THE IMPACT OF COMPUTER-BASED INFORMATION SYSTEMS ON THE PERFORMANCE ON NGOs IN KISUMU CITY

BY

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DECLARATION

I declare that all the contents of this project are my original works and all the information in it is true to the best of my knowledge.

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This research project has been submitted with my approval as the Supervisor.

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This research project has been duly approved by me as the Chairman of Department

CHAIRMAN, BUSINESS ADMINISTRATION: MR. S. BETT

Signature........................................
Date.............................................
DEDICATION

This project is dedicated to my husband Tom Abol, my source of motivation, to my brother Bell Okello, my inspiration; and in whose footsteps I walk. And to my daughter Terri-Jenn, for whom I undertake all this work.
ACKNOWLEDGEMENT

I am greatly indebted to my supervisor, Phelgona Genga, for her resourcefulness, patience, guidance, advice and professionalism without which I would not have successfully concluded this study.

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### LIST OF ABBREVIATIONS AND ACRONYMS

1. **ANOVA** | **ANALYSIS OF VARIANCE**
2. **CBIS** | **COMPUTER BASED INFORMATION SYSTEMS**
3. **CSFs** | **CRITICAL SUCCESS FACTORS**
4. **CVI** | **CONTENT VALIDITY INDEX**
5. **DDO** | **DISTRICT DEVELOPMENT OFFICE**
6. **DSS** | **DECISION SUPPORT SYSTEMS**
7. **ES** | **EXPERT SYSTEMS**
8. **ICT** | **INFORMATION COMMUNICATION TECHNOLOGY**
9. **ISD** | **INFORMATION SYSTEMS DEVELOPMENT**
10. **IT** | **INFORMATION TECHNOLOGY**
11. **KWS** | **KNOWLEDGE WORK SYSTEMS**
12. **MIS** | **MANAGEMENT INFORMATION SYSTEMS**
13. **NGOs** | **NON-GOVERNMENTAL ORGANIZATIONS**
14. **NR** | **NOT RELEVANT**
15. **OAS** | **OFFICE AUTOMATION SYSTEMS**
16. **QR** | **QUITE RELEVANT**
17. **SWR** | **SOMEWHAAT RELEVANT**
18. **TPS** | **TRANSACTION PROCESSING SYSTEMS**
19. **UN** | **UNITED NATIONS**
20. **UNESCO** | **UNITED NATIONS EDUCATIONAL SCIENTIFIC AND CULTURAL ORGANIZATION**
21. **VR** | **VERY RELEVANT**
This study sought to examine the impact of computer-based information systems on the performance of NGOs Kisumu City. The study was prompted by the fact that several well intentioned NGOs in Kisumu City and in Kenya as a whole do not live to realize their objectives and as a result, both the NGOs and the communities for which they were intended suffer. The study was conceived due to the fact that of the 78 projects started in Kisumu in 2006, a total of 44 had collapsed by 2007 while only about 22 were fully active. The study particularly sought to assess the contributions of office automation systems, management information systems, transaction processing systems, decision support systems, and expert systems on the performance of NGOs in Kisumu City. The study was carried out between 2010 and 2011 using a cross sectional survey research design. Data was collected through questionnaire technique from 240 respondents in 60 NGOs between December 2010 and January 2011. The sample of 60 NGOs and 240 respondents were selected through simple random sampling and convenience sampling techniques respectively. The data was analysed through STATA using regression analysis to show effects, correlation analysis, and one-way ANOVA techniques and was presented in bar graphs and tables. The study was intended to find out whether NGOs that use the computer-based information systems have better performance indicators in terms of resource mobilization and management, control and regulation of social impacts and responsibilities, decision-making and problem solving, efficiency of product and service delivery, and the efficiency in record keeping and reporting. Based on the actual findings of the study, the researcher was then able to make recommendations on the use of computer-based information systems and performance of NGOs.
CHAPTER ONE

1.1 INTRODUCTION

1.2 Background to the Study

Ciborra (2002) defines information systems as the deployment of information technology in organizations, institutions, and the society at large. The term is often used erroneously as a synonym for computer-based information systems, but this is only the information technologies component of an information system (Ciborra, 2002).

Information Systems (IS) is a professional and academic discipline concerned with the strategic, managerial and operational activities involved in the gathering, processing, storing, distributing and use of information, and its associated technologies, in society and organizations. As an area of study, IS bridges the multidisciplinary business world and the interdisciplinary computer science field that is evolving toward a new scientific discipline (Hoganson, 2001). An IS may be regarded as an automated or manual system that comprises people, machines, and/or methods organized to collect, process, transmit and disseminate data that represent user information, and that deals with the development, use and management of an organization’s Information technology (IT) infrastructure. An information system generally consists of three components: human, technology, and organization (Ciborra, 2002).

Weller (2005) observes that the purpose of any information system is to support the activities of an organization. Therefore it is necessary to have a good grasp of information technology aspects related to information systems as well as the business characteristics and needs that technology should serve (Weller, 2005). Due to the rapid
changes in technology, Weller (2005) points out that new organizational paradigms demand new information systems. They point out that nothing can be more devastating for cross-functional teamwork than a rigid information system that inhibits cross-functional information flows. The key to unlocking this rigidity is computer-based information systems (CBIS).

CBIS refer to technologically implemented mediums for recording, storing, and disseminating linguistic expressions, as well as for drawing conclusions from such expressions (Langefors, 1973). They comprise management information systems (MIS), office automation systems (OAS), transaction processing systems (TPS), decision support systems (DSS), executive systems and expert systems (ES). These will be the determinants of CBIS in this study.

OAS is a combination of various technologies to reduce manual labour. Office automation refers to the varied computer machinery and software used to digitally create, collect, store, manipulate, and relay office information needed for accomplishing basic tasks and goals (Laudon & Laudon, 2002). Raw data storage, electronic transfer, and the management of electronic business information comprise the basic activities of an OAS (Laudon et al, 2002). TPS, on the other hand, support operational decisions; and, from a technical perspective, monitor transaction programs, which are a special kind of programs. The essence of a transaction program is that it manages data that must be left in a consistent state. MIS allow for the capture storage, access and easy manipulation of stored information. They also help in the management of resources, production of reports as well as maintenance of records needed for quality control. MIS support tactical
decisions, and are used, for example, for annual budgeting. DSS are used by top management to choose between several alternatives, while ES are computer programs designed to simulate the problem-solving behavior of a human who is an expert in a narrow domain or discipline. They help to diagnose problems and to come up with the most effective solution (Giarratano & Riley, 2004).

The essence of CBIS is to improve organizational performance (Laudon & Laudon 2007). According to Edwards & Hulme (1995), one of the most common concerns themes of concern over the growth and development of NGOs is performance and accountability. Performance is how well or badly something is done, or how well or badly something works. It is the act or process of performing a task, an action, the carrying into execution or action, execution, achievement, accomplishment, or representation by action or undertaking of a duty (Wehmeier, 2000). It will be characterized in this study by resource mobilization and management, control and regulation of social impacts and social responsibilities, decision-making and problem solving by Non-Governmental organizations (NGOs), efficiency of product and service delivery, and the efficiency of record keeping and reporting. Information is the livelihood of any organization, whether commercial or nonprofit. It is essential to sound problem solving and decision making, upon which business success is built. In fact, the main factor limiting the services and information that computers can provide within an organization is the budget (Laudon et al, 2002). This is more so because, as Oakland (2001) avers, performance-based measurement of all processes and people development activities is necessary to determine progress; and that IT has provided the means to
achieve the breakthrough in process performance in various organizations (Oakland, 2001).

Lack of information is a major problem to any management situation. It is also a major constraint to markets, finance, technology and sources of other inputs, as well as to changes in the business environment and administrative procedures, which are essential to the business survival. NGOs are of particular interest since they are a crucial component of our society today. There are hundreds of thousands of NGOs addressing every aspect of human activity and interest. NGOs have taken over areas and issues where the government was not involved or was less concerned about. They have also penetrated the rural areas faster, more aggressively and deeper than the government.

In this era of information technology, it is hard to envisage a management practice which does not embrace information systems. Since Kisumu was declared a millennium city in 2006 by the United Nations, it has witnessed a flowering of NGOs undertaking projects addressing a multitude of issues that affect the society and in line with the millennium development goals; especially those concerned with health and poverty alleviation. To this end, there have been several NGOs dealing with research, agriculture, health as well as enterprise growth and promotion. Many international bodies have come in to fund these projects; but one striking feature of these NGOs is their fast rate of collapse. Forza, (1995) asserts that information systems are an essential component in the efficacy of quality management systems and that information system therefore merit greater recognition within the theory and practice of quality management.
1.2 Problem Statement

The performance of NGOs in Kisumu City is relatively poor. A substantial number of NGOs, once initiated, are unable to sustain themselves and do not live long enough to achieve their objectives (Daniels & Associates, 2006). Research indicates that most NGOs lack appropriation of information technologies, and that despite the tremendous effort to embed IT in organizational processes, use of Information Communications Technology (ICT) in NGOs is slimmer. (Lytras et al. 2008).

Kisumu became the first millennium city in 2006 following a declaration by the UN. It has, in the last decade, seen its number of NGOs increase tenfold. But, according to the NGO Bureau (2008), a considerable number of them are inactive, or have collapsed all together. NGOs in Kenya have come under heavy criticism over their utilization, management and accountability of resources (Onyando, 1999). Among other reasons, weak documentation, management inability, lack of capital and poor information dissemination have been given as responsible for their inability to mobilize and manage resources efficiently, control and regulate social impacts and responsibilities, effectively make decisions and solve problems. The effectiveness of their product and service delivery as well as record keeping and reporting has also been questioned.

NGOs are a crucial component of any society today. Their availability and increase, and more so, their sustainability, is therefore everybody’s priority (Lindsay, 2000). For this sustainability to be realized, the contribution of CBIS to their performance is crucial. It was on the basis of this, and in consideration of the fact that the role of CBIS
on the performance of NGOs in Kisumu has not been explored, that the researcher decided to undertake this study.

1.3 Purpose of the Study

The purpose of this study was to assess the impact of CBIS on the performance of NGOs in Kisumu City. In particular, it examined the effect of OAS, TPS, MIS, DSS and ESS on resource mobilization and management, control and regulation of social impacts and responsibilities, decision making and problem solving, efficiency of product and service delivery, and efficiency of record-keeping and reporting in NGOs in Kisumu City.

1.4 General Objective

The main objective of this study was to find out if the integration of CBIS in NGOs had an impact on the overall performance of these NGOs.

1.5 Specific Objectives

To realize the purpose stated above, the study pursued the following objectives:

1. To determine the effect of OAS on the performance of NGOs in Kisumu city.
2. To determine the relationship between TPS and the performance of NGOs in Kisumu city.
3. To establish the effect of MIS on the performance of NGOs in Kisumu city.
4. To test whether DSS has an influence of on the performance of NGOs in Kisumu city.
5. To test whether ESS affects the performance of NGOs in Kisumu city.
1.6 Research Questions

The study further pursued the following research questions:

1. How did OAS affect the performance of NGOs in Kisumu city?
2. What was the relationship between TPS and the performance of NGOs in Kisumu city?
3. What was the effect of MIS on the performance of NGOs in Kisumu city?
4. Was the performance of NGOs in Kisumu city influenced by DSS?
5. Was the performance of NGOs in Kisumu City affected by ESS?

1.7 Justification of the Study

The managerial functions of planning, organizing, directing and controlling depend on communication in an enterprise. For planning to be realistic, it is essential that it be based on sound information. The foundation of this is a good system of communication in an organization. This study will endeavour to provide answers on how CBIS affect the performance of NGOs. Such information should go a long way to help improve the management of NGOs and increase their productivity. A productive NGO would be more useful as a development vehicle than the less productive ones.

The study will also extend entrepreneurial knowledge on how enterprises can achieve sustainable growth and survival through the integration of information systems in their operations. Today, information technology has become the backbone of all organisations especially due to its economy and efficiency. The knowledge of the actual measure of the impact of the information systems on performance is therefore a very crucial management tool. This study will provide information to this effect.
The study will form a basis for further research on ways of instituting effective performance of NGOs. It will contribute to the already available literature on information systems and act as reference material for other researchers and readers in general. This is so because it is the only study known to the researcher that has so far focused on CBIS in NGOs in Kisumu City.

1.8 Scope of the Study

This study attempted to determine the impact of CBIS on the performance of NGOs in Kisumu City. It was conducted in Kisumu city between October 2010 and December 2010 through a cross-sectional sample survey research design and a sample of 60 NGOs. Data was be collected by the researcher using semi-structured questionnaires technique in November 2010. The study particularly sought to determine if CBIS affect the performance of NGOs.

1.9 Limitations

Ideally, this study should have been conducted through an experimental research design where NGOs would have been provided with the OAS, TPS, MIS, DSS and ES materials and the effects of each on the performance of the organizations determined. This should have provided a more concrete measure of the impact of the CBIS from a cause-effect perspective. But resource constraints could not allow this procedure to be used. Besides, the researcher did not have the authority and the capacity to administer these measures of CBIS. All the same, the study would be useful for the exemplification and for the beginning of a debate on the effect of information systems on the performance of NGOs and other organizations.
1.10 Assumptions

1. The study assumed that computers would continue being important in the work environment

2. It also assumed that more and more organizations would embrace the use of information systems

3. It also assumed that the findings of the study would be a true reflection of the performance of NGOs in Kisumu City.
2.0 LITERATURE REVIEW

2.1 Introduction

This chapter discussed the literature related to information systems and performance of NGOs. It was broadly divided into theoretical, empirical and analytical sections. The theoretical section presented the history, facts and theories related to information systems and organizational performance globally and nationally. The empirical section reviewed literature on related studies so far conducted on information systems and performance. The analytical section compared the differences between the theoretical section and the studies conducted and exposed the gaps that needed to be filled by the study. All these were done in reference to the objectives of the study.

2.2 Theoretical Review

2.2.1 History of IS

The history of the science information systems overlaps with the history of science, the history of information systems (previously "documentation"), and the history of technology. It includes the usual genres of historical inquiry: biography, archeology, cliometrics (here, especially, bibliometrics and infometrics), oral history, and documentary research, with their differing strengths and weaknesses (Buckland, 1996).

Agarwal & Lucas (2005) points out that the history of information systems, like any other field, has its mystic history and narratives that are even more mythic than history ordinarily is. The Memex phenomenon, with the engineer-administrator Vannevar Bush as an icon, is a good example. Bush led the technology effort for World War II,
creating the atomic age, and was the father of the National Science Foundation (Zachary, 1997). Bush is best known in the field of information retrieval, even though his systems hardly worked. Further, his ideas were not new, and he did not really understand what he was talking about most of the time (Buckland & Hahn, 1998).

The advent of microelectronics revolutionalized the nature and scale of human communications. The ability to harness electrical power in miniature form has had a huge impact on everyday life both at home and at the workplace. Combined with the calculating possibilities of computers and the global reach of telecommunications facilities, microelectronics has transformed people’s ability to acquire, store, use and disseminate information. This information may be in numeric, textual, pictorial or sound form, and can be applied in a wide range of contexts (Cole, 2004).

For human society, modernity begins when communities began to explore, tolerate, and accept the new and diverse. Thus, modernity includes a receptiveness of human societies to new ideas (Lindsay 2000). Living in the modern age allows us to expect that modern enterprises and markets will tolerate and potentially reward to new ideas and new practice. In a modern age, those individuals who design insightful innovations (i.e. innovators) can be highly praised if their innovations are well timed, well designed, and well implemented (Watson, 2007).

In the post-industrial information age, according to Ciborra (2002), the focus of companies has shifted from being product oriented, to knowledge oriented in a sense that market operators today compete on process and innovation, rather than product. The emphasis has shifted from the quality and quantity of production, to the production
process itself, and the services that accompany the production process. In this paradigm shift, the biggest asset of companies today has become their information, represented in people, experience, know-how, innovations (patents, copyrights, and trade secrets). For a market operator to be able to compete, he or she must have a strong information infrastructure, at the heart of which lies the information technology infrastructure. Thus, the study of information systems has focused on why and how technology can be put into best use to serve the information flow within an organization (Ciborra, 2002).

The emergence of a systematic body of history of information systems is a recent development. Up to 1991 there had been little attention to information systems. The nurturing of a community interested in information systems has been consciously cultivated by a series of steps taken, largely within or through the American Society for Information Science, to build a supportive infrastructure (Zachary, 1997). Williams (1999) points out that once an information system has been adopted, there is a vested interest in it and there may be little opportunity left for alternative designs. Information systems, once adopted, create legacies. It is for this reason that today we have to live with the consequences of the data collection, data categorization, and data processing decisions of the past because it is impossible or unaffordable to make retroactive changes. Even the adoption of improved practices is inhibited because changes could create incompatibilities or inconsistencies with the inherited data and systems. This emphasizes the fact that information management is crucial to the survival of individuals and the organization (Zachary, 1997).
Watson, (2007) makes a distinction between IT and IS. An IT transmits, processes, or stores information. An IS is an integrated and cooperating set of software directed information technologies supporting individual, group, organizational, or societal goals. In other words, IS applies IT to accomplish the assimilation, processing, storage, and dissemination of information.

According to Agarwal & Lucas (2005), the study of information systems originated as a sub-discipline of computer science, in an attempt to understand and rationalize the management of technology within organizations. It has matured into a major field of management that is increasingly being emphasized as an important area of research in management studies, and is being taught at all major universities and business schools the world over. Agarwal & Lucas (2005) further observe that an information system is any organized combination of people, hardware, software, communication networks and data that collect, transform, and disseminate information in an organization. Agarwal & Lucas (2005) add that the computer based information systems of OAS, TPS, MIS, DSS, ESS and KWS correspond to the three management levels and their requirements. In the early in the 18th century, manufacturers and business owners discovered that outlining a step by step process to complete a task, then delegating steps to stations established to complete only one specific step increased efficiency, quality, and productivity. Today’s automation systems are a direct result of such early process engineering. Businesses across a broad spectrum of industries can realize the benefits from implementing an automation system. An automation system is a precisely planned change in a physical or administrative task utilizing a new process, method or machine
that increases productivity, quality and profit while providing methodological control and analysis. The value of system automation is in its ability to improve efficiency, reduce wasted resources associated with rejects or errors, increase consistency, quality and customer satisfaction and maximize profit (Zachary, 1997).

2.2.2 Office Automation Systems (OAS)

According to Oakland (2001), OASs are computer based information systems that combine various technologies to reduce the manual labour required in operating an efficient office environment. These technologies include voice mail, e-mail, scheduling software, desktop publishing, word processing, and fax among others. They are used throughout all levels of an organization. The pace of change has, of course, been enormous and IT systems unavailable just 10 to 15 years ago have enabled sweeping changes in business process improvement, particularly in office systems Irani (2002). Generally, there are three basic activities of an office automation system: data storage of information, data exchange, and data management. Within each broad application area, hardware and software combine to fulfill basic functions. Data storage usually includes office records and other primary office forms and documents. Data applications involve the capture and editing of files, images, or spreadsheets. Word processing and desktop presentation packages accommodate raw textual and graphical data, while spreadsheet applications provide users with the capacity to engage in the easy manipulation and output of numbers. Image applications allow the capture and editing of visual images. Text handling software and systems cover the whole field of word processing and desktop publishing. Word processing, the most basic and common office automation
activity, is the inputting (usually via keyboard) and manipulation of text on a computer. Today's commercial word processing applications provide users with a sophisticated set of commands to format, edit, and print text documents.

Cooke and Slack (1991) point out that whether or not to automate a task in a business requires careful consideration. There are complex variables involved and not every process will benefit from automation. They observe that one key area to look at is quality, which is a large factor in gaining and retaining customers. Another major factor in an automation decision is value. An automation system needs to provide an explicit rate of return on investment. Greater process control, reduced rejects rate, and speed are value factors to think about.

2.2.3 Transaction Processing Systems (TPS)

Laudon & Laudon (2007) define TPSs as systems that support operational decisions which are majorly used to collect data are concerned with capturing information at the boundaries of organizations, and are the most widely used information systems. In most organizations, particularly business organizations, most of what goes on takes the form of transactions. A transaction is a recorded event having to do with the routine business activities. These include everything concerning the product or service which the organization is engaged in (i.e. production, distribution, sales orders, materials purchased, employees hired, taxes paid, etc). These systems tend to have clearly defined inputs and outputs with emphasis on efficiency and accuracy. TPS record data but do little in the way of converting data into information Laudon & Laudon (2007).
Fast performance with a rapid response time is critical. Businesses cannot afford to have customers waiting for a TPS to respond, the turnaround time from the input of the transaction to the production for the output must be a few seconds or less. Many organizations rely heavily on their TPS; a breakdown will disrupt operations or even stop the business. For a TPS to be effective its failure rate must be very low. If a TPS does fail, then quick and accurate recovery must be possible. This makes well–designed backup and recovery procedures essential. TPS want every transaction to be processed in the same way regardless of the user, the customer or the time for day. If a TPS were flexible, there would be too many opportunities for non-standard operations. The processing in a TPS must support an organization's operations. For example if an organization allocates roles and responsibilities to particular employees, then the TPS should enforce and maintain this requirement.

According to O'Brien & Marakas (2008), TPS is designed to maintain databases in a known consistent state by ensuring that any operations carried out on the database that are interdependent are either all completed successfully or all cancelled successfully. TPS allows multiple individual operations on a database to be linked together automatically as a single indivisible transaction. The transaction processing system ensures that all operations in a transaction are completed. O'Brien & Marakas (2008) add that TPS when integrated within an organization aid with cash control management, employee record keeping, compensation, training and development, payroll, order processing, material movement, among others. All these cut across the different functional areas of an organization thus leading to better performance.
2.2.4 Management Information Systems (MIS)

MIS are management level systems designed to support tactical decisions (Weller, 2005). They are computer-based information systems that use high volume data recorded by TPS as input into programmes that produce routine or summary reports as output. MIS provide important tools supporting delivery and adding credibility to an organization. Managers at this level usually receive information in the form of several kinds of reports as summary reports, exception reports, periodic reports and on demand reports Laudon & Laudon (2007). Weller, (2005) concurs that exception reports show out-of-the ordinary data such as an inventory report that lists only those items that are less than 10 in stock; while periodic reports are produced on a regular schedule which may be daily, weekly, monthly, quarterly or annually. They may contain sales figures, income statements or balance sheets. The authors point out that the systems are used by middle managers to make structured as well as semi-structured decisions. They are report control oriented and use both past and present data. However, their design involves a very lengthy process.

2.2.5 Decision Support Systems (DSS)

DSS are a specific class of CBIS that supports business and organizational decision-making activities. DSS serve the management level of the organization and help to take decisions, which may be rapidly changing and not easily specified in advance (Power, 2002). A properly-designed DSS is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions. DSS are used mainly by top management to help them choose between several causes of
action and come up with the one most suited to their organizations. These systems are interactive and their inputs involve low volume data. They are designed for application by professionals and staff for purposes of decision analysis in order to achieve the objectives of the organization, and serve its strategic priorities (Daniels & Associates, 2006). According to Gadomski (2001), they are programmed to process raw data, make comparisons and generate information to help the managers choose the best alternative for their business. Since the managers have neither the time nor the resources to study and absorb long detailed reports of data and information, the DSSs are of great use to processing and availing the required information within a short time. According to Cooke and Slack (1991), it is the decision body that the organization’s objectives are interpreted and translated into operational criteria.

DSSs effectively integrate and distil data into mission-critical information for decision-making (O'Brien & Marakas 2006). They further notes that inadequate data access and analysis capabilities may prevent managers from exploiting the wealth of information buried in transaction data. Often a group of managers must make a decision that determines the general way forward for the organization. In tackling such tasks the managers may use Group DSSs. These are programs that help a group rather than the individual to make decisions since they support collaborative ways of working. The DSS is also called the analysis tool or the business intelligence applications (Torrington, et al., 2005). The support given by DSS can be separated into three distinct, interrelated categories: Personal Support, Group Support, and Organizational Support (Hackathorn & Keen, 1981). Apart from improving personal efficiency, expediting problem solving,
facilitating interpersonal communication and promoting learning or training, DSS also increase organizational control. According to O'Brien & Marakas (2006), it is commonly accepted that the use of a DSS improves the organizational decision maker's capabilities by improving their ability to visualize pertinent financial data. If this is true, then it is also true that profitability, productivity, quality, and labour turnover as some of the main elements of performance, will improve (O'Brien & Marakas 2006).

2.2.6 Expert Systems (ESS)

Cook and Slack (1991) describe ESS as information systems designed to be used by experts or people with the most appropriate solution to the problems, or as interactive systems whose inputs are aggregate data and have projections as output. Generally, ESSs are used when decision-making is knowledgeable in a particular area to help senior managers in organizations diagnose problems and come up with solutions. An expert system is normally composed of a knowledge base (information, heuristics, etc.), inference engine (analyzes the knowledge base), and the end user interface (accepting inputs, generating outputs). One of the most powerful attributes of expert systems is the ability to explain reasoning. Since the system remembers its logical chain of reasoning, a user may ask for an explanation of a recommendation and the system will display the factors it considered in providing a particular recommendation. This attribute enhances user confidence in the recommendation and acceptance of the expert system (Russel & Norvig, 2003).

Expert systems are most valuable to organizations that have a high-level of know-how experience and expertise that cannot be easily transferred to other members. They are
designed to carry the intelligence and information found in the intellect of experts and provide this knowledge to other members of the organization for problem-solving purposes. They are used when decision making is not structured; or more particularly, when there is no unique proven method to reach an optimal solution Darlington, (2000). After gathering expertise from the experts and building a program, the program can be distributed and used repeatedly. The expertise resides in the program in the form of a knowledge base consisting of facts and their respective relationships. The expert systems cannot help to solve a problem that was not considered by the experts at the time of building the system. The experts are often outsiders to the organization. According to Laudon & Laudon (2002), ESS are top level management systems designed to the individual, which tie the CEO to all levels of the organization and require extensive support staff. They can be employed, for instance, in making a 5-year operating plan. The downside is that they are very expensive to keep up.

2.3 Empirical Review

Hutchinson and Sawyer (2000) observed that there are six elements of a computer-based information system and these include: hardware, software, data/information, people, procedures and communications. Hutchinson and Sawyer (2000) emphasize that people constitute the most important component of a computer-based information system. They say that it is people who operate the computer hardware, it is people who create and use computer software and that it is people who face ethical issues and decisions regarding the use of information technology.
According to a research conducted on knowledge worker aspect, the use of technology has advanced from the automation of structured processes to systems that are truly revolutionary, in that they introduce change into fundamental business procedures, workflow and the management of an organization (Daud & Kamsin 2004). They aver that 'more than being helped by computers, companies will live by them, shaping strategy and structure to fit new IT'. In their research, they observe that changes in organization procedures, workflows and management require knowledge-based workers (Daud & Kamsin 2004). Information technologies, such as database, networks, and programming languages, are used to create organizational systems, adds Watson, (2007). Undoubtedly, the computer has had, and will continue to have, the greatest impact on business organizations. It has revolutionized the way companies operate through product design, product features, processing technology, information processing and communication (Weller, 2005).

In his review of IT and organizational performance, Melville (2004) states that a review of literature on previous research has shown that IT in fact can contribute to the improvement of organizational performance. Technological advances in new materials, new methods, and new equipment have also made their mark on operations. Performance based measurement of all processes and people development activities is necessary to determine progress so that the vision, goals, mission and critical success factors (CSFs) may be examined and reconstituted if necessary to meet new requirements for the organization and its customers, internal and external (Irani 2002). Lowering the costs of horizontal communications, facilitating teamwork, enabling flexible manufacturing and
providing information support for time management and quality control are key enablers on the supply side (Weller, 2005). Technological changes in products and processes have had major implications for production systems, affecting competitiveness and quality, but unless technology is carefully integrated into an existing system, it can do more harm than good by raising costs, reducing flexibility, and even reducing productivity — all of which have the end result of reducing the efficiency of NGOs (Cole, 2004; Weller, 2005).
Effectiveness is often referred to as “doing the right thing”. Watson (2007) defines effectiveness as the ability of an organization to achieve its stated goals and objectives. Typically, a more effective firm is one that makes better decisions and is able to carry them out successfully. Responding better to the needs of different customers: An organization can create or refine its products and services based on data collected from customers as well as information accumulated from its operations. In other words, information systems help organizations to understand their customers better, and provide products and services customers desire. Doing so even helps organizations to provide personalized service if the organization collects customer data at the individual level (Watson, 2007).
According to Laudon (2003), the new technologies will allow managers to handle more functions and widen their span of control. Fewer levels of management hierarchy will be required, enabling companies to flatten the pyramid of today's management structure. The new information technologies allow decentralization of decision-making without loss of management awareness; thus employees at all levels can be encouraged to be more creative and intrapreneurial. Laudon (2003) suggests further that the key responsibility of the CEO will be leadership; to capture the light or energies of the organization and focus them on the key strategic objectives. The new organizational paradigm is indeed intertwined with the structure of an organization's information systems. Under the old paradigm, the firm was governed by a relatively rigid functional structure. This separation into distinct and well-defined organizational units economizes on the information and communications requirements across functional units and reduces cost and complexity (Laudon, 2003).

In another research conducted by Bacha (2007) on the impact of Information Systems on the performance of the core competence and supporting activities of a firm, results obtained from quantitative analysis showed that information systems have relatively more influence on the performance of the core competence than on the performance of supporting activities. Cole (2004) asserts that the prime purpose of every office is to collect, process, store and dispatch information. Typical office functions once dealt with separately, often by specialized sections, are now handled as a whole by flexible teams using comprehensive databases, which link previously separate documents. A clerk can now call up, or process, a customer enquiry while at the same time checking
the original invoice or purchase order and establishing the current state of the customer's account. A secretary can prepare a letter or e-mail on behalf of a manager, add a relevant document stored on a computer, and print out for signing or dispatch electronically (Cole, 2004).

In the network era, electronic linkages within and among organizations are proliferating, altering the ways in which firms acquire factor inputs, convert them into products and services, and distribute the result to their customers. This, according to Melville (2004), raises questions about how IT can be applied to improve organizational performance. To him, although emerging studies are beginning to examine pieces of the network-era IT business value puzzle, knowledge of this issue remains underdeveloped and unsystematic (Melville, 2004).

CBIS have today become a common feature of all organizations' management. According to Agarwal & Lucas (2005), they have become one of the most valuable assets of modern corporations. It is now used as a management tool by all managers to effect better management and improve performance. Faced with the problem of coordinating the activities of specialized sub-units, managers of large organizations need to develop structures or mechanisms which will allow units to operate effectively and in the interest of the organization as a whole. Structured decisions are clear, well defined, distinct, and unambiguous. On the other hand, unstructured decisions are ill-understood, fuzzy, and difficult to tackle (Cooke & Slack, 1991). Forza (1995) points out that quality management practices are closely linked to quality information flows; and that the contribution of information flows to quality performances is considerable. He further adds
that information technologies contribute to the achievement of high quality performance and in particular of low defectiveness.

Accordingly, where accountability mechanisms are effective, people are more likely to feel that their needs are being taken into account. Greater transparency of decision-making can assist this as it will help to build trust in political processes. This trust is increased if feedback loops are built into the decision-making processes so that decision-makers can learn from communities affected by their decisions and, in particular, learn from their mistakes in order not to repeat them (Kovach, Neligan & Burali, 2003).

On service provision, the belief among donors that NGOs give "value for money" has led to large amounts of official funds being channeled to NGOs for work in the health and education sectors, credit schemes, and small-scale infrastructure, sometimes under "Investment Funds" or "Social Funds" intended to mitigate the social consequences of economic and structural adjustment packages (Edwards & Hulme, 2004).

Claims that NGOs reach "the poorest of the poor" are often inaccurate, however, as had been demonstrated in the case of NGO credit schemes (Edwards & Hulme, 1996); and further, that large NGOs in some areas fail to reach the poorest in their efforts to achieve rapid expansion in geographical coverage - the drive for "breadth" rather than "depth."

According to Laudon & Laudon (2002), thinking of an organization in terms of its sub organizations or subsystems – called systems thinking – is a powerful management approach because it creates a framework for both excellent problem solving and excellent decision making. Laudon & Laudon (2002), further postulate that to solve problems, managers need to isolate them through the recognition of the subsystems in which the
problems occur and solving the problems within those subsystems’ constraints and strengths. However, in many organizations, the knowledge that this and much more is possible is lacking, or when it is there, costs for setting up the systems are considered prohibitive and the NGOs choose to continue doing everything manually, not knowing that this, in itself is a major cost to them (Cole, 2004).

Traditionally, performance measures and indicators have been derived only from cost accounting information, often based on outdated and arbitrary principles. These provide little motivation to support attempts to improve performance, and in some cases, actually inhibit continuous improvement because they are unable to map process performance Irani (2002). Decision-making is a central concern of, and justification for, all forms of information systems development (Lewis, 1994). Lewis further argues that if this is true, then decision makers must be provided with the information they require. Laudon & Laudon (2007) concurs that the decision is the vehicle by which all of the organization’s resources are deployed or structured at any given moment. Thus, the ultimate responsibility and accountability for the outcomes associated with decisions lies with the manager.

Edwards & Hulme (2004) point out that although many individual development projects have been successful, their combined impact on macro-structures has been disappointing, and that the performance of NGOs has been seriously questioned in recent years by journalists, academics and former NGO workers (Edwards & Hulme, 2004). According to them, several studies have concluded that there is difficulty in assessing the impact of NGO development programmes due to poor data, diffuse objectives, rapidly
changing circumstances and poor quality evaluation; performance therefore cannot be quantified and has to be judged by sketchy and circumstantial evidence (Edwards & Hulme, 2004).

IT has similarly a great role to play in the promotion of multi-sectoral coordination and convergence between Government and the NGOs in communication with donor agencies, in donor services reporting, documentation of the projects implementation, appraising the donors regarding the stages of implementation of projects, distance education and training, e-Governance, e-Commerce and e-Impact assessments. In the areas of demographic trends, analysis of poverty ratios, analysis of literacy rates, analysis of development indicators, IT enabled services are highly useful in achieving Millennium Developmental Goals. IT is very handy in planning for development indicators in many areas of operations. In the management of the organizations, with particular references to Human Resources Management and in evolving training plans, IT has an important role to play. In addition, services such as, Payroll package, MIS and financial management of the organizations, Information Technology can be of great help (Vadaon, 2008).

Ultimately, IT and IT enabled services will enable the NGOs to become professional organizations, knowledge based organizations with appropriate capacity building, Government and NGO collaboration, multi-sectoral coordination, convergences and making the organizations to be very powerful, productive organizations on the path of the sustainable organizations and sustainable development (Vadaon, 2008).
2.4 Analytical Review

According to Lewis (1994), the field of information systems has become a disorganized aggregate of ideas and theories from many different disciplines, some of which have incommensurable philosophical bases. He adds that the goal-oriented models of human behavior often used in the area of DSS, for example, conflict sharply with the models of human behavior employed elsewhere. (Saeed, Rhode & Wulf 2008) aver that there is awareness among community organizations to use technology in their activities but the complexity of technologies and lacks of technological knowledge are big obstacles.

Though information has become one of the most valuable assets of modern corporations, development of information systems faces many problems. Among the most important are low productivity, a large number of failures, and an inadequate alignment of information systems with business needs. The first problem, low productivity, has been recognized in the term “software crisis”, as indicated by the development backlog and maintenance problems. Simply put, demands for building new or improved information systems have increased faster than the ability to develop them. Some reasons for this are the increasing cost of software development (especially when compared to the decreasing cost of hardware), the limited supply of personnel and funding and only moderate productivity improvements Laudon & Laudon (2007).

Information systems should be regarded in terms of not what is technically possible, but rather, what is organizationally desirable (Lewis, 1994). From the business perspective, there has been growing criticism of the poor alignment of information
systems and business needs. While an increasing part of organizations’ resources are spent on recording, searching, refining and analyzing information, the link between information systems and organizational performance and strategies has been shown to be dubious (Smith & McKeen, 1993). Most managers and users still cannot get information they need to run their units. Hence, ISD is continually challenged by the dynamic nature of business together with the ways that business activities are organized and supported by information systems. Many large companies and non-profit organizations have resources dedicated to internal knowledge management efforts, often as a part of their 'business strategy', 'information technology', or 'human resource management' departments (Addicott, McGivern & Ferlie 2006).

There are arguments to the effect that historical inheritance has constrained much thinking about information systems, and that the development of information systems is analogous to the construction of designed physical artifacts such as buildings and bridges (Lewis, 1994). He goes on to say that this has led to the development of information systems that focuses upon technical problem-solving and gives insufficient consideration to the special characteristics of organizations. These problems are further aggravated by the increasing complexity and size of software products. Each generation has brought new application areas as well as extended functionality leading to larger systems, which are harder to design, construct and maintain. For instance, DSSs cannot yet be designed to contain distinctly human decision making talents such as creativity, imaginativeness or intuition (Marakas, 2002). Furthermore, as Marakas adds, DSSs are normally designed to
be narrow in scope of application, thus inhibiting their generalizability to multiple decision making.

One issue clearly emerges from the above discussion; because of a large number of new technical options and innovations available (like client/server architectures, object-oriented approaches, and electronic commerce) novel technical aspects are transforming the practice of ISD. All in all, it seems to be commonly recognized that information systems development is not satisfying organizations’ needs, whether they are technical, economical, or behavioral. Consequently, companies world-wide are facing challenges in developing new strategies for ISD as well as in finding supporting tools and ways of working (Rockart, Myers, Kock, Klein, Hoving, & Gray, 2002).

In his critique on Information Systems, Ciborra (2002) argues that even when discussing decision making, transaction costs, knowledge management, or enterprise resource planning applications, there must be an authentic and an inauthentic way to deal with these issues. He further postulates that the authentic way feeds upon something that is beyond technology, management and organization (Ciborra, 2002).

Almost without exception, NGOs find it difficult to come up with sound, cost effective methods to show the results of their development activities, or even to demonstrate their effectiveness as organizations (Fowler, 2002). In an article by the Union of International Associations (2007), it is argued that an NGO only exists because it has a special interest in a particular set of problems. This is not a very important problem when NGO projects are few and far between. It does become important when NGOs start building up "comprehensive" information systems - particularly those which make use of
computers. It is then that overlap leads to wastage of carefully acquired resources. Some of the problems which NGOs must collectively face in working out the kind of information systems they need include how to build up their data bases in such a way they can be fed into a computer; how to divide up the potential users of the information so the system is efficiently used; and how to divide up the potential sources of funds to support such information systems so that each system is adequately funded (Fowler, 2002). But, as Rockart et al. (2002) aver, much action-relevant knowledge does exist, but it is inaccessible, because the current coding of relevant knowledge is highly inefficient, typically embedded in "difficult-to-understand" articles published in premier journals (Rockart et al., 2002).

At the same time, it goes further to state; NGOs must also be concerned with conserving the resources of each system to ensure its survival. Resources of the network of information systems must be conserved to ensure that the service as a whole is adequate on a cost/effectiveness basis and total resources available to avoid wastage of the limited funds available for this type of undertaking. Secondly, NGOs must avoid unnecessary duplication and overlap and ensure comprehensive rather than fragmented coverage. They need to serve the maximum number of users with the maximum variety of purposes and avoid confusion on the part of governmental and nongovernmental users faced with a multiplicity of services. They should also provide adequate security to prevent abuse of the data stored as well as a comprehensive picture of projects and programmes underway. Lastly, NGOs should commit to preparing for the near future in which computer files of all such data banks are linked, and data is transferred automatically from one to the other.
according to a programmed "arrangement" between the different parties (UIA Study Papers, 2007).

These, according to the researcher, are very real problems. Many of them also arise in the case of commercial data banks, but there is an added twist in the case of nonprofit data banks. The nonprofit information systems are supposedly created to supplement one another and not to compete. And yet in order to survive, each is forced to "hoard" information to increase the relative quality of the service it has to offer, just as with the (nonprofit) UN Agency information services. There is an extra turn to the twist in that usually one of the objectives of the responsible NGOs is to make available information at minimum cost, and yet it is clearly in its interest to raise the cost of such information to other NGOs which possess their own data banks.

It is these problems which will govern the rise and fall of NGO information services over the next 10-15 years. NGOs can either take the view that their own field of interest is too specialized to warrant collaboration with more general data banks. In this case their information functions will be swept into the maw of commercial or government data networks and the NGO will fall by the wayside, unless they can actively investigate methods of organizing, financing and controlling nongovernmental, nonprofit collective information services (UIA Study Papers, 2007).

2.5 Conceptual Framework

The conceptual framework is indicated in the Figure 2. In the framework, CBIS are presumed to influence the performance of NGOs. CBIS will be characterized by MIS, OAS, TPS, DSS and ES, and performance by resource mobilization and management,
controls/regulation of social impacts and responsibilities, decision making and problem solving, efficiency of product and service delivery, and efficiency of record-keeping and reporting.

In the context of the framework, MIS, OAS, TPS, DSS and ES have direct influence on productivity and worker achievement, controls/regulation of social impacts and responsibilities, decision making and problem solving, turnover of products and quantity and quality of work done in an NGO. Thus if there is proper and adequate MIS, OAS, TPS, DSS and ES in an NGO, there should also be effective resource mobilization and management, control and regulation of social impacts and responsibilities, decision-making and problem solving, efficiency of product and service delivery, and efficiency in record keeping and reporting.
A conceptual framework for CBIS

INDEPENDENT VARIABLE

INFORMATION SYSTEMS

CBIS

NON-CBIS

DEPENDENT VARIABLE

PERFORMANCE

OAS
- Data storage
- Data exchange via electronic transfer (e-mails)
- Data management (Scheduling software)

TPS
- Multiple individual operators
- Rapid response
- Reliability, inflexibility, controlled processing

MIS
- Access and manipulation of stored information
- Managing resources
- Production of reports and record maintenance

DSS
- Decision analysis
- Expediting problem solving
- Increase organizational control

ESS
- Explain reasoning
- Address of imprecise and incomplete data
- Delivery of quantitative information

Resource mobilization and management

Controls/Regulation of Social impacts and responsibilities

Decision Making & Problem-solving

Efficiency of product and service delivery

Efficiency of record keeping and reporting

Source: Researcher (2011)
CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research procedure and techniques that were used in the study. It provides a description of the research design, population, sample size, and sampling procedures to be employed as well as the basis for planning, selecting and developing the instruments to be used in the study. It also describes the procedure for the applications of the instruments, and the data analysis techniques which will be used.

3.2 Research Design

This study employed a cross-sectional sample survey design. A survey was preferred over other competing designs because it would enable the researcher to collect a lot of data in a shorter time than a longitudinal survey. It would also enable the researcher to provide numeric description of the population from just a part of it (Amin, 2005). In cross-sectional design, data is collected at one point in time instead of following a single case (or cases) over a prolonged period of time. The study was non-experimental and was concerned with explanations, descriptions and exploration of opinions, attitudes, feelings and perceptions of managers and staff of NGOs, rather than predictions based on manipulation of variables. Such kinds of studies are best carried out through survey designs (Touliatos & Compton, 1988). The aim of the researcher was to gather as much facts as possible to enable her clarify and describe the implications of CBIS on the performance of NGOs, rather than to manipulate variables in an attempt to relate causes to effects. This is the domain of survey research (Oso & Onen, 2008).
The sample survey was considered ideal for this study because the researcher intended to collect data in only NGOs in Kisumu City, and then use descriptive and inferential statistical methods to make generalizations to the entire population of NGOs. Sample survey design would enable the researcher to collect a lot of data within a short time and at minimum possible cost. Further, as Amin (2005) also points out, sample survey would enable the researcher to collect both qualitative and quantitative data, which would permit a fuller explanation of the phenomenon under investigation.

3.3 Population and Sampling

3.3.1 Target Population

Target (or parent) population refers to the population to which a researcher ultimately wants to generalize the results of his or her study (Amin, 2005). In this study, the target population consisted of all the 120 NGOs in Kisumu City. By targeting all the NGOs, the researcher intended to capture as many different characteristics of as many NGOs, thus, raising the validity and reliability of the study. A list of all registered NGOs in Kisumu is provided in Appendix B.

3.3.2 Sample Size

A sample is a collection of some (a subset) elements of a population of study (Amin, 2005). It is used in research to enable a detailed study to be carried out on a few members of a larger target population, but with an intention of generalizing the results of the investigation to the entire parent population (Amin, 2005). In this study, the sample consisted of 60 NGOs in Kisumu City. The sample of 60 was determined according to Mugenda & Mugenda (2003) which recommends that a sample of 50% is ideal for a
survey when there is no estimate available of the proportion in the target population considered as having the characteristics of interest, and 60 is 50% of the 120 NGOs.

3.3.3 Sampling Techniques

Sampling generally refers to a process of selecting elements from an accessible population in such a way that the sample elements selected represent the population on which the results of an investigation is to be generalized (Amin, 2005). In this study, simple random sampling and purposive sampling techniques were used to select the sample. Simple random sampling is a chance selection in which every member of the population has an equal and an independent chance of being included in the sample (Amin, 2005). The method involves defining the population, identifying each individual or member of the population using a suitable tag, and then selecting individuals on the basis of chance from an accessible population. Simple random sampling, by way fishbowl technique, was used in this study to select the individual 60 registered NGOs to be studied. This sampling technique would ensure that each NGO in the accessible population had an equal and independent chance of being included in the sample. It would also produce a fairly representative and an unbiased sample where members of the sample would vary only due to random fluctuations.

Purposive sampling is a sampling technique that allows a researcher to use cases that have the required information with respect to the objectives of the study (Mugenda & Mugenda, 2003). In this technique, the researcher consciously decides who to include in the sample and is helpful in the collection of focused information (Oso & Onen, 2008). Purposive sampling technique was used in this study to choose the individual respondents
to be included in the sample. There were 4 respondents per NGO to make a total of 240 respondents. This technique was mainly used to ensure the respondents, mostly managers and supervisors, had knowledge of the required variables of the study. This also helped to save time and to cut down on the cost of the study since the NGOs are scattered all over the city and it would not be easy to locate the right respondents if they were to be selected by simple random sampling method.

3.4 Instrumentation

Semi-structured questionnaires were the main tool for collecting data in this study. The selection of this tool was guided by the nature of the data that was to be collected, the time available as well as by the objectives of the study. The overall aim of the study was to investigate the relationship between CBIS and performance of NGOs with the intention of raising the level of performance of NGOs in the city. The researcher was mainly concerned with the views, opinions, perceptions, feelings and attitudes of the respondents towards the effects of CBIS on the performance of NGOs. Questionnaire is the best tool for collecting views and opinions (Oso & Onen, 2008).

A questionnaire is a carefully designed instrument consisting of a set of items to which the respondents are expected to react usually but not always in writing. It is a self-report instrument used for gathering information about variables of interest in an investigation (Amin, 2005). Only semi-structured questionnaires were used in this study. They would enable the researcher to balance between the quantity and quality of data collected, besides making data analysis simpler than using entirely unstructured instruments would, while at the same time collecting more information than entirely
structured instruments would. The delicate balance between quality and quantity of information was useful for a fuller explanation of the relationship between CBIS and performance. Questionnaires were preferred because the sample size used in this study was quite large (240 respondents) and given the time constraints, questionnaire was the most ideal tool for collecting data within the shortest possible time. Besides, the target population for this study was largely literate and was unlikely to have difficulties responding to the questionnaire items. Thus questionnaire was the ideal tool for collecting data in this study.

3.5 Research Procedure

This study was conceived during a class discussion when the topic of information systems was being discussed. The researcher decided to develop a proposal to this effect. After the proposal was written, defended and approved, the researcher with the guidance of her supervisors proceeded to develop research instruments and pilot them. The researcher then sought permission and a letter of introduction from the Dean of the School of Business Studies – Kenyatta University, to go to the field and collect data. With the letter, the researcher proceeded to collect data, using questionnaires, from the sampled 60 NGOs and 240 respondents during the months of November 2010.

3.6 Quality Control

Controlling quality involves adjusting the values of validity and reliability coefficients of the study instruments until each instrument attains a value of at least 0.70. This is the least value of validity and reliability coefficient accepted for survey studies (Amin, 2005). Validity of research instruments is a measure of the extent to which the
instruments measure what they are intended to measure (Oso & Onen, 2008). The validity of the instrument was determined by using experts. The questionnaires were given to two experts in information systems management to evaluate and judge the relevance of each item in the instrument to the study objectives and the overall purpose of the study, and to rate each item on a 1 to 4 scale where 1 is Not Relevant (NR), 2 is Somewhat Relevant (SWR), 3 is Quite Relevant (QR) and 4 is Very Relevant (VR). The validities of the instruments were determined by calculating the Content Validity Index (C.V.I) from the total number of items rated as quite relevant (3) and very relevant (4) compared to the total items in the questionnaires using the formula:

\[
C.V.I = \frac{\text{Items rated 3 or 4 by both Judges}}{\text{Total number of items in the questionnaire}}.
\]

Reliability is dependability or trustworthiness of the research results or the degree to which a measuring instrument consistently measures what it is supposed to measure (Amin, 2005). Reliability of the study instrument was determined through the test-re-test method to a sample of individuals who were not part of the main study. The same instruments were administered twice to the same pilot sample of 15 respondents: 15 being the least sample size accepted in correlation studies (Oso & Onen, 2008). Their responses were scored to give a set of scores (T₁). After two weeks, the same instruments were administered again to the same group and their responses scored to obtain a set of scores (T₂). The two sets of scores (T₁ and T₂) were correlated using Pearson Product Moment Correlation.
3.7 Data Analysis

In this study, the independent variable (CBIS) was categorical, while the dependent variable (Performance of NGOs) was continuous. Various statistical tests and measurements were used in the analysis of the data collected.

In order to find out the effect OAS on the performance of NGOs in Kisumu city a regression analysis was done with performance as the dependent variable and OAS as the independent variable. The coefficient of determination of the regression model was then computed. The regression equation was as follows:

\[ Y = \alpha + \beta X_1 + \gamma X_2 \]

Where \( Y \) was the DV: Performance

And \( X \) was the IV: the CBIS

\( X_1 \) was the extent of utilization of the CBIS

\( X_2 \) was the degree of adequacy of the CBIS

From the coefficient of determination the researcher was able to know how much of performance is affected by OAS. For example if a coefficient of determination of 0.745 was obtained, that meant that 74.5% of the dependent variable (performance of NGOs) was determined by the independent variable (OAS). Therefore \((1 - 74.5\%) = 25.5\%\) of the dependent variable is determined by other factors other than the dependent variable.

The study further sought to determine the relationship between TPS and performance in Kisumu. In order to know the relationship between the two variables a correlation analysis was done on the two variables at 95% confidence interval. It would
show whether or not the two variables had a relationship. It would further show whether the two variables had a positive association or a negative relationship. Lastly, from the correlation analysis, the magnitude of the relationship was determined.

The researcher also sought to establish the effect of MIS on the performance of NGOs in Kisumu. To answer this question, a regression analysis, with the dependent variable being performance and the independent variable being MIS, was done. The coefficient of determination of this model was done and this showed the effect of MIS on performance i.e. how much of the performance of NGOs was determined by MIS and how much was determined by other factors.

In order to find out whether or not DSS influences performance of NGOs, a one way ANOVA was done at 95% confidence interval. The factor variable in the ANOVA model would have a value of 1 if the organizations had DSS, and 0 if an organization did not have DSS. The performance of the organizations in the two groups would be established and an ANOVA test was done on them at 95% confidence interval. The null hypothesis was that DSS had no effect on the performance of organizations and the alternative hypothesis was that DSS have an effect of the performance of the NGOs in Kisumu. If the researcher failed to reject the null hypothesis, then it would be concluded that the DSS did not influence the performance of NGOs. If the null hypothesis was rejected then it would be concluded that DSS had an influence on the performance of NGOs in Kisumu. If it was established that DSS had an effect on performance, a multiple linear regression would be done to determine the influence of DSS on performance. The dependent variable would be performance and the independent variables would be the
adequacy of the DSS in the organizations and degree of utilization of DSS in the organizations. From this regression model the coefficient of determination would be computed. This would show the extent to which the performance of NGOs is determined by the dependent variables.

Lastly, the researcher established whether ESS affected performance. A one way ANOVA at 95% confidence interval computed. The null hypothesis of the ANOVA model was that ESS have no effect on performance and the alternative hypothesis was that ESS have an effect of performance. The factor variable in the model would have a value of 1 if the organizations employed ESS and 0 if the organizations had not employed ESS. Performance of the organizations in the two groups was then computed. There after ANOVA was computed at 95% confidence interval. If the p – value of the model was less than 0.05 the null hypothesis would be rejected and it would be concluded that ESS have an effect on performance. If the p – value of the model was greater than 0.05 then the null hypothesis would not be rejected and it would be concluded that ESS have no effect of performance of the NGOs in Kisumu.

It was the researcher’s belief that these analyses would be able to give an indication of the impact of CBIS on the performance of NGOs in Kisumu City.
CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the data obtained from the study. The respondents in the study involved 240 respondents selected from 60 NGOs in Kisumu. Each NGO provided 4 respondents to the study. The data was analyzed and presented using tables and bar graphs.

4.2 The effect of OAS on the performance of NGOs in Kisumu city.

This section examines how OAS affects the performance of NGOs in Kisumu City. It was observed that OAS had three major elements, namely; data storage, data exchange via electronic transfer and data management. In analyzing data storage in the NGOs in Kisumu city, it was observed that most NGOs were using OAS for data storage satisfactorily.

4.2.1 Use of OAS for data storage

58 respondents said that data storage in their organizations was very good. This represented 24% of the total respondents in the study. 70 of all the respondents said that data storage was good. This represented 29% of all the respondents in the study. We therefore see that a total of 53%, more than half of the respondents, said that data storage was either good or very good. 50 of the respondents said that data storage in the organization was average. This represents 20.83% of all the respondents. 38 of the respondents said that data storage in their organizations was poor. This represented 15.83% of all the respondents. Lastly, 24 respondents, 10% of the respondents, said that
data storage was very poor. We therefore see that the mode response was that data storage was good. Figure 2.0 and table 1.0 below, represents this information.

![Grade data storage in your organisation](image)

**Figure 1.0: Data storage in NGOs in Kisumu city.**

<table>
<thead>
<tr>
<th>Response</th>
<th>Very poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>24</td>
<td>38</td>
<td>50</td>
<td>70</td>
<td>58</td>
<td>240</td>
</tr>
<tr>
<td>Percent</td>
<td>10</td>
<td>15.83</td>
<td>20.83</td>
<td>29.17</td>
<td>24.17</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 1.0: Data storage in NGOs in Kisumu city**

4.2.2 Use of OAS for data exchange via electronic transfer

Most respondents reported that data exchange via electronic transfer was very good, good or average. 34 respondents said that the data exchange via electronic transfer in their organizations was very good. This represented 14.17% of all the respondents. 55 respondents said that data exchange via electronic transfer was good. This represented 22.92% of all the respondents. 65 respondents said that data exchange via electronic transfer was average. This represented 27.08% of all the respondents. In general 64.17%
of all the respondents either said that data exchange via electronic transfer was very good, good or average. On the other hand 36 respondents, 15% of the total respondents; and 50 respondents, 20.83% of the total respondents said that data exchange via electronic data transfer was very poor and poor respectively. Figure 4.0 and table 2.0 present this information.

All the organizations used the internet for electronic data exchange. Most organization also used intranets for electronic data transfer. Only four organizations used extranets for electronic data transfer. They include CDC, University of Washington project in Kemri and Walter Reed Project.

Figure 2.0: Data exchange via electronic transfer

<table>
<thead>
<tr>
<th>Grade data exchange via electronic transfer in your organisation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td>36</td>
</tr>
<tr>
<td>Poor</td>
<td>50</td>
</tr>
<tr>
<td>Average</td>
<td>65</td>
</tr>
<tr>
<td>Good</td>
<td>55</td>
</tr>
<tr>
<td>Very good</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>240</td>
</tr>
</tbody>
</table>

Table 2.0: Data exchange via electronic transfer.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Very poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>36</td>
<td>50</td>
<td>65</td>
<td>55</td>
<td>34</td>
<td>240</td>
</tr>
<tr>
<td>Percent</td>
<td>15</td>
<td>20.83</td>
<td>27.08</td>
<td>22.92</td>
<td>14.17</td>
<td>100</td>
</tr>
</tbody>
</table>
4.2.3 Use of OAS for data management

Most respondents said that use of OAS in data management was either very good or good. 62 respondents out of the 240 respondents said that the use of data management systems in their organization was very good. This represented 25.83% of all the respondents. 77 of the respondents said that the use of data management systems in their organizations was good. This represented 32.08% of all the entire population. 15% of the respondents said that use data management in their organizations was average. 17.92% of the respondents said that use of data management systems in their organizations was poor. Lastly 9.17% of the respondents said that use of data management systems in their organizations was very poor. Figure 4.0 and Table 3.0 below represents this information.

**Figure 3.0: Use of OAS for data management**

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td>22</td>
</tr>
<tr>
<td>Poor</td>
<td>43</td>
</tr>
<tr>
<td>Average</td>
<td>36</td>
</tr>
<tr>
<td>Good</td>
<td>77</td>
</tr>
<tr>
<td>Very good</td>
<td>62</td>
</tr>
</tbody>
</table>

| Total           | 240       |

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very poor</td>
<td>9.17</td>
</tr>
<tr>
<td>Poor</td>
<td>17.92</td>
</tr>
<tr>
<td>Average</td>
<td>15</td>
</tr>
<tr>
<td>Good</td>
<td>32.08</td>
</tr>
<tr>
<td>Very good</td>
<td>25.83</td>
</tr>
</tbody>
</table>

| Total           | 100       |

**Table 3.0: Use of OAS for data management**
4.2.4 Effect of OAS on performance

Regression analysis was performed in order to establish the effect of OAS on the performance of organizations. In order to establish the effect of OAS on the performance of NGOs in Kisumu City, the regression model had performance of the organization as the dependent variable, the adequacy of OAS infrastructure as one of the independent variables and the level of utilization of the OAS as the other independent variable. The coefficient of determination of this model was used to establish the effect of the independent variables on the dependent variables. Below is a break down of the regression analysis.

Definition of variables:

\[ Y = \text{Performance of the organization} \]

\[ X_1 = \text{Adequacy of OAS} \]

\[ X_2 = \text{Level of utilization of OAS} \]

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered</th>
<th>Variables Removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( Y, X_1, X_2 )</td>
<td>( )</td>
<td>Enter</td>
</tr>
</tbody>
</table>

a) All requested variables entered

b) Dependent variable: \( Y \)

*Table 4.0: Variables included in the model*

From table 4.0, all the variables in the regression equation were included in the equation as they were all relevant in the equation.
Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.885</td>
<td>0.783</td>
<td>0.781</td>
</tr>
</tbody>
</table>

(Constant), $x_1, x_2$

Table 5.0: Model Summary

From table 5.0 above the coefficient of determination is 0.783. This indicates adequacy and level of utilization of OAS affect 78.3% of performance of organizations in Kisumu city. The remaining 21.7% of performance of organizations is affected by other variables that are neither adequacy of OAS or level of utilization of OAS. These factors may include hard work among the employees, influence of other forms of information systems, amount of funding in an organization, management, leadership, among others.

4.3 Relationship between utilization of TPS and the performance of NGOs in Kisumu city

TPS in the organizations in Kisumu city had four elements, namely: rapid response, reliability, inflexibility and controlled processing. Table 6.0 below shows the extent to which they are utilized in the organization according to the respondents.

Table 6.0: Level of utilization of TPS

<table>
<thead>
<tr>
<th>Element</th>
<th>Least utilized</th>
<th>Less utilized</th>
<th>Moderately utilized</th>
<th>Well utilized</th>
<th>Very well utilized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid response</td>
<td>31(12.92%)</td>
<td>45(18.75%)</td>
<td>52(21.67%)</td>
<td>63(26.25%)</td>
<td>49(20.42%)</td>
</tr>
<tr>
<td>Reliability</td>
<td>47(19.58%)</td>
<td>49(20.42%)</td>
<td>53(22.08%)</td>
<td>48(20%)</td>
<td>43(17.92%)</td>
</tr>
<tr>
<td>Inflexibility</td>
<td>44(18.33%)</td>
<td>46(19.17%)</td>
<td>55(22.92%)</td>
<td>53(22.08%)</td>
<td>42(17.5%)</td>
</tr>
<tr>
<td>Controlled processing</td>
<td>43(17.92%)</td>
<td>50(20.83%)</td>
<td>57(23.75%)</td>
<td>56(23.33%)</td>
<td>34(14.17%)</td>
</tr>
</tbody>
</table>
From table 6.0 above, the degree of utilization of TPS is relatively equally distributed. The element of rapid response is largely well utilized, 63 respondents in the study said that the rapid response element of their TPS was well utilized, this represents 26.25% of all the respondents in the study. 31 respondents said that TPS in their organizations was least utilized. This represented 12.92% of the entire sample. 18.75% of the sampled respondents said that rapid response was less utilized, 21.67% said use for TPS for rapid response was averagely utilized and lastly 26.25% of the respondents said that use of TPS for rapid response was well utilized.

On the use of TPS to achieve reliability, 47 respondents, representing 19.58% of all the respondents in the study said that TPS was least utilized to achieve reliability. 49 respondents, representing 20.42% said that use of TPS to achieve reliability was less utilized. 53 respondents said that use of TPS to achieve reliability was moderately utilized. 48 respondents, representing 20% of the entire population said that use of TPS to achieve reliability was well utilized. Lastly, 43 respondents, representing 17.92% of all the respondents, said that use of TPS to achieve reliability was very well utilized.

On the use of TPS to achieve inflexibility, 44 respondents said that TPS was least utilized; this represented 18.33% of the entire sample. 46 respondents said that use of TPS to achieve inflexibility was less utilized; this represented 19.17% of the entire sample. 55 respondents said that use of TPS to achieve inflexibility was moderately utilized; this represented 22.92% of the entire sample. 53 respondents said that use of TPS to achieve inflexibility was well utilized; this represented 22.08% of the entire sample size. Lastly,
42 respondents said that use of TPS to achieve inflexibility was very well utilized. This represented 17.5% of the entire sample size.

On the other hand, 43 respondents said that TPS was least utilized in order to achieve controlled processing; this represented 17.92% of the entire sample. 50 respondents said that use of TPS to achieve controlled processing was less utilized; this represented 20.83% of the entire sample. 57 respondents said that use of TPS to achieve controlled processing was moderately utilized; this represented 23.75% of the entire sample. 56 respondents said that use of TPS to achieve controlled processing was well utilized; this represented 23.33% of the entire sample size. Lastly, 34 respondents said that use of TPS to achieve controlled processing was very well utilized. This represented 14.17% of the entire sample size.

In order to establish the relationship between TPS and performance of NGOs in Kisumu city, a correlation analysis was done. The correlation analysis involved two variables, namely: performance of NGO and the extent of utilization of TPS. The correlation matrix below shows the relationship between performance of NGOs and the level of utilization of TPS.

Definition of variables:

Y = Performance of NGOs

X = Level of utilization of TPS
**Correlation is significant at the 0.01 level (2-tailed).**

**Table 7: Correlation matrix of performance of NGOs and level of utilization of TPS**

From the correlation matrix presented in table 7.0 the correlation between performance and the level of utilization of TPS is 0.318. The correlation has a p value of 0.000 which indicates that the correlation is significant at 95% level of significance. The correlation between the two variables is positive indicating that as the level of utilization of TPS increases in an organization so does the performance of the organization. Though the relationship is not strong as it is less that 0.5, it is still significant.

**4.4 The effect of MIS on performance of NGOs in Kisumu city**

MIS is used to capture, store, access and manipulate stored information. MIS is also used to do resource management, report production, record maintenance, recording and tracking of outcomes. Table 8.0 shows the utilization of MIS to capture, store, access and manipulate stored information. 68 respondents reported that MIS in their organizations was very poor when it came to capturing, storing, accessing and manipulation of stored information. This represented 28.33% of all the respondents. 47 respondents said that use of MIS in their organizations to capture, access, store and manipulate stored information was poor. This represented 19.58% of the entire sample size. 52 respondents said that use
of MIS to capture, store, access and manipulate information was average. This represented 21.67% of the entire sample. 41 respondents said that the utilization of their organization to capture, store, access and manipulate stored information was good. This represented 17.08% of the entire population. Lastly, 32 respondents said that the use of MIS to capture, store, access and manipulate stored information was very good.

On the other hand 71 respondents said that use of MIS in their organizations was very poor when it came to resource management. This represented 29.58% of all the respondents. 48 respondents said that use of MIS in their organizations for resource management was poor. This represented 20% of the entire sample size. 54 respondents said that use of MIS for resource management was average. This represented 22.5% of the entire sample. 43 respondents said that the use of MIS for resource management was good. This represented 17.92% of the entire population. Lastly, 24 respondents said that the use of MIS for resource management was very good. This represented 10% of the entire sample.

When it came to the use of MIS for report production and record maintenance, 33 respondents said that use of MIS in their organizations was very poor. This represented 13.75% of all the respondents. 52 respondents said that use of MIS in their organizations for report production and record maintenance was poor. This represented 21.67% of the entire sample size. 63 respondents said that use of MIS to do report production and record maintenance was average. This represented 26.25% of the entire sample. 53 respondents said that the use of MIS for report production and record maintenance was good. This represented 22.08% of the entire population. Lastly, 39 respondents said that the use of
MIS for reporting and record maintenance was very good. This represented 16.25% of the entire sample.

On the use of MIS for recording and tracking of outcomes, 53 respondents said that use of MIS in their organizations was very poor. This represented 22.08% of all the respondents. 81 respondents said that use of MIS in their organizations for recording and tracking of outcomes was poor. This represented 33.75% of the entire sample size. 47 respondents said that use of MIS for recording and tracking of outcomes was average. This represented 19.58% of the entire sample. 42 respondents said that the use of MIS for recording and tracking of outcomes was good. This represented 17.5% of the entire sample. Lastly, 17 respondents said that the use of MIS for recording and tracking of outcomes was very good. This represented 7.08% of the entire sample.

<table>
<thead>
<tr>
<th></th>
<th>Very Poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capture storage, Access</td>
<td>68 (28.33%)</td>
<td>47 (19.58%)</td>
<td>52 (21.67%)</td>
<td>41 (17.08%)</td>
<td>32 (13.33%)</td>
</tr>
<tr>
<td>Manipulation of Information</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Management</td>
<td>71 (29.58%)</td>
<td>48 (20.42%)</td>
<td>54 (22.05%)</td>
<td>43 (17.92%)</td>
<td>24 (10%)</td>
</tr>
<tr>
<td>Report Production and</td>
<td>33 (13.75%)</td>
<td>52 (21.67%)</td>
<td>63 (26.25%)</td>
<td>53 (22.08%)</td>
<td>39 (16.25%)</td>
</tr>
<tr>
<td>Record Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recording and Tracking</td>
<td>53 (22.08%)</td>
<td>81 (33.75%)</td>
<td>47 (19.53%)</td>
<td>42 (17.5%)</td>
<td>17 (7.08%)</td>
</tr>
<tr>
<td>of Outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table 8.0: Use of MIS by NGOs in Kisumu*

The effect of MIS on the performance of NGOs in Kisumu city was established from the coefficient of determination of the regression analysis. The dependent variable in the regression equation was performance of NGOs in Kisumu city while the independent variables included level of utilization of MIS and adequacy of MIS.
The variables for the regression equation are presented below:

\[ Y = \text{Performance of NGOs in Kisumu City} \]
\[ X_1 = \text{Level of utilization of MIS} \]
\[ X_2 = \text{Degree of adequacy of MIS} \]

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered</th>
<th>Variables Removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( X_1, X_2 )</td>
<td>-</td>
<td>Enter</td>
</tr>
</tbody>
</table>

a. All requested variables entered.

b. Dependent Variable: \( Y \)

Table 9.0: Variables Entered/Removed in the regression equation

<table>
<thead>
<tr>
<th>Model</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.906(a)</td>
<td>.820</td>
<td>.819</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), \( X_1, X_2 \)

Table 10.0: Model Summary

Table 9.0 shows that all the variables that were entered in the equation were included in the equation, meaning that all the independent variables were relevant in the regression equation. In table 10.0 we see that the coefficient of determination is 0.82, meaning that adequacy and utilization MIS infrastructure in the organizations affects 82% of the performance of NGOs in Kisumu city.
4.5 The influence of DSS on performance of NGOs in Kisumu city

Only 2 NGOs had DSS. They included Walter reed and CDC. These organizations had very good performance as shown in figure 4 below:

![Performance of Walter Reed and CDC (DSS)](image)

Figure 4.0: Performance of Walter Reed and CDC (DSS)

Out of the 8 sampled respondents from CDC and Walter reed, 7 (87.5%) respondents said that the performance of their organizations was very good and only 1 (12.5%) said that the performance of their organization was good. The other organizations did not have DSS employed in them. As shown in figure 5, most NGOs had an average performance according to the respondents.
Figure 5.0: Performance of NGOs that did not have DSS

All the NGOs had not adopted DSS apart from CDC and Walter reed. The NGOs that did not have DSS had an average performance. 35% of the NGOs had an average performance according to the respondents. 27.5% of the organizations had a good performance according to the respondents. 15% of the organizations had poor performance according to the respondents. Comparing the results of Figure 5 and Figure 7, it is evident that the performance of the NGOs is improved by having DSS, though most of the organizations in Kisumu had no DSS.

4.6 Whether ES affects performance of NGOs in Kisumu city.

Only 2 NGOs had ES. They included Walter reed and CDC. These organizations had very good performance as shown in figure 6 below:
Out of the 8 sampled respondents from CDC and Walter reed, 7 (87.5%) respondents said that the performance of their organizations was very good and only 1 (12.5%) said that the performance of their organization was good. The other organizations did not have ES employed in them. As shown in figure 7, most NGOs had an average performance according to the respondents.

Figure 6.0: Performance of Walter Reed and CDC (ES)

Figure 7.0: Performance of NGOs that did not have ES
All the NGOs had not adopted ES apart from CDC and Walter reed. Most of the NGOs that did not have ES had an average performance. Among the organizations that did not have ES, 35% of the NGOs had an average performance according to the respondents. 27.5% of the organizations had a good performance according to the respondents. 15% of the organizations had poor performance according to the respondents. Comparing the results of Figure 6 and Figure 7 we see that the performance of the NGOs is improved by having ES, though most of the organizations in Kisumu had no ES.
CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The researcher sought to establish the impact of CBIS on the performance of NGOs in Kisumu City. In particularly the researcher sought to examine the effect of OAS, TPS, MIS, DSS and ES on resource mobilization and management, control and regulation of social impacts and responsibilities, decision making and problem solving, efficiency of product and service delivery, and efficiency of record-keeping and reporting in NGOs in Kisumu City. The study was done in the period of December 1st, 2010 to January 29th, 2011. This chapter presents the summary of the major findings of the study, the conclusion of the study, the recommendations and gives suggestion for further study.

5.2 Summary of Major findings

The purpose of this study was to assess the impact of CBIS on the performance of NGOs in Kisumu City. The research particularly examined the effect of OAS, TPS, MIS, DSS and ES on resource mobilization and management, control and regulation of social impacts and responsibilities, decision making and problem solving, efficiency of product and service delivery, and efficiency of record-keeping and reporting in NGOs in Kisumu City. The researcher studied the effect of OAS on the performance of NGOs in Kisumu city, the relationship between TPS and the performance of NGOs in Kisumu city, the effect of MIS on the performance of NGOs in Kisumu city, the influence of DSS on the performance of NGOs in Kisumu city and whether ES affect the performance of NGOs in Kisumu city.
5.2.1 The effect of OAS on the performance of NGOs in Kisumu city.

Adequacy and level of utilization of OAS affect 78.3% of performance of organizations in Kisumu city. This is can be established from the fact that the coefficient of determination of the regression model, as shown in table 5.0 is 0.783. 21.7% of the performance of organizations is affected by other variables that are neither adequacy of OAS or level of utilization of OAS. These factors may include hard work among the employees, influence of other forms of information systems, amount of funding in an organization etc.

5.2.2 Relationship between utilization of TPS and the performance of NGOs in Kisumu city

Performance of NGOs and utilization of TPS have a correlation of 0.318. The correlation has a p value of 0.000 which indicates that the correlation is significant at 95% level of significance. The correlation between the two variables is positive indicating that as the level of utilization of TPS increases in an organization so does the performance of the organization. Though the relationship is not strong as it is less that 0.5, it is still significant. This information is presented in table 7.0.

5.2.3 The effect of MIS on performance of NGOs in Kisumu city

The effect of MIS on the performance of NGOs was determined using a regression equation. The regression equation had performance of the NGO as the dependent variable and adequacy and utilization of MIS as the independent variable. From the regression model, the coefficient of determination was found to be 0.82,
meaning that adequacy and utilization MIS infrastructure in the organizations affects 82% of the performance of NGOs in Kisumu city.

5.2.4 The influence of DSS on performance of NGOs in Kisumu city

The study established that only 2 NGOs in Kisumu had DSS. These organizations were CDC and Walter reed. Comparing the performance of CDC and Walter reed vis-à-vis the other organizations we see that majorly CDC and Walter reed had very good performance in their operations while the other organizations had an average performance. This shows that DSS improves the performance of an organization.

5.2.5 Effect of ES on the performance of NGOs in Kisumu city

The study established that only 2 NGOs in Kisumu had ES. These organizations were CDC and Walter reed. Comparing the performance of CDC and Walter reed vis-à-vis the other organizations we see that majorly CDC and Walter reed had very good performance in their operations while the other organizations had an average performance. This shows that ES affects the performance of an organization.

5.3 Conclusion

It was observed that all the NGOs sampled in Kisumu city have employed the use of information technology in their operations. Almost all the NGOs sampled did not have DSS and ES infrastructure in their organizations, they comprised 58 organizations making 97% of all the NGOs sampled and 48% of all the 120 NGOs in Kisumu city. This is not a good scenario as the research has established that the organizations that use those systems have a better performance than the majority which do not.
The performance of the organizations was seen to be affected and influenced significantly with the use of information system. Adequacy and level of utilization of OAS affect 78.3% of performance of organizations in Kisumu city. Adequacy and utilization MIS infrastructure in the organizations affects 82% of the performance of NGOs in Kisumu City; adequacy and utilization of DSS in the NGOs in Kisumu city influenced the performance of NGOs in Kisumu city. Those organizations that had DSS were only two and performed much better than those that did not. NGOs that had DSS performed very well compared to those that did not. Majorly NGOs that did not have DSS had an average performance.

The researcher can therefore conclude that amongst the most important technologies to employ, those that aid in problem solving and decision making are very important as the ability to carry out these functions effectively appears to have a positive impact on the performance of NGOs.

5.4 Recommendations

The following was the recommendation from the study:

- Since it was found that ES and DSS improves the performance of NGOs but only 2 NGOs had employed them. The researcher recommends that these systems should therefore be employed by all progressive and development oriented organizations.

- Organizations should pay more attention to their ability to effectively solve problems and make decisions instead of focusing entirely on resource
management, as this latter depends on how well problems are solved and decisions made.

5.5 Suggestion for further study

1. This study was not able to establish the specific nature of each CBIS that would improve the performance of NGOs. It would therefore be useful to find out if some particular kinds of CBIS are better than others in performance improvement for specific types of organizations.

2. Future researchers should look into the effect of CBIS on the performance of the governmental institutions and the private sector.

3. Another useful study would be a comparison between the performance of similar organizations that use CBIS and those that do not.
CHAPTER SIX

6.0 REFERENCES


www.portal.acm.org/citation.cfm


The Earthscan Reader on NGO Management


NGO Coordination Board (2008) www.ngobureau.or.ke


Promise, or Serial Hypocrisy? Communications of the Association for Information Systems, 8(23), 330-346.


APPENDICES

Appendix I: The Questionnaire

1. Data storage, data exchange through electronic transfer and data management are some of the major elements of Office Automation Systems (OAS). Please rate the extent to which each is utilized in your organization on a scale of 1 to 5. Check 1 when the element is least used and 5 when the element is maximally used in the appropriate box.

<table>
<thead>
<tr>
<th>Element</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data storage</td>
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<td>Data exchange via electronic transfer</td>
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<tr>
<td>Data management</td>
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</tbody>
</table>

Comment on your answer

71
2. Rapid response, reliability, inflexibility and controlled processing are some of the major elements of TPS. Please rate the extent to which each is attained in your organization on a scale of 1 to 5. Check ☐ 1 when the element is least used and 5 when the element is maximally used in the appropriate box.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Rapid response</td>
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<tr>
<td>Reliability</td>
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<tr>
<td>Inflexibility</td>
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<tr>
<td>Controlled processing</td>
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</table>

Comment on your answer

3. MIS are useful for the capture and storage of information, access and manipulation of stored information, resource management, report production and record maintenance, as well as in the recording and tracking of outcomes. Please rate the extent to which each is achieved in your organization on a scale of 1 to 5. Check ☐ 1 when the element is least used and 5 when the element is maximally used in the appropriate box.
<table>
<thead>
<tr>
<th>Capture, storage, access &amp; manipulation of stored information</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Resource management</td>
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<tr>
<td>Report production &amp; record maintenance</td>
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<tr>
<td>Recording &amp; tracking of outcomes</td>
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</tbody>
</table>

Comment on your answer

4.DSS are designed for improving personal efficiency, decision analysis, expediting problem solving, and increasing organizational control. Please rate the extent to which each is realized in your organization on a scale of 1 to 5. Check ☐ 1 when the element is least used and 5 when the element is maximally used in the appropriate box.

<table>
<thead>
<tr>
<th>Improving personal efficiency</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
<th>4.</th>
<th>5.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision analysis</td>
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<tr>
<td>Expediting problem solving</td>
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<tr>
<td>Increasing organizational control</td>
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</tbody>
</table>
5. ES are designed to explain reasoning, integrate different perspectives, address imprecise and incomplete data and deliver quantitative information. Please rate the extent to which each is utilized in your organization on a scale of 1 to 5. Check ☐ 1 when the element is least used and 5 when the element is maximally used in the appropriate box.

<table>
<thead>
<tr>
<th>Explaining reasoning</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
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<th>5.</th>
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</thead>
<tbody>
<tr>
<td>Integration of different perspectives</td>
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<tr>
<td>Address of imprecise and incomplete data</td>
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<tr>
<td>Delivery of quantitative information</td>
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</table>

6. Rate the performance of your organization on the following aspects on a scale of 1 to 5 by indicating 1 when the element is very good and 5 when the element is very poor in the appropriate box.
<table>
<thead>
<tr>
<th>Category</th>
<th>Very poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource mobilization &amp; management</td>
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<td>Controls and regulation of social impacts and responsibilities</td>
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<tr>
<td>Decision making &amp; Problem solving</td>
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<tr>
<td>Efficiency of product &amp; service delivery</td>
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<tr>
<td>Efficiency of record keeping &amp; reporting</td>
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</table>

Comment on your answer

7. How would you grade the adequacy of computer-based information systems in your organization under the following categories? Please indicate by checking one box under the selected category.
8. How would you grade the performance of your organization under the following functional areas? Please indicate by checking one box under the selected category.

<table>
<thead>
<tr>
<th></th>
<th>Very Poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very Good</th>
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</thead>
<tbody>
<tr>
<td>Office Automation Systems (OAS)</td>
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<tr>
<td>Transaction Processing Systems (TPS)</td>
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<tr>
<td>Management Information Systems (MIS)</td>
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<tr>
<td>Decision Support Systems (DSS)</td>
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<tr>
<td>Expert Systems (ESS)</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Very Poor</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
<th>Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Resources</td>
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<tr>
<td>Monitoring &amp; Evaluation</td>
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<tr>
<td>Information Technology</td>
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<tr>
<td>Finance &amp; Administration</td>
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</tbody>
</table>
Appendix II: list of NGOs in Kisumu City

1. Academy for Education Development
2. Action Aid
3. Africa Now Kisumu
4. AGMARK
5. AMREF
6. CARE-Kenya
7. CDC
8. CISS International
9. Concern International
10. Concern Worldwide
11. Development Promotion and Technical Services
12. Development Work in Education, Livelihood & Environment
13. Disability Equality In Education Program
14. Disaster and Health Support Organization
15. Dominion Chapel\Churches
16. Dunga Spirulina
17. East Africa Development ministries
18. East Africa Inland Waters & Rural Concern
19. ECODEV
20. ECODS
21. Education for Social Responsibility-Africa
22. Elimu Yetu Coalition
23. Empowerment Resources Development Centre
24. FAHDO
25. Family Aid Africa
26. FHOK
27. FIDA
28. Friends Pioneer Youth Group
29. Futa Magendo Action Network
30. Future Vision Group
31. Gender & Development Centre
32. Geolink
33. Goldalel Hatchery Project
72. Nightingales Rural Health Services
73. Noble Charity Homes for Destitutes
74. NRHS
75. Nyalenda Recycling Project
76. Nyanza Youth Coalition
77. Ogam Non-Formal Education Centre
78. OGRA Foundation
79. OMEGA Foundation
80. OSIENALA
81. Outreach Kenya
82. Pandpieri Catholic Centre
83. Plan International
84. Practical Action
85. Red Cross Society of Kenya
86. Relief Environmental Care – Africa
87. Resources Oriented Development Initiatives
88. SABCI
89. SADEP
90. Salem Orphanage
91. SANA International
92. Sarvaden Shiv Mandir Dunga
93. Social Needs Network
94. Society for Hospital & Resources Exchange
95. St. Keziah’s Development Foundation
96. STIPA
97. SUCAM
98. Support for Rural Initiative Enhancement
99. Support for Rural Initiative Enhancement
100. SWAK
101. SWAP
102. TEMAK
103. TICH
104. Tropical Focus for Rural Development
105. UHAI Lake Forum
106. Uhuru Organization International
107. Ujima Foundation
108. University of Washington Project
109. Umbrella International
110. Unified Health & Agriculture Initiatives
111. VI Agroforestry
112. VIRED
113. WAFNET
114. Walter Reed Project
115. Wings of Hope
116. Women and Children in Crisis
117. WIFIP
118. Whitestone Community Based Care Organization
119. Youth Initiative Network
120. Youth to Youth Group