 2001/2002 (0.0013) and 2003/2004 (0.0013) are not random. From these results the randomness of the data set is expected. Further analysis of the data for Markov chain model can be done by using TPM behaviours.

Generally all the graphs are of unique trend or shape showing that the price changes were random and therefore that any errors in prices changes are due to chance. For Run’s test also suggest the presence of randomness as explained to some years. So the use of the stochastic model is therefore justified.

3.5 Determination of the Unknown Parameters

The collected raw data are further analysed to obtain the other valuable information from the study. In the analysis, data was grouped in various time intervals: quarterly, semi-annual, annual up to six years duration. Using the assigned states “U”, “G”, and “L”, the TPM are obtained from respective state matrices and other parameters in the given time frame. The state matrices and TPM were formed at different durations.

Further analysis of the TPM using the Maple software was carried out. The monthly TPM were not obtained since some TPM did not meet the requirements that the row elements should add to unit. This was due to the fact that some of the transitions had not taken place as per data we have.

Note that from the results, probability values in the TPM and steady state vectors were rounded to 2 or 4 decimal places respectively while meeting the condition that row sums must be unity (equation 4 and 8 respectively). Tables

3.4 to 3.6 give the summary of how the results are obtained using maple programme. The analysed intervals are quarterly, semi-annual, annual, 18 months, two years, three years and six years duration.

Table 3.4: Two Years TPM and Steady State Vectors

Time Interval	The TPM	No. of transitions to attain steady state matrix	The steady state vectors $\pi = [\pi_1 \quad \pi_2 \quad \pi_3]$
October 1998 to September 2000 (YY1)	$\begin{bmatrix} .69 & .16 & .15 \\ .42 & .23 & .35 \\ .33 & .34 & .33 \end{bmatrix}$	10	$[\text{.5463} \quad \text{.2177} \quad \text{.2360}]$
October 2000 to September 2002 (YY2)	$\begin{bmatrix} .72 & .16 & .12 \\ .26 & .51 & .23 \\ .25 & .52 & .23 \end{bmatrix}$	14	$[\text{.4782} \quad \text{.3444} \quad \text{.1774}]$
October 2002 to September 2004 (YY3)	$\begin{bmatrix} .70 & .15 & .15 \\ .45 & .25 & .30 \\ .46 & .27 & .27 \end{bmatrix}$	9	$[\text{.6027} \quad \text{.1938} \quad \text{.2035}]$
		Average steady state matrix	$[\text{.532} \quad \text{.252} \quad \text{.206}]$

Table 3.5: Three Years TPM and Steady State Vectors

Time Interval	The TPM	No. of transitions to attain steady state matrix	The steady state vectors $\pi = [\pi_1 \quad \pi_2 \quad \pi_3]$
October 1998 to September 2001 (THY1)	$\begin{bmatrix} .74 & .14 & .12 \\ .39 & .31 & .30 \\ .33 & .42 & .25 \end{bmatrix}$	14	$[\text{.5828} \quad \text{.2314} \quad \text{.1858}]$
October 2001 to September 2004 (THY2)	$\begin{bmatrix} .61 & .24 & .15 \\ .33 & .41 & .26 \\ .37 & .35 & .28 \end{bmatrix}$	10	$[\text{.4697} \quad \text{.3185} \quad \text{.2118}]$
		Average steady state matrix	$[\text{.526} \quad \text{.275} \quad \text{.199}]$

Table 3.6: Six Years TPM and Steady State Vectors

Time Interval	The TPM	No. of transitions to attain steady state matrix	The steady state vectors $\pi = [\pi_1 \quad \pi_2 \quad \pi_3]$

October 1998 to September 2004 (SX)	$\begin{bmatrix} .67 & .20 & .13 \\ .35 & .37 & .28 \\ .36 & .37 & .27 \end{bmatrix}$	12	$[.5177 \quad .2820 \quad .2003]$
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In order for the TPM in Tables 3.4 - 3.6 to comply with the properties of Markov chain model, the corresponding elements of the steady state vectors in consecutive intervals must be close to each other. In this situation the n-step transition probability matrices can be used for prediction purposes and other Markovian computations. The closer the values of the steady state vectors in consecutive intervals, the more the data agrees with the stationary Markov chain model.

Using the steady state values $\pi = [\pi_1 \quad \pi_2 \quad \pi_3]$ in the results, the highest differences in each interval were computed (highest value – lowest value). The differences were converted into percentages. These computations are as tabulated in Table 3.7. For example consider the (Annual TPM and Steady State Vectors) the largest and smallest values of π , are 0.6553 and 0.3080 respectively. Their difference is 0.3473 or 34.73%. This value is then recorded in Table 3.7 in the row labeled “Annual”. The rest of the entries in Table 3.7 were computed similarly.

Table 3.7: The summary of the steady state differences in percentage within the classified group.

Group Interval Duration	Highest % difference for π_1	Highest % difference for π_2	Highest % difference for π_3	Average % difference
Quarterly	73.9	54.9	34.9	54.6
Semi-annual	69.4	52.9	38.7	53.7
Annual	34.7	27.4	22.5	28.2
18 Months	29.6	21.6	16.7	22.6
2 Years	12.5	15.1	5.9	11.2
3 Years	11.3	8.7	2.6	7.5

It is noted from the results in Table 3.7 that the average percentage differences diminish with increasing time intervals/more data (Column 5). This indicates that the larger the interval, the smaller the average percentage difference and therefore the closer the steady state vectors to the Markov chain model. In other words, the last two (2 to 3 years) intervals are best as they give the smallest average percentage differences of 11.2 and 7.5 percent, respectively. Therefore for prediction purposes, the 3 years interval steady state vectors will be used as the expected probability of future price changes. The corresponding TPM will be used for predicting future n-step transition probabilities.

Using the average steady state vectors at the bottom of each interval, the overall average steady state vector computed was found to be 0.5294, 0.2656, and 0.2050. These averages can be used to get another interpretation of the price changes for the six years of business for DSE, particularly TBL's shares. That is there are 52.94% chance that prices remained unchanged, 26.56% of the time prices increased, and 20.50% of the time the prices decreased. From these figures it can therefore be concluded that most of the time the prices remained unchanged.

The TPM obtained from six years combination is

$$\begin{bmatrix} .67 & .20 & .13 \\ .35 & .37 & .28 \\ .36 & .37 & .27 \end{bmatrix}$$

with a steady state vector of [0.5177 0.2820 0.2003]. This result shows the general performance of the Stock Market (DSE) for six years as follows-: About 52% of the price changes remained the same indicating that there was no very serious competition in the market. The price increased 28% of the time over six years of business and it decreased by 20% of the time. Values are very close to the general average obtained above. The situation shows that the Stock Market is not performing well in business because the competition of investors is very low. As a result of limited number of customers who are involved in the business, the DSE gets very low returns.

4. Conclusion and Recommendations

4.1 Conclusion

4.1.1 Results and Discussion

In this study, Markov chain model for the analysis of the price dynamics was developed and used. From the first part of testing, the data were found to be appropriate for stochastic model as shown in graphs (Figures 4.1 to 4.6). The graphs were drawn using the Excel package. The observed trends of the prices were decreasing since about 67% (4 out of 6) of the graphs had linear decreasing trend. The general randomness of the graphs also supports the use of stochastic modelling. However, from the known nature of the efficient stock market general graphs model, it can be deduced that the market has not performed according to the required model and thus more efforts are needed to enhance the market.

For prediction purposes, by using Markov chain model (using Maple package), the steady state matrices established in different durations gave the proper direction to this. The 3 years combination TPM has been analysed and observed to be more Markovian as its first steady state vector is closely correlated with the second in regards to all the three states. This can be used to predict the general market performance in the price changes for the next three years.

4.1.2 The Utility of the Model

The developed model in this study is of great importance to DSE management as it can be used for planning, decision making and implementation. The management or practitioners can use the results of the model to review their activities according to the nature of their customers. The results will also help the management to improve their strategies on public education towards DSE activities awareness.

Customers on the other hand are interested in knowing at what time they can buy or sell their shares using the model. Although the model agrees well with 3 years interval data, but still, it is possible to reformulate the model using monthly or weekly data.

4.2 Recommendations

4.2.1 General Recommendations

The results from this work are very useful to DSE and the related financial sectors. This is particularly in the use of idle resources (surplus money) for sure investment that can boost the socio-economic status of the people. Thus apart from banking system, investors may use this as it caters for the exchange rate of our money in the world network of finance. Therefore it can be recommended that:-

- i. DSE should take into consideration the results of this work and review their business strategies so as to use it as one of the guiding factor in decision making.
- ii. DSE should identify the geographical and general background of their customers so as to add other customers who have never been in the market since opening of the centre.
- iii. DSE should provide public education about their activities by conducting seminars or workshops at different centres such as higher learning institutions.
- iv. DSE should use performance of other Stock Markets in East Africa, Africa and world wide as a challenge to them.
- v. DSE should set up a research department to carry out different analysis of the market performance and hence use it in decision making. This is based on the fact that DSE is a financial firm that needs to expand its activities to other parts of the country. Its expansion is a function of its performance.

4.2.2 Further Studies Recommendations

1. Research on the other listed companies can be done so as to compare and may be to come up with true colour of the market.
2. Analysis by using other models like deterministic models also can be conducted.
3. Studies that use all the prices obtained in the day is highly recommended so as to establish monthly, even weekly TPM.

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TRANSPORTATION AND LOGISTICS MANAGEMENT

The capacitated plant location problem with customer and supplier matching and interval demands uncertainties

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Abstract

The capacitated plant location problem with customer and supplier matching can be modeled as a mixed integer linear program, where the product distribution from plants to customers and the material supply from suppliers to plants are considered together. In order to save allocation cost, distribution trip and a supply trip is merged into one triangular trip. Moreover, vehicles from plants visit a customer and a supplier for each trip. In this paper, we assume interval uncertainties in the demands of costumers. We show that the robust counterpart of the original model with interval uncertainty is equivalent to a larger mixed integer linear program. Finally, the original and robust models are compared on several randomly generated examples for different level of uncertainties.

Keywords: Capacitated plant location, Matching, Mixed integer linear program, Interval uncertainty.

1. Introduction

The capacitated plant location problem (CPL) consists of locating a set of potential plants with capacities, and assigning a set of customers to these plants. The goal is to minimize the total fixed and shipping costs such that the demand of all customers is satisfied without violating the capacity of plants. The CPL is modeled as a mixed integer linear programming problems, where several heuristic algorithms are designed to solve it [2-6, 8].

A slightly different problem is CLP with customer and supplier matching. In this problem, customers, suppliers and a set of potential plants are mixed in a same network and each open plant holds its fleet of homogenous vehicles. It is assumed that the vehicles serve customers from a plant, the same vehicles visit suppliers from customers, and then the vehicles transport material/parts from suppliers back to the plant [9]. In this paper, first we describe CLP with customer and supplier matching and then present its robust counterpart when interval uncertainties are assumed for demands [1]. It is shown that the robust counterpart of CLP is a larger mixed integer linear program. Finally, on several randomly generated examples, original and robust problems are compared using Lingo 11 [7].

2. CLP with Customer and Supplier Matching

Let us consider a graph $G = (N, A)$, where N denotes the nodes and A denotes the set of directed arcs between nodes [9]. Nodes are divided to three categories: a set of potential plants H , a set of customers I , and a set of potential suppliers J such that

$$N = H \cup I \cup J.$$

Each potential plant $h \in H$ has a limited capacity b_h and fixed cost f_h . The limited capacity of suppliers is denoted by w_j . The demand of each customer $i \in I$ is v_i , where $v_i \leq b_h$ for all i, h and $v_i \leq w_j$ for all i, j . The trigonal distance d_{hij} is equal to

$$d_{hi} + d_{ij} + d_{jh}$$

Which means the distance from the plant h visiting customer i , from customer i to supplier j , from supplier j back to plant h [9]. The optimizer's goal is to design a model which minimizes the total opening costs of plants and allocation costs subject to the following constraints: Each customer should be served by one plant and matched with one supplier, each open plant does not supply more than its capacity, suppliers capacity cannot exceeded. Moreover, x_{ijh} is equal to 1 if and only if customer i and supplier j are assigned to plant h , otherwise it is equal to 0. If plant h is open, then $y_h = 1$, otherwise it is equal to 0. Thus the problem can be formulated as the following binary integer linear program [1]:

$$\begin{aligned} Z_p = \min & \sum_h f_h y_h + c \sum_h \sum_i \sum_j v_i d_{hij} x_{hij} \\ & \sum_h \sum_j x_{hij} = 1 \quad \forall i \in I \\ & \sum_i \sum_j v_i x_{hij} \leq b_h y_h \quad \forall h \in H \\ & \sum_h \sum_i v_i x_{hij} \leq w_j \quad \forall j \in J \\ & x_{hij} \in \langle 0, 1 \rangle \quad \forall i \in I, \forall j \in J, \forall h \in H \\ & y_h \in \langle 0, 1 \rangle \quad \forall h \in H. \end{aligned} \quad (1)$$

However, it is known that most of real world problems are having certain uncertainties in problem data. In such a case, the solution of the previous model might not lead to the solution which we expect. In the next section, we consider uncertainty on the demand of customers and show the robust counterpart of (1) is a larger mixed integer linear program under interval uncertainties.

2. Robust Model

In this section, we consider uncertainties on parameter v_i . Each uncertain coefficient v_i is known to belong to an interval centered at its nominal value \bar{v}_i and of half-length \hat{v}_i . We define the scaled deviation of parameter v_i from its nominal value as $z_i = \frac{v_i - \bar{v}_i}{\hat{v}_i}$, which belongs to the interval $[-1, 1]$. We always have $\sum_i |z_i| \leq \Gamma$ where $\Gamma \in (0, |I|)$.

Now let us consider the third set of constraints in (1):

$$\sum_h \sum_i v_i x_{hij} \leq w_j \quad \forall j \in J.$$

Its robust counterpart is given by

$$\sum_h \sum_i (\bar{v}_i + \hat{v}_i z_i) x_{hij} = \sum_h \sum_i \bar{v}_i x_{hij} + \sum_h \sum_i \hat{v}_i z_i x_{hij} \leq w_j \quad \forall j \in J.$$

This should hold in the worst case. Thus it is sufficient to solve the following problem for

$$\forall j \in J :$$

$$\begin{aligned}
\max \quad & \sum_h \sum_i \hat{v}_i z_i x_{hij} \\
& \sum_i |z_i| \leq \Gamma \quad (2) \\
& 0 \leq |z_i| \leq 1 \\
& x_{hij} \in \langle 0, 1 \rangle.
\end{aligned}$$

The dual of (2) is given by

$$\begin{aligned}
\min \quad & q_j \Gamma + \sum_i r_i \\
& q_j + r_i \geq \hat{v}_i \left(\sum_h x_{hij} \right) \quad \forall i \in I \\
& q_j, r_i \geq 0, x_{hij} \in \langle 0, 1 \rangle.
\end{aligned}$$

Thus the third set of constraints in the robust case is equivalent to

$$\begin{aligned}
& \sum_h \sum_i \bar{v}_i x_{hij} + q_j \Gamma + \sum_i r_i \leq w_j \quad \forall j \in J \\
& q_j + r_i \geq \hat{v}_i \sum_h x_{hij} \\
& q_j, r_i \geq 0, \quad x_{hij} \in \langle 0, 1 \rangle.
\end{aligned}$$

The robust counterpart of the second set of constraints can be worked out in the same manner. Therefore, the robust counterpart of (1) is

$$\begin{aligned}
\min \quad & \sum_h f_h y_h + ct \\
& \sum_h \sum_j x_{hij} = 1 \quad \forall i \in I \\
& \sum_i \sum_j \bar{v}_i x_{hij} + q_h \Gamma + \sum_i r_i \leq b_h y_h \quad \forall h \in H \\
& q_h + r_i \geq \hat{v}_i \left(\sum_j x_{hij} \right) \quad \forall h \in H, \forall i \in I \\
& \sum_h \sum_i \bar{v}_i x_{hij} + q_j \Gamma + \sum_i r_i \leq w_j \quad \forall j \in J \\
& q_j + r_i \geq \hat{v}_i \left(\sum_h x_{hij} \right) \quad \forall i \in I, \forall j \in J \\
& \sum_h \sum_i \sum_j \bar{v}_i d_{hij} x_{hij} + q_t \Gamma + \sum_i r_i \leq t \\
& q_t + r_i \geq \hat{v}_i \left(\sum_h \sum_j d_{hij} x_{hij} \right) \quad \forall i \in I, t \\
& q_h, q_j, q_t, r_i \geq 0 \quad \text{and} \quad x_{hij}, y_h \in \langle 0, 1 \rangle
\end{aligned}$$

As we see, the robust counterpart of (1) is a mixed integer linear program but it is much larger.

3. Numerical Experiments

In this section, we present numerical experiments on the original and robust models for five different examples where the demand, capacity of plants, fixed costs, capacity of suppliers, and the distance between customer, plant and supplier are randomly generated in the intervals $[10,50]$, $[200,600]$, $[300,600]$, $[100,400]$, $[10,60]$, respectively. For all examples we consider $\epsilon = 0.1$. We use Lingo 11 to solve the original and robust models and results are summarized in the following tables.

i	20	20	30	40	50
j	5	10	10	10	20
h	5	5	5	5	15
Original Objective	1956.119	1811.909	2455.055	3493.492	3152.593
Time (sec)	1	2	21	19	2.36
$\hat{v}_i = 0.1$	1960.179	1814.911	2458.179	3500.35	3160.972
Time (sec)	19	6	1.04	1.39	9.21
$\hat{v}_i = 0.2$	1964.239	1817.914	2462.111	3506.683	3168.469
Time (sec)	5	10	1.40	1.5	4.29
$\hat{v}_i = 0.3$	1968.299	1820.916	2467.098	3512.493	3243.501
Time (sec)	7	17	1.19	1.28	127.2
$\hat{v}_i = 0.4$	1998.341	1823.918	2471.052	3518.285	3249.946
Time (sec)	19	7	1.52	1.11	6.44

Table 1: Comparison of Original and Robust model for 5 different examples

$\hat{v}_i = 0.5$	2007.015	1826.920	2474.176	3524.605	3257.908
Time (sec)	24	4	1.15	1.55	3.04
$\hat{v}_i = 0.6$	2021.707	1829.923	2480.046	3530.459	3264.707
Time (sec)	20	5	1.14	1.3	2.25
$\hat{v}_i = 0.7$	2025.883	1832.925	2483.170	3536.251	3272.567
Time (sec)	24	5	1.21	1.2	3.0
$\hat{v}_i = 0.8$	2030.06	1835.927	2486.295	3542.043	3279.039
Time (sec)	16	4	1.20	1.1	2.54
$\hat{v}_i = 0.9$	2058.976	1838.929	2493.091	3547.835	3292.888
Time (sec)	27	5	1.07	1.1	2.59
$\hat{v}_i = 1$	2083.711	1841.931	2499.4	3553.627	3301.474
Time (sec)	36	4	1.12	1.39	3.22

In the previous table, we considered Γ equal to $\lfloor i \rfloor$. However, if we consider Γ equal to 30, we have the following results.

Table 2: Comparison of Original and Robust model for $\Gamma = 30$

i	50
j	20
h	15
Original Objective	3152.593
Time (sec)	2.36
$\hat{v}_i = 0.1$	3158.348
Time (sec)	3.54
$\hat{v}_i = 0.2$	3162.283
Time (sec)	2.56
$\hat{v}_i = 0.3$	3166.218
Time (sec)	4.11
$\hat{v}_i = 0.4$	3172.159
Time (sec)	4.48
$\hat{v}_i = 0.5$	3243.501
Time (sec)	153.53
$\hat{v}_i = 0.6$	3247.368
Time (sec)	3.05
$\hat{v}_i = 0.7$	3251.235
Time (sec)	14.50
$\hat{v}_i = 0.8$	3256.356
Time (sec)	3.58
$\hat{v}_i = 0.9$	3260.840
Time (sec)	2.50
$\hat{v}_i = 1$	3264.707
Time (sec)	3.57

As we see from these numerical experiments, at least for two cases, the time taking to solve the robust model is significantly larger. This might be due to the complexity of the robust model compared to the original one. Moreover, various level of uncertainties show how the solutions may vary from the original solution. These observations show the importance of robust model in real world modeling.

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