



# **UNIVERSITY OF NAIROBI**

COLLEGE OF BIOLOGICAL AND PHYSICAL SCIENCES  
SCHOOL OF COMPUTING AND INFORMATICS

## **BENEFITS OF THE INTEGRATED FINANCIAL MANAGEMENT INFORMATION SYSTEM ON EXPENDITURE IN THE PUBLIC SECTOR: A CASE OF THE MINISTRY OF AGRICULTURE, LIVESTOCK, FISHERIES AND IRRIGATION**

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Submitted in partial fulfillment of the requirements of the Master of Science Degree in  
Information Systems.

## **Declaration**

This research project being presented is my original work and has not been published or presented for the award of any university degree.

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## **Approval**

This research is submitted as partial fulfillment for the Degree of Master of Science in Information Systems with my approval as the University Supervisor.

.....

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.....

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## **Dedication**

I give all Glory to God for the ultimate effort in this journey towards graduation. In particular, I dedicate this project to my family for their unwavering support and understanding during the difficult times.

To my little boy, Alem may you grow up to be a top scholar.

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To all the aforementioned, friends and colleagues at the Ministry of Agriculture, Livestock, Fisheries and Irrigation, Ministry of Health – National Aids & STI Control Programme, The Independent Electoral and Boundaries Commission and The Treasury, I say may God bless you richly.

## **Abstract**

IFMIS is an information system that supports budgeting and accounting for the Government of Kenya. It is an online system that manages budgeting, payment processing, expenditure and reporting for National Government, County Governments and other entities involved in public financial management. This study focused on the challenges experienced by the Ministry of Agriculture, Livestock, Fisheries and Irrigation in implementing IFMIS and sought to identify key interventions that would ensure consistency in the net benefits.

The researcher interviewed financial managers and users at The Ministry Headquarters and Departments at the Counties of Busia and Bungoma, as well as The National Treasury. By obtaining valid and latest data as a reference to the implementation of IFMIS, an analysis was done to determine the relationship and the influence of variables according to DeLone and McLean model. Data collection techniques used included questionnaires to obtain answers concerning problems related to variables and a review of the help desk logs at the implementing agency.

Respondents revealed increasing confidence in using IFMIS and improved availability of the various modules. Users noted that IFMIS provided detailed information in simple and easy to generate reports. There was increased accountability by managers as a result of timely and accurate data. Challenges remain in system availability and this was attributed to the delays in the realization of the national optical fibre backbone.

The quantitative data was analyzed and presented using descriptive and inferential statistics. Factor analysis was used for hypotheses testing to determine the relationships between the independent and dependent variables. The study rejected all the null hypotheses and re-affirmed the importance of IFMIS in Public Expenditure Management.

The net benefits of the IFMIS implementation far outweigh the costs related to the system roll out and subsequent training of users. The turn-around time for transactions within MALFI is tremendously short as attested to by most users. It also reduced time spent by clients travelling to make follow-ups at the ministry while eliminating geographical barriers. In terms of government expenditure and reporting IFMIS sets a precedent on prudent utilization of funds and a high threshold on accountability.

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## List of Abbreviations

ICT	Information and Communication Technology
IFMIS	Integrated Financial Management Information System
IFMS	Integrated Financial Management System
IS	Information Systems
MALFI	Ministry of Agriculture, Livestock, Fisheries and Irrigation
MDAs	Ministries, Departments and Agencies
NOFBI	National Optical Fibre Backbone Infrastructure
PFMA	The Public Finance Management Act

# CHAPTER ONE: INTRODUCTION

## 1.1 Background

Information Systems (IS) Investments have a significant impact on financial management and accounting. IS plays a critical role in providing better services and competitive advantage to government ministries. It is a challenge for continuous improvement (Jafreh 2017). The information systems success in the banking sector is now being used as a measure for deployment in many other sectors. Organizations must have a heavy investment in information systems (IS) to achieve benefit from these systems (Jafreh 2017). The organizations main concern during evaluation is to find out the impact of these systems on them as well as on individuals (Gable et al., 2008). Failure of information systems (IS) has become a major issue for organizations, leading to excessive costs, time wastage and failure in achieving their strategic objectives and goals thus missing competitive advantage. According to Chaos report, “The United States spend more than \$250 billion each year on IT application development”.

Evaluating the success of information systems is one of the most critical issues in information systems field and the measurement of IS success is important for assessing the effectiveness of IS in order to justify IS investments. It is argued, “If information systems research is to make a contribution to the world of practice, a well-defined outcome measure (or measures) is essential” (Delone & Maclean,1992). There is little agreement among researchers on how best to measure the impact of IS in organizations (Gable et al. 2008). Sabherwal et al. (2006) observe, “Despite considerable empirical research, the results of the relationships among constructs related to information systems (IS) success, as well as the determinants of IS Success, are often inconsistent.” A range of concerns with past attempts to measure IS Success have been suggested, including - poor measurement (DeLone & McLean 1992; 2003).

An integrated financial management system (IFMS) is an ICT-based budgeting and accounting system that manages spending, payment processing, budgeting and reporting for governments and other entities. An IFMS bundles many essential financial management functions into one software suite. It may also be known as an integrated financial management information system (IFMIS).

It has been found that “a fully functioning IFMIS can improve governance by providing real-time financial information that financial and other managers can use to administer programs

effectively, formulate budgets, and manage resources. Sound IFMIS systems, coupled with the adoption of centralized treasury operations, can not only help developing country governments gain effective control over their finances, but also enhance transparency and accountability, reducing political discretion and acting as a deterrent to corruption and fraud.” (Muigai, 2012).

In Kenya, Government ministries “have adopted the use of IFMS in their daily operations with mixed results. This is attributed to a wide range of factors such as lack of adequate training, lack of investment in ICT tools required and shortage of the same.” (Kirui, 2012). The current administration has reiterated its support for the IFMIS project and allocated funds aimed at enhancing the infrastructure for ICT services. This study aims at carrying out an assessment of the effects within the Ministry of Agriculture, Livestock and Fisheries for the successful implementation of the IFMIS especially across the county offices and state corporations. The Ministry is listed among the most active users of the IFMIS Help Desk System for various system issue resolution.

## **1.2 Historical Perspective**

The process of implementing the Integrated Financial Management Information System (IFMIS) in Kenya started in 2005 and so far the IFMIS/Ministry of Finance has connected Ministries, Agencies and Departments (MDAs) and all the 47 County governments to the IFMIS. This is in line with the new constitution (Article 226), and the Public Finance Management (PFM) Act 2012 (Article 12). The re-engineering vision of the IFMIS which is now a department headed by a director within the Ministry of Finance is to provide “An excellently secure, reliable, efficient, effective and fully integrated financial management system.” (IFMIS Times, April 2013). Among the IFMIS re-engineering components is Re-engineering for Business results (RBR), Plan to Budget (P2B), Procure to Pay (P2P), Revenue to Cash (R2C), Record to Report (R2R), ICT to Support (ICT2S) and Communicate to Change (C2C) which tackle different aspects of the modular system from planning and budgeting to procurement and eventual expenditure. The IFMIS is currently conducting a post roll out support to the counties and government ministries. The help desk is available round the clock on <http://10.101.5.110/portal> for registered users.

### **1.3 Description of the Case: The Role of Finance Division within MALFI**

The role of the Finance Division (FD) within the Ministry of Agriculture, Livestock, Fisheries and Irrigation (MALFI) includes:

- i. Advising the Accounting Officer on Financial Management matters
- ii. Budget planning, preparation and implementation at the Ministry level.
- iii. Coordinating the preparation of annual work plans, procurement plans and Cash Management.
- iv. Systematic scheduling of expenditures consistent with work plans.
- v. Coordinating the preparation of Ministerial Public Expenditure Reviews and sector reports.
- vi. Controlling budgetary commitments.
- vii. Financial evaluation and processing of major policy changes (i.e. changes with substantial financial implications) within the Ministry.
- viii. Incorporation of state corporations' budgets and other agencies funded in the Ministry budget, release of funds for state corporations and monitoring the use of their financial resources.
- ix. Timely issuance of Authority-to-Incur Expenditures (AIEs) to various spending points, particularly to the counties and ensuring that AIEs are consistent with quarterly ceilings.
- x. Monitoring and review of programme implementation and taking corrective measures.
- xi. Coordinating the replies to audit queries.
- xii. Any other duty which may be assigned by the Accounting Officer.

These roles perfectly fit within the capabilities of IFMIS especially with regard to Budget planning, preparation and implementation. Controlling budgetary commitments is a key task in ensuring prudent utilization of resources; staff are involved in the budget preparation and funds will be allocated to priority activities. Users will monitor accrued expenditure and balances as the year progresses thereby allowing budget holders to effectively expend the resources evenly.

### **1.4 IFMIS Components**

The components below bring to focus the actual functionality of the IFMIS deployment.

#### **1.4.1 Re-engineering for Business Results (RBR)**

Re-engineering business process for improved Financial Management. This encompasses prudent allocation of funds and utilization of real time data for decision making.

#### **1.4.2 Plan to Budget (P2B)**

This is a fully integrated process and system that links planning, policy objectives and budget allocation. It targets Principal Finance Officers.

#### **1.4.3 Procure to Pay (P2P)**

An automated procurement process, from requisition, tendering, contract award to payment that aims to make work easier for accountants.

#### **1.4.4 Revenue to Cash (R2C)**

This component facilitates Auto-reconciliation of revenue and payments with automatic file generation. Most useful to the accountants in Ministries, counties and departments.

#### **1.4.5 Record to Report (R2R)**

Secure two-way interface with Central Bank of Kenya (CBK) for accurate, up to date information on the Government of Kenya financial position and the production of statutory reports real time. This component supports the accountants in production of accurate, timely and reliable reports.

#### **1.4.6 ICT to Support (ICT2S)**

Dedicated IFMIS support functions for software, hardware and infrastructure. This component comprises a team of dedicated IT staff that carry out routine upgrades, maintenance and roll out in new sites.

#### **1.4.7 Communicate to Change (C2C)**

The IFMIS Academy supports capacity building and continuous learning for all the actors involved in public expenditure management.

#### **1.4.8 Infrastructure support and GPay**

Until April 2013, IFMIS Re-engineering had delivered 180 computers to Counties to support county IFMIS financial transactions. Each of the 47 Counties received four computers. IFMIS

Technical teams inspected and configured the computers before they were dis-patched to the respective County stations. IFMIS Re-engineering organized with the Central Bank of Kenya (CBK) to install GPAY in 47 of these computers (one per County) to facilitate County payment via the IFMIS system (IFMIS Times, April 2013). This facility maintains an audit trail while enabling electronic payments. Loss of funds due to fraud will be minimized and payments expedited because the system log also keeps a tab on dates when requests for payments were made and the dates for actual payment.

The Kenya National Audit Office (KENAO) will be able to improve from the current situation where accounts are audited three to four years after the financial year in question. This will enhance accountability and facilitate the timely implementation of corrective measures.

#### 1.4.9 Fibre Broadband connectivity

The Kenyan government has been central to the success of the ICT industry through proactive interventions in equipment and services rollout e.g. the National Optic Fibre Backbone Infrastructure, TEAMS and SEACOM. Two other submarine cables link Kenya to the rest of the world EASSY and LION. It is logical then to expect that implementation of the IFMIS would be overly successful owing to the enormous investment in this sector. Fig.1 below shows the coverage of this fibre backbone.

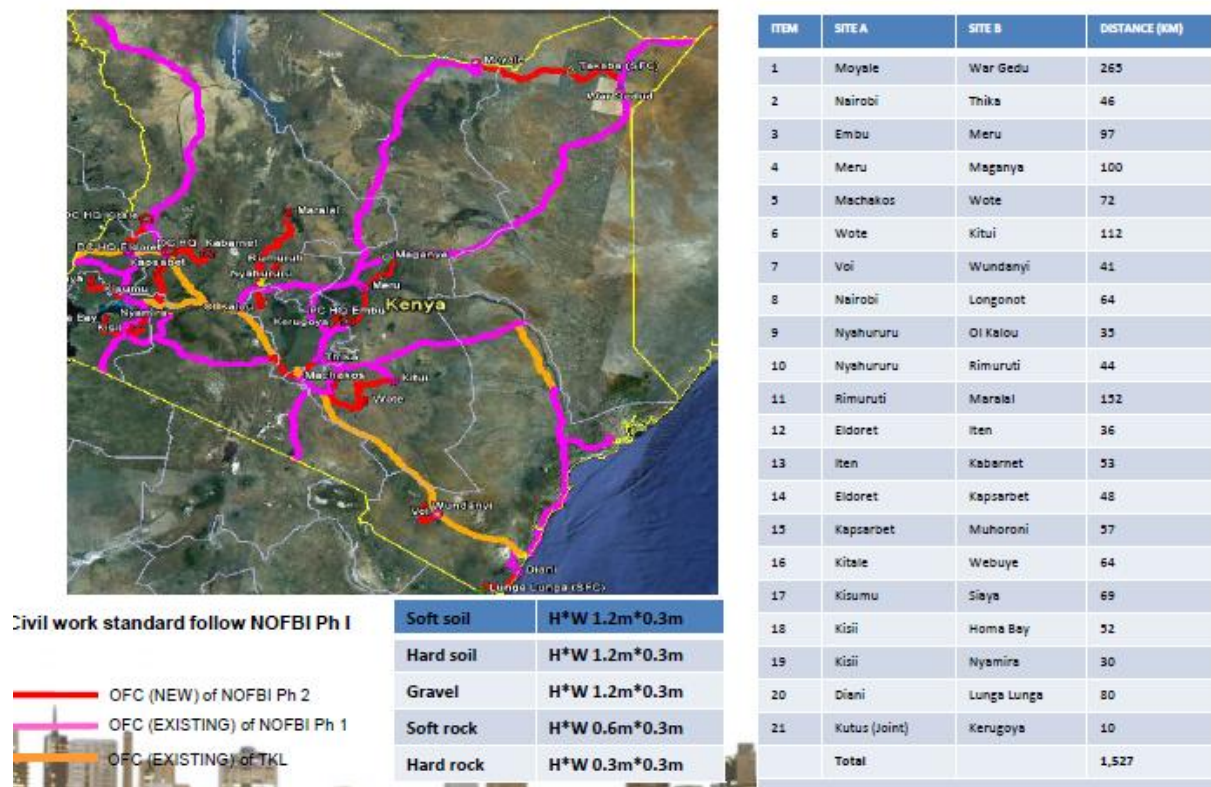




Fig. 1.1 *Physical Route NOFBI-backbone (Kenya ICT Board)*

## **1.5 The case of Malawi**

Malawi has one of the fastest growing economies. It has undertaken a series of reforms in the legal and institutional framework for management of public finances. This system has undergone quite some reforms since the first elections in 1994. The process of incorporating a sound system was spearheaded by sound legislation that regulated finances, audits, and procurements which were in time for the Malawi budget process. There are various studies that have indicated that the IFMIS system in Malawi was a success and relatively well designed. (Muigai, 2012)

In addition, the World Bank's 2003 Country Financial Accountability Assessment for Malawi states: "When compared to most developing countries, Malawi has a good legal and institutional framework for public sector financial management and accountability." (World Bank, 2003). With such achievements it follows that the formal legal and institutional PFM framework in Malawi would provide for effective fiscal and expenditure planning, budget preparation, execution, and control in line with the priorities set in the Malawi Poverty Reduction Strategy Paper (MPRSP).

In comparison with Kenya, key improvements have been delivered by the department including dedicated IFMIS support function for software, hardware and infrastructure; help desk and call centre with expert technical support; improved availability and system performance; operational security plan including business continuity planning, back up and disaster recovery; and support for the e-Government Shared Services strategy. These improvements resonate with the updated DeLone and McLean model of IS Success (2011).

## **1.6 Problem Statement**

In order to succeed, managers need information so they can decide. They must decide so they can control. They must control so the organization can survive. A successful IS, therefore, must deliver timely, accurate, and complete information to decision-makers with a minimum of mental and economic cost (Briggs et. al 2003).

Organizations are concerned with the evaluation, and to find out the impact of these systems on them as well as on individuals (Gable et al.,2008). The implementation of IFMIS over the last 13 years is yet to deliver the desired impact on service delivery. Ministries and government departments have had challenges in budgeting, budget monitoring and

implementation. This includes delayed expenditures during the year and excessive procurement of goods and services in the last quarter of the financial year; a concern in government expenditure that often results in committed but unspent funds or debts being carried forward to the next financial year.

The level of budget awareness by staff through the use of IFMIS is poor hence limiting the efficient implementation of annual budgets within the prescribed timelines. This has affected cash flows in the public sector. In a press release The National Treasury urged county governments to ensure compliance with The Public Finance Management Act (PFMA) 2012 provisions “because some of the resources lying idle at the various county Revenue Funds Kitty are borrowed and therefore attracting interest” (The National Treasury Press Release, 1<sup>st</sup> October 2013).

Previous studies found out that effective use of the system is affected largely by sabotage and resistance by staff, lack of management support (Kimwele, 2011) among other emerging issues.

Challenges in system quality have been reported not only in Kenya but in other countries including Malawi and Namibia. Planned interventions to ensure consistency in the net benefits need to be reviewed using the DeLone and McLean Updated Model (2003) to determine effectiveness of IFMIS at The National Treasury.

## **1.7 Objectives of the Study**

The general aim of this study is to assess the impact of IFMIS on public expenditure by the Ministry of Agriculture Livestock & Fisheries and consider the progress made in its implementation.

The specific objectives are to:

- i. Assess the system quality characteristics of IFMIS: usability and performance
- ii. Determine the level of information quality including reports generated
- iii. Examine the quality of service / system availability at the headquarters and county level including training and support to users
- iv. Assess the perceived willingness of users to adopt IFMIS in their operations
- v. Determine the level of satisfaction of staff and suppliers on the implementation of IFMIS
- vi. Determine the turnaround time for a transaction as a measure effectiveness of the system

## **1.8 Research Questions**

From the specific objectives the following research questions were derived:

- i. To what extent do the system quality characteristics affect the turnaround time for transactions in IFMIS
- ii. To what extent does the level of information quality affect the turnaround time for transactions in IFMIS
- iii. To what extent does the quality of service / system availability affect the processing of transactions in IFMIS
- iv. To what extent does the perceived willingness of users to adopt IFMIS in their operations affect the turnaround time for transactions in IFMIS
- v. To what extent does the level of satisfaction of staff and suppliers on the implementation of IFMIS influence the use of IFMIS to process transactions
- vi. To what extent does the turnaround time for a transaction influence the adoption of IFMIS for all government transactions

## **1.9 Research Hypotheses**

The study sought to test the following null hypotheses

1. H<sub>01</sub>: There is no statistically significant relationship between system quality characteristics and turnaround time for transactions in IFMIS.
2. H<sub>02</sub>: There is no statistically significant relationship between the level of information quality including reports generated and turnaround time for transactions in IFMIS.
3. H<sub>03</sub>: There is no statistically significant relationship between the quality of service or system availability and turnaround time for transactions in IFMIS.
4. H<sub>04</sub>: There is no statistically significant relationship between the perceived willingness of users to adopt IFMIS in their operations and turnaround time for transactions in IFMIS.
5. H<sub>05</sub>: There is no statistically significant relationship between the level of satisfaction of staff and suppliers on the implementation of IFMIS and the use of IFMIS to process transactions.
6. H<sub>06</sub>: There is no statistically significant relationship between the turnaround time for a transaction and the adoption of IFMIS for all government transactions.

### **1.10 Significance of the Study**

The DeLone and McLean IS Success Model has been fully adapted to the above research problem using newly developed constructs that are similar to those of the original model. Wixom and Watson (2001), for example, developed and validated a model for empirically investigating data warehousing success on the basis of the D&M IS Success Model. They utilized context-specific constructs such as organizational, project, and technical implementation success.

This study is aimed at investigating factors that enhance the utilization of state funds in a prudent and effective manner. In a recent press release The National Treasury urged county governments to ensure compliance with The Public Finance Management Act (PFMA) 2012 provisions “because some of the resources lying idle at the various county Revenue Funds Kitty are borrowed and therefore attracting interest” (The National Treasury Press Release, 1<sup>st</sup> October 2013). By examining the underlying knowledge and attitude of staff and suppliers at The Ministry of Agriculture Livestock and Fisheries it is possible to propose areas of improvement for faster realization of the benefits of technology.

The establishment of an IFMIS has become an important benchmark for the country’s budget reform agenda often regarded as a precondition for achieving effective management of budgetary resources (Diamond et al, 2005).

Previous studies found out that effective use of the system was affected largely by sabotage and resistance by staff, lack of management support (Kimwele, 2011) and lack of training among other factors. It is worth noting that financial management cannot be equated to service delivery hence the need to measure both variables separately to determine the level at which there has been improvement. The study also established that management support is lacking and top management does not inspire the users. The capacity and technical knowhow was found to be low due to lack of training and the hurried implementation of the system” (Kimwele, 2011). The study further recommended that “the Government employs a change agent to oversee the implementation of the IFMIS system and those users of the system to undergo on the job training” (Kimwele, 2011).

Another study conducted in Local Authorities within Trans Nzoia County identified the main factors affecting implementation of IFMIS as “lack of adequate training, lack of investment in ICT tools required and shortage of the same” (Kirui, 2012). In response, the Government established the IFMIS Academy in May 2012 to train principal finance officers (P2B), accountants (P2P, R2C and R2R) and county budget controllers (all components) all of whom

were to focus on respective modules. The IFMIS Re-engineering also launched the Help desk system in the same month to assist Ministries, Departments and Agencies (MDAs) resolve end user problems on-line. Some of the issues handled via the Helpdesk include definition tracking (Supplier and Employee), VAT de-activation, system related concerns (encumbrance) and General Ledger (negative balances). The system was also used to communicate the IFMIS system downtime. IFMIS users from MDAs could use the IFMIS Helpdesk system for solutions and feedback on the IFMIS system without visiting the National Treasury.

In the context of e-commerce context, primary system users are customers or suppliers rather than internal users. Customers and suppliers use the system to make buying or selling decisions and execute business transactions. These electronic decisions and transactions will then impact individual users, organizations, industries, and even national economies. This communications and commerce process fits well into the updated D&M IS Success Model and its six success dimensions which shall be used to evaluate the current IFMIS implementation.

In summary, therefore, this study intends to assess the gains made so far in the implementation of IFMIS and whether training for users has impacted positively on this process. There has also been massive sensitization by government organs urging citizens to access online services through the e-government platform and the rapid results initiative (RRI). Both platforms immensely exploit the use of ICT in service delivery.

### **1.11 Assumptions and Limitations**

During product evaluation, User Experience (UX) is usually regarded as a key factor. Developers and designers who strive to create positive experiences while avoiding any negative impressions depend on a variety of data which represent the user's perspective on their product (Minge et. al, 2016). This has been assumed to be the only useful metric in IS Success.

A major limitation of this study was the small number of respondents who agreed to be interviewed due to the current governance climate in the country. There have been a dozen high profile prosecutions of perpetrators of economic crimes especially in state offices. This turned out to be a deterrent in users volunteering honest responses in the questionnaires.



## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This Chapter discusses the background of information systems and the role they play in business processes. A review is done of the theoretical literature followed by the conceptual framework which also examines available empirical data. The implementation of IFMIS has seen a marked improvement in public expenditure management and with it a dozen prosecutions for economic crimes. While this may not be the key indicators of IS success, they point towards prudent financial management within the National and County Governments.

### **2.2 Background**

In most developing countries, the consequent lack of reliable and timely revenue and expenditure data for budget planning, monitoring, expenditure control, and reporting has negatively impacted budget management (Mungai, 2012). It has created loop holes and created opportunity for officers charged with the responsibility of these processes to manipulate records, make additions or deletions at will therefore painting a false picture of the financial data. It has also taken inordinately long to audit some expenditure statements for numerous reasons ranging from non-availability of data to inaccurate capture. This has resulted in a poorly controlled commitment of government resources, a large build-up of arrears; excessive borrowing, high interest rates and crowding out private sector investment; and misallocation of resources, undermining the effectiveness and efficiency of service delivery.

Previous studies have found that the main factors affecting implementation of IFMIS include lack of adequate training, lack of investment in ICT tools and resistance from staff for fear of the unknown (Kirui, 2012). It is possible that lack of education concerning the IFMIS has discouraged key staff from embracing this technology. As will be demonstrated shortly, the benefits of IFMIS actually cut across board. Civil servants get their allowances processed expeditiously while suppliers experience short turnaround times after delivery of commodities.

Karanja et al (2014) in their study identified three key factors influencing the successful implementation of IFMIS namely: organizational commitment, management support and implementation cost. This study will demonstrate that besides all these, the environment in which IFMIS is implemented is of great importance especially the ICT infrastructure and connectivity to the internet backbone.

### **2.3 Theoretical Literature**

In order to provide a general and comprehensive definition of information systems (IS) success that covers different evaluation perspectives, DeLone and McLean reviewed the existing definitions of IS success and their corresponding measures, and classified them into six major categories (DeLone and McLean 2011). Thus, they created a multidimensional measuring model with interdependencies between the different success categories (DeLone and McLean 1992). Ten years after the publication of their first model and based on the evaluation of the many contributions to it, DeLone and McLean proposed an updated IS Success Model (DeLone and McLean 2003).

Based on Mason's expansion of the effectiveness or influence level and the three levels of information by Shannon and Weaver, DeLone and McLean defined six distinct dimensions of IS success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact (DeLone and McLean 1992). System Quality is a construct that measures technical success, Information Quality measures semantics (value to process) while the rest measure effectiveness success. These dimensions are interrelated and have an impact on IS success if considered together (DeLone and McLean 1992).

Use or Intention to use is a dimension that can be interpreted to mean frequency or amount of use such that higher frequency of use or deployment of the system implies IS Success. However, this measure becomes less significant when use of the system under investigation is mandatory and this is the main reason the study will focus on system quality, information quality and user satisfaction as the key variables. The updated DeLone and McLean Model introduces an aspect of organizational and individual impact considered jointly as net benefits which is more holistic and was covered during the hypotheses formulation.

The updated model consists of six interrelated dimensions of IS success: information, system, and service quality; (intention to) use; user satisfaction; and net benefits (DeLone and McLean 2003).



The success dimension system quality constitutes the desirable characteristics of an IS and, thus, subsumes measures of the IS itself. These measures typically focus on usability aspects and performance characteristics of the system under examination. A very common measure is perceived ease of use caused by the large amount of research related to the Technology Acceptance Model (TAM) (Davis 1989).

The success dimension information quality constitutes the desirable characteristics of an IS's output. An example would be the information an employee can generate using a company's IS, such as quarterly sales revenue or current prices for supplier Local Purchase Orders (LPOs). Thus, it subsumes measures focusing on the quality of the information that the system produces and its usefulness for the user. Information quality is often seen as a key antecedent of user satisfaction.

The other success dimension service quality represents the quality of support that the users receive from the IS department and IT support personnel, such as, training, configuration, hotline, or helpdesk.

The success dimension (intention to) use represents the degree and manner in which an IS is utilized by its users. Measuring the usage of an IS is a broad concept that can be considered from several perspectives. In case of voluntary use, the actual use of an IS may be an appropriate success measure. Previous studies measured use objectively by capturing the connect time, the functions utilized, or the frequency of use. As the amount of time a system is used is apparently not a sufficient success measure, other studies applied subjective measures by questioning users about their perceived use of a system (e.g. DeLone 1988). A more comprehensive approach for explaining the usage of an IS is described by other technology acceptance models as independent variables perceived ease of use and perceived usefulness contributing to attitude toward use, intention to use and actual use. Due to difficulties in interpreting the dimension use, DeLone and McLean suggest intention to use as an alternative measure to use for some contexts.

The success dimension user satisfaction constitutes the user's level of satisfaction when utilizing an IS. It is considered as one of the most important measures of IS success. Measuring user satisfaction becomes especially useful, when the use of an IS is mandatory and the amount of use is not an appropriate indicator of systems success. Widely used user satisfaction instruments are the ones by Ives et al. (1983) and Doll et al. (2004). However,

these instruments also contain items of system, information, and service quality, rather than only measuring user satisfaction.

The success dimension net benefits, constitutes the extent to which IS are contributing to the success of achieving the objectives of the different stakeholders. This construct brought to focus the individual impact as well as the organizational impact which can also be interpreted as societal impact. The choice of what impact to be measured is dependent on the system being evaluated, the purpose of the study, and the level of analysis. Although use and user satisfaction are correlated with net benefits, there is still the necessity to measure net benefits directly. Some studies look at the value of technology investments through quantifiable financial measures such as return on investment (ROI), market share, cost, productivity analysis, and profitability. Some researchers argue that benefits in terms of numeric costs are not possible because of intangible system impacts and intervening environmental variables (McGill et al. 2003).

While settling on net benefits as an independent variable, the updated D&M IS Success Model defines the dependent variables for purposes of this evaluation as outlined above. The updated D&M IS Success Model includes arrows to demonstrate proposed associations among success dimensions in a process sense, but does not show positive or negative signs for those associations in a causal sense. The nature of these causal associations should be hypothesized within the context of a particular study. For example, in one instance a high-quality system will be associated with more use, more user satisfaction, and positive net benefits. The proposed associations would then all be positive. In another instance, more use of a poor quality system would be associated with more dissatisfaction and negative net benefits. The proposed associations would then be negative (Delone and Mclean, 2011).

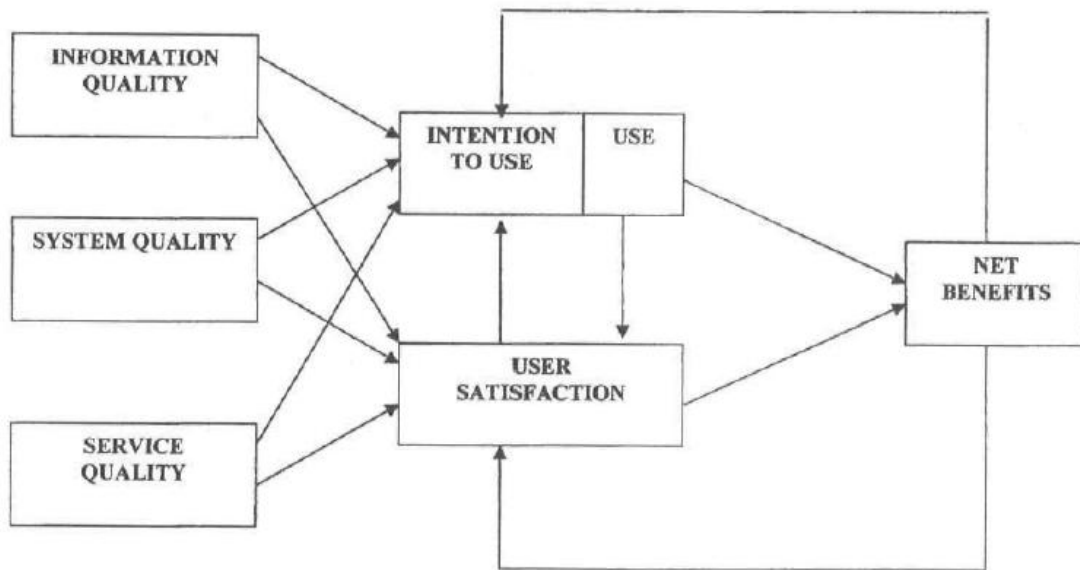


Figure 2.1: The Updated D&M IS Success Model

## 2.4 Conceptual Framework

Smithson and Hirschheim proposed a conceptual framework for IS evaluation and demonstrated its usefulness in practice by applying the framework to the evaluation of an outsourcing situation (Delone and Mclean, 2003). Their framework presents various theoretical bases for IS evaluation organized into three "zones" of evaluation: efficiency, effectiveness, and understanding. In view of these, new constructs or metrics could be drawn from the literature stream associated with each conceptual base; for example, software metrics, organizational behavior, sociology, cognitive psychology, and so on. This framework includes evaluation areas that overlap with the D&M success dimensions, including hardware and software metrics ("system quality"), system usage, user satisfaction, cost-benefit analysis, and so on, but also suggests many other theoretical sources of IS evaluation measures. Many studies however validate the D&M IS Success Model as modern, complete and sufficient tool. It can also be adopted for determining suitability of an IS prior to purchase.

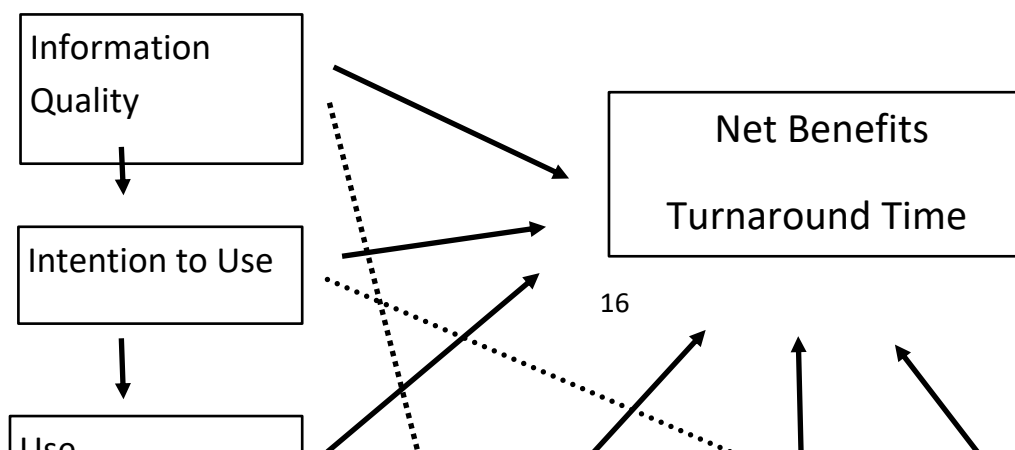


Figure 2.2: The Conceptual Framework Model

A study conducted by Mahmoodi Zohreh and others to evaluate a virtual education system concluded that “system quality has the greatest overall impact on the net benefits of the system, both directly and indirectly by affecting user satisfaction and the intention to use. System quality should therefore be further emphasized, to use these systems more efficiently.” (Mahmoodi et al., 2017). Further, in their study they found that success can be associated with system quality, information quality and service quality, which are the prerequisites of three other key structures, namely user satisfaction, intention to use and net benefits, which measure the effects of using the system after it is implemented.

The Conceptual Framework Model proposed in Figure 2.2 postulates that it is a management function to ensure that users are satisfied and comfortable using the system. This can be achieved through regular training and retraining of users as well as system update to incorporate user feedback. Organizational Commitment can be measured by examining the quality of information processed, the intention of users to use the system and actual use. These factors impact directly on the decision of management to enhance user support hence the causal perception. However, the IFMIS is a system rolled out with mandatory functionalities and as such users do not have the option to use or not to, given the circumstances of PEM. Management Support therefore presents a catalyst effect since Intention to Use and Actual Use cease to be of significance or even to be used as a measure of user satisfaction.

This Model therefore reinforces the Mahmoodi et al. Model with slight modification by eliminating the intention to use as a critical success factor in the implementation of Information Systems.

Net benefits remain a function of implementation cost depending on the stage of implementation. At the initial stages implementation cost is usually a barrier to project approval while in the latter stages the net benefits are quantifiable or tangible and provide a critical success measure hence the motivation for IS project approvals.

## **2.5 Summary of Literature Review**

A Well-Integrated Financial Management Information System will support government operations as well as provide a measure of performance in service delivery to its citizens. It will integrate budget and budget execution data, allowing greater financial control and reducing opportunities for discretion in the use of public funds. This system will provide information for budget planning, analysis and reporting for both central and county governments. It will also facilitate the preparation of financial statements and provide a complete audit trail in order to facilitate audits in a timely manner.

The above studies provide an important aspect regarding IFMIS and its components. They also provide results and conclusions of research done on IFMIS in Malawi. None of the studies have tackled effects of IFMIS on service delivery in the public sector in Kenya. It is against this backdrop that this research will seek to fill the existing gap by seeking to establish the level of success of IFMIS in fulfilling the desire by staff in the civil service as well suppliers, hitherto prequalified for a speedy payment system in the public sector in Kenya. That has been the root of corruption and if all recommendations of this and other studies are implemented, then Kenya's ranking in the corruption index will greatly improve.

C.R. Kothari (2004) in his discourse concerning the accuracy of computers says "The computer's accuracy is consistently high. Errors in the machinery can occur but, due to increased efficiency in error-detecting techniques, these seldom lead to false results. Almost without exception, the errors in computing are due to human rather than to technological weaknesses". This is a firm corroboration that IFMIS is the only and best option for Kenya's economic growth.

# **CHAPTER THREE: RESEARCH METHODOLOGY**

## **3.1 Introduction**

This chapter describes the methodology that was used to conduct this study. These include: Research paradigm, research design, target population, sample size and sampling procedure, research instrument, data collection procedure, data analysis techniques, the methodology for testing the hypotheses and operationalization of research variables. Further, reliability and validity procedures used for testing the research instrument are discussed.

## **3.2 Research Paradigm**

Rossmann & Rollins identify 4 different paradigms although the two primary paradigms are Positivism and Interpretivism. Positivism is associated with quantitative research. It involves hypothesis testing to obtain “objective” truth. Also used to predict what may happen at a future date. Critical realism is a subtype of positivism that incorporates some value assumptions on the part of the researcher. It involves looking at power in society. Researchers primarily rely on quantitative data to do this. Interpretivism is associated with qualitative research. It is used to obtain an understanding of the world from an individual perspective. Critical Humanism is a subtype of the interpretive paradigm. The critical humanism approach is one in which the researcher involves people studied in the research process. In this approach data is used for social change. Other writers have identified Pragmatism as one of the primary paradigms associated with critical realism.

Positivist studies use quantitative methods for empirical testing of formulated hypothesis. These studies involve obtaining data through surveys and analyzing the structured data using statistical methods to determine the linkages between variables. Quantitative approaches are based on the logic of deduction, beginning from accepted theories or premises and testing them rationally. Interpretivism (phenomenology) takes more or less the opposite approach, positing a view of reality as wholly constructed, subjective and social in nature. The phenomenological paradigm is concerned with the understanding and exploration of the phenomenon from participant’s own frame of reference (Hussey & Hussey, 1997). The research is based on unstructured data obtained through mainly qualitative methods like field work studies and case research methods. Qualitative research tends to focus on subjective experience. In the present study, a positivism paradigm and quantitative research method was used as it relied mainly on secondary and primary quantitative data.

Primary data are the data collected specifically for the study in question. In contrast secondary data are not originally collected for the specific purpose of study at hand, but rather for a different purpose. Primary data was obtained by survey using a structured questionnaire and secondary data was obtained from Treasury and Ministry Publications such as the *IFMIS Times*, Reports from Audit and Training activities.

### **3.2.1 Research Design**

According to Shukla (2010) a research design is a framework or a blue print for conducting a research. It provides a clear plan on how the research will be conducted and helps the researcher in sticking to the plan. The two approaches to research are qualitative and quantitative researches. The distinction between the two is framed in terms of using words (qualitative) rather than numbers (Quantitative), or using closed-ended questions (quantitative hypotheses) rather than open-ended questions (qualitative interview questions). Quantitative research is based on the theory of positivism, which postulates that only meaningful phenomena are those which are observable. Qualitative research is based on post-positivism philosophy which postulates that there is no single objective reality.

There are two primary types of quantitative research, descriptive and explanatory (Hair et al., 2003). There are two types of descriptive studies: Longitudinal designs include the study of a population over a period of time. Cross sectional designs include the study of individuals (usually an attitude or belief) at one point in time. The cross-sectional design is perhaps the most predominant design employed in the social sciences and is identified with survey research, a method of data collection common in many social science fields (Nachmias & Nachmias, 2005). In a cross-sectional study all the measurements are made at about the same time, with no follow-up period. Cross-sectional designs are well suited to the goal of describing variables and their distribution patterns.

The present research is a descriptive cross section and correlation design and used a stratified sample survey to obtain the empirical data to determine the linkages between variables. This method was used because it allows statistical inferences to broader population and permits the generalization of findings to real – life situations, thereby increasing the external validity of the study (Nachmias & Nachmias, 2005).

### **3.3 Target Population**

Mugenda and Mugenda (2003) assert that, the target population is the population to which a researcher wants to generalize the results of the study. The target population of this study was about 100 staff and a few suppliers within the Ministry of Agriculture, Livestock, Fisheries and Irrigation and The Treasury who interact directly or indirectly with IFMIS in Kenya.

### **3.4 Sample Size and Sampling procedures**

This section describes the sample size and sampling procedure that was used in the study.

#### **3.4.1 Sample Size**

The respondents were a total of 42 drawn from about 400 users of IFMIS in the country. Sampling was done in two (2) out of the 47 counties, in addition to The Ministry Headquarters and National Treasury. In total a minimum of 10 accountants and 10 suppliers were sought for interview during the study. 20 members of staff with non-finance roles were also requested to participate in this research.

Stratified random sampling technique was employed in the selection of the study population. Rosco (1975) proposed a rule of thumb of 30 and 500 as the appropriate sample size for most researches.

#### **3.4.2 Sampling Procedure**

In the present study random sampling was used for various strata including accountants and lower level users. Sampling proportionate to size was undertaken to come up with the total number of accountants and lower level users. Out of 42 respondents 26 were Financial Managers while 16 were users. No Suppliers were identified.

Mugenda and Mugenda (2003) discusses purposive sampling as a technique that allows a researcher to use cases that have the required information with respect to the objectives of the study. Cases of subjects are therefore hand-picked because they are informative or they possess the required characteristics. This technique was used to arrive at the 2 Counties selected – Bungoma and Busia, first due to their proximity to one another and secondly as a representative sample of rural counties.



### **3.5 Research Instrument**

The instrument for primary data collection in this research was a numerical 5-point Likert scale questionnaire and it applied to the 42 sampled respondents. Questionnaire has advantages of low cost, reduction in biasing error, greater anonymity, considered answers and consultations and finally accessibility to a wide geographical contact at minimal cost (Nachmias & Nachmias, 2005). The questionnaire method was selected as it allowed the researcher to collect data systematically and address the research issues in the standardized and economical way. In addition the questionnaire was chosen because of the nature of this study which may have required consultation. An additional questionnaire was developed to address the training needs of users which was a significant part of this study.

The research instrument was developed based on the constructs identified in the conceptual framework. The questionnaire was organized into seven sections in order to bring out the information required: Section 1 elicited Personal information; section 2 probed the system quality characteristics of IFMIS; section 3 checked the level of information quality including Reports generated; section 4 probed the quality of service / system availability at Headquarters and at County Level including training and support to users; section 5 investigated perceived willingness or intention of users to use IFMIS in their operations; section 6 looked at the level of satisfaction of staff and suppliers on the implementation of IFMIS and section 7 the Turnaround time for a transaction as a measure of effectiveness of the system.

Secondary data was obtained from the National Treasury and Ministry Publications such as the *IFMIS Times*, Reports from Audit and Training activities.

During the pre-analysis, Cronbach's Alpha coefficients were all found to be greater than 0.7, meaning that the instrument had an acceptable reliability coefficient and was appropriate for the study.

### **3.6 Data Collection Procedure**

An introduction letter from The School of Computing and Informatics, University of Nairobi and a research permit from the National Commission for Science, Technology and Innovation were obtained. The researcher deployed soft questionnaires and this provided an opportunity to explain to the respondents the purpose of the study; why it was important that the

respondents answered the questions and assuring the respondents that their responses would be held in strict confidence and used only for the intended purpose.

The study relied on both primary and secondary data. The primary data was to be collected using questionnaires which contained semi structured questions to be administered to IFMIS users and suppliers personally to shorten the response time and enable on the spot clarification of any doubt the respondents would have regarding any questions. Both qualitative and quantitative approaches were used to collect the data. Three segments (strata) of the users were constructed thus users with finance role (accountants, auditors and budget controllers), users with non-finance roles (staff from other departments such as field extension services, administration, human resources) and suppliers who are basically non-staff. The primary data was collected by the use of a well-structured questionnaire pre-tested for validity and reliability

Secondary data was obtained from IFMIS implementation review report, the helpdesk logs, IFMIS Times (2014 publication), economic survey and statistical abstract books. Likert scale was used in the questionnaires where: 1 – strongly agree, 2 – agree, 3 – disagree and 4 – strongly disagree.

The questionnaires were administered by the researcher to the respondents in Busia County, Bungoma County, Ministry of Agriculture, Livestock, Fisheries and Irrigation. The collected data was near ready for analysis considering that it was already in soft copy.

### **3.7 Pilot Testing**

A pilot study represents a cornerstone of a good research design. In fact, a pilot study is an essential initial step in research. Pilot study refers to “a small-scale test of the methods and procedures to be used on a large scale” (Porta, 2008). The Researcher carried out the pilot testing of the questionnaire for validity and reliability on a small and similar group to the one that was used in the research at the County Headquarters. A sample size of 10 participants was used in the pilot study which is almost 20% of the sample size of 42 respondents for the actual study. Baker (1994) found out that a sample size of 10% of the sample size for the actual study is a reasonable number of participants to consider enrolling in a pilot study. Pretesting the questionnaire was important because: ambiguous and vague questions were revealed as respondents interpreted them differently; comments and suggestions made by the

respondents were used to improve the questionnaire; deficiencies in the questionnaire were corrected.

### **3.7.1 Validity of Research Instrument**

Validity is defined as the extent to which the instrument measures what it purports to measure. Construct validity is a measure of the degree to which data obtained from an instrument meaningfully and accurately reflects or represent a theoretical concept. While content validity is a measure of the degree to which data collected using a particular instrument represents a specific domain of indicators or content of a particular concept (Mugenda & Mugenda, 2003). Construct validity assesses whether a questionnaire has been designed in a manner that will elicit the required information from the respondents. This process allows weaknesses in the questionnaire to be detected so that they can be removed before the final questionnaire is prepared.

### **3.7.2 Reliability of Research Instrument**

Reliability is defined as the extent to which a questionnaire, test, observation or any measurement procedure produces the same results on repeated trials. Reliability can be internal or external. Internal reliability is the extent to which data collection, analysis and interpretation are consistent. If multiple data collectors are used, they should agree. External reliability is the extent to which the results can be replicated. It is ensured by the quality of the researcher. The researcher ensured that there were no inaccurate coding, ambiguous instructions by using a research process that minimized the random error and examining and appraising the questionnaire critically to enhance the reliability of the instrument.

There are four common ways of estimating reliability: the test - retest method, the parallel (equivalent) - form technique, the split - half method and the internal consistency. The researcher used the split-half reliability test and calculated the reliability of the questionnaire using the Cronbach's Coefficient Alpha. Alpha should be at least 0.70 or higher to retain an item in an adequate scale (Hair, Black, Babin, Anderson, & Tatham, 2006).

### **3.8 Data Analysis Techniques**

Analysis of data in a general way involves a number of closely related operations which are performed with the purpose of summarizing the collected data and organizing these in such a manner that they answer the research question(s) (Kothari, 2004). After completing the field survey, the collected data was edited for accuracy, uniformity, consistency and completeness, organized, summarized, coded and tabulated before final analysis. Descriptive statistics and inferential statistics were used to analyze the data.

#### **3.8.1 Descriptive Statistics**

Descriptive statistics was used to summarize both the primary and the secondary data to enable meaningful interpretation and description. Descriptive statistical analysis limits generalization to the particular group of individuals observed. The descriptive analysis technics that were used in this study were: percentages, means, overall mean and standard deviation. Standard Deviation (SD) provides an indication of how far the individual responses to a question vary or "deviate" from the mean. The distribution of responses is important to consider and the SD provides a valuable descriptive measure of this. Likert item means and overall mean were analyzed despite the ordinal nature of Likert items. Baggaley and Hull (1983), Maurer and Pierce (1998), Allen and Seaman (1997) and Vickers (1999) as cited by Brown (2011) have argued that Likert scales can indeed be analyzed effectively as interval scales. Likert-type items are individual questions on the construct while scores derived from a Likert scale are summated scores determined by a composite of responses to multiple items rather than responses to single items (Warmbrod, 2014).

#### **3.8.2 Inferential Statistics**

Inferential statistics was used in the study to enable the researcher to reach conclusions about the relationship between the variables. Drawing conclusions about populations based on observations of samples is the purpose of inferential analysis. A statistic is a measure based on observations of the characteristics of a sample. A statistic computed from a sample may be used to estimate a parameter, the corresponding value in the population from which the sample is selected (Best & Kahn, 1998). A correlation analysis was performed to determine if any variables were correlated. Further, correlation analysis was used to find out the strength and the direction of the relationship between the variables. Factor Analysis was used for

hypotheses testing to determine the relationships and predictions between the independent and dependent variables. These technique allows researchers to investigate concepts that are not easily measured directly by collapsing a large number of variables into a few interpretable underlying factors.

*a) Spearman's Correlation Analysis for Relationship Strength and Direction*

Spearman's Correlation Coefficient is also referred to as Spearman Rank Correlation or Spearman's rho. It is often used as a statistical method to aid with either proving or disproving a hypothesis. It is typically denoted either with the Greek letter rho ( $\rho$ ), or rs. Spearman's rho measures the strength of association and direction of two variables in a single value between -1 and +1. This value is called the correlation coefficient. A positive correlation coefficient indicates a positive relationship between the two variables while negative correlation coefficient expresses a negative relationship. A correlation coefficient of 0 indicates that no relationship between the variables exists at all.

The Spearman Correlation requires ordinal or ranked data; therefore, it is very important that measurement levels are correctly defined in SPSS. SPSS was used to calculate the Spearman's correlation coefficient. Correlation analysis was carried out to gauge if there was any relationship between each independent variable (system quality, information quality, willingness to use and level of satisfaction) and turnaround time; the direction of this relation and the strength of this relation. The correlation strengths were interpreted using Cohen (1988) decision rules where r values from 0.1 to 0.3 indicate weak correlation, 0.31 to 0.5 indicate moderate correlation strength and greater than 0.5 indicate a strong correlation between the variables. Correlation is statistically significant at 0.05 level if p values are 0.05 and below and statistically insignificant if p values are more than 0.05.

*b) The Factor Analysis Technique for Hypothesis Testing*

Hypothesis testing is the method in which we select samples to learn more about characteristics in a given population. Factor analysis is a useful tool for investigating variable relationships for complex concepts such IS evaluation or assessment of impact. The key concept of factor analysis is that multiple observed variables have similar patterns of responses because they are all associated with a latent (i.e. not directly measured) variable.

In every factor analysis, there are the same number of factors as there are variables. Each factor captures a certain amount of the overall variance in the observed variables, and the factors are always listed in order of how much variation they explain. The eigenvalue is a measure of how much of the variance of the observed variables a factor explains. Any factor with an eigenvalue  $\geq 1$  explains more variance than a single observed variable. The factors that explain the least amount of variance are generally discarded.

The relationship of each variable to the underlying factor was expressed by the so-called factor loading. An example of the output of a simple factor analysis looking at indicators of Information Quality such as completeness gives a factor loading of 0.65. This would be considered a strong association for a factor analysis in most research fields. As a rule of thumb, a variable should have a rotated factor loading of at least  $|0.4|$  (meaning  $\geq +.4$  or  $\leq -.4$ ) onto one of the factors in order to be considered important.

This study attempted to measure an underlying characteristic that cannot be observed or measured directly. The measure is hypothesized to exist to explain variables, such as documented in section 1.9 that can be observed. The measurable variables are called manifest variables. The unmeasurable are called latent variables. Latent variables are often called factors, especially in the context of factor analysis.

Measurement in science must take into account various kinds of error. That error can be random and/or systematic. In this statistical approach data is isolated to the true score in a variable so as to remove the error. This is what happens when using latent variables for measurement.

To measure something accurately, decompose a measure  $X$  (i.e. what was actually measured) into the true score ( $T$ ) and the error ( $E$ ):

$$X = T + E$$

One way of splitting  $X$  into  $T$  and  $E$  is to add the scores across a number of different  $X$  variables.

For instance, if you have four variables that are all measuring the same underlying concept then you could just add those up and take a summed score.

This approach has the benefit that the random error in each of those measurements will cancel out as you add items together. However, with this approach you assign equal weight to each

item in the construction of the true score and that may not lead to the most accurate measurement.

Another approach is to actually estimate some kind of latent variable model. Exploratory Factor Analysis (EFA) is conducted to discover what latent variables are behind a set of variables or measures. In contrast, Confirmatory Factor Analysis is conducted to test theories and hypotheses about the factors or latent variables one expects to find. Therefore, the key difference between CFA and EFA is that a measurement model is specified before looking at the data based on theory.

The challenge with a latent variable is that it does not have a metric since it is an unobserved-hypothetical variable. In other words, it has no units. Confirmatory Factor Analysis allows one to give a specific metric to the latent variable that makes sense. There are two approaches that are usually followed: One approach is to essentially produce a standardized solution so that all variables are measured in standard deviation units. This can be done by constraining the variance of the latent variable to one. The downside of this approach is that one no longer has a non-standardized metric that could be given to this latent (unobserved) variable.

Another approach is to make a reference item from the group of items that make up the latent variable. Then compare all the other items of this latent variable with the reference item. This reference item has a fixed loading for ease of comparison purposes. The value of the loading of this reference items is one.

The latter approach is more flexible as it can yield a standardized solution or an unstandardized solution.

In summary therefore, the criterion for testing if the null hypothesis were true would be generated through factor loading. A variable should have a rotated factor loading of at least  $|0.4|$  onto one of the factors in order to reject the null hypothesis.

The Confirmatory Factor Analysis would provide the most reliable statistic based on the latent variable.

### **3.9 Measurement of Variables**

The study used perceptual measures to capture data on IS success and technological factors. A criterion for selection of constructs was that they have been employed frequently in IS research as a measure of IS success (Jafrey 2017). The specific constructs included for measurement in the questionnaires are operationalized below.

Panneerselvam (2006) defines measurement as the assignment of a number to an object which reflects the degree of possession of a characteristic by that object. The respondents were asked to rate the extent to which the independent variables influenced the dependent variable. The Likert scale, developed by Rensis Likert, was designed as an interval scale to examine how strongly subjects agree or disagree with the statement. Chimi and Russel (2009) revealed that Likert scale is used in nearly all fields of scholarly and business research: when the value sought is a belief, opinion or effect; when the value sought cannot be asked or answered definitely and with precision; and when the value sought is considered to be of such a sensitive nature that respondents would not answer except categorically in large ranges.

The 5-point Likert scale ranged from “Strongly disagree” which was represented by 1 to “Strongly agree” which was represented by 5. Turnaround time is a dependent variable and based on this a dichotomous scale was used. This model was used because an information system can only be successful or not successful in delivering the desired outcomes. The researcher interpreted the mean and related it to the degree of agreement of the question asked or reality in the department such that a mean below 1.5 represent to a very less extent; mean of 1.5 to 2.4 represent less extent; mean of 2.5 to 3.4 represent moderate; mean of 3.5 to 4.4 represent to a large extent and above 4.4 represent to a very large extent. On the other hand, the deviation of the standard deviation from the mean represent level of convergence of the respondents on the question asked. Standard deviation below 0.7 represent most convergence; 0.7 to below 0.9 represent more convergence; 0.9 to below 1.1 represent moderate convergence; 1.1 to below 1.3 represent less convergence and 1.3 and above represent least convergence.



### 3.9.1 Operationalization of the Variables

Objective	Variables	Indicators	Measurement	Scale	Research Approach	Tools of Analysis	Types of Data Analysis
Influence of system quality characteristics on the turnaround time for transactions in IFMIS	Accuracy of the system, Ease of learning, Ease of use, Accessibility, Flexibility of the system, And Integration of systems, Adaptability, Availability, currency, Reliability, Response time, user-friendly	Improved efficiency and effectiveness, Acceptance, Greater financial integrity and transparency, Greater accountability among staff, Laws and regulations followed to the letter, all transactions processed within IFMIS, automated procedures and internal controls	Extend of agreement ( Strongly disagree to strongly agree)	Ordinal	Quantitative	Descriptive statistics, Correlation, Factor Analysis	Descriptive and Inferential
Influence of the level of information quality on the turnaround time for transactions in IFMIS	Accuracy, Completeness, Format, Precision, Relevance, Reliability, and Timeliness. Understandability	Completeness of information, Ease of understanding, Personalization, Relevance, Security	Extend of agreement ( Strongly disagree to strongly agree)	Ordinal	Quantitative	Descriptive statistics, Correlation, Factor Analysis	Descriptive and Inferential

<b>Objective</b>	<b>Variables</b>	<b>Indicators</b>	<b>Measurement</b>	<b>Scale</b>	<b>Research Approach</b>	<b>Tools of Analysis</b>	<b>Types of Data Analysis</b>
	and Conciseness						
Influence of the quality of service / system availability on the processing of transactions in IFMIS	Assurance, Reliability, Responsiveness, Tangibles, And Empathy	Assurance, Responsiveness, Empathy	Extend of agreement ( Strongly disagree to strongly agree)	Ordinal	Quantitative	Descriptive statistics, Correlation, Factor Analysis	Descriptive and Inferential
Influence of perceived willingness of users to adopt IFMIS in their operations on the turnaround time for transactions in IFMIS	Frequency of use, Number of reports generated, Expected future use	Ease of extraction and presentation, Access, Real time data, Ease of analysis, reconciliation	Extend of agreement ( Strongly disagree to strongly agree)	Ordinal	Quantitative	Descriptive statistics, Correlation, Factor Analysis	Descriptive and Inferential
Influence of the level of satisfaction of staff and suppliers on the implementation of IFMIS on the use of IFMIS to process transactions	Adequacy, Effectiveness, Efficiency, Information satisfaction	Training Frequency of use Helpdesk logs	Extend of agreement ( Strongly disagree to strongly agree)	Ordinal	Quantitative	Descriptive statistics, Correlation, Factor Analysis	Descriptive and Inferential
Influence of the turnaround time	Cost reduction, improved decision	Timely supervision,	Extend of agreement (	Ordinal	Quantitative	Descriptive statistics,	Descriptive and

<b>Objective</b>	<b>Variables</b>	<b>Indicators</b>	<b>Measurement</b>	<b>Scale</b>	<b>Research Approach</b>	<b>Tools of Analysis</b>	<b>Types of Data Analysis</b>
for a transaction on the adoption of IFMIS for all government transactions	making, and Productivity improvement. And Time savings	reduced costs, reduced corruption, Accuracy of records, Integrity of database, internal controls, traceability, collaboration	Strongly disagree to strongly agree)			Correlation, Factor Analysis	Inferential

Table 3.1 Operationalization of Variables

## **CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION**

### **4.1 Introduction**

This chapter presents the study results and discussions which were analyzed in line with the study objectives in the following areas; Response rate, reliability and validity of the research instrument, Bio data of the respondents, descriptive statistics, and correlation analysis and hypotheses tests. Percentages, means and standard deviations were used to analyze the descriptive data, while inferential statistics was used for the correlation analysis and the testing of the hypotheses using factor analysis to predicting the relationship between the dependent and independent variables.

Data Analysis refers to the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap and evaluate data. According to Shamoo and Resnik (2003) various analytic procedures “provide a way of drawing inductive inferences from data and distinguishing the phenomenon of interest from the statistical fluctuations present in the data”.

### **4.2 Response Rate**

A total of 43 digital questionnaires were distributed and of those respondents targeted 42 responded conclusively putting the response rate at 99%. One respondent quit the interview midway for personal reasons.

Out of the 42 respondents 26 are Financial Managers while 16 are users. No Suppliers were identified. The tables below present the descriptive findings.

### **4.3 Reliability Tests**

For reliability analysis Cronbach’s alpha was calculated by application of SPSS. The value of the alpha coefficient ranges from 0 to 1 and may be used to describe the reliability of factors extracted from dichotomous (questions with two possible answers) and/or multi-point formatted questionnaires or scales (i.e., rating scale: 1 = strongly disagree, 5 = strongly agree). A higher value shows a more reliable generated scale. Hair et al, (2006) indicate 0.7 to be the minimum acceptable reliability coefficient. The study involved questionnaires from 26 respondents, who were financial managers and 16 users. Since, the alpha coefficients were all greater than 0.7, a conclusion was drawn that the instrument had an acceptable reliability coefficient and was appropriate for the study. Table 4.1 shows the results of the reliability tests.

Variable	Cronbach's Alpha
System Quality	0.82
Information Quality	0.85
Quality of Service / System Availability	0.65
Willingness to use / use	0.49
Turnaround time	0.89
<b>Average</b>	<b>0.74</b>

Table 4.1 Reliability Tests Results

#### 4.4 Descriptive Statistics

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	19	73.1	73.1	73.1
	Female	7	26.9	26.9	100.0
	Total	26	100.0	100.0	

Table 4.2 Analysis of Financial Managers by Gender

Of those interviewed 19 were male while 7 were female representing 73% and 27% respectively.

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 - 29 Years	3	11.5	11.5	11.5
	30 - 39 Years	13	50.0	50.0	61.5
	40 - 49 Years	5	19.2	19.2	80.8
	50 Years and Above	5	19.2	19.2	100.0
	Total	26	100.0	100.0	

Table 4.3 Analysis Financial Managers by Age

Majority of the Managers were aged between 30 and 39 Years. This explains the increasing adoption of IFMIS.

Highest Education					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Diploma	7	26.9	26.9	26.9
	Degree	16	61.5	61.5	88.5
	Post Graduate Degree	3	11.5	11.5	100.0
	Total	26	100.0	100.0	

Table 4.4 Highest Education attained by Financial Managers

Most of the Financial Managers were degree holders with 11.5% holding postgraduate degrees. There is therefore adequacy of skills and knowledge.

Department					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Accounts	5	19.2	19.2	19.2
	Audit	4	15.4	15.4	34.6
	IT	11	42.3	42.3	76.9
	Finance	6	23.1	23.1	100.0
	Total	26	100.0	100.0	

Table 4.5 Financial Managers clustered by Department

The Financial Managers were evenly distributed across the various departments with IT Department having the highest number of managers – this places emphasis on the support function.

Length at Work					
	Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	6 - 10 Years	5	19.2	19.2	19.2
	10 Years and Above	12	46.2	46.2	65.4
	4	9	34.6	34.6	100.0
	Total	26	100.0	100.0	

Table 4.6 Duration at the Place of work

Majority of the Financial Managers have been in those roles for more than 10 Years.

Frequency of Using IFMIS				
	Frequency	Percent	Valid Percent	Cumulative Percent
	Daily	14	53.8	53.8
Valid	Weekly	12	46.2	100.0
	Total	26	100.0	100.0

Table 4.7 Frequency of using IFMIS

53% of the Financial Managers revealed that they use the IFMIS system on a daily basis making it a critical component to their day to day operations.

Greater Financial Integrity and Transparency				
	Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly Agree	7	26.9	26.9
	Agree	13	50.0	76.9
Valid	Neither Agree Nor Disagree	5	19.2	96.2
	Disagree	1	3.8	100.0
	Total	26	100.0	100.0

Table 4.8 Does IFMIS enhance transparency at work?

77% of the Financial Managers agreed that the use of IFMIS enhances financial integrity and transparency in their operations.

Laws and regulations followed				
	Frequency	Percent	Valid Percent	Cumulative Percent
	Strongly Agree	8	30.8	30.8
	Agree	8	30.8	61.5
Valid	Neither Agree Nor Disagree	10	38.5	100.0
	Total	26	100.0	100.0

Table 4.9a Does the use of IFMIS improve internal and external financial controls?

It was also evident that 60% of the users agreed that IFMIS improved the internal and external financial controls necessary in achieving accountability.

**Completeness of Information**

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	23	88.5	88.5	88.5
Valid Agree	3	11.5	11.5	100.0
Total	26	100.0	100.0	

Table 4.9b Does the use of IFMIS provide complete financial records?

Financial Managers unanimously agreed that a major outcome of the IFMIS implementation is complete records during financial reviews which greatly enhances decision making.

**Responsiveness**

	Frequency	Percent	Valid Percent	Cumulative Percent
Very Great extent	17	65.4	65.4	65.4
Valid Great extent	9	34.6	34.6	100.0
Total	26	100.0	100.0	

Table 4.10 Is IFMIS System Responsive?

Financial Managers unanimously agreed that another outcome of the IFMIS implementation is responsiveness to data queries and timely reporting during financial reviews which greatly enhances decision making.

**Offers Real Time Financial Info**

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	12	46.2	46.2	46.2
Valid Agree	9	34.6	34.6	80.8
Neither Agree Nor Disagree	5	19.2	19.2	100.0
Total	26	100.0	100.0	

Table 4.11 Does the use of IFMIS offer real time information?

80% of the Financial Managers agreed that IFMIS offers real time information.



**Accurately discloses financial Information**

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	13	50.0	50.0	50.0
Neither Agree Nor Disagree	11	42.3	42.3	92.3
Strongly Disagree	2	7.7	7.7	100.0
Total	26	100.0	100.0	

Table 4.12 Does the IFMIS provide accurate disclosure of financial records?

Some Financial Managers were not sure whether disclosure was completely accurate largely for the fact that errors are made during input. 50% of the managers, however, responded to the affirmative.

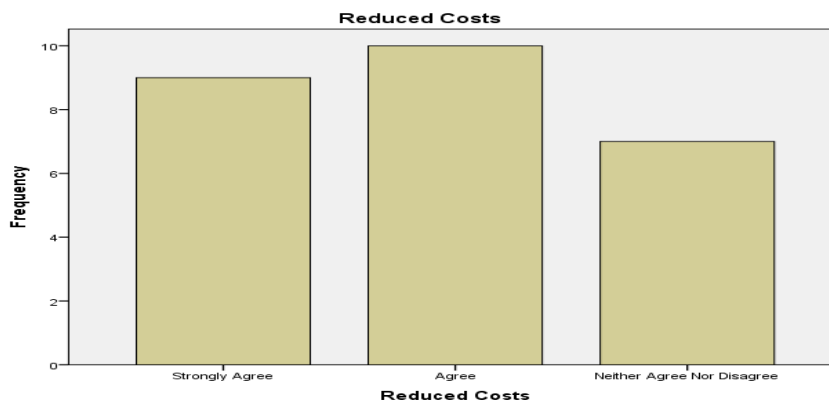


Chart 4.1 Does IFMIS implementation lead to reduced operational costs?

Majority of the financial managers agreed that IFMIS implementation reduced costs by a good proportion. 73% of the managers either strongly agreed or agreed with this proposition.

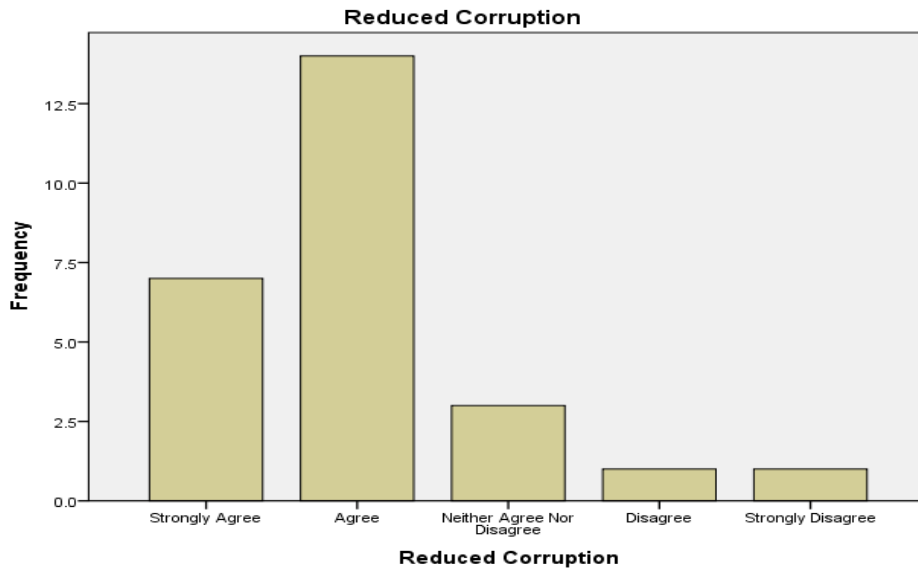


Chart 4.2 Does IFMIS implementation lead to reduced corruption?

Majority of the financial managers agreed that IFMIS implementation reduced incidences of corruption. A similar analysis was done for users of IFMIS and the following findings were made:

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	11	68.8	68.8	68.8
Female	5	31.3	31.3	100.0
Total	16	100.0	100.0	

Table 4.13 Analysis of Users by Gender

Of the 16 respondents 11 were male and 5 female.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 18 - 29 Years	9	56.3	56.3	56.3
40 - 49 Years	6	37.5	37.5	93.8
50 Years and Above	1	6.3	6.3	100.0
Total	16	100.0	100.0	

Table 4.14 Analysis of Users by Age

56% of the users were aged below 29 Years which has a positive impact on IFMIS implementation.

Frequency of Using IFMIS				
	Frequency	Percent	Valid Percent	Cumulative Percent
Daily	11	68.8	68.8	68.8
Valid Weekly	5	31.3	31.3	100.0
Total	16	100.0	100.0	

Table 4.15 Frequency of Using IFMIS

Majority of the users 68% said that they logged in to IFMIS on a daily basis. They also disagreed that there was a reduction in manual entry as it appeared they had to do more work to ensure IFMIS was up to date. Some of the users also felt that the accuracy of IFMIS relied on their data entry efficiency and effectiveness.

## 4.5 Inferential Analysis

The process of data analysis follows data presentation. Data is subjected to various tests aligned to the conceptual framework model. Different variables provide a trend that will be used in the following section to demonstrate the impact of IFMIS implementation over time.

			<b>Correlations</b>		
			Internal Controls	Fin Transactions conducted transparently	Financial info available and reliable
Spearman's rho	Internal Controls	Correlation Coefficient	1.000	.516 <sup>*</sup>	.079
		Sig. (2-tailed)	.	.041	.772
		N	16	16	16
	Fin Transactions conducted transparently	Correlation Coefficient	.516 <sup>*</sup>	1.000	-.074
		Sig. (2-tailed)	.041	.	.785
		N	16	16	16
	Financial info available and reliable	Correlation Coefficient	.079	-.074	1.000
		Sig. (2-tailed)	.772	.785	.
		N	16	16	16

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

Table 4.16 Correlation between Transparency and internal/external control for users

Using the bivariate test to determine the correlation between enhanced transparency and improved controls, it was found that there is a strong relationship between the two variables. As the level of transparency in operations was enhanced there was a corresponding increase in the level of internal / external controls. There was however less than significant relationship between availability of reliable financial information and internal controls.

A significant relationship was also noted between availability of reliable financial information and transparent conduct of financial transactions.

## 4.6 Hypotheses Testing

The study tested the null hypothesis using Factor analysis. In every factor analysis, there are the same number of factors as there are variables. Each factor captures a certain amount of the overall variance in the observed variables, and the factors are always listed in order of how much variation they explain. The eigenvalue is a measure of how much of the variance of the

observed variables a factor explains. Any factor with an eigenvalue  $\geq 1$  explains more variance than a single observed variable. The factors that explain the least amount of variance are generally discarded.

The relationship of each variable to the underlying factor is expressed by factor loading. An example of the output of a simple factor analysis looking at indicators of Information Quality such as completeness gives a factor loading of 0.65. This would be considered a strong association for a factor analysis in most research fields. As a rule of thumb, a variable should have a rotated factor loading of at least  $|0.4|$  (meaning  $\geq +.4$  or  $\leq -.4$ ) onto one of the factors in order to be considered important.

The findings of this analysis are presented below:

<b>Communalities</b>	
	Initial
Improved Efficiency and Effectiveness	1.000
Greater Fin Integrity and Transparency	1.000
Fin Transactions conducted transparently	1.000
Greater Accountability among staff	1.000
Reliability	1.000
Laws and regulations followed	1.000
All Receipts and Payments done through IFMIS	1.000
Response Time is short	1.000
Reduced Risk of Corruption	1.000
Completeness of Information	1.000
Ease of Understanding Reports	1.000
Personalization of Information	1.000
Relevance of Information Generated	1.000
Security of Information	1.000
Assurance	1.000
Empathy	1.000
Responsiveness	1.000
Easy to extract and present data	1.000
Access specific information	1.000
Offers Real Time Financial Info	1.000
Tools that enable Analysis of data	1.000
Allow Reconciliation of Transactions	1.000
Accurately discloses financial Information	1.000
Generates Custom reports for int/external use	1.000
Allows access to Non-Financial Information	1.000

Timely Supervision	1.000
Reduced Costs	1.000
Reduced Manual Data Entry	1.000
Improved Visibility	1.000
Reduced Corruption	1.000
Comprehensive Public FS	1.000
Accuracy of record	1.000
Integrity of Database	1.000
Internal Controls	1.000
Internal and External Audits	1.000
Reconciliation of bank, fiscal records	1.000
Traceability	1.000
Communicate with Contractors	1.000
Create an Alert System	1.000
Collaborate with Suppliers	1.000
Implement Tracking System	1.000

Extraction Method: Principal Component Analysis.

Table 4.17 All variables generated from the questionnaire

The table shows all the variables captured during data collection. These variables are then extracted for analysis.

**Total Variance Explained**

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	17.010	41.487	41.487	7.929	19.339	19.339
2	4.597	11.211	52.698	7.042	17.176	36.514
3	4.021	9.807	62.506	5.629	13.730	50.244
4	3.514	8.571	71.077	4.670	11.391	61.635
5	2.180	5.316	76.393	4.569	11.144	72.779
6	1.779	4.339	80.732	2.405	5.867	78.646
7	1.560	3.806	84.538	2.125	5.184	83.830
8	1.496	3.650	88.187	1.786	4.357	88.187
9	.944	2.303	90.490			
10	.839	2.047	92.537			
11	.768	1.874	94.411			
12	.659	1.607	96.018			
13	.465	1.135	97.152			
14	.390	.952	98.104			
15	.312	.761	98.865			
16	.230	.561	99.426			
17	.156	.380	99.806			

18	.080	.194	100.000		
19	1.025E-013	1.062E-013	100.000		
20	1.016E-013	1.040E-013	100.000		
21	1.012E-013	1.030E-013	100.000		
22	1.010E-013	1.023E-013	100.000		
23	1.008E-013	1.019E-013	100.000		
24	1.007E-013	1.017E-013	100.000		
25	1.005E-013	1.012E-013	100.000		
26	1.003E-013	1.007E-013	100.000		
27	1.002E-013	1.005E-013	100.000		
28	1.001E-013	1.003E-013	100.000		
29	-1.000E-013	-1.001E-013	100.000		
30	-1.001E-013	-1.003E-013	100.000		
31	-1.004E-013	-1.011E-013	100.000		
32	-1.005E-013	-1.012E-013	100.000		
33	-1.006E-013	-1.014E-013	100.000		
34	-1.007E-013	-1.016E-013	100.000		
35	-1.008E-013	-1.019E-013	100.000		
36	-1.008E-013	-1.019E-013	100.000		
37	-1.009E-013	-1.022E-013	100.000		
38	-1.011E-013	-1.028E-013	100.000		
39	-1.015E-013	-1.037E-013	100.000		
40	-1.017E-013	-1.041E-013	100.000		
41	-1.020E-013	-1.050E-013	100.000		

Extraction Method: Principal Component Analysis.

Table 4.18 Actual factors extracted

This table shows the actual factors that were extracted. The section labelled “Rotation Sums of Squared Loadings” shows only those factors that met the cut-off criteria. In this case, there were eight factors with eigenvalues greater than 1. SPSS always extracts as many factors initially as there are variables in the dataset, but the rest of these didn’t meet the threshold set. As mentioned earlier these factors are therefore ignored. The “% of Variance” column shows that Factor 1 accounts for 19.339% of the variability in all the 41 variables.

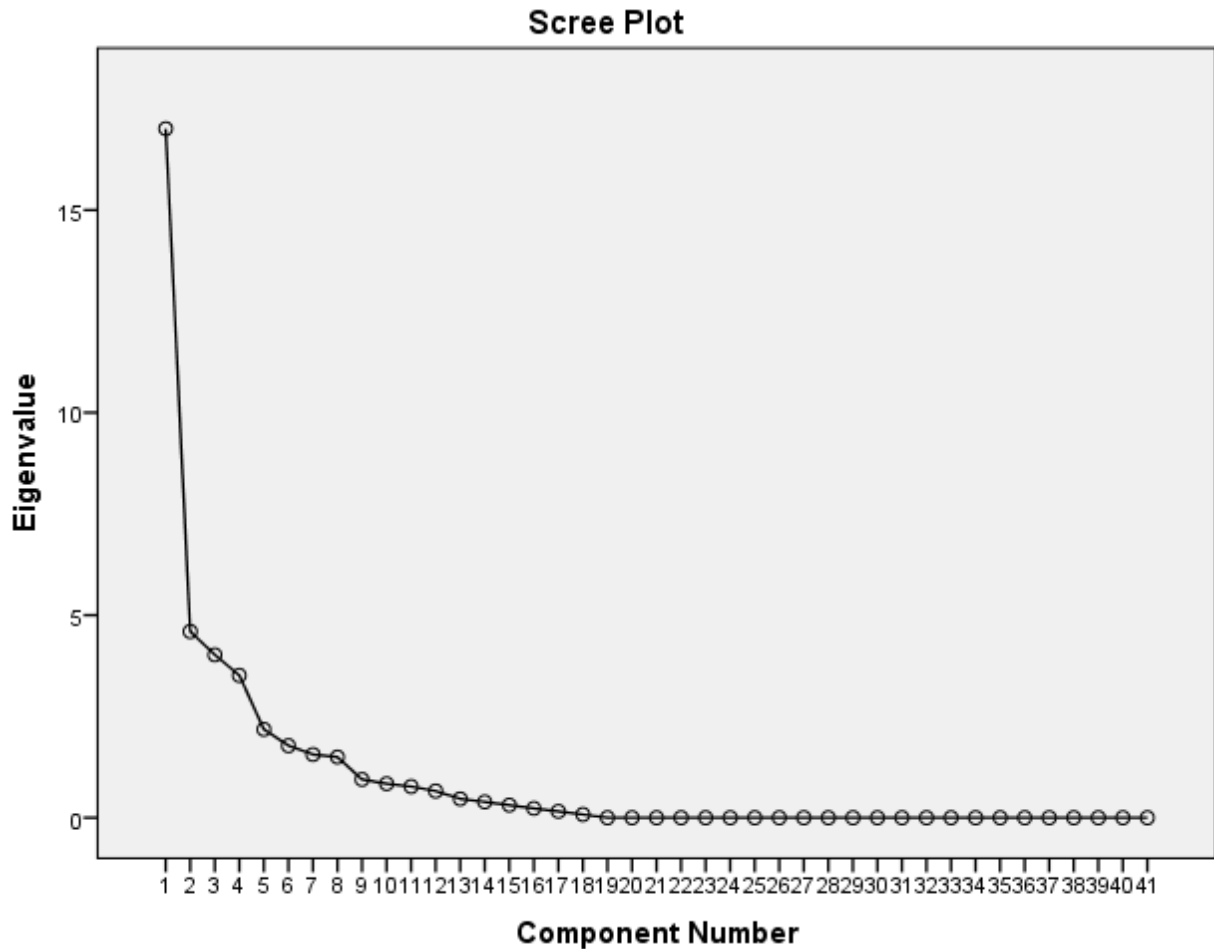


Chart 4.1 Scree Plot showing Eigenvalues for all variables

The Chart above shows the eigenvalues for all components extracted. Factor 1 – 8 have a value greater than 1. Looking at the original constructs and set of hypotheses it is likely that some of the components might be sharing closer association than earlier anticipated by the study. Factor analysis does well to bring out some of the underlying relationships which often go un-noticed. This affirms the study was successful with the use of latent variables.

To draw the study to a close this analysis was then narrowed to six factors with the highest Eigenvalues in a rotated component matrix. This is to allow conclusions to be drawn in with the set of hypotheses. The findings are tabulated below:



**Total Variance Explained**

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	17.010	41.487	41.487	7.996	19.502	19.502
2	4.597	11.211	52.698	6.983	17.031	36.533
3	4.021	9.807	62.506	5.883	14.350	50.883
4	3.514	8.571	71.077	5.325	12.987	63.870
5	2.180	5.316	76.393	4.582	11.176	75.046
6	1.779	4.339	80.732	2.331	5.686	80.732
7	1.560	3.806	84.538			
8	1.496	3.650	88.187			
9	.944	2.303	90.490			
10	.839	2.047	92.537			
11	.768	1.874	94.411			
12	.659	1.607	96.018			
13	.465	1.135	97.152			
14	.390	.952	98.104			
15	.312	.761	98.865			
16	.230	.561	99.426			
17	.156	.380	99.806			
18	.080	.194	100.000			
19	1.025E-013	1.062E-013	100.000			
20	1.016E-013	1.040E-013	100.000			
21	1.012E-013	1.030E-013	100.000			
22	1.010E-013	1.023E-013	100.000			
23	1.008E-013	1.019E-013	100.000			
24	1.007E-013	1.017E-013	100.000			
25	1.005E-013	1.012E-013	100.000			
26	1.003E-013	1.007E-013	100.000			
27	1.002E-013	1.005E-013	100.000			
28	1.001E-013	1.003E-013	100.000			
29	-1.000E-013	-1.001E-013	100.000			
30	-1.001E-013	-1.003E-013	100.000			
31	-1.004E-013	-1.011E-013	100.000			
32	-1.005E-013	-1.012E-013	100.000			
33	-1.006E-013	-1.014E-013	100.000			
34	-1.007E-013	-1.016E-013	100.000			
35	-1.008E-013	-1.019E-013	100.000			
36	-1.008E-013	-1.019E-013	100.000			
37	-1.009E-013	-1.022E-013	100.000			
38	-1.011E-013	-1.028E-013	100.000			
39	-1.015E-013	-1.037E-013	100.000			

40	-1.017E-013	-1.041E-013	100.000			
41	-1.020E-013	-1.050E-013	100.000			

Extraction Method: Principal Component Analysis.

Table 4.19 Six factors extracted

The table shows the revised output with a six-factor solution. Note that Factor 1 now accounts for 19.5% of the total percentage variability.

The factor loadings are presented in the table below:

	Rotated Component Matrix <sup>a</sup>					
	Component					
	1	2	3	4	5	6
Improved Efficiency and Effectiveness	.358	.160	.137	.769	-.034	-.046
Greater Fin Integrity and Transparency	.175	.763	.339	.374	-.069	.066
Fin Transactions conducted transparently	.193	.547	.626	.164	-.082	-.162
Greater Accountability among staff	.134	.843	.304	.216	-.123	.090
Reliability	.298	.683	.375	.107	.019	.206
Laws and regulations followed	.136	.688	.275	-.071	.012	.186
All Receipts and Payments done through IFMIS	-.694	.181	-.111	-.085	.153	.188
Response Time is short	-.133	-.041	.137	.877	-.050	.127
Reduced Risk of Corruption	.732	.257	.264	.313	.040	-.247
Completeness of Information	-.112	.133	.793	.308	.057	.271
Ease of Understanding Reports	.375	.121	.465	.659	.148	.345
Personalization of Information	.486	.076	.097	.582	.087	.523
Relevance of Information Generated	-.095	.617	.016	.266	-.055	.665
Security of Information	.310	.113	.566	.576	.139	.171
Assurance	.059	-.037	.021	.824	.470	.007
Empathy	.116	.548	.041	.353	.544	.282
Responsiveness	.588	.104	.281	.433	.018	-.146
Easy to extract and present data	.651	.060	.105	.621	.099	.269
Access specific information	.516	.289	.588	-.076	.173	-.074

Offers Real Time Financial Info	.383	.262	.675	.001	.150	-.002
Tools that enable Analysis of data	-.001	.535	-.005	-.261	.594	.004
Allow Reconciliation of Transactions	.470	.202	.646	.110	.133	.008
Accurately discloses financial Information	-.462	-.553	.020	.088	-.259	.227
Generates Custom reports for int/external use	-.185	-.896	-.095	.073	-.138	.108
Allows access to Non-Financial Information	.004	-.815	.002	.184	-.181	-.038
Timely Supervision	-.021	-.103	.058	.367	.850	.044
Reduced Costs	.369	.059	.281	.157	.774	.180
Reduced Manual Data Entry	.858	.190	.221	-.051	.136	.106
Improved Visibility	.565	.225	.570	.105	.189	-.196
Reduced Corruption	.200	.444	.758	.389	.047	-.026
Comprehensive Public FS	.412	.643	.323	.280	.027	-.122
Accuracy of record	.359	.103	.532	.322	.230	.556
Integrity of Database	.476	.143	.702	-.041	.203	.237
Internal Controls	.777	.162	.202	.161	.126	.235
Internal and External Audits	.095	.023	.445	.171	.765	-.251
Reconciliation of bank, fiscal records	.141	-.004	.071	-.057	.894	.088
Traceability	.830	.249	.224	-.136	.220	.149
Communicate with Contractors	-.306	-.561	-.430	-.326	.124	.073
Create an Alert System	.883	.227	.084	.146	.140	.169
Collaborate with Suppliers	.110	.198	-.137	-.143	.658	-.520
Implement Tracking System	.717	.298	.187	.336	.108	-.051

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Table 4.20 Final Factor Loadings

The table above shows the factor loadings. Some of the variables load strongly onto the factors with a high of |0.89| and a low of |0.004|. Majority of the variables loaded strongly ( $\geq 0.65$ ) on to at least one factor, an indication of their relevance in the study. Going by the rule of thumb of (|0.4|) more variables would have met the threshold. The variables that met the criteria are highlighted in the table above.

The first null hypothesis states that “There is no statistically significant relationship between system quality characteristics and turnaround time for transactions in IFMIS.” This hypothesis has been tested by the following variables:

- i.) Reduced risk of corruption 0.731
- ii.) Easy to extract and present data 0.651
- iii.) Reduced manual data entry 0.858
- iv.) Internal Controls 0.777
- v.) Traceability 0.830
- vi.) Create an Alert System 0.883
- vii.) Implement tracking system 0.717

These variables agreeably speak to the system quality characteristics as a dimension of IS more than the ones envisioned by the researcher. As stated above all the variables selected load strongly onto the factors as shown.

The second null hypothesis states that “There is no statistically significant relationship between the level of information quality including reports generated and turnaround time for transactions in IFMIS.” This hypothesis has been tested by the following variables:

- viii.) Greater financial integrity and transparency 0.763
- ix.) Generates custom reports for internal/external use -0.896

The third null hypothesis states that “There is no statistically significant relationship between the quality of service or system availability and turnaround time for transactions in IFMIS.” This hypothesis was tested by the following variables:

- x.) Completeness of information 0.793
- xi.) Offers real time financial information 0.675
- xii.) Reduced corruption 0.758
- xiii.) Integrity of databases 0.702

The fourth null hypothesis states that “There is no statistically significant relationship between the perceived willingness of users to adopt IFMIS in their operations and turnaround time for transactions in IFMIS.” This hypothesis was tested by the following variables:

- xiv.) Improved efficiency and effectiveness 0.769
- xv.) Response time is short 0.877
- xvi.) Ease of understanding of reports 0.659

The fifth null hypothesis states that “There is no statistically significant relationship between the level of satisfaction of staff and suppliers on the implementation of IFMIS and the use of IFMIS to process transactions.” This hypothesis was tested by the following variables:

- xvii.) Timely supervision 0.850
- xviii.) Internal and external audits 0.765
- xix.) Reconciliation of bank, fiscal records 0.894
- xx.) Collaborate with suppliers 0.658

The sixth and last null hypothesis states that “There is no statistically significant relationship between the turnaround time for a transaction and the adoption of IFMIS for all government transactions.” This hypothesis was tested by the following variables:

- xxi.) Relevance of information generated 0.665

20 variables had low factor loadings of below 0.6 and were thus ignored. 21 variables were greatly relevant to the study and were grouped as shown.

The question of whether the study can reproduce the hypotheses distinction H01 to H06 with appropriate responses grouping into each category, using factor analysis has well been answered. This dataset gives responses from financial managers as well as users and the variables have been aligned to each of the six null hypotheses. It follows therefore that the following conclusions could be drawn from the outcome:

- a. That some indicators exhibited closer association than others within different categories (Objectives)
- b. Factor reduction is an ideal method for analyzing large sets of data. The table below gives the outcomes based on this analysis.

### **Hypothesis Testing**

Factor analysis has shown that some variables share a closer relationship than earlier anticipated. It has also shown the underlying relationship between the dependent and independent variables as earlier defined. The following conclusions can therefore be derived:

<b>SN.</b>	<b>Hypothesis</b>	<b>Decision</b>	<b>Outcome / Explanation</b>
1	H01: There is no statistically significant relationship between system quality characteristics and turnaround time for transactions in IFMIS.	Reject	There is a statistically significant relationship between system quality characteristics and turnaround time for transactions in IFMIS.
2	H02: There is no statistically significant relationship between the level of information quality including reports generated and turnaround time for transactions in IFMIS.	Reject	There is a statistically significant relationship between the level of information quality and turnaround time for transactions in IFMIS.
3	H03: There is no statistically significant relationship between the quality of service or system availability and turnaround time for transactions in IFMIS.	Reject	There is a statistically significant relationship between the quality of service or system availability and turnaround time for transactions in IFMIS.
4	H04: There is no statistically significant relationship between the perceived willingness of users to adopt IFMIS in their operations and turnaround time for transactions in IFMIS.	Reject	There is a statistically significant relationship between the perceived willingness of users to adopt IFMIS in their operations and turnaround time for transactions in IFMIS.
5	H05: There is no statistically significant relationship between the level of satisfaction of staff and suppliers on the implementation of IFMIS and the use of IFMIS to process transactions.	Reject	There is a statistically significant relationship between the level of satisfaction of staff and suppliers on the implementation of IFMIS and the use of IFMIS to process transactions.
6	H06: There is no statistically significant relationship between the turnaround time for a transaction and the adoption of IFMIS for all	Reject	There is a statistically significant relationship between the turnaround time for a transaction and the adoption of IFMIS for all

	government transactions.		government transactions.
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Table 4.21 Test of Hypotheses

The study rejected all the null hypotheses and established the existence of important relationships among variables under study in assessing the impact of IFMIS in Public Expenditure Management.

## **CHAPTER FIVE:**

### **SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter presents a summary of the findings of the study results, conclusions and the recommendations made from the research findings. The general objective of the study was to assess the impact of IFMIS on public expenditure by the Ministry of Agriculture Livestock & Fisheries and consider the progress made in its implementation. The independent variables were system quality, information quality, quality of service / system availability, perceived willingness to use and user satisfaction. The dependent variable was the turnaround time as a measure of effectiveness and a net benefit. The data sources that were employed in this study consisted of both primary and secondary data. The presentation is organized around specific objectives and conclusions are in tandem with the specific objectives. The chapter also highlights the recommendations of the research and suggested areas for further research.

#### **5.2 Summary of Key Findings**

The quantitative data was analyzed and presented using descriptive and inferential statistics. Factor analysis was used for hypotheses testing to determine the relationships between the independent and dependent variables.

The Null Hypothesis, H<sub>01</sub>: There is no statistically significant relationship between system quality characteristics and turnaround time for transactions in IFMIS, was rejected.

The Null Hypothesis, H<sub>02</sub>: There is no statistically significant relationship between the level of information quality including reports generated and turnaround time for transactions in IFMIS, was rejected.

The Null Hypothesis, H<sub>03</sub>: There is no statistically significant relationship between the quality of service or system availability and turnaround time for transactions in IFMIS, was rejected.



The Null Hypothesis, H<sub>04</sub>: There is no statistically significant relationship between the perceived willingness of users to adopt IFMIS in their operations and turnaround time for transactions in IFMIS, was rejected.

The Null Hypothesis, H<sub>05</sub>: There is no statistically significant relationship between the level of satisfaction of staff and suppliers on the implementation of IFMIS and the use of IFMIS to process transactions, was rejected.

The Null Hypothesis, H<sub>06</sub>: There is no statistically significant relationship between the turnaround time for a transaction and the adoption of IFMIS for all government transactions, was rejected.

### **5.3 Training of Government Staff on IFMIS**

Lack of capacity which is required by staff in operating the IFMIS systems has been identified as one of the hindrances for the successful implementation of IFMIS. The staff ought to be knowledgeable about the systems and also to have adequate experience. The staff oversight IFMIS transactions, conduct and manage thus if they are conversant with the systems implementation will succeed.

The National Treasury procured the services of a Training/Capacity enhancement firm to develop content and provide in-classroom and online training for IFMIS users in national and county governments. The IFMIS Academy developed curriculum and manuals in line with the users' system responsibilities and have provided training at the Kenya School of Government since 2012. It should be noted that a few officials charged with the responsibility of managing the system have had adequate training. Commendably, the Treasury has been conducting countrywide trainings for users of the system.

Although in some instances, the staff have been insufficiently trained on the system, there is general improvement. A third note, the system itself is yet to be fully tested and configured to suit all the county operations and all the persons necessary to fully process the procurement online. Quite often operations stall for various reasons as it appears that for a system that was designed to improve on efficiency, it has now become a major cause of delay in the delivery of services and goods in government/Counties.

During the data collection on training all the four respondents admitted that they were not sufficiently trained on IFMIS therefore they needed more training. The specific issues that came from all the respondents were as follows:

- ✓ Overall training given was insufficient and not satisfactory as per the users' needs.
- ✓ Duration of training was not sufficient for comprehensive knowledge transfer.
- ✓ Curriculum provided by the Academy only partly matched with the business requirements. The curriculum should be made more practical.
- ✓ They also claimed not to have heard or experienced Learning Management System (LMS).

## **5.4 Conclusion**

The study rejected all the SIX null hypotheses.

The study pointed out the need for capacity building for all staff involved in IFMIS operations.

The study confirmed that information generated through IFMIS is accurate, complete traceable and meets the basic accounting standards.

## **5.5 Recommendations**

The following are the recommendations based on the findings of this study:

- i) Capacity building of users through continuous and regular training of staff to achieve greater efficiency and user acceptance.
- ii) Government to invest more on critical infrastructure (National Optical Fibre Backbone Infrastructure) that will ensure the smooth functioning of IFMIS.
- iii) Future studies to focus on the scope of IFMIS implementation in government that is, breadth and depth within Ministries, Departments and Agencies.
- iv) More research to be conducted on other implemented Information Systems such as the HR System, e-citizen, National Integrated Information Management System (NIIMS) and the i-Tax. This will open discussion around interoperability and opportunities for unified data capture.

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# Appendix

## A. Questionnaires

- Financial Managers
- Users – Accounts, Audit, Finance, IT, Procurement
- Suppliers/vendors
- Equipment checklist (Desktop, Laptop, Printer, Scanner, Internet Connection, Secure office)

## B. Constructs

- Systems quality
  - Adaptability
  - Availability
  - Reliability
  - Response time
  - Usability
- Information quality
  - Completeness
  - Ease of understanding
  - Personalization
  - Relevance
  - Security
- Service quality
  - Assurance
  - Empathy
  - Responsiveness
- Use
  - Nature of use
  - Navigation patterns
  - Number of site visits
  - Number of transactions executed
- User satisfaction
  - Repeat visits
  - User surveys
- Net benefits

- Cost savings
- Reduced search costs
- Time savings

C. Approved Questionnaires for accountants, auditors and budget controllers.

## FINANCIAL MANAGERS QUESTIONNAIRE

### SECTION A: DEMOGRAPHIC INFORMATION

1. Gender of respondent? Male Female
2. Age bracket of the respondent? 18-29 Years 30-39 Years 40-49 Years 50 Years and above.
3. Highest education level attained by the respondent? Certificate Diploma Degree Postgraduate Other(*specify*)
4. In which department do you work? Accounts; IT; Finance; Procurement
5. How long have you worked in the department? Less than one year 1-5 Years 6-10 Years More than 10 years
6. How frequent do you use IFMIS as part of your work? Daily Weekly Monthly Quarterly Annually
7. What is the respondent's designation in the Ministry? Procurement manager/Head Finance Manager/Head ICT Manager/Head Other (Specify)

### SECTION B: SYSTEM QUALITY CHARACTERISTICS OF IFMIS: USABILITY AND PERFORMANCE

8. To what extent do the following system quality characteristics of the integrated financial management information system have on the expenditure in the public sector:

	Very great extent	Great extent	Moderate extent	Small extent	Very small extent
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There is improved efficiency and effectiveness at the ministry since IFMIS was introduced					
Everyone in the ministry have readily embraced IFMIS for greater financial integrity and transparency					
Financial transactions and processes are conducted transparently at the ministry					
Since the introduction of IFMIS, there is greater accountability among staff in the ministry					
Reliability					
Due laws, regulations and processes are followed in the ministry to the letter regarding financial matters in the ministry					
All ministry's transactions both receipts and payments are processed through IFMIS					
Response time					
Use of IFMIS has greatly enhanced security of information which minimizes risk of corruption and improve reliability of the system					

**SECTION C: THE LEVEL OF INFORMATION QUALITY INCLUDING REPORTS GENERATED**

9. To what extent do the following aspects of level of information quality including reports generated in IFMIS affect the expenditure in the public sector?

	Very great extent	Great extent	Moderate extent	Small extent	Very small extent
Completeness of information					
Ease of understanding of the reports generated from IFMIS					
Personalization of the information in the IFMIS system					



Relevance of the information generated from the IFMIS system					
Security of information in the IFMIS system					

**SECTION D: THE QUALITY OF SERVICE / SYSTEM AVAILABILITY AT THE HEADQUARTERS AND COUNTY LEVEL INCLUDING TRAINING AND SUPPORT TO USERS**

10. To what extent do the following aspects of the quality of service / system availability at the headquarters and county level including training and support to users in IFMIS affect the expenditure in the public sector?

	Very great extent	Great extent	Moderate extent	Small extent	Very small extent
Assurance					
Empathy					
Responsiveness					

**SECTION E: THE PERCEIVED WILLINGNESS OR INTENTION OF USERS TO USE IFMIS IN THEIR OPERATIONS**

11. What extent do you agree or disagree with the following aspects of the perceived willingness or intention of users to use IFMIS in their operations in the expenditure in the public sector?

Use a scale of 1-5 where 1= strongly agree and 5 =strongly disagree.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
I can easily extract and present data from IFMIS in ways that facilitate analysis					
I can access IFMIS to derive the specific information I require to carry out my work					
IFMIS offers real-time financial					

information that enhances my decision-making abilities					
There are built-in analytical tools within IFMIS that enables trend analysis of various elements of fiscal operations in the office					
Through IFMIS, I am able to reconcile transactions data in real-time					
IFMIS accurately discloses the financial position to the public					
The IFMIS system enables me to generate custom reports for internal and external use					
I can easily access non-financial information such as employee number and cadre					

**SECTION F: THE LEVEL OF SATISFACTION OF STAFF AND SUPPLIERS ON THE IMPLEMENTATION OF IFMIS**

- Repeat purchases
- Repeat visits

**SECTION G: THE TURNAROUND TIME FOR A TRANSACTION AS A MEASURE EFFECTIVENESS OF THE SYSTEM**

What is impact the turnaround time for a transaction as a measure effectiveness of the system on expenditure in the public sector?

Use a scale of 1-5 where 1= strongly agree and 5 =strongly disagree.

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Timely all systems supervision					
Reduced costs					
Reduced manual data entry					
Improved visibility					
Reduced corruption					

Comprehensive public finance system					
Accuracy of record					
Integrity of database					
Internal controls					
Internal and External Audits					
Reconciliation of bank, fiscal records					
Traceability					
Communicate with contractors					
Create an alert system					
Collaborate with suppliers					
Implement tracking system/software					

Give any other information that you would like to share about (IFMIS) on expenditure in the public sector?

## USERS QUESTIONNAIRE

### SECTION A: DEMOGRAPHIC INFORMATION

1. **Gender of respondent?** Male Female
2. **Age bracket of the respondent?** 18-29 Years 30-39 Years 40-49 Years 50 Years and above.
3. **Highest education level attained by the respondent?** Certificate Diploma Degree Postgraduate Other(*specify*)
4. **In which department do you work?** Accounts Audit IT Finance Procurement
5. **How long have you worked in the department?** Less than one year 1-5 Years 6-10 Years More than 10 years
6. **How frequent do you use IFMIS as part of your work?** Daily Weekly Monthly Quarterly Annually
7. **What is the respondent's designation in the Ministry?** Procurement manager/Head Finance Manager/Head ICT Manager/Head Other(Specify)

### SECTION B: SYSTEM QUALITY CHARACTERISTICS OF IFMIS: USABILITY AND PERFORMANCE

8. what is your level of agreement with the following system quality characteristics of IFMIS: usability and performance on expenditure in the public sector  
Use a scale of 1-5 where 1= strongly disagree and 5 =strongly agree.

There is improved efficiency and effectiveness at the ministry since IFMIS was introduced					
Everyone in the ministry have readily embraced IFMIS for greater financial integrity and transparency					
Financial transactions and processes are conducted transparently at the ministry					
Since the introduction of IFMIS, there is greater accountability among staff in the ministry					

Due laws, regulations and processes are followed in the ministry to the letter regarding financial matters in the ministry					
All ministry's transactions both receipts and payments are processed through IFMIS					
Using IFMIS, financial information is made available in a reliable and timely manner					
Response time					
IFMIS has automated procedures and internal controls which promotes accountability					

**SECTION G: THE TURNAROUND TIME FOR A TRANSACTION AS A MEASURE EFFECTIVENESS OF THE SYSTEM**

**9. What is impact of the turnaround time for a transaction as a measure effectiveness of the system on expenditure in the public sector?**

Use a scale of 1-5 where 1= strongly disagree and 5 =strongly agree.

	1	2	3	4	5
Timely all systems supervision					
Reduced costs					
Reduced manual data entry					
Improved visibility					
Reduced corruption					
Comprehensive public finance system					
Accuracy of record					
Integrity of database					
Internal controls					
Internal and External Audits					
Reconciliation of bank, fiscal records					
Traceability					

Communicate with contractors					
Create an alert system					
Collaborate with suppliers					
Implement tracking system/software					

**10.** Give any other information that you would like to share about (IFMIS) on expenditure in the public sector?

## SUPPLIERS QUESTIONNAIRE

### SECTION A: DEMOGRAPHIC INFORMATION

1. Gender of respondent? Male Female
2. Age bracket of the respondent? 18-29 Years 30-39 Years 40-49 Years 50 Years and above.
3. Highest education level attained by the respondent? Certificate Diploma Degree Postgraduate Other(*specify*)
4. How long have you been a supplier in the Ministry/department? Less than one year 1-5 Years 6-10 Years More than 10 years

### SECTION B: THE LEVEL INFORMATION QUALITY INCLUDING REPORTS GENERATED

5. To what extent do the following aspects of level of information quality including reports generated in IFMIS affect the expenditure in the public sector?

	Very great extent	Great extent	Moderate extent	Small extent	Very small extent
Completeness of information					
Ease of understanding of the reports generated from IFMIS					
Personalization of the information in the IFMIS system					
Relevance of the information generated from the IFMIS system					
Security of information in the IFMIS system					

### SECTION C: THE QUALITY OF SERVICE / SYSTEM AVAILABILITY AT THE HEADQUARTERS AND COUNTY LEVEL INCLUDING TRAINING AND SUPPORT TO USERS

6. To what extent do the following aspects of the quality of service / system availability at the headquarters and county level including training and support to users in IFMIS affect the expenditure in the public sector?

	Very great extent	Great extent	Moderate extent	Small extent	Very small extent
There is improved efficiency and effectiveness at the ministry since IFMIS was introduced					
Since the implementation of IFMIS, stakeholder confidence with the ministry has improved a lot					
Financial transactions and processes are conducted transparently at the ministry					
Since the introduction of IFMIS, there is greater accountability among staff in the ministry					
Communicate with contractors					
Due laws, regulations and processes are followed in the ministry to the letter regarding financial matters in the ministry					
IFMIS has improved the effectiveness and efficiency of public expenditure programmes					


7. Give any other information that you would like to share about (IFMIS) on expenditure in the public sector?



## IFMIS STAFF TRAINING QUESTIONNAIRE

1. Was the overall training received on IFMIS adequate for your daily operations?
2. Was the Duration of training adequate?
3. Does the curriculum provided address all the aspects of the training?
4. Is the current IFMIS system in use tested and configured to suit all the country/county operations?
5. Are there any other training needs you may have to enable you work efficiently?
6. Do you have any other comment on training you received?

## D. Approval Letters from the University, Research Permit and other Letters

  
**UNIVERSITY OF NAIROBI**  
**COLLEGE OF BIOLOGICAL AND PHYSICAL SCIENCES**  
**SCHOOL OF COMPUTING AND INFORMATICS**

Telephone: 4447870/4446543/4444919 P. O. Box 30197  
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 Email: [director-sci@uobi.ac.ke](mailto:director-sci@uobi.ac.ke)

Our Ref: UON/CBPS/SCI/MSCIS/2010 18<sup>th</sup> February 2019

Director  
 IFMS: Treasury  
 Nairobi


Dear Sir/Madam


**RE: RESEARCH PERMIT – JOEL BARAKA OKOMOLI REG. P56/60094/2010**

The above named is a bona fide student pursuing an MSc course in Information Systems at the School of Computing and Informatics, University of Nairobi. He is currently carrying out his research on the project entitled **"Benefits of IFMS on Expenditure in the Public Sector: A Case of the Ministry of Agriculture Livestock, Fisheries and Irrigation"**. The project involves gathering relevant information from various institutions and he has informed the office that he would wish to carry his research in your organization and is under supervision of Prof. Robert O. Oboko.


We would be grateful if you could assist Mr Okomoli as he gathers data for his research. If you have any queries about the exercise please do not hesitate to contact us.

Yours sincerely

  
**DR. AGNES N. WAUSI**  
 DIRECTOR  
 SCHOOL OF COMPUTING AND INFORMATICS



ANG/jsn

  
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Our Ref: UON/CBPS/SCI/MSCIS/2010 18<sup>th</sup> February 2019

Ministry of Agriculture, Livestock, Irrigation and Fisheries  
 Nairobi County  
 Nairobi


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 DIRECTOR



  
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Our Ref: UON/CBPS/SCI/MSCIS/2010 18<sup>th</sup> February 2019

Ministry of Agriculture, Livestock, Irrigation and Fisheries  
 Busia County  
 Busia


Dear Sir/Madam


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Our Ref: UON/CBPS/SCI/MSCIS/2010 18<sup>th</sup> February 2019

Ministry of Agriculture, Livestock, Irrigation and Fisheries  
 Bungoma County  
 Bungoma


Dear Sir/Madam


**RE: RESEARCH PERMIT – JOEL BARAKA OKOMOLI REG. P56/60094/2010**

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Yours sincerely

  
**DR. AGNES N. WAUSI**  
 DIRECTOR  
 SCHOOL OF COMPUTING AND INFORMATICS



ANG/jsn

**THIS IS TO CERTIFY THAT:**  
**MR. JOEL BARASA OKOMOLI** of **UNIVERSITY OF NAIROBI, 30-100** **Nairobi**, has been permitted to conduct research in **Bungoma, Nairobi Counties** on the topic: **BENEFITS OF THE INTEGRATED FINANCIAL MANAGEMENT INFORMATION SYSTEM ON EXPENDITURE IN THE PUBLIC SECTOR: A CASE OF THE MINISTRY OF AGRICULTURE, LIVESTOCK, FISHERIES AND IRRIGATION** for the period ending: **24th June, 2020**

Permit No : **NACOSTI/P/19/65968/31130**  
 Date of Issue : **27th June, 2019**  
 Fee Received : **Ksh 1000**

**Applicant's Signature**

**Director General**  
 National Commission for Science, Technology and Innovation



*[Signature]*  
 Director General  
 National Commission for Science, Technology and Innovation

**THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013**

The Grant of Research Licenses is guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014.

**CONDITIONS**

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The Licensee does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice.

**RESEARCH LICENSE**

**Serial No.A 25593**

**CONDITIONS: see back page**

**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION**

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**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION**

Ref No: **NACOSTI/P/19/65968/31130** Date: **27th June 2019**

Joel Barasa Okomoli  
 University of Nairobi  
 P.O Box 30197-00100  
 NAIROBI.

**RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on **"Benefits of the Integrated Financial Management Information System on expenditure in the public sector: A case of the Ministry of agriculture, livestock, fisheries and irrigation."** I am pleased to inform you that you have been authorized to undertake research in **Bungoma and Nairobi Counties** for the period ending **24th June, 2020**.

You are advised to report to the **County Commissioners, and the County Directors of Education, Bungoma and Nairobi Counties** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit a **copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

*[Signature]*  
**DR. ROY B. MACHIRA, PhD.**  
**FOR: DIRECTOR-GENERAL/CEO**

- Copy to:
- The County Commissioner  
Bungoma County.
  - The County Director of Education  
Bungoma County.

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified