

APPLICATION OF PROJECT MANAGEMENT TOOLS IN BANKING
INFORMATION SYSTEMS DEVELOPMENT IN KENYA

BY

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DECLARATION

This project is my own original work and it has not been presented for award of a degree in any university.

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DEDICATION

To the intellectually introspective and those who seek enrichment of standards for the practice of business analysis and project management in information system development.

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To God I give thanks for giving me the ability and opportunity to further my studies, for being with me. giving strength and guidance in all facets of my life so that no matter how busy I become, I was always able to cope.

ABSTRACT

The development of banking information systems is a dynamic environment for banks with respect to project management, and is prone to failure if not managed with the criticality it deserves. This study aims to identify the application of various tools and techniques that aid in the effective and efficient management of the various banking information system development stages. The objectives of the study were to establish the project management tools and techniques used in Bank Information system project management in practice, to determine the effectiveness of the tools and techniques used in Bank Information system projects and to determine the challenges faced in using project management tools and techniques in Bank Information system projects.

The research targeted all the 43 commercial banks in Kenya. Data was collected using questionnaires; that used a 'drop-and-pick later*' approach. The respondents to the questionnaire were the project manager(s), business analyst(s) and Heads of ICT from each bank. Demographic data of the respondents and the banks were analyzed using descriptive statistics. Means and standard deviation were used to analyze the use and effectiveness of tools and techniques used in the phases of a bank information system project lifecycle. The challenges associated with the use of tools and techniques were analyzed by employing means and standard deviation.

The study found out that all the banks used various project management tools in bank information systems analysis and design. The Business Case justification was the most common technique used by banks in the conceptualization phase while Requirements analysis is the preferred technique in the planning phase. User Acceptance Testing and action logs are the most common techniques used in the execution and termination phases respectively. The least employed techniques in the conceptualization phase are net present value and decision analysis. In the planning phase the least used technique was questionnaires and surveys. The Fishbone diagrams and lessons-learned reports were the least used in the execution and termination phases respectively.

The study found out that all the banks experienced various levels of effectiveness in using project management tools in bank information systems analysis and design. The

Business Case justification was the most effective technique used by banks in the conceptualization phase while Requirements analysis is the most effective technique in the planning phase. User Acceptance Testing and issues logs are the most effective techniques used in the execution and termination phases respectively. The least effective techniques in the conceptualization phase are Return on investment and Payback analysis. In the planning phase the least effective techniques were Decision trees and Resource histograms. The Fishbone diagrams and lessons-learned reports were the least effective in the execution and termination phases respectively. The study established that complexity of the tools and techniques used and differences in formality of phases in the project lifecycle are the key challenges faced by commercial banks in information system development life cycles.

The application of project management tools and techniques is largely based on individual bank judgment most notably from continuous use and size of the information system development projects undertaken. It was discovered that most information system developments don't adopt use of more than two to three tools or techniques to generate a well-grounded base for decision making at the different stages of the project life cycle. Findings arrived at imply that these banks apply the same tools and techniques over time and therefore make use of them in the various bank information system projects undertaken. To ensure that there is a more diverse use of project management tools and techniques the policy makers within the banks should institutionalize project management methodologies that should be adopted in every bank information system project that will ensure at least two or more tools and techniques are used at the various lifecycle stages of a bank information system development appreciation of these tools and techniques is also required for project managers, business analysts and ICT project teams who should use them, therefore adequate training should be adopted for these crucial resources to gain understanding on the use of the tools and techniques. Further all bank information system developers and project managers must ensure to adhere to the traditional system lifecycle in all bank information system developments, this guide will greatly aid in setting the right framework for applying the various tools and techniques.

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Abbreviations

ICT - Information Communication Technology

IS - Information Systems

IT - Information Technology

SDLC - System Development Life Cycle

SME - Small Medium Enterprise

SD - Standard Deviation

SE - Standard Error of the Mean

CHAPTER ONE: INTRODUCTION

1.1. Background

The desired result of a banking information system development or ICT project is its success. This success is measured by delivering an Information System of high quality within the project's scope, time and cost. Hastie (2006) defines ICT project success as a measure of the effectiveness of an organization's process for implementing new information system projects, up to the point of deploying the new system to the end user community, where the project is delivered on-time, on budget, with required features and functions and to the requisite quality standard. Cleland (1990) defines an ICT project as, a series of actions or activities embodied in a process of getting things done by working with members of the project team and other people to reach the project schedule, cost, and technical performance objectives.

1.1.1. ICT Project Management and Success

Managing project constraints is a major task that has to be undertaken to achieve ICT project and bank information system development success. To do so the practice of project management and the use of its requisite tools and techniques must be used at every stage of the project life to achieve successful closure of a project (Patanakul, Iewwongcharoen and Milosevic, 2010). Project management is a process of managing and controlling the tasks and activities within all stages of a project lifecycle so as to close a project successfully.

The Standish group international (1999) defines project management as a process that spans the full lifecycle of a project, from inception to completion with its cornerstones being planning, execution and control of all resources, tasks and activities necessary to complete a project. The Standish group further enumerates that project management is not an isolated activity but rather is a team effort. Munns and Bjeirmi (1996) cited by Murphy and Ledwith (2006) conclude that a project can succeed despite the failure of project management but successful project management implementation can increase the potential for success on an overall project scale.

The International Institute of Business Analysis (2009) describes project management tools and techniques as additional ways that a task may be performed, further to this a task can have one or more related tools and techniques. The Project Management Institute (2000) cited by Murphy and Ledwith (2006) describes project management as the application of knowledge, skills, tools and techniques to project requirements.

1.1.2. Project Management Tools and Techniques

The tools and techniques cannot be used in isolation; they are best incorporated into a bank information system development lifecycle since different tasks are carried out at the different phases whereby each phase dictates a different tool or technique to be used. Definitions of an information system development lifecycle may differ with various authors; Kerzner (2003) cited by Prabhakar (2008) defines these phases as conceptualization, planning, execution and termination; these phases are common across all ICT projects. Since specific deliverables will be produced in each phase of an ICT project, different tools and techniques should therefore be used in association with the project phases.

To explain further, Patanakul, Icwwongcharoen and Milosevic (2010) give examples of tools and techniques used at the various information system development lifecycle stages; during the conceptual phase, project managers are required to develop preliminary scope definitions possibly, the tools and technique that are used to develop such deliverables are preliminary scope statements. When the project goes further along to the planning phase, the main deliverables of this phase are for example, a detailed scope, project schedule and budget. To develop such deliverables, a Work Breakdown Structure, hierarchical schedule and analogous budget estimation may be used. In the execution phase. Earned Value Management, cost baseline, schedule crashing may be the majorly employed. Lessons learned and performance report may be used in the termination phase.

If project management tools and techniques are used to develop project management deliverables for each phase, such uses should have a positive impact on the success of the project. For instance, the use of work breakdown structure in the planning phase as part of defining scope and developing the project plan should contribute to a better project performance and final delivery of a bank information system.

A study carried out by the Standish group (1999) highlighted the fact that most ICT projects in corporate America do not fail due to lack of appropriate funding but rather due to lack of skilled project management. The Standish group research describes the ICT project environment as dynamic; composed of a matrix of applications, users, customer demand, laws, internal policy, budget and organizational dependencies that are in constant change. Further studies conducted by the Standish group identified organizations that handled major ICT projects between the years of 1994 to 1998 and they concluded in their statistical findings that projects that adopted project management practices yielded a higher rate of success as opposed to those that did not.

Murphy and Ledwith (2006) studied the use of project management tools and techniques in ICT projects for high-tech SMEs in Ireland and from their findings concluded that indeed the adoption of project management tools and techniques have played a role in the success of ICT projects. A study by Giehoya (2005) on factors affecting the successful implementation of ICT projects in governments stated one of the factors for success being the effective use of project management and its requisite tools and techniques. The importance of using project management tools and techniques is crucial if not a basic, the project management institute (2010) describes their use as "having become an essential ingredient for success for most organizations, whether they realize it or not". From the findings in the different literature it can be determined that the use of tools and techniques in project management play a substantial role in bank information systems project success.

The Standish group (1999) conducted further research on the construction and aviation industries in the United States focusing on the application of project management methodologies and the similarities in challenges faced during project management. The Standish study identified complexity and size of the projects in the two industries as the main challenge in selection of the appropriate tools and techniques. The Standish group further identified that adequate use of tools and techniques in managing the projects was a contributing factor in attaining project success as it greatly coordinated the project teams activities and aided in decision making during the project life.

1.1.3. Banks in Kenya

The financial sector in Kenya is comprised of various key players most notably the commercial banks. These institutions offer a wide array of services, such as deposits and savings products, money transfer services, loans and financing services; just to mention a few. These products and services run from underlying information systems. According to Mullei and Davidson, (2004) and the center for research on financial markets and policy (2012), the commercial banks in Kenya have in the recent past undertaken dynamic ICT project ventures which have been precipitated by such factors as industry competition witnessed by the rapid branch network expansions both locally and regionally, trends and developments in ICT such as the convergence of mobile phones and mobile money services in Kenya which has seen majority of commercial banks offer banking services via the mobile phone, the bank governing body's policy and regulations that have dictated the use of ICT systems to curb fraud and money laundering, information sharing between all lending institutions and socio-economic trends where more and more Kenyans are now educated and are more aware on their consumer needs and rights.

Recent examples of ICT projects that have been undertaken by the commercial banks are; the Cheque truncation system that aimed at stream lining the Cheque clearing process and the implementation of the national payment service, (Mullei and Davidson, 2004). According to Prabhakar (2008) Bank information systems are majorly characterized by complexity of development and implementation, large level

of integration to other bank systems and size of project teams involved, these factors thus necessitate the use of project management tools and techniques to manage project constraints efficiently and effectively. The Standish group international (1999), highlights that project resources, tasks and activities necessary to complete a project are best managed by using the various project management tools and techniques.

1.2. Statement of the problem

The use of project management tools and techniques enhances the success of ICT projects. In their study Murphy and Ledwith (2006) attribute ICT project success to the use of tools and techniques in managing projects for Small and Medium Enterprises in Ireland. Patanakul, Iewwongcharoen and Milosevic (2010) conducted a study on five industries to identify the importance of using project management tools and techniques. They found that the use of these tools and techniques appropriately on the different phases of a system development life cycle aided in successful completion of projects in those industries.

According to Prabhakar (2008) the project lifecycles of an information system development are characterized by major challenges of complexity and scope. The Standish group (1999) also reiterates the issue of information system complexity curbing project success in large corporate organizations in America. Both sources reach agreement wherein they determine that the use of project management tools & techniques contribute to improved likely hood in achieving information system project success. The Standish group in the years 1994 - 1998 carried out a survey on various ICT project in organizations in the United States where particular issues relating to project lifecycle were assessed and overall success of the ICT projects gauged with respect to use of the project management tools and techniques. The results of this study depicted that there was a higher rate of success within the organizations that adopted use of tools and techniques. These findings are also supported further by Murphy and Ledwith (2006) who also identified the project dependencies of SMEs in Ireland and owed success of such ICT projects to the use of project tools and techniques to achieve success and mitigate the challenges faced in the respective information system development undertakings.

This study was carried out in context of the Kenyan commercial banks, which are significantly similar in mode of operation and regulatory adherence with the services offered through their Information systems (Mullei and Davidson, 2004). According to Murphy and Ledwith (2006) there exist many project management methodologies, tools and techniques that can be used in managing the development of financial Information systems, though their adequate use is not well defined as to guide project managers identify which tools and techniques should be used at the different stages of information system development. The study therefore aimed to answer the questions; what are the project management tools and techniques used to manage ICT projects? What is the importance of using project management tools and techniques in managing ICT projects? And what are the challenges faced in using project management tools and techniques?

1.3. Research objectives

The general objective of this study was to investigate application of project management tools in Bank information systems development in Kenya.

In respect of the bank information systems development, the specific objectives were:

- a) To establish the project management tools and techniques used in ICT project management in practice.
- b) To determine the effectiveness of the tools and techniques used in ICT projects.
- c) To determine the challenges faced in using project management tools and techniques in ICT projects.

1.4. Value of the study

The findings of this study aimed at providing insights on which project management tools and techniques are used in ICT project management and how they are effective for success in the different phases of a project lifecycle. The findings of the study also aimed at identifying the most commonly faced challenges by project managers and project teams during the use of project management tools and techniques.

The study is aimed at identifying the most effective and efficient tools and techniques that should be used by Project managers and business analysts to handle the planning and coordination of the project lifecycles from inception to closure, this will aid in resolving the issue of; where and how they use the tools or techniques. The study will also contribute to existing theory by identifying the most suitable tools and techniques to be used at the different lifecycle stages of a Bank Information System development project majorly to address issues of project constraint in Kenya commercial banks.

Policy makers within Commercial banks in Kenya will benefit in appreciating the use of achieving ICT project success through the use of project management tools and techniques that exhibit the most use and effectiveness. On this basis supportive policy can be put in place to govern the management of ICT projects in the various commercial banks.

Academics will benefit from the contribution to ICT best practice knowledge that addresses which tools and techniques should be adopted as part of the lifecycle phases for an ICT project. This contribution will offer a simplified model of using the tools and techniques for the benefit of training and reference by project management practitioners.

ICT consultants will also benefit from this study from where they will be able to gauge the importance of the various tools and techniques as per their application on the lifecycle stages of bank information system development. This knowledge will provide an advisory outline based on the effectiveness of the usage of the tools and techniques in the surveyed Kenyan commercial banks.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

In this chapter the existing literature on the topic was reviewed to gain an understanding of the importance of using project management tools and techniques in achieving bank information systems project success as well as the challenges faced in the use of project management tools and techniques in Bank Information System development. The concept was studied from multiple perspectives and common issues concerning ICT projects were also studied to better understand the challenges faced by business analysts and project managers in using project management tools and techniques.

Project success is a measure of the effectiveness of the organizations processes for implementing new Information System projects, up to the point of deploying a new system to the end user community (Hastie, 2006). A Standish group research (CHAOS, 1999) identifies two key factors that facilitate project success. Smaller ICT project duration and Smaller ICT project duration. Smaller ICT projects are easily manageable and require less effort to coordinate activities and the tools and techniques are easily applied. Small project team enables closer monitoring of tasks, and responsibility is high and therefore the higher the likelihood of success.

Investigation on failed projects studied by the Standish group (1999) indicates that ICT projects fail at the beginning and not the end due to a lack of sufficient planning, further it can be observed that ICT projects fail because they are rushed. Because so many companies today rely on ICT for a competitive advantage, they speed through development efforts and systems implementations in order to be first to market with new, IT-based products, services and capabilities. The ICT projects scope is at most too unwieldy especially in the context of the Systems implemented by financial institutions.

According to Jones (2003), ICT project success for a financial institution would be defined as the efficient management of a project life cycle, where effective end user and business requirements are realized with quality, in scope, on time and within the allocated cost. Jones (2003) states that project success is enabled by the use of project management methodologies and adoption of appropriate project management tools and techniques in executing tasks and activities during project management.

2.2. ICT Project Management

A study by Pinto and Slevin (1988) cited by Prabhakar (2008) defines an ICT project as a series of series of complex or interrelated activities with a defined beginning and end aimed at specific preordained goals on a limited budget. Examples of ICT projects implementations that are undertaken by financial institutions may include but not limited to: Core banking System implementations, Card Management System projects. Electronic banking systems and Payments and Settlement system projects.

Munns and Bjeirmi (1996) cited by Abdullah and Ramly (2006) observe that from their review of literature, project management has been recognized as an efficient tool to handle ICT projects when used in the lifecycles of an ICT project. The role of project management is to define the requirements of the work, establish extent of the work, allocate the resources required, plan and execute the work, monitor progress and adjust deviations. It is concerned with identification of the client's objectives in terms of utility, function, quality, time and cost, and the establishment of relationships between the project resources. Walker(1984) cited by Abdullah and Ramly (2006) concludes that project management is essential to the outcome of the project because it is the integration, monitoring and control of contributing factors to a project and their output, and the evaluation and selection of alternatives in pursuit of a client's satisfaction.

According to Charvat (2003) project management is best applied over the project life cycle to achieve project success. Common project management methodologies include: Projects IN Controlled Environments (PRINCE), Method 123 Project Management methodology, agile project management and many more. On the

contrary Jones (2003) questions whether project management kills creativity. Jones (2003) argues that project management systems which are comprised of checklists, templates, processes and procedures, reek of rigidity and bureaucracy. Jones cites an example of the PRINCE2 project management methodology that evolved to meet the need of large government departments in the United Kingdom thus showing its bureaucratic origins, Jones (2003) also states that this methodology is only best applicable to large projects due to its comprehensive nature and high level of detail. He further urges that project management systems reflect senior managers' desire to keep control of projects as if success can be guaranteed if staff use approved templates and follow set procedures. Jones (2003) states that sound techniques are needed even in the most creative project. He explains that project management methods provide useful tools and techniques that represent accumulated best practice and how they are chosen for application is up to the user (project manager/team), he further states that the project management tools and techniques are too useful to ignore.

2.3. ICT Project lifecycle Tools and Techniques

Each ICT project must go through different project steps which involve initiation of the project, planning and controlling the project and finally closing the project. Adams and Cladentcy (1997) as cited by Patanakul et al (2010) states that a project life cycle provides the basic framework for managing projects, depending on the management and control needs of an organization, the uniqueness of the industry, the nature of projects, and its areas of applications; the authors further state that the names and numbers of phases in project life cycles vary. This definition elaborates the fact that an organization has the option of selecting the stages to follow; this in turn has effect on what tools and techniques that will be used during the project's life thus dictating project success.

According to Royce (1970) there are two essential steps common to all computer program developments; Analysis and Coding. He however urges that any plan to manufacture larger software systems based on just these two steps is doomed to fail. This realization is true as a projects lifecycle is essential in determining the tools and

techniques for an ICT project. Simplifying the lifecycle too much therefore means the project success rate is much lower.

For purposes of addressing the ICT project lifecycle in a holistic manner the traditional system development lifecycle (SDLC) is best suited to define the various phases of an ICT project, these phases are; investigation/Feasibility, System analysis. System design. Development, Integration and testing. Implementation and Maintenance.

With the varying definitions of a project life cycle four main phases recur; conceptualization, planning, execution and termination, (Patanakul et al, 2010). With the definition of a project life cycle by Patanakul et al (2010), the traditional SDLC can be summarized into four management control functions as follows: Conceptualization Investigation and feasibility study; Planning System analysis and System design; Execution - Development, Integration and Testing; Termination Implementation and Maintenance. During the ICT project lifecycle tools and techniques are used to facilitate the management of: Project estimation and planning, Scheduling, cost control and budget management, resource allocation, collaboration, communication, quality management, and documentation.

Tools and techniques vary in importance and when they can be used, project managers/team use project management tools and techniques so as to give focus on the organizations end user and business requirements; to utilize the organizational structures to constitute project teams; to offer flexibility of managing user and business requirements; to control project scope, quality, time and cost through all stages of the project life cycle; to gain capability to manage Small, medium and large ICT projects.

From a study on the use of project management tools and techniques Patanakul et al. (2010) provide a summary of the tools and techniques that were found as best suited for the different stages of an ICT system development lifecycle:

Tabic 1: Project lifecycle Tools and Techniques

Project Phase	Techniques	Tools
"Conceptualization (Investigation and feasibility study)	<ul style="list-style-type: none"> • Estimation techniques • Business Case justification • Project selection methods • Communication strategy 	<ul style="list-style-type: none"> • Scope statements • Statements of work • Net present value • Return on investment • Payback analysis • Cost benefit analysis • SWOT analysis
Planning (System analysis and System design)	<ul style="list-style-type: none"> • Stakeholder analyses • Work breakdown structures • Decision analysis • Requirements elicitation • Requirements analyses • Documentation techniques • Estimation techniques • Risk analysis • Communication strategy 	<ul style="list-style-type: none"> • Gantt charts • Work package plans • Critical path analysis • Project organizational charts • Responsibility assignment matrices • Resource histograms • Decision trees • Flow charts • Data models • Templates • Workshops • Questionnaires/Surveys
Execution (Development, Integration and Testing)	<ul style="list-style-type: none"> • Process modeling • Change management • User Acceptance Testing • Scope management • Quality assurance • Scope management plans • Communication strategy • Contingency plans 	<ul style="list-style-type: none"> • Change control boards • Change requests • Quality metrics • Checklists • Quality control charts • Fishbone diagrams • Prototyping • Project review meetings
Termination (Implementation and Maintenance)	<ul style="list-style-type: none"> • Conflict management • Documentation techniques 	<ul style="list-style-type: none"> • Lessons-learned reports • Issues logs • Action logs • Status reports

2.4. Importance of project management tools and techniques

Charvat (2003) emphasizes that project management tools are important in achieving deliverables at every system development phase. The importance of these tools and techniques is elaborated by Strait(2006) where use of the tools and techniques is associated to; cost effectiveness of the project thus allowing a project manager to understand the available resources and the methods to use them with the demands. Strait also states that tools and techniques aid in managing project risk where the risks are identified and thus inform the decision on how to mitigate the risk. The author further states that the tools will aid in accomplishing the goals and objectives by managing the constraints of time and quality of the deliverable. The increased productivity of the project team is also identified as an important factor of using the tools and techniques.

2.5. Challenges of using project management tools and techniques

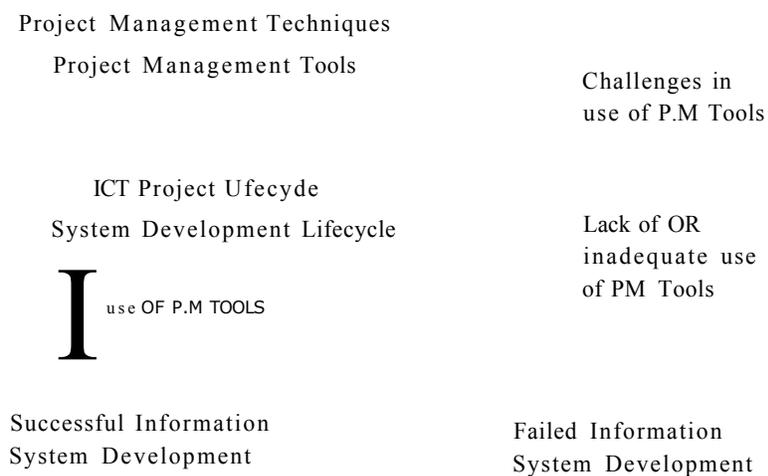
There exists various challenges that deter the use of project management tools and technique; a study carried out by Nguyen(2007) identified some of these factors as: Lack of active exchange of ideas pertaining to project management training concepts and methodology, the lack of suitable training material and piecemeal training in modern project management body of knowledge. Prabhakar (2008) also identifies challenges of using project management tools and techniques as owing to project size and project complexity. Bryee (2006) lists four challenges faced by organizations in using project management tools and techniques; the lack of knowledge, lack of organizational policy, lack of enforcing policy and procedure and the lack of consideration for the magnitude and complexities of project management.

The International Institute of Business Analysis (2009) identifies various tools and techniques that can be applied at different phases of an ICT project. The challenges faced in using the various project management tools and techniques are implied in their use as well as their short comings. An interpretation of the challenges in using the tools and techniques is due to the lack of adequate inputs or requirements analysis to guide a decision on the best tool or technique to use, the existing differences in formality and level of detail in deliverables of a project life cycle e.g. choosing plan

or change driven project management. The complexity of using some of the tools and techniques, some tools and techniques are identified as time consuming and tedious to use e.g. documentation techniques. Some tools make use of individual judgment thus prone to error e.g. estimation techniques. The associated biases from results of using a tool like interviews might lead to less use. The cost associated with using a tool or technique is also associated with the reluctant use of the tool or technique. Knowledge of the existing tools and techniques and their associated challenges therefore leads us to question what are the suitable tools and techniques to use so as to attain ICT project success in Kenyan commercial banks.

The conceptual framework in figure 1 illustrates the end results of using project management tools and techniques in ICT projects.

Figure 1: Conceptual Framework



In summary the ICT project is a laborious undertaking that requires adequate management that is best offered by using best practices provided under existing project management methodologies. To achieve the best productivity, use of these methodologies should follow the System development lifecycle that guides the most appropriate tools and techniques to be used at each phase of the banks information system development lifecycle. Though faced with their own shortcomings; project management tools are essential in determining the success of banking information system development. The challenges of using most tools and techniques can be overcome by carrying out user training where the adequate knowledge is disseminated regarding their usage and adequate application (Nguyen 2007).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Research design

The research was conducted as a survey that allowed collection of large amounts of data from a sizable population in a highly economical way. Data collected using the survey was quantitative in nature and thus was analyzed using descriptive and inferential statistics

3.2. Population and Sample Design

The population for the study was all the 43 commercial banks in Kenya (See list on Appendix A.) A census was used since all of the 43 commercial banks would offer the best baseline of all bank information system development projects undertaken in Kenya.

3.3. Data Collection

Data was gathered using questionnaires. The questionnaires used a "drop-and-pick later*" approach. The respondents to the questionnaire were the project manager(s), business analyst(s) and Heads of ICT from each bank. These respondents were selected due to their level of knowledge in bank information system development and high level of involvement in the bank information system development projects. The questionnaire was divided into four sections: Section A concerned the demographics of the respondents and commercial banks. Section B concerned the tools and techniques used within the commercial banks during an ICT project lifecycle. Section C related to the effectiveness of using tools and techniques during the ICT project lifecycle. Section D concerned challenges faced in using tools and techniques during an ICT project lifecycle.

3.4. Data analysis

Data analysis was carried out using several analyses. Analysis of data relating to Section A of the questionnaire which was demographic data of the respondents and organizations used descriptive statistics. Analysis of data relating to Section B and Section C used means and standard deviation to analyze the use and effectiveness of tools and techniques used in the phases of an ICT project lifecycle. Analysis of Data relating to Section D analyzed the challenges associated with the use of tools and techniques by employing means and standard deviation.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND PRESENTATION

4.1. Introduction

In this chapter an analysis of the responses to the questionnaire is presented. This covers Section A which addressed the demographics of the respondents and commercial banks. Section B analyzed the tools and techniques used within the commercial banks during an ICT project lifecycle, Section C addressed the effectiveness of using tools and techniques during the ICT project lifecycle and Section D addressed challenges faced in using tools and techniques during an ICT project lifecycle.

Out of the 43 commercial banks that were studied, 33 responded by completing and returning the questionnaires. This gave a response rate of 77 percent. The study results presented in Table 2 show that of the 33 commercial banks that participated in the study, 6 (18%) were small while 12 (36%) were medium size. The results further show that 15 large banks participated in the study this gave an indication that the medium and large banks have more engagement in bank information system developments as compared to the small banks.

Table 2: Survey of Responses by Bank Size

Firm Size	Total Assets (Kshs Billions)	Number of Participating Banks	Percentage of Total participating banks	Number of Banks in the category
Large	15 and above	15	45	15
Medium	5 to 15	12	36	17
Small	Below 5	6	18	11
Total		33	100	43

4.2. Analysis of Demographics

4.2.1. Demographics factors

The demographic characteristics of respondents and the banks are discussed and presented in subsections of this section.

4.2.2. Age of Respondents

The highest numbers of respondents (42%) in the age category were aged between 26 to 35 years. Forty Six percent (46%) were between 36 to 45 years while the least percentage was aged above 45 years as shown on Table 3. This implies that a majority of the bank IS human resources are between the ages 26 to 45 years. This is tabulated in Table 3.

Table 3: Age of respondents

	TOTAL	
BASE	33	100%
	Frequency	%
26-35 years	14	42%
36-45 years	15	46%
Over 45 years	4	12%

4.2.3. Gender of Respondents

Seventy percent (70%) of the respondents were male while thirty percent (30%) were females as shown on Table 4. This implies that there were more male respondents than females. This however does not imply that there are more male employees than female employees in ICT or project management related roles, in the surveyed banks.

table 4: Gender of respondents

	TOTAL	
BASE	33	100%
	Frequency	%
Male	23	77%
Female	10	23%

4.2.4. Banks length of operation

Majority (91%) banks have been in operation for more than 10 years. A further 27% have been operating between 11-20 years. The rest 63% have been in the market for more than 20 years. This is as shown on Table 5.

Table 5: Banks length of operation

	TOTAL	
BASE	33	100%
6-10yrs	3	9%
11-20yrs.	9	27%
21-10()yrs	18	54%
More than 100yrs.	3	9%

4.2.5. Respondents Role in the IT department

Respondents were asked to indicate their designation in the IT departments. According to Table 6, 13 respondents (60%) were managers and heads of departments; while 12 (39%) respondents were analysts and technical staff in their respective IT departments. This is an indication that the respondents had good knowledge of the project management operations in their respective departments.

Table 6: Respondents role in the IT department

	TOTAL.	
BASE	33	100%
Chief Manager Head of Department	20	60%
Manager analyst	6	18%
Technical staff	7	21%

4.2.6. Respondents length of service

Fifty four percent (54%) of the respondents have worked in the banking industry for more than 5 years. 39% have been in service for not more than 10 years. The rest 46% have worked at their current banks for less than 5 years. This offered a good representation of experience in development and implementation of bank information systems. This is shown on Table 7.

Table 7: Respondents length of service

	TOTAL	
BASE	33	100%
>1 - 5yrs.	15	46%
> 5 - 10yrs.	13	39%
>Over 10yrs.	5	15%

4.2.7. Respondent Size of Workforce

The study sought to establish the size of banks in terms of number of employees. According to the result of the study as shown in Table 8, 33 percent of the institutions had less than 300 employees. 46% had between 300 and 1000 employees while the rest; 21% had more than 1000 employees.

Table 8: Respondent Size of Workforce

	Frequency	Percent
0 - <300 Employees	11	33
300-1000 Employees	15	46
Over Employees	7	21
Total	33	100

4.3. Tools and techniques Employed

In this section the study sought to establish the extent to which project management tools and techniques are used during bank information system development phases by the commercial banks in Kenya.

This was on a score of "very great extent, great extent, moderate extent, little extent and No extent". The score 'very great extent' represents 'very high level usage' of the tool

or technique, and has been taken to be equivalent to mean score of 4.1 to 5.0 on the Likert. The scores 'great extent' represents 'high usage*' of tools and techniques and is equivalent to a mean score of 3.1 to 4.0. The scores 'moderate extent*' represent 'moderate usage' and taken to be equivalent to mean score of 2.1 to 3.0. The scores 'little extent' represents 'low level usage" and are taken to be equivalent to mean score of 1.1 to 2.0. And the scores 'no extent' have been taken to represent 'very low usage' and are taken to be equivalent to mean score of 0.1 to 1.0. A standard deviation of more than 1 implies a significant difference in the respondents' response. The results of the study are presented in subsections that follow.

4.3.1. Conceptualization Phase

Respondents were asked to indicate the tools and techniques used during the conceptualization phase. The study findings indicate that business case justifications and cost benefit analysis are the top tools used by Kenyan commercial banks in the conceptualization phase with means of 3.97 and 3.91 respectively. There were no significant differences in the respondents* responses except in decision analysis whose standard deviation was 1.04. This is presented in Table 9.

Table 9: Tools and techniques used in the Conceptualization Phase

Conceptualization Phase (Investigation and feasibility study)			
Tools	Mean	SD	SE
Business Case justification	3.97	0.73	0.13
Cost benefit analysis	3.91	0.77	0.13
Statements of work	3.85	0.62	0.11
SWOT analysis	3.85	1.00	0.17
Risk analysis	3.85	0.57	0.10
Scope statements	3.76	0.75	0.13
Return on investment	3.58	0.83	0.14
Payback analysis	3.55	0.90	0.16
Net present value	3.18	0.81	0.14
Decision analysis	3.18	1.04	0.18

4.3.2. Planning Phase

Respondents were asked to indicate the tools and techniques below used during bank information system planning phase. The study findings indicate that requirements analyses and requirements elicitation are the top tools used by Kenyan commercial banks in the planning phase with means of 4.18 and 3.94 respectively the least used tool was questionnaires/survey with a mean of 2.70 this is presented in Table 10. There were no significant differences in the respondents' responses except in decision trees where standard deviation was 1.24.

Table 10: Tools and techniques used in the Planning Phase

Planning Phase (System analysis and System design)			
Tools	Mean	SD	SE
Requirements analyses	4.18	0.85	0.15
Requirements elicitation	3.94	0.70	0.12
Stakeholder analyses	3.73	0.94	0.16
Gantt charts	3.61	0.97	0.17
Flow charts	3.55	1.09	0.19
Work package plans	3.48	1.15	0.20
Work breakdown structures	3.42	1.12	0.19
Project organizational charts	3.39	0.97	0.17
Data models	3.36	1.14	0.20
Responsibility matrices	3.30	0.98	0.17
Templates	3.15	0.94	0.16
Workshops	3.12	1.08	0.19
Critical path analysis	3.03	1.02	0.18
Resource histograms	3.00	0.87	0.15
Decision trees	2.79	1.24	0.22
Questionnaires/Surveys	2.70	1.05	0.18

4.3.3. Execution Phase

Respondents were asked to indicate the tools and techniques below used during bank information system execution phase. The study findings indicate that user acceptance testing and change requests are the top tools used by Kenyan commercial banks in the execution phase with means of 4.39 and 4.12 respectively. The least used tool in Kenyan commercial banks is the Fishbone diagram with a mean of 2.52. There were

no significant differences in the respondents* responses except in change control boards which had a standard deviation of 1.16. This is presented in Table 11.

Table 11: Tools and techniques used in the Execution Phase

Execution Phase (Development, Integration and Testing)			
Tools	Mean	SD	SE
User Acceptance Testing	4.39	0.86	0.15
Change requests	4.12	0.89	0.16
Project review meetings	4.03	0.68	0.12
Quality assurance	3.82	0.85	0.15
Checklists	3.70	0.81	0.14
Change control boards	3.30	1.16	0.20
Quality control charts	3.12	0.89	0.16
Prototyping	2.94	1.00	0.17
Fishbone diagrams	2.52	1.00	0.17

4.3.4. Termination Phase

Respondents were asked to indicate the tools and techniques below used during bank information system development termination phase. The study findings indicate that action logs with a mean of 4.18 and status reports with a mean of 4.12 are the top tools used by Kenyan commercial banks in the termination phase, whereas the least used tool was the lessons-learnt reports with a mean of 3.39. There were no significant differences in the respondents' responses except in lessons learned reports which had a standard deviation of 0.9. This is presented in Table 12.

Table 12: Tools and techniques used in the Termination Phase

Termination Phase (Implementation and Maintenance)			
Tools	Mean	SD	SE
Action logs	4.18	0.53	0.09
Status reports	4.12	0.74	0.13
Issues logs	4.09	0.80	0.14
Lessons-learned reports	3.39	0.90	0.16

4.4. Level of effectiveness with Tools and Techniques

Respondents were asked to indicate the effectiveness of using the tools and techniques to achieve overall project success at every phase of a bank information system development life cycle. This was on a score of 'very effective, greatly effective, moderately effective, little effectiveness and not effective'. The score 'very effective*' represents very "high level of effectiveness*" with the tool or technique, and has been taken to be equivalent to mean score of 4.1 to 5.0 on the Likert. The scores 'greatly effective' represent 'high effectiveness*' with tools and techniques and is equivalent to a mean score of 3.1 to 4.0. The scores 'moderately effective' represent "moderate effectiveness" and taken to be equivalent to mean score of 2.1 to 3.0. The scores 'little effectiveness*' represent 'low level effectiveness*' and are taken to be equivalent to mean score of 1.1 to 2.0. And the scores 'not effective*' have been taken to represent 'very low effectiveness*' and taken to be equivalent to mean score of 0.1 to 1.0. A standard deviation of more than 1 implies a significant difference in the respondents' response.

4.4.1. Conceptualization Phase

According to the results of the study, the respondents indicated high to moderate levels of effectiveness with the tools and techniques employed in the conceptualization phase of the project life cycle as the mean score ranged from 3.5 to 4.30. The most effective tool used by Kenyan commercial banks is Business Justification with a mean of 4.30 whereas the least effective tool being payback analysis with a mean of 3.45. There were no significant differences in the respondents' responses except in decision analysis which had a standard deviation of 1.15. This is presented in Table 13.

Table 13: Effectiveness of Tools and techniques used in the Conceptualization Phase

Conceptualization Phase	Investigation and feasibility study)			Ratings
	Mean	SD	SE	
Tools				
Business Case justification	4.30	0.77	0.13	High
Risk analysis	4.15	0.76	0.13	High
Cost benefit analysis	4.09	0.91	0.16	High
Statements of work	4.06	0.97	0.17	High
SWOT analysis	4.00	0.90	0.16	High
Scope statements	3.94	0.90	0.16	Moderate
Decision analysis	3.55	1.15	0.20	Moderate
Net present value	3.48	0.91	0.16	Moderate
Return on investment	3.48	0.83	0.15	Moderate
Payback analysis	3.45	0.97	0.17	Moderate

4.4.2. Planning Phase

Respondents were asked to indicate the effectiveness of tools and techniques below used during bank information system planning phases. According to the results of the study, the respondents indicated moderate levels of effectiveness with the tools and techniques employed as the mean score ranged from 3.67 to 4.42. The most effective tools used by Kenyan commercial banks are requirements analyses with a mean of 4.42 and requirements elicitation with a mean of 4.36. The least effective tool is the resource histogram with a mean of 3.24. There were no significant differences in the respondents* responses. This is presented in Table 14.

Table 13: Effectiveness of Tools and techniques used in the Conceptualization Phase

Planning Phase (System analysis and System design)				Ratings
Tools	Mean	SD	SE	
Requirements analyses	4.42	0.66	0.12	High
Requirements elicitation	4.36	0.60	0.10	High
Stakeholder analyses	4.06	0.75	0.13	High
Work package plans	4.00	0.75	0.13	High
Work breakdown structures	4.00	0.87	0.15	High
Gantt charts	3.88	0.70	0.12	Moderate
Project organizational charts	3.79	0.78	0.14	Moderate
Flow charts	3.79	0.82	0.14	Moderate
Responsibility matrices	3.76	0.79	0.14	Moderate
Critical path analysis	3.70	0.92	0.16	Moderate
Data models	3.67	0.89	0.15	Moderate
Workshops	3.67	0.96	0.17	Moderate
Questionnaires/Surveys	3.45	0.87	0.15	Moderate
Templates	3.36	0.90	0.16	Moderate
Decision trees	3.33	0.82	0.14	Moderate
Resource histograms	3.24	0.87	0.15	Moderate

4.4.3. Execution Phase

Respondents were then asked to indicate the effectiveness of tools and techniques below used during bank information system execution phase. According to the results of the study, the respondents indicated high levels of effectiveness with the tools and techniques employed as the mean score ranged from 3.12 to 4.67. The most effective tools used by Kenyan commercial banks are user acceptance testing with a mean of 4.67 and change requests with a mean of 4.48. Fishbone diagrams are the least used tools with a mean of 3.12. There were no significant differences in the respondents' responses. This is presented in Table 15.

Table 13: Effectiveness of Tools and techniques used in the Conceptualization Phase

Execution Phase (Development, Integration and Testing)				Ratings
Tools	Mean	SD	SE	
User Acceptance Testing	4.67	0.48	0.08	High
Change requests	4.48	0.71	0.12	High
Project review meetings	4.33	0.69	0.12	High
Quality assurance	4.30	0.77	0.13	High
Change control boards	4.06	0.97	0.17	High
Checklists	4.00	0.87	0.15	High
Quality control charts	3.73	0.80	0.14	Moderate
Prototyping	3.45	0.79	0.14	Moderate
Fishbone diagrams	3.12	0.82	0.14	Moderate

4.4.4. Termination Phase

Respondents were then asked to indicate the effectiveness of tools and techniques below used during bank information system termination phases. According to the results of the study, the respondents indicated high levels of effectiveness with the tools and techniques employed as the mean score ranged from 4.15 to 4.55. The most effective tool used by Kenyan commercial banks is the issues log with a mean of 4.55. There were no significant differences in the respondents' responses. This is presented in Table 16.

Table 16: Effectiveness of Tools and techniques used in the Termination Phase

Termination Phase (Implementation and Maintenance)				Ratings
Tools	Mean	SD	SE	
Issues logs	4.55	0.62	0.11	High
Action logs	4.48	0.67	0.12	High
Status reports	4.39	0.83	0.14	High
Lessons-learned reports	4.15	0.83	0.15	High

4.5. Challenges in Using Project Management Tools and Techniques

In this section the study sought to establish the challenges faced in using project management tools and techniques in banks information systems development. The results of the study are presented in the subsection that follows.

4.5.1. Project management challenges

From the study, complexity of the tools and techniques used and differences in formality of phases in the project lifecycle are the key challenges in project management with means of 3.70 and 3.64 respectively. There were no significant differences in the respondents' responses except on there being piecemeal training in modern project management body of knowledge and the lack of suitable training and training material on project management tools and techniques which had a standard deviations of 1.10 both these findings are as represented on Table 17.

Table 17: Effectiveness of Tools and techniques used in the Conceptualization Phase

CHALLENGES OF TOOLS and TECHNIQUES	Mean	SD	SE
Using some of the tools and techniques is complex	3.70	0.59	0.10
There are differences in formality and level of detail in the phases of a project life cycle.	3.64	0.82	0.14
There are varying metrics for gauging which tool or technique to use	3.58	0.75	0.13
There exists associated biases of using certain tools and techniques	3.58	0.90	0.16
Some tools and techniques are time consuming and tedious to use	3.48	0.76	0.13
There is no clear guideline for which tools to use due to Project complexity	3.39	0.93	0.16
The costs associated with using certain tool or technique	3.39	0.93	0.16
There is rigidity is using certain tools and techniques	3.39	0.79	0.14
Some tools make use of individual judgment thus prone to error	3.30	0.92	0.16
There is piecemeal training in modern project management body of knowledge	3.27	1.10	0.19
There is lack of adequate inputs to guide a decision on the best tool or technique to use	3.06	1.03	0.18
There is lack of suitable training and training material on project management tools and techniques	3.03	1.10	0.19
There is lack of enforceable project management controls prior to commencing a project	3.03	1.02	0.18
There is lack of active exchange of ideas pertaining to project management methodology	3.00	0.94	0.16

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1. Introduction

This chapter discusses the main findings and conclusions based on research conducted in this project. The purpose of these conclusions is to address the research objectives. Each of the research objectives will be addressed in separate sections. Finally, recommendations for management, limitations of the study and suggestion for future study are presented. The study concerned application of project management tools in banking information systems development life cycle and the challenges of their application.

5.2. Discussion

5.2.1. Application of project management tools in systems analysis and design of bank information systems by Kenyan banks

The study established that all of the respondent banks used various project management tools in systems analysis and design. The average level of application is 100 percent for all banks. This is consistent with the findings of Patanakul et al. (2010) on their summary of the tools and techniques that were found as best suited for the different stages of the system development lifecycle. Charvat (2003) emphasizes that project management tools are important in achieving deliverables at every system development phase. This is consistent with the observation by Strait(2006) that use of the tools and techniques is associated with cost effectiveness of the project which in turn allows a project manager to understand the available resources and the methods to use them with the demands.

Business Case justification (mean score of 3.97) was the most common technique used by banks in the conceptualization phase while Requirements analyses (mean score of 4.18) is the preferred technique in the planning phase. User Acceptance Testing (mean score of 4.39) and action logs (mean score of 4.18) are the most common techniques used in the execution and termination phases respectively.

The least employed techniques in the conceptualization phase are net present value and decision analysis. In the planning phase the least used technique was questionnaires/surveys. Fishbone diagrams and lessons-learned reports were the least used in the execution and termination phases respectively. These findings support similar research findings by Patanakul et al. (2010) who stated that tools and techniques vary in importance and therefore project managers/team use judgment in decision making to determine which project management tools and techniques give focus on the organizations end user and business requirements.

5.2.2. Effectiveness of project management tools and techniques used in bank information systems project management in practice

The study assessed the effectiveness of the tools and techniques used in bank information systems projects. The tools and techniques employed in the conceptualization phase of the project life cycle were ranked between high to moderate levels of effectiveness. The study results further established that in terms of adoption, the business case justification (mean of 4.3) was the most effective while payback analysis was the least effective (mean of 3.45).

The tools and techniques employed in the planning phase of the project life cycle were ranked at moderate levels of effectiveness. The study results further established that in terms of adoption, requirements analyses (mean of 4.42) was the most effective while resource histograms was the least effective (mean of 3.24). The tools and techniques employed in the execution phase of the project life cycle were ranked at high levels of effectiveness. The study results further established that in terms of adoption, user acceptance testing (mean of 4.67) was the most effective while fishbone diagrams was the least effective (mean of 3.12).

It is worth noting that all the tools and techniques employed in the termination phase of the project life cycle were ranked at high levels of effectiveness with all ratings being above a mean of 4.15.

The other objective sought to establish the challenges faced in using project management tools and techniques in banks information systems development. According to the findings of the study, complexity of the tools and techniques used and differences in formality of phases in the project lifecycle are the key challenges in project management and the subsequent use of the tools and techniques in the banks information systems lifecycle stages. This observation is consistent with The International Institute of Business Analysis (2009) observations that the complexity of using some of the tools and techniques, render them time consuming and tedious to use.

5.3. Conclusion

The study established that user acceptance testing; a tool used in the execution phase (development, Integration and Testing) is the most used tool in commercial banks operating in Kenya. Questionnaires/Surveys a tool used in the planning phase (system analysis and system design) is the least used tool in commercial banks operating in Kenya. The study established that complexity of the tools and techniques used and differences in formality of phases in the project lifecycle are the key challenges faced by commercial banks in bank information systems development life cycle.

5.4. Recommendations

Though the study established that all banks to a large extent used most of the project management tools and techniques, this largely depends on the size and turnover of banks. This makes it difficult for the small banks to realize the full benefits of ICT project management in practice.

The study therefore recommends that for commercial banks in Kenya to realize the full benefits of tools and techniques and to achieve bank information system project success the banks should adopt high and frequent use of business case justifications and cost benefit analysis during the conceptualization phases, requirements analyses and requirements elicitation during the planning phases, user acceptance testing and

change requests during the execution phases, and finally action logs, status reports and issues logs during the termination phases.

ICT project management can be used to achieve competitive advantage for the organization in which the organization decides to adopt the most effective tools and techniques thereby ensuring quality in terms of service delivery to its customers.

5.5. Limitations

The findings are based on responses by bank ICT managers, business analysts and technical resources, and the quality of the study will be limited to their knowledge and experience. Further the limitation of funds to conduct the study was a constraint in the preparation of the questionnaires and their distribution, this summed up to a substantial amount of money. Time limitation was also a challenge as not enough time was available to follow up the remaining respondents who did not return their questionnaires. In spite of the limitations, the study will be useful in highlighting the benefits and risks that Kenyan banks face in bank information systems project management.

5.6. Recommendations for Future Research

Further studies can be done on the impact of ICT project management in practice on the organizational performance. Similar studies can be replicated in other sectors of the economy to ascertain the performance levels associated with impact of ICT project management. Further studies on the application of project management tools and techniques by information system vendors should be pursued. A study on the project management methodologies of ICT bank information systems vendors/providers would also be encouraged.

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APPENDIX A: LIST OF COMMERCIAL BANKS

1. ABC Bank (Kenya)
2. Bank of Africa
3. Bank of Baroda
4. Bank of India
5. Barclays Bank
6. CFC Stanbic Bank
7. Charterhouse Bank
8. Chase Bank (Kenya)
9. Citibank
10. Commercial Bank of Africa
11. Consolidated Bank of Kenya
12. Cooperative Bank of Kenya
13. Credit Bank
14. Development Bank of Kenya
15. Diamond Trust Bank
16. Dubai Bank Kenya
17. Eco bank
18. Equatorial Commercial Bank
19. Equity Bank
20. Family Bank
21. Fidelity Commercial Bank
Limited
22. Fina Bank
23. First Community Bank
24. Giro Commercial Bank
25. Guardian Bank
26. Gulf African Bank
27. Habib Bank
28. Habib Bank AG Zurich
29. I&M Bank
30. Imperial Bank Kenya
31. Jamii Bora Bank
32. Kenya Commercial Bank
33. K-Rep Bank
34. Middle East Bank Kenya
35. National Bank of Kenya
36. NIC Bank
37. Oriental Commercial Bank
38. Paramount Universal Bank
39. Prime Bank (Kenya)
40. Standard Chartered Kenya
41. Trans National Bank Kenya
42. United Bank for Africa
43. Victoria Commercial Bank

APPENDIX B: QUESTIONNAIRE

Questionnaire cover letter

Dear Participant:

My name is Kelvin Nyaga and I am a post graduate student at University of Nairobi. For my final project. I am examining the application of project management tools and techniques in banking information systems development in Kenya. Because of your involvement in Bank information system development I'm inviting you to participate in this research study by completing the attached questionnaire.

The following questionnaire will require approximately 15 minutes to complete. In order to ensure that all information will remain confidential, please do not include your name. If you choose to participate in this project, please answer all questions as honestly as possible and return the completed questionnaires to the administrator at your premises for collection. Participation is strictly voluntary.

Thank you for taking the time to assist me in my educational endeavors. The data collected will provide useful information regarding the success of bank information system development. If you would like a summary copy of this study please contact me using my email below requesting for the copy.

Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below.

Sincerely,

Kelvin Nyaga

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SECTION A: DEMOGRAPHICS

Gender:_____Age:_____Years of Employment;

Position/Title held:_____

Years of experience in position:_____Number of projects worked on?

Bank's No. of Years in operation:_____Number of Branches;

Bank's current turnover:_____No. of bank Employees;

Bank incorporation: [Kenyan] [Foreign] [Partly Kenyan and partly Foreign] - (tick appropriately)

SECTION B: TOOLS and TECHNIQUES

To what extent are tools and techniques below used during bank information system development phases? (Tick appropriately)

Conceptualization Phase (Investigation and feasibility study)					
Tools	Very great Extent	Great Extent	Moderate Extent	Little Extent	None Extent
Scope statements					
Statements of work					
Net present value					
Return on investment					
Payback analysis					
Business Case justification					
Cost benefit analysis					
SWOT analysis					
Risk analysis					
Decision analysis					
Planning Phase (System analysis and System design)					
Tools	Very great Extent	Great Extent	Moderate Extent	Little Extent	None Extent
Stakeholder analyses					
Requirements analyses					
Requirements elicitation					
Gantt charts					
Work package plans					

Work breakdown structures					
Critical path analysis					
Project organizational charts					
Responsibility matrices					
Resource histograms					
Decision trees					
Flow charts					
Data models					
Templates					
Workshops					
Questionnaires/Surveys					
Execution Phase (Development, Integration and Testing)					
Tools	Very great Extent	Great Extent	Moderate Extent	Little Extent	None Extent
Change control boards					
Change requests					
User Acceptance Testing					
Quality assurance					
Checklists					
Quality control charts					
Fishbone diagrams					
Prototyping					
Project review meetings					
Termination Phase (Implementation and IVaintenance)					
Tools	Very great Extent	Great Extent	Moderate Extent	Little Extent	None Extent
Lessons-learned reports					
Issues logs					
Action logs					
Status reports					

SECTION C: EFFECTIVENESS OF TOOLS and TECHNIQUES

What is the effectiveness of using the tools and techniques below at every phase of a bank information system development lifecycle to achieve ICT project success? (Tick appropriately)

Conceptualization Phase (Investigation and feasibility study)					
Tools	Very Effective	Effective	Moderately Effective	Little Effective	Not Effective
Scope statements					
Statements of work					
Net present value					
Return on investment					
Payback analysis					
Business Case justification					
Cost benefit analysis					
SWOT analysis					
Risk analysis					
Decision analysis					
Planning Phase (System analysis and System design)					
Tools	Very Effective	Greatly Effective	Moderately Effective	Little Effectiveness	Not Effective
Stakeholder analyses					
Requirements analyses					
Requirements elicitation					
Gantt charts					
Work package plans					
Work breakdown structures					
Critical path analysis					
Project organizational charts					
Responsibility matrices					
Resource histograms					
Decision trees					
Flow charts					
Data models					
Templates					

Workshops					
Questionnaires/Surveys					
Execution Phase (Development, Integration and Testing)					
Tools	Very Effective	Greatly Effective	Moderately Effective	Little Effectiveness	Not Effective
Change control boards					
Change requests					
User Acceptance Testing					
Quality assurance					
Checklists					
Quality control charts					
Fishbone diagrams					
Prototyping					
Project review meetings					
Termination Phase (Implementation and Maintenance)					
Tools	Very Effective	Greatly Effective	Moderately Effective	Little Effectiveness	Not Effective
Lessons-learned reports					
Issues logs					
Action logs					
Status reports					

SECTION D: CHALLENGES OF TOOLS and TECHNIQUES

To what degree do you agree with each of the statements given below as the challenges in using project management tools and techniques in banks information systems development? (Tick appropriately)

Challenge	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
There is lack of suitable training and training material for project management tools and techniques					
There is piecemeal training in modern project management body of knowledge					
There is lack of active exchange of ideas pertaining to project management methodology					
There is lack of adequate inputs to guide a decision on the best tool or technique to use					
There are differences in formality and level of detail in the phases of a project life cycle.					
Using some of the tools and techniques is complex					
There are varying metrics for gauging which tool or technique to use					
There is no clear guideline for which tools to use due to project complexity					
Some tools and techniques are time consuming and tedious to use					
Some tools make use of individual judgment thus prone to error					
There exists associated biases of using certain tools and techniques					
The costs associated with using certain tool or technique					
There is lack of enforceable project management controls prior to commencing a project					
There is rigidity in using certain tools and techniques					
Other Challenges (Please Indicate by hand below)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree

OTHER: In this section please include any information relevant to project management tools and techniques not covered by the questions above.