FACTORS INFLUENCING IMPLEMENTATION OF BIOMEDICAL RESEARCH PROJECTS: A CASE OF KENYA MEDICAL RESEARCH INSTITUTE

BY

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DECLARATION

This research project report is my original work and has not been submitted for the award of a degree or certification in any other institution

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This research project report has been submitted for examination with my approval as the supervisor

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DEDICATION

To my dear husband Jesee Maina Kinyua and our wonderful sons Morris Kinyua Maina and Miguel Wachira Maina you are very special to me. Thank you for your encouragement, support and prayers throughout my studies. Jesee I appreciate your contribution and comments on this project report. May almighty God bless you all.

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LIST OF ABBREVIATIONS AND ACRONYMS

CSF:	Critical success factors
ERC:	Ethical Review Committee
KEMRI:	Kenya Medical Research Institute
PIP:	project implementation profile
PM:	Project management
R&D:	Research and development
SSC:	Scientific Steering Committee

ABSTRACT

The purpose of this research project is to examine factors influencing successful implementation of biomedical research projects in Kenya Medical Research Institute (KEMRI). These research sought to achieve five objectives with the key variables examined being the dependent variable successful implementation of biomedical projects in KEMRI and independent variables of top management support, organization structure, communication system, project team leader and procurement procedures. The research design employed in conducting this study is descriptive research design. The study used questionnaire to collect data, which incorporated qualitative and quantitative data. Participants in this study were KEMRI scientific staffs who have been involved in project implementation. The sample size used was 90 scientific staff. Data from questionnaires was obtained using Statistical Package for Social Sciences (SPSS version 20.0) and analyzed using descriptive statistics, frequencies and percentages. One sample nonparametric test of significance, using chi-square, was used to determine the statistical significance between the observed distribution frequencies and the expected distribution based on the null hypotheses. The results indicate that top management support influence successful implementation of the project with 76.3% of the respondent supporting this. 73.7%, of the respondents indicated that organization structure in the institute supports projects implementation. Communication system which was found to be effective and used by both project leader and top management was emails with 73.7% respondents indicating its effective. All the respondents 100% of indicated that the project leaders are committed to successful implementation of the projects while 57.9% said procurement procedures contribute to successful implementation of the projects. Statistically the study showed a significance relationship between; top management support P value 0.000, organization structure P value 0.008, project leader performance P value 0.003, procurement procedure P value 0.015 and successful implementation of biomedical projects. Recommendation: The roles the top management's plays during project implementation should be standardized to all projects to make sure all project gets equal or relatively the same attention from the top management. The adoption of project friendly organization structure will keenly consider projects and success rate of project will be high and within the time limit given to each projects. It is important for the institute organization structure to have project related structure. The bureaucracy of communication which takes long and it's not effective should be done away with and embrace the faster and effective way of communication. The projects leaders should be offered indoor training to enhance their project management skills. The top management should have checks and control of procurements procedures to enhance its effectiveness. In conclusion the study found out that the project leaders are committed to successful implementation of the project. The top management should devise a way of assisting the project leaders in project implementation. The coordination of projects is easier if the organization structure fully supports projects. Communication is one of most challenging and difficult tasks in any project implementation. The communication between the project team and top management in KEMRI should be improved. The same is to scientific committee and project team leader. The project leader needs to have skills and knowledge that would help him/her in leading the project. By applying the appropriate leadership traits a project manager could direct projects effectively and efficiently. The delay in procurement of consumables delays the completion of the projects and hence increases the project budget.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

This chapter discusses the background of the study. This includes project implementation, statement of the problem, research objectives, questions and significance of the study.

Critical success factors are those elements that must be completed in order for the project to be considered complete. Success is defined in the context of project as the art of gaining consensus from a group of people on the definition of good art (Jugder and Muller, 2005). The project management literature agrees that there are two components of project success. First component: project success factors, elements of a project that can be influenced to increase the likelihood of success; these are independent variables that make success more likely; second component project success criteria, the measures by which we judge the successful outcome of a project; these are dependent variables which measure project success (Jugdev and Muller, 2005; Morris and Hough, 1987; Turner, 1999). Project success criteria vary from project to project. What is acceptable in one project without impact on perceived success is failure in another project. For example a five day delay in an IT project to achieve better functionality is abject failure in another project the same delay in biomedical project.

The success of each project relies on the implementation phase of the project. The implementation phase is the longest phase in the project life cycle. Project Implementation is the Process whereby “project inputs are converted to project outputs”. This may be looked at as: Putting in action the activities of the project as well as putting into practice what was proposed in the project document (i.e. transforming the project proposal into the actual project). This involves management of the project or executing the project intentions. Implementation success deals with the issues of how to succeed through a project implementation. It covers aspects such as: project success and failure definitions, problems and outcomes, critical success factors and risk management.

Biomedical research is the broad area of science that looks for ways to prevent and treat diseases that cause illness and death in people and in animals. This general field of research includes many areas of both the life and physical sciences. It includes studies in basic and strategic research (involving pathogenesis and genomics of infectious agent, host and vector), in product research and development (from product discovery with target identification, screening, lead optimization through preclinical development to clinical development) and in field implementation. Utilizing biotechnology techniques, biomedical researchers study biological processes and diseases with the ultimate goal of developing effective treatments and cures. Biomedical research is an evolutionary process requiring careful experimentation by many scientists, including biologists and chemists. Discovery of new medicines and therapies requires careful scientific experimentation, development, and evaluation. Projects are becoming more complex, involving an increasing variety and number of experts and partners. They require all collaborators to come together, share their complementary knowledge and work towards the common goal of the completion of the research project on time, within budget, and following agreed quality criteria (WHO, 2007). Kenya Medical Research Institute (KEMRI) is national body responsible for carrying out health research in Kenya. Most of the projects are biomedical oriented. The projects are mainly funded by donor funds. There are different and a wide range of biomedical research that are funded and going on in KEMRI some are in the area of malaria, parasitology, medical entomology, leshmaniasis, schistosomiasis, polio, HIV, hepatitis, dengue virus, diabetes, cancer, helminthes etc. The projects managers of these projects are scientists who are either the principle or co- investigators of the projects. The project implementation is done by the project leader (scientists).

1.2 Statement of the problem

Project success is usually discussed in terms of success factors and success criteria. Success factors are considered to be those aspects of management that lead directly or indirectly to the success of the project while success criteria are defined as the measures by which success or failure of a project was judged (Cooke-Davies, 2002). Perhaps the simplest answer to the question of which factors contribute directly to project success is the ability to stay within the

cost, time and performance specifications of the project (Lai, 1997). According to Meredith et al. (2012), the factors associated with project success are different for different industries. When these factors are given proper importance they can transform a project. If an implementation team takes time to create tangible, achievable and measurable critical success factors (CSF's) and every decision made during the execution of the project is defined and managed based on these CSF's then the project implementation was a success.

The implementation process of a biomedical project is vital for the success of the project. Many factors influence implementation and thus the success of a project. Empirical studies have identified and documented some factors influencing the implementation of projects. For every biomedical project in KEMRI a number of deficiencies and delays occur and continue to occur. In some few instances new problems develop and despite efforts to implement critical success factors these problems persists. The literature identifies a range of success factor but there is no research that exists which illustrates the relationship between success factors and the successful implementation of the biomedical projects. This study investigated the relationship of five critical success factors (top management support, organization structure, communication system, project team leader and procurement procedures) and project implementation success in KEMRI in order to help the project parties to minimize the project implementation problems. The five CSFs selected are not unique to biomedical implementation project; however they gain importance than the others because of the specific characteristic of biomedical implementation project.

1.3 Purpose of the Study

The purpose of this study was to examine factors influencing successful implementation of biomedical research projects in Kenya Medical Research Institute

1.4 Objectives of the study

This study sought to achieve five objectives

To establish the role of top management support on successful implementation of biomedical projects in KEMRI

To establish the influence of organization structure on successful implementation of biomedical projects in KEMRI

To establish the influence of communication system on successful implementation of biomedical projects in KEMRI

To assess the extent to which project team leader influences successful implementation of biomedical projects in KEMRI

To investigate the impact of procurement procedures on successful implementation of biomedical projects in KEMRI

1.5 Research Questions

This study was guided by five questions

How does the top management role impact on successful implementation of biomedical projects in KEMRI?

To what extent do organization structure impact on successful implementation of biomedical projects in KEMRI

How does Communication system influences successful implementation of biomedical projects in KEMRI

How does the project team leader influences successful implementation of biomedical projects in KEMRI?

To what extent do procurement procedures impact on successful implementation of biomedical projects in KEMRI?

1.6 Research Hypotheses

This study tested four hypotheses

*H*o1: There is no relationship between top management support and successful implementation of biomedical projects.

*H*o2: There is no relationship between organization structure in the institute and successful implementation of biomedical projects.

*H*o3: There is no relationship between project leader performance and successful implementation of biomedical projects.

*H*o4: There is no relationship between procurement procedures and successful implementation of biomedical projects.

1.7 Significance of the Study

This study is significance to KEMRI top management because the outcome of the study will help the future design and implementation of biomedical projects. The study is a great contribution to the scientific community for it will inform them the factors that need to be closely monitored during the implementation of their projects. The research will add more information in the existing knowledge and will stimulate further research in this area of study.

1.8 Delimitation of the study

The aim of this is study is to determine the key factors that contribute to successful implementation of biomedical projects in Kenya Medical Research Institute. The domain of the study was confined to biomedical projects in KEMRI.

The research focused on the implementation phase of the projects and concentrated on a number of critical success factors. The study was constrained to KEMRI headquarter.

1.9 Limitations of the Study

The cost of undertaking the study.

Time factor the research was done for a specific duration of time and therefore it was not possible to deal with a very large sample size.

1.10 Assumptions of the Study

One of the assumptions of the study is that the scientist at KEMRI would accept to respond to the questionnaire. Another assumption is that the respondents would give truthful and honest responses. It is also assumed that the questionnaire was an adequate instrument in gathering sufficient information in this study.

1.11 Definitions of Significant Terms in the Study

Critical success factors: elements that must be completed in order for the project to be considered complete.

Success: the art of gaining consensus from a group of people on the definition of good art

Project Implementation: the Process whereby project inputs are converted to project outputs. It refers to mobilization, utilization and control of resources and project operation.

Procurement procedure: the full range of activities related to purchasing goods

Top management support: the nature and amount of support the project manager can expect from management both for himself as leader and for the project

Organization structure: the hierarchical arrangement of lines of authority, communications, rights and duties of an organization. Organizational structure determines how the roles, power and responsibilities are assigned, controlled, and coordinated, and how information flows between the different levels of management.

Project team leader: project team leader provides guidance , instruction, direction and leadership to group of other individuals (the team) for the purpose of achieving objectives of the project.

Communication system: collection of individuals' communication

Implementation of biomedical research project: It refers to mobilization, utilization and control of resources to looks for ways to prevent and treat diseases that cause illness and death in people and in animals.

KEMRI: a state corporation established through the Science and Technology (Amendment) Act of 1979, as the national body responsible for carrying out health research in Kenya

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter gives the literature review. It consists Concept of project implementation, Critical Success Factors of Projects, Benefits of CSF for Managers, Overview of Critical success Factors and projects, Top Management Support and Commitment, Organization structure, Communication system, Project team leaders commitment, Procurement procedures, Conceptual Framework Operational Definitions of Variables.

2.2 Concept of project implementation

Projects are commonly divided into several phases, completion of each phase is marked by defined deliverables. The number of phases in a project life cycle is context dependant. Most projects have been found to have four or five phases (Stretton, 2000). The life cycle model provided in the PMBOK® Guide (PMI, 2000) provides a typical example. Each phase of a project can be associated with performance criteria, and separate deliverables which mark the completion of the phase. Project phases are in a linear fashion, with one phase being formally completed before the next is formally initiated, as one phase might provide deliverables which are necessary for the initiation of a subsequent phase. The PMBOK® Guide (PMI, 2000, p. 30) identifies five different processes as aiding in the management of the phase: initiating processes; planning processes; executing processes; controlling processes; and closing processes.

The Initiation process, occurs at the beginning of the project. Initiation acknowledges that a project, or the next project phase, should begin. Initiation grants the approval to commit the organization's resources to working on the project or phase (PMI, 2000, 2004). Planning is the second phase and is a process of formulating and revising planning documents to be used throughout the project. In this process project requirements are fleshed out and stakeholders are identified. Planning has more processes than any of the other project management processes. The Executing, Controlling, and Closing process all rely on the Planning process

and the documentation produced during the Planning processes in order to carry out their functions. Project managers perform frequent iterations of the Planning processes prior to project completion. Planning must encompass all areas of project management and consider budgets, activity definition, scope planning, schedule development, risk identification, staff acquisition, procurement planning, and more. The greatest conflicts a project manager will encounter in this process group are project prioritization issues (PMI, 2000, 2004).

The third phase is executing process this involves putting the project plans into action. It's here that the project manager will coordinate and direct project resources to meet the objectives of the project plan. The Executing process keeps the project plan on track and ensures that future execution of project plans stays in line with project objectives. The executing process utilizes the most project time and resources. Costs are usually highest during the executing process. Project managers will experience the greatest conflicts over schedules in this phase (PMI, 2000, 2004).

The fourth phase is controlling process this is where project performance measurements are taken and analyzed to determine if the project is staying true to the project plan. If it's discovered that variances exist, corrective action is taken to get the project activities aligned with the project plan (PMI, 2000, 2004).

Closing is the fifth phase it is probably the most often skipped process in project management. Once the project objectives have been met, most of us are ready to move on to the next project. However, Closing is important as all the project information is gathered now and stored for future reference. The documentation collected during closing processes can be reviewed and utilized to avert potential problems on future projects. Contract closeout occurs here, and formal acceptance and approval are obtained from project Stakeholders (PMI, 2000, 2004).

Project success is a topic that is discussed so frequently in the project management but yet irregularly agreed upon (Pinto & Slevin, 1989). Project success is usually discussed in terms

of success factors and success criteria. Success factors are considered to be those aspects of management that lead directly or indirectly to the success of the project, while success criteria are defined as the measures by which success or failure of a project or business was judged (Cooke-Davies, 2002). According to Lai (1997) the factors that contribute directly to project success is the ability to stay within the cost, time and performance specifications of the project. Different authors came up with factors influencing success this includes: support from senior management and adequate funds (White & Fortune, 2002); adequate resources (Posner, 1987); and the importance of planning, monitoring and controlling, technical, commercial and external issues (Morris et al., 2000). Ashley et al (1987) examine the links between success criteria and success factors, finding a direct cause and effect relationship between some factors and criteria.

What counts as a successful project depends on how that success is measured. It has been found that the traditional measures of success, time, cost and goal specifications, are the most cited in the PM literature and were used most regularly as practical judges to project success (White & Fortune, 2002). There is a tendency to rely on time and cost as measures for easy measurement (quantify) (Pinto & Slevin, 1988).

2.3 Critical Success Factors of Projects

Project success is one of the most debated topics but still the least agreed upon (Pinto & Slevin, 1998Shenhar et al., 1997). Determination of project success is not unanimous among the team and client personnel (Rad and Ginger, 2002). Since the late 1960s project management researchers have been trying to discover which factors leads to project success (Baker et al. 1974, 1988; Pinto and Slevin, 1988; Lechler, 1998). An architect may consider success in terms of aesthetic appearance while an engineer may consider in terms of technical competence while a biomedical researcher may consider it in terms of active product against a certain disease . The parameters for measuring project success are mostly influenced by project type and specifications.

The purpose of any critical success factors (CSF) approach is the determination of the set of factors that the manager considers critical for his or her success (Dadashzadeh 1989). There are several definitions of CSF. Rockart (1979) defines CSF as the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. Maylor (2003) viewed satisfaction as the difference between how the project is perceived or viewed by a stakeholder and how they expect the project to perform. While Bruno and Leidecker (1984) define CSF as those characteristics, conditions or variables that, when properly sustained, maintained, or managed, can have a significant impact on the success of a firm competing in particular industry. Pinto and Slevin (1987) regarded CSF as factors which, if addressed, significantly improve project implementation chances.

2.4 Benefits of CSF for Managers

Rockart (1979) defined the following benefits for managers when applying CSF method: First the process helps the manager to determine those factors on which he or she should focus management attention. It also helps to ensure that those significant factors will receive careful and continuous management scrutiny. Second the process forces the manager to develop good measures for those factors and to seek reports on each of the measures. Third the identification of CSF allows a clear definition of the amount of information that must be collected by the organization and limits the costly collection of more data than necessary. Fourth the identification of CSF moves an organization away from the trap of building its reporting and information system primarily around data that are easy to collect. Rather, it focuses attention on those data that might otherwise not be collected but are significant for the success of the particular management level involved. Five the process acknowledges that some factors are temporal and that CSFs' are manager specific.

Various project success factors have been identified by different researchers in different projects around the world. Some of these factors are discussed below.

2.5 Overview of Critical success Factors and projects

Research on CSF can be traced back to 1961, Daniel (1961) first discussed success factors in management literature. He focused on industry-related CSF which are relevant for any company in a particular industry. Anthony et al. (1972) went a step further by emphasizing the need to tailor CSF to both a company's particular strategic objectives and its particular managers. The management planning and control systems were made responsible for reporting those CSF that are perceived by the managers as relevant for a particular job and industry. Between the year 1970s – 1980s, critical success factor (CSF) requirements were addressed as a response to the indicators of project success at the implementation phase, focusing on time, cost and quality as well as, stake holder satisfaction (Jugdev and Muller, 2005).

Combining the perspective of both Daniel (1961) and Anthony et al. (1972), Rockart (1979) described a study on three organizations in 1979 which confirmed that organizations in the same industry may exhibit different CSF. In 1982 Rockart gathered data in regard to project executives. The data indicated that executives share a limited number of CSF. Each executive lists some, but not all, of the CSF gathered from the sample as a whole (Zahedi, 1987). The remaining differences were linked to organizational aspects as well as the time pressure facing the particular manager at the time the data was collected (Rockart, 1982).

Rockart (1979) stressed that his CSF approach concentrates on information needs for management control and seeks to identify data which can be used to monitor and improve existing areas of business. Today, Rockart's (1979) CSF approach is particularly relevant within the limits of project management and implementation and therefore often used by project executives. Table 2.1 below gives lists of CSF from the literature by various authors.

Table 2.1 Critical success factor lists by various authors

Author	Critical factors
Sayles and chandler (1971)	Project manager's competence, Scheduling, Control systems and responsibilities, Monitoring and feedback, Continuing involvement in project
Martin (1976);	Define goals, Select project organizational philosophy, Top management support, Organize and delegate authority, Select project team, Allocate sufficient resources, Provide for control and information mechanism, Require planning and review
Cleland & King (1983);	Project summary, Operational concept, Top management support, Financial support, Logistic requirements, Facility support, Market intelligence, Project schedule, Executive development and training Manpower and organization acquisition, Information and communication channels, Project review
Backer, Murphy and Fisher (1983);	Clear goals, Goal commitment and project team, Adequate funding to completion, Adequate project team capability, Accurate initial cost estimates, Minimum start up difficulties, Planning and control techniques; Tasks (verses social orientation), Absence of bureaucracy
Locke (1984);	Make project commitments known, Project authority from the top, Appoint competent project manager, Set up communication and procedures, Set up control mechanisms, Progress meetings
Morris and Hough (1987);	Project objectives, Technical uncertainty Innovation, Schedule duration urgency, Financial contract, legal problems, Implementation problems, Politics, Community involvement
Kerzner (1987)	Corporate understanding of project management, Executive commitement to project management, organizational adaptability, project manager leadership, commitment to planning and control
Pinto and Slevin (1987, 1989);	Top management support, Client consultation, Personal recruitment, Technical tasks, Client acceptance, Monitoring and feedback, Communication, trouble shooting, Characteristics of the project manager, Schedule urgency.

Pinto and Slevin (1987) attempted to develop a comprehensive set of CSFs related to project implementation success. In their work, they propose a project implementation profile (PIP) model, which consists of 10 CSFs as given in below (Table 2.1). PIP model of 10 CSFs, is claimed to be suitable as an instrument for project managers to measure those factors (Pinto and Slevin 1987). Later, Pinto and Prescott (1988), took a further step by determining the relative importance of 10 CSFs over the life of a project and discovered that the relative importance of several CSFs vary at different phases of the project life cycle. The generalized 10 CSFs of the PIP have also been employed as a model for many project types in several studies (Pinto and Prescott, 1988, Finch 2003, and Hyva¨ri, 2006).

A great deal of previous research has focused on a single aspect of the project such as the management of professionals in R&D projects (Katz and Tushman, 1979; Roberts and Fusfeld, 1981), communication patterns in technical and R&D projects (Katz and Tushman, 1979; Allen et al., 1980), project organizational structure (Larson and Gobeli, 1985) and team performance (Thamhain and Wilemon, 1987). Studies aimed explicitly at identifying project success factors have often concentrated on a limited number of variables. For example, Tubig and Abetti (1990) studied variables contributing to the success of defense research and development contractors such as contractor selection, type of contract and type of R&D effort, while Pinto and Slevin (1987) used their research respondents to identify, for each successful project, a single action that would substantially help implementation. However, project management is more complex. Bringing a project to a successful conclusion requires the integration of numerous management functions such as controlling, directing, team building, communicating, cost, schedule management, technical and risk management, conflict and stakeholders management and life cycle management, among others (Morris and Hughes, 1987). The large variety of tasks has gradually fostered the systems approach to project management, aimed at helping managers to understand the intricate nature of a project and capturing it as a whole (Cleland and King, 1983)

Based on the literature it can be concluded that there is not a consistent CSF framework. Rather there is different perspective of what constitute CSFs, depending on how the authors

identify and classify them. Moreover, although early literature on project management does not consider project success criteria, containing the focus to CSFs, subsequent studies attempt to close the gap between CSFs and project success criteria, both of which impact on project success. In addition to this recently developed CSFs are more complex than those of the previous decade as more recent CSFs cover both hard and soft aspects of project management such as the competence of the project manager and the project team members and leadership (Pinto and Slevin, 1987: Pinto and Prescott, 1988).

For this study five CSFs have been selected whereas we agree that they are not unique to biomedical project implementation they gain importance than the others because of the specific characteristic of biomedical project implementation. These factors are top management support and commitment, organization structure, communication system, project team leaders' commitment, procurement procedures.

2.6 Top Management Support and Commitment

Top management support and commitment are critical to achieve success in the project. According to Green (1995) top management includes the CEO and his/her direct subordinates all those who are responsible for corporate policy. Top management support is needed throughout the implementation of the project (Easteves and pastor 2000, Nah et al. 2001). Top management support refers to both the nature and amount of support the project manager can expect from management both for himself as leader and for the project. As noted by Schultz and Slevin (1975), management support for projects, or indeed for any implementation, has long been considered of great importance indistinguishing between their ultimate success or failure. Beck (1983) sees project management as not only dependent on top management for authority, direction and support, but as ultimately the conduit for implementing top management's plans, or goals, for the organization.

Top management support has been consistently identified as the most important and crucial success factor in project implementation (Somers & Nelson 2003). Slevin & Pinto 1996 define top management to provide the necessary resources and authority or power for project

success. Top management support in project implementation has two main facets: One providing leadership; and two providing the necessary resources. To implement project successfully, management should monitor the implementation progress and provide clear direction of the project. They must be willing to allow for a mindset change by accepting that a lot of learning has to be done at all levels, including themselves (Rao 2000). Easteves and pastor (2000) stated that sustained management support is related with sustained management commitment, both at top and middle levels during the implementation, in terms of their own involvement and the willingness to allocate valuable organizational resources. Management support is important for accomplishing project objectives and aligning these with strategic business goals. Bingi et. al. (1999) mention that top management needs to constantly monitor the progress of the project and provide direction to the implementation teams.

2.7 Organization structure

Organization structure is the hierarchical relationships of various entities within the organization that collaborate with each other for project execution. Different organizations, by virtue of their objectives and core philosophies, carry different organizational structures (PMBOK 2008, 2004, 2002). The structure of an organization determines the operational model used in the organization. Organizational structure determines the responsibilities for different functions and entities. The organizational structure dictates the chain of command, resulting in the reporting structure that provides accountability of those at all levels within the organization (PMBOK 2008, 2004, 2002).

Organizational structure, style, and culture influence implementation of projects. Cultures and styles of an organization are known collectively as its cultural norms. These norms include a standard approach (organization style) regarding the manner in which projects are implemented, what means are considered, and who is influential in facilitating implementation (Chandramouli 2011, PMBOK 2008, 2004, 2002). Cultural fitment, or cultural quotient (CQ), is the ability of an organization to cope with national, corporate, and vocational cultures. Project managers should understand the different organizational styles and cultures that may affect a project. The project manager should identify important organizational decision makers

and work with them to influence project success (Chandramouli 2011, PMBOK 2008, 2004, 2002).

2.8 Communication system

Communication is one of most challenging and difficult tasks in any project implementation. It is considered a critical success factors for the implementation of projects by many authors (Esteves & Pastor 2001a,b,c). It is essential for creating an understanding, an approval of the implementation and sharing information between the project team and communicating to the whole organization the results and the goals in each implementation stage. In addition to gaining approval and user acceptance, the communication will allow the implementation to initiate the necessary final acceptance. The communication should start early in any project implementation and can include overview of the system and the reason for implementing it be consistent and continuous (Davenport, 1993, Dixon et al., 1994).

The need for adequate communication channels is extremely important in creating an atmosphere for successful project implementation. Communication is not only essential within the project team itself, but between the team and the rest of the organization as well as with the client. Communication refers not only to feedback mechanisms, but the necessity of exchanging information with both clients and the rest of the organization concerning project goals, changes in policies and procedures, status reports, etc (Chandramouli 2011, PMBOK 2008, Davenport, 1993, Dixon et al., 1994)

Internal communication includes all communication within a project and is just as important as external communication. One might even see internal communication as a prerequisite for all external communication. Internal communication makes sure that all partners speak with one voice and provide the same consistent information (Chandramouli 2011, PMBOK 2008).

Communication management refers to the process of timely and appropriate development, collection, dissemination, storage, and disposition of project related information. Generally,

more than 90% of a project manager's time goes for communication. Project managers generate a communication management plan, prepare reports based on it, ask and discuss with stakeholders about their needs, identify what communication processes they need, and frequently revisit communication needs of stakeholders at team meetings to avoid communication related problems. The above activities of project managers clearly state that whatever a project manager does is related with communication (Chandramouli 2011, PMBOK 2008, 2004, 2002).

The PMBOK (2002, 2004) has identified five communication processes, this are; Identify Stakeholders: This is a process of identifying all entities, project team members and associates, third-party organizations, and the performing organization impacted by a project and documenting relevant information regarding their interests, involvement, and impact on project success. Plan communications: This process determines the information needs of project stakeholders and establishes a communications system. Distribute Information: It is a process of implementing the communication management plan and responding to unexpected requests for information. Manage stakeholder expectations: Working with stakeholders to meet their needs and addressing their issues as they occur. Report performance: This is a process of collecting and presenting performance information to stakeholders on how resources are being used to achieve project objectives (Hinterhuber, 1995; Berrington and Oblich, 1995; Cooper and Markus, 1995; Talwar, 1993). The Plan communications process is one of determining the information needs of project stakeholders and establishing a communications system that identifies information that is required by each stakeholder, provides that information to stakeholders when they need it, determines the manner in which the information is to be disseminated to stakeholders, and specifies and authorizes individuals to disseminate information.

Effective communication is said to have been made when information has been provided in the right format, at the right point in time, and with the right impact on both the sender and receiver (Davenport, 1993; Jackson, 1997). Here, right impact means that the purpose of passing the message should be achieved. For example, if you are sending a message stating a proposed delay in a project along with the reasons for the delay, the client, on getting the

message, should accept the delay and the reasons you describe. That is effective communication. Efficient information, on the other hand, refers only to the process of providing the required information when needed. The plan communications process is tightly linked with the enterprise environmental factors of the organization, and therefore, organizational structure has a major impact on project communication requirements (Jackson, 1997; Dawe, 1996; Zairi and Sinclair, 1995; Hammer and Stanton, 1995; Carr and Johansson, 1995; Arendt et al., 1995; Davenport, 1993).

Effective distribution of information includes a number of techniques such as choosing appropriate sender-receiver models, correct choice of communication media, writing style of the message, presentation methods, facilitation, etc. Sender–Receiver models: An appropriate sender-receiver model is based on aspects such as whether it is a one-to-one communication or one-to-many communication, a push communication (email) or pull communication (records retrieval), etc. Choice of media: Choosing the right media to convey information will make the process effective. For example, some types of information can be passed on through e-mail, while others may be best disclosed face-to-face. Writing style of the message: Key elements that make an e-mail (or any other message effective) include choosing an appropriate and meaningful "subject line", use of proper salutation in the message, correct sentence structure, and appropriate use of active and passive voice. Meeting management techniques: Agenda, conflicts. Presentation styles: Body language. Facilitation techniques: Building consensus (Chandramouli**,** 2011).

2.9 Project team leaders commitment

The project manager, in the broadest sense of the term, is the most important person for the success or failure of a project. The project manager is responsible for planning, organizing and controlling the project. In turn, the project manager receives authority from the management of the organization to mobilize the necessary resources to complete a project (Hendrickson, 2000). A project manager is often by default regarded as a project leader, playing a significant role in not merely managing but also leading the project team to achieve the objectives of the project.

Project management effectiveness refers to the success of the project (Hyva ¨ri, 2006). Achieving projects' success depends on people as people are the most critical project management resource. Cleland (1995) suggest that research on project leadership is still limited though calls have been made for more project leadership research within the field of project management for more than a decade. Huemann et. al. (2007) suggests that the project is a social system, and includes several areas focused on organizational behavior, leadership, communication, team building, and human resource management.

Leadership affects all facets of human enterprise. The following definitions of leadership are found from literature which may be more representative for leadership: Leadership is: Development of a clear and complete system of expectations in order to identify, evoke and use the strengths of all resources in the organization the most important of which is people (Batten, 1991). Leadership is the lifting of people's vision to a higher sight, the raising of their performance to a higher standard, the building of their personality beyond its normal limitations (Drucker, 1985). The ability to lead, including inspiring others in a shared vision, Leaders have clear visions and they communicate these visions to their employees. They foster an environment within their companies that encourages risk taking, recognition and rewards, and empowerment allowing other leaders to emerge. Leaders are people who inspire with clear vision of how things can be done better (Slater, 2001).

The above definitions plausibly come to agree that 'vision' and 'people' are primary ingredients in leadership context. Literature have it that 'People First, Strategy Second. Getting the right people in the right jobs is a lot more important than developing a strategy. This truth applied to all kinds of projects. We learned hard way that we could have the greatest strategies in the world. Without the right leaders developing and owning them, we'd get good-looking presentations and so-so results (Welch, 2001).

Organizations involved in projects are now focusing on effective leadership as an important success factor (Pinto and Slevin 1988; Pinto 1986). Crawford (2000) suggests that project leadership is the highest ranking category among project management competence factors.

Project management leadership style affects overall project performance. Recent research supports the idea that successful projects are led by individuals who possess not only a blend of technical and management knowledge, but also leadership skills that are internally compatible with the motivation of the project team (Turner et al. 1998; Slevin and Pinto, 1988). Zimmerer and Yasin (1998) found that positive leadership contributed almost 76% to the success of projects. Negative or poor leadership contributed 67% failure of projects. Project leaders need both relationships and task oriented leadership styles to cope up with the challenges of different phases of project (Slevin and Pinto, 1991). In projects, project leaders must lead his or her team towards completing the defined goal with in a fixed time scale. Verma (1997) states "Achieving the goal or final aim is the ultimate test of leadership". Goals or tasks are achieved through people thus making people an important resource for projects.

In various studies on project success or failure, effective leadership (Ammeter and Dukerich, 2002), good communication, the ability to operate under pressure, in a complex environment (White and Fortune, 2002; Pettersen, 1991), were found to be important skills required by project managers. Verma (1995) lists the following people skills that are important for project managers, apart from the technical knowledge and decision- making skills that they require: communication, motivation and negotiation, self-confidence, reliability, maturity and emotional stability, a constructive, positive attitude, and flexibility and tolerance for ambiguity and uncertainty. Kerzner (2003) states that effective leaders are not completely task or relationship focused in their action rather they maintain a balance between the two. Team management leader is the predominant style of leadership for effective project management. Indeed this style constitutes factors which are critical for effective project management like participative decision making, open communication, conflict management, delegation of power, task monitoring, time management, coaching, and team work (Clark, 2004).

2.10 Procurement procedures

Project procurement management refers to the purchase of products and services from third parties to meet requirements listed in the project scope. This knowledge area of project management, therefore, involves the processes of procurement planning, identification of

sources, and administering and closing of contracts with identified sources (Chandramouli 2011, PMBOK 2008). Here, effective administration of contracts is a critical skill required of project managers, because procurement management deals primarily with third parties. Project related products and services may be sourced from with a performing organization as well. Although procurement planning is best competed early in the project planning stages, changing project conditions, priorities, and uncertainties ensure that it is best executed as an iterative process, repeatedly performed almost over the entire project life cycle (Chandramouli 2011, PMBOK 2008, Kerzner 2009, Panayiotou et al 2004).

The primary objective of the Plan Procurements process is to identify those parts, services, or activities of a project that should be procured from outside the organization (or from outside the project management team, if procurement is planned to be made from other entities of the performing organization). Procurement plans aim to answer the following questions: What to acquire? When to acquire? How to acquire? How much should acquire (Chandramouli 2011, PMBOK 2008).

The Conduct Procurements process is one of communicating to all concerned of the proposed contract, interacting with prospective sellers before the process of collection of submitted proposals begins, collecting and evaluating prospective sellers' proposals, selecting a seller on the basis of predefined criteria, and awarding the contract. In this process, the performing organization advertises the contract; receives bids, quotes, or proposals; applies the selection criteria to select a seller; and awards the contract to the selected seller (Chandramouli 2011, PMBOK 2008, Kerzner 2009, Panayiotou et al 2004).

The Administer Procurements process is one of managing procurement relationships, monitoring and managing the contractual performance of sellers, and making changes and corrections as needed per the terms of the contract (Chandramouli 2011). Effective contract administration ensures that the seller fulfils the terms of the contract. Fulfillment of contract obligations is an outcome toward which both the seller and the project management team must work together. The latter, especially in complex projects involving several contracts and

several contractors, must ensure adequate coordination of schedules of contractors so that the ability of one contractor to deliver on time is not hampered by the failure of another to do so. In the execution of such processes, project team members must be aware of the legal implications of actions they may take and face (Chandramouli 2011, PMBOK 2008, Kerzner 2009). The main project management processes related to the administration of procurements are as follows: Managing project execution to authorize, evaluate, and validate the seller's work at appropriate times; Reporting on seller's performance to monitor continued compliance to contract scope, cost requirements, schedules, and technical standards; Performing quality control and integrated change control processes; Monitoring and controlling risks (Chandramouli 2011, PMBOK 2008, Kerzner 2009, Panayiotou et al 2004).

2.11 Conceptual Framework

The conceptual framework shown in Figure 1 below is a schematic diagram which illustrates the relationship between the dependent variable that is successful implementation of biomedical projects in KEMRI and the independent variable which are top management support, organization structure, communication system, project team leader, procurement procedures.

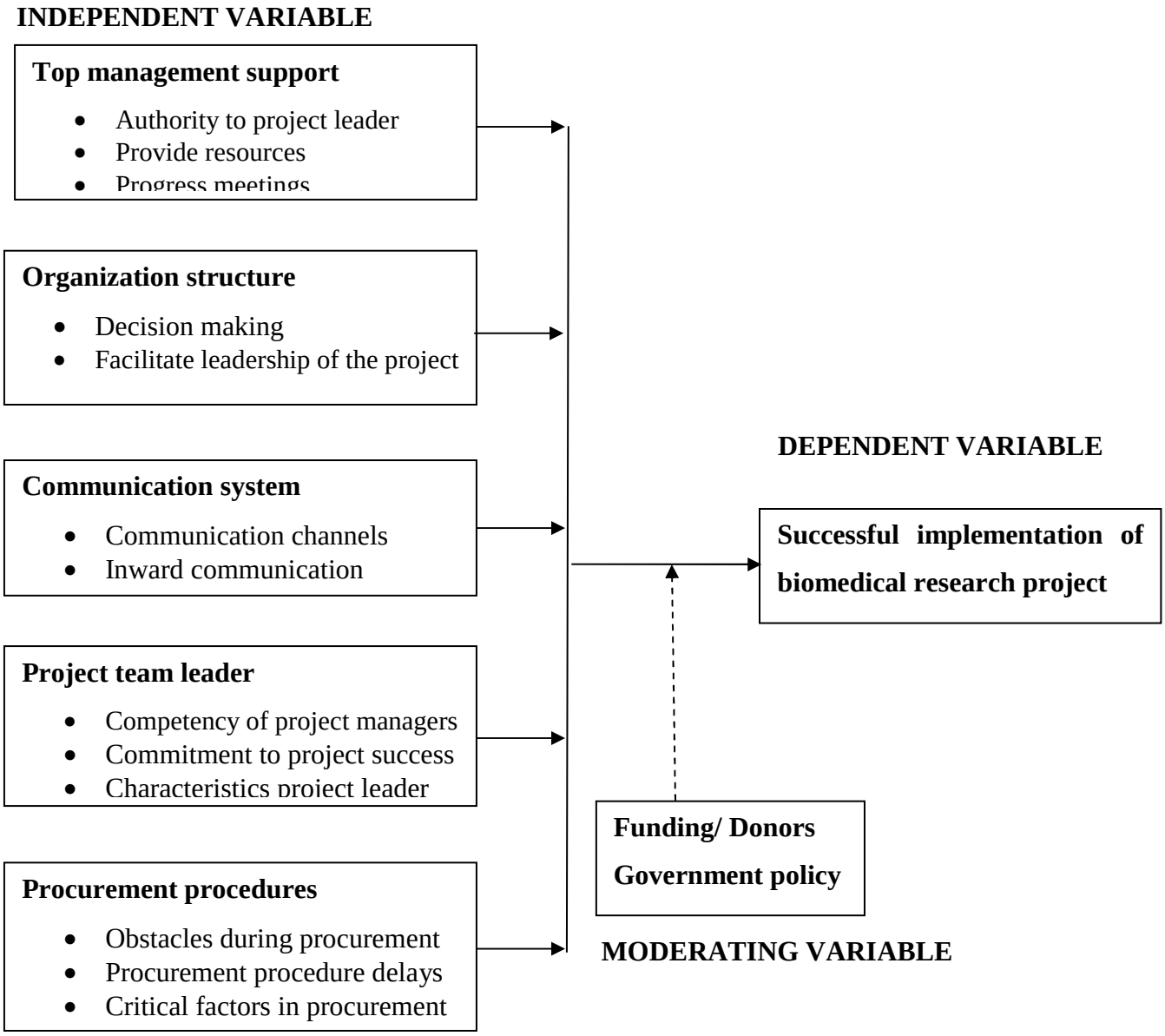

Figure 1: Conceptual Framework on the relationship among variables

Interrelationship between variables

KEMRI works with projects and its performance contracts is based on protocols written and projects funded. The implementations of the funded project form the bases of research in KEMRI. The top management support is very important in implementation of the funded biomedical research project.

Organization structure determines the operation of the organization; it plays a very important role during implementation of the projects. Project implementation follows a laid down rules in the organization. These rules laid down have to be fulfilled before the project implementation. Since implementation of biomedical projects is one of the core business of KEMRI the organization structure gathers a lot of influence.

Communication system between the stake holders is very important for the success of any project. The flow of information from organization to project team leader and to project team and also within the project team makes the implementation of projects to be faster. Communication systems used to communicates affects successful implementation of the projects

Project team leader in KEMRI are the principal investigators of the projects. They play a role of writing the proposal as well as soliciting for funds. They implement the project and take the project to all stages of project cycle. Their commitment to the successful implementation of the project is personalized due to the fact that they conceived the idea. Therefore project team leader have the ability of influencing successful implementation of the projects.

Procurement procedures in KEMRI affect implementation of biomedical projects. Biomedical project deals with pathogenesis and genomics of infectious agent, host and vector all of which involves procurement procedures to import or locally acquire them; together with the consumables involved in carrying out laboratory experiments. The procurement procedure whether short or long affects the implementation of these projects.

Funding is a moderating factor. The only implemented projects in KEMRI are funded projects. There is no implementation of projects without funds.

2.12 Summary of literature review

The literature review highlights that there is clearly a need for further research in the area of critical success factors. Based on the literature it can be concluded that there is not a consistent CSF framework. Rather there is different perspective of what constitute CSFs, depending on how the authors identify and classify them. Pinto and Slevin (1987) developed a comprehensive set of CSFs related to project implementation success. None of the authors comprehensively say that the critical factors are exhaustive and critical to all types of the projects. There is therefore a gap in knowing which critical success factors contribute to success of which type project. Different authors give different CSFs', and this affects the success of project differently depending on the type of the project.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides information about the applied research process for the proposal. This includes research design, target population, sample size and sampling procedures. It also includes research instruments, data collections procedures, data analysis techniques.

3.2 Research design

The research design employed in conducting this study is descriptive survey research design. Descriptive design is used to obtain information concerning current status of the phenomena to describe what exists with respect to variables or conditions in a situation, it allows the researcher to describe, record, analyze and report conditions that exists or existed Kothari (2005). it is aimed at finding out "what is," so observational and survey methods are frequently used to collect descriptive data (Borg and Gall,1989, Kothari, 2005)). It is mainly conducted when researcher wants to gain deeper understanding of a topic. It involves gathering data that describe events and then organizes, tabulates, depicts, and describes the data collected (Glass and Hopkins, 1984).

Descriptive approach was chosen for this study as it allows for the exploration of relationships between variables through the testing of hypotheses. The study used four hypotheses aimed at seeking to identify if a relationship exists between the study's independent and dependent variables. Survey designs attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables (Gay, 1983).

3.3 Target population

The population consisted of KEMRI scientific staffs who deals directly with biomedical projects. Biomedical projects in KEMRI are different in nature some projects are in the area of malaria, parasitology, medical entomology, leshmaniasis, schistosomiasis, polio, HIV, hepatitis, dengue virus, diabetes, cancer, helminthes etc. Each project has atleast three people working in it, principal investigator, co-investigator, technician or support staff. The projects which are scientifically and ethically approved by KEMRI SSC (Scientific Steering Committee) and ERC (Ethical review Committee) are identified by numbers given for records purpose. The staffs working with the funded and implemented projects form the target population. The funded projects and implemented projects are 150 in number. The targeted population came from the 150 projects, out of which 30% of 150 which are 45 projects were randomly chosen. In each project two project team member were interviewed this brings a sample size for the study to be 90 KEMRI scientific staff.

3.4 Sample size and Sampling techniques

The sample size was made up of individuals who are work on biomedical projects and who had some relationship with project implementation. Sampling is the process of obtaining information about the entire population by examining only part of it (Kothari 2007). The sampling procedures are methods that are used to select an element from the population that was included in the sample. The sampling design that was used for this study was purposive and simple random techniques. Random sampling is the purest form of probability sampling. Each project and each member working on these projects had an equal chance of being selected. Purposive sampling was used to sample KEMRI staffs who work in specific projects. The number of implemented biomedical projects in KEMRI are 150, 30% of this projects (45 projects) were randomly selected; two team members in each projects were purposively chosen and interviewed. According to Mugenda and Mugenda, (2003), a purposive sampling technique allows a researcher to use cases that have the required information with respect to the objective of the study. Cases of subjects are therefore handpicked because they are informative or they possess the required characteristics.

3.5 Data Collection instruments

The study used both open ended and close ended questions in the questionnaire to collect data, which incorporated qualitative and quantitative data. The study was facilitated by the use of both secondary and primary data. Questionnaire was the main source of primary data because they provided detailed individual feedback which gave accurate picture of the implementation of biomedical projects. Secondary sources of data were obtained from institute bulletins and records.

The questionnaire included an introductory note explaining the purpose of the study. The questionnaire was divided into sections, in line with the study objectives and contained both open and closed ended questions. The questionnaire was prepared in English.

Validity of the instruments

Mugenda and Mugenda (2003), defines validity as the accuracy and meaningfulness of inferences which are based on the research results. Validity refers to the appropriateness, meaningfulness and, usefulness of evidence that is used to support the interpretations (Cooper & Schindler, 2003). Validity is the degree to which results obtained from analysis of the data actually represent the phenomenon under study. It is correctness and reasonability of data.

Validity refers to getting results that accurately reflect the concept being measured. Establishing validity for a survey testing focuses on the use to which the instrument is put, not on the survey itself (Tashakkori, & Teddlie, 2003). In order to test and hence improve validity of the results the researcher used questionnaires in a pre-test. The questionnaires was subjected to two projects and one person in each project as a pilot study, to get feedback and input on other important issues that may be worthy of consideration, that the instrument may have missed. This guided the study to determine that the instrument measured the right concept, hence its validity.

Reliability of the instruments

Reliability is an examination of the consistency between a set of independent observations that are interchangeable. Reliability is the extent to which results are consistent over time and an accurate representative of the total population of a study, the results of a study are said to be reliable if they are reproducible under similar methodology (Nahid 2003). Reliability can be defined as the degree to which a questionnaire, test, observation or any other measurement procedure produces the same repeated trials; it is the stability or consistency of scores over time or across raters (Michael, 2010). Mugenda and Mugenda (2003), defines reliability as a measure of the degree to which a research instruments yields consistent results or data after repeated trials. Berg (1998) explains that, the use of consistent and systematic line of questions for even unanticipated areas in particularly important for reliability and for possible replication of a study.

Split-half method was used to test reliability of tools where sample was split into two and tests were administered to the two halves using same tool. The coefficient was computed using Spearman's Rank Correlation method. The instruments were conclude to be reliable since the coefficient of 0.903 was obtained a good indicator that the tools were reliable. The value of rank correlation nearer to +1 or -1 indicates high degree of positive or negative correlation between variables respectively.

Table 3.1 Reliability Statistics

Case Processing Summary

		N	%
Cases	Valid	76	100.0
	Excluded[a]	0	.0
	Total	76	100.0

Reliability Statistics

Cronbach's Alpha	Part 1	Value	.940
		N of Items	7
	Part 2	Value	.947
		N of Items	7
		Total N of Items	14
Correlation Between Forms			.824
Spearman-Brown Coefficient	Equal Length		.903
	Unequal Length		.903
Guttman Split-Half Coefficient			.902

3.6 Operational Definitions of Variables

Operational definitions are specific ways in which real cases can be classified into categories of the concept ones wants to use in research. The indicators were denoted by the main variables under study in order to render them measurable.

Table 3.2 Operational Definitions of Variables

Objective	Variables	Type of Variables	Indicators	Measure	Scale of measurement	Tools of analysis
To establish the role of top management on successful implementation of biomedical projects in KEMRI	successful implementation of biomedical projects	dependent	Financial success Policy success Completed within stipulated time	Dimension of success	Nominal	Descriptive
To establish the role of top management on successful implementation of biomedical projects in KEMRI	Top management	Independent	Give authority to project leader Provide resources Hold project progress meetings Provides access to technical expertise	How many	Ordinal Ratio	Descriptive
To establish the influence of organization structure on successful implementation of biomedical projects in KEMRI	organization structure	Independent	Centralized decision or decentralized decision making Facilitate leadership of the project	Efficient and Effectiveness of the structures	Nominal Ordinal	Descriptive

To establish the influence of Communication system on successful implementation of biomedical projects in KEMRI	Communication system	Independent	Communication channels inward communication	Efficient and Effectiveness of the structures	Nominal Ordinal	Descriptive
To investigate the extent to which project team leader influences successful implementation of biomedical projects in KEMRI	project team leader	Independent	Competency of project managers Commitment to project success Good Characteristics of project leader	How many	Nominal Ordinal	Descriptive
To investigate the impact of procurement procedures on successful implementation of biomedical projects in KEMRI	procurement procedures	Independent	Obstacles during procurement Procurement procedure delays Critical factors in procurement of consumables	Efficient and Effectiveness of the procedures	Nominal Ordinal	Descriptive

3.7 Data Analysis Techniques

The qualitative data was generated from open-ended questions in the questionnaire it supplemented the quantitative data and was analyzed in themes, content analysis and categories identifying similarities and differences that emerged. The themes emerging from secondary data was identified and secondary data was augmented the primary data.

Quantitative data was scrutinized for completeness, accuracy and uniformity then coded. Data from questionnaires was obtained using Statistical Package for Social Sciences (SPSS version 20.0) and analyzed using descriptive statistics, frequencies and percentages. The study also tested the hypotheses to determine if there was a relationship between the independent variable and dependent variable successful implementation of biomedical projects. According to Cooper and Schindler (2003) every sample vary from its population, therefore, the statistical significance or insignificance must be reviewed. The study was made up of one sample from KEMRI scientific staff. For that reason a one sample nonparametric test of significance, using chi-square, was used to determine the statistical significance between the observed distribution frequencies and the expected distribution based on the null hypotheses. The desired level of significance was 0.05 since this level is associated with a lower risk of being incorrect. A two-tailed test of significance was also done using cross-tabulations to show the relationship between the variables since the direction of difference was stated in the null hypotheses.

Chi-squire is a nonparametric statistical technique used to determine if a distribution of observed frequencies differs from the theoretical expected frequencies. Chi-squire statistics use nominal (categorical) or ordinal level data, instead of using means and variances, this test uses frequencies. The value of the Chi-squire statistics is given by

$$X^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$$

where X^2 is the Chi-squire statistic, O stands for the observed frequency and E stands for the expected frequency. The Chi-squire statistic summarizes the discrepancies between the expected number of times each outcome occurs and the observed number of times each outcome occurs, by assuming the squares of the discrepancies, normalized by the expected numbers, over all the categories (Dorak, 2006).

3.8 Ethical Considerations

The Belmont Report (1979) outlines three basic principles relevant to the ethics of research involving human subjects, namely respect of persons, beneficence, and justice. The measures taken to make sure the respondent or subject were treated with the principles of respect of person, beneficence, and justice were informed consent, confidentiality, anonymity and, the participant's right to privacy. The participants' names or projects they were working on were not disclosed and they voluntarily participated in the study. The consent from the participant was sought and no one was coerced to participate in the study.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents data that was analyzed in order to give a clear picture of the findings and for purpose of comparison with the expected findings. The purpose of this study was to examine factors influencing successful implementation of biomedical projects in Kenya Medical Research Institute. The data was summarized in table form and bar graph to bring out the reality at the ground. The data was collected using questionnaire, analyzed and classified into meaningful categories. The findings have been arranged according to the objectives.

4.2 Questionnaire Return Rate

Out of 90 questionnaires distributed to KEMRI scientific staff only 76 questionnaires were returned. This is 84.44% return rate. The reason for unreturned questionnaire was because the respondents went to the field and others to trainings and had not been back by the time of data analysis.

4.3 Characteristics of the Study Respondents

The demographic questions were designed to obtain information from the participants in some seven general areas: The variables used in this study in social demographic characteristics of the respondents are age, sex, education, designation, project role, number of years working experience, and number of projects respondent has been involved in. The variables are proportional to the number of respondent in this study.

Table 4.1 Respondents background information

	Characteristic	Frequency	Percentage (%)
1.	Age		
	20-29	4	5.3
	30-39	38	50.0
	40-49	26	34.2
	Above 50	8	10.5
	Total	76	100
2.	Sex		
	Male	40	52.6
	Female	36	47.4
	Total	76	100
3.	Education		
	PhDs	15	19.7
	Masters	32	42.1
	Bachelor	23	30.3
	Diploma	6	7.9
	Total	76	100
4.	Designation		
	principal research officer	4	5.3
	senior research officer	12	15.8
	research officer	29	38.2
	assistant research officer	15	19.7
	technologist	16	21.1
	Total	76	100
5.	Project role		
	principal investigator	42	55.3
	co-investigator	22	28.9

	collaborator	1	1.3
	support	11	14.5
	Total	76	100
6.	Number of years of working experience		
	Below 2 years	7	9.2
	2-5 years	17	22.4
	6-10 years	19	25.0
	Above 10 years	33	43.4
	Total	76	100
7.	Number of project involved in		
	2-5	44	57.9
	6-10	11	14.5
	Above 10	21	27.6
	Total	76	100

Table 4.1 demonstrates the socio-demographic characteristics of the study respondents. 52.6 % of respondents were male while 47.4% were female. The 76 respondents age were categorized in different age brackets. Half of the respondents 50.0% were aged between 30-39 years and 34.2% of the respondents were aged 40-49 years, 10.5% of the respondents were above 50 old while only 5.3% of the respondents were aged between 20-29. Out of 76 respondents 15 of them had a PhDs. degree, 32 masters degree, 23 bachelors degree while 6 had a diploma. In terms of designation 5.3% were principle research officer, 15.8% senior research officer, 38.2% research officer, 19.7% assistant research officer while 21.1% technologist.

When project role was considered majority 55.3% of the respondents were principal investigators, 28.9% were co-investigator, 14.5% were supporting the principal investigators while only 1.3% were collaborator. Most of the respondents 43.4% had more than 10 years working experience in KEMRI, 25.0% of them had 6-10 years working experience,

22.4% of the respondents 2-5 years, only 9.2% who had experience of less than two years. The respondent were asked the number of projects they were involved in, 57.9% of the respondent said 2-5 projects, 14.5% said 6-10 projects while 27.6% said more than 10 projects (Table 4.1).

When the respondents were asked whether they had performed similar role in other project; The majority of the respondents, 85.5%, had previously been involved in the role of project implementation in other projects in the same capacity as they had reported in the questionnaire (at the capacity of either principal investigator, co-investigator, collaborator, support principle investigator as indicated above on project role) and 11 % indicated that they were not involved in the role of project implementation in other projects in the same capacity as they had reported in the questionnaire. This indicates that the respondents are well versant with the project implementation process in KEMRI (Table 4.2).

Table 4.2 Project implementation information

	Characteristic	Frequency	Percentage (%)
1.	Participant Performed similar role in other project		
	Yes	65	85.5
	No	11	14.5
	Total	76	100
2.	How many times did you perform similar role in past projects		
	0 time before	11	14.5
	1 time before	14	18.4
	2-3 times before	28	36.8
	More than 5 times before	23	30.3
	Total	76	100

3.	Were you involved with full implementation of project		
	Yes	59	77.6
	No	17	22.4
	Total	76	100
4.	Was the implementation of the project successful		
	Yes	76	100.0
	Total	76	100

When respondents were asked how many times they had been involved in similar role in projects 36.8% said 2-3 times before and 30.3 % more than 5 times before, 18.4% only 1 time before while 14.5% had not been involved in similar role in a project before. When asked whether the respondents were involved in full implementation of the project 77.6% said yes while 22.4% said no. All the respondents 100% indicated that implementation of the project was successful (Table 4.2).

4.4 Top Management Support on Successful Implementation Projects

The study sought respondents view on top management support on the project team during implementation. The analysis was done using 5- point likely scale 1-no support at all, 2-little support, 3-high support, 4-higher support, 5- highest support.

The frequency analysis indicating the factor: Top management initial involvement after the funding of the project revealed that 64.5 % of the responses either said there was higher support or high support from the top management after project was funded indicating that they supported project implementation (Table 4.3).

The frequency analysis indicating the factor: Top management respect for project managers revealed that 58 % of the responses either said there was highest support; higher support or

high support from the top management respects project managers indicating that they recognize project managers' role and hence supports project implementation (Table 4.3).

The frequency analysis indicating the factor: Top management gives authority to project manager to carry out project implementation without any interference revealed that 73.7% of the responses either said there was highest support; higher support or high support from the top management indicating that they project managers has authority to carry out their role and hence supports project implementation (Table 4.3). The frequency analysis indicating the factor: Top management has regular meetings with the project team to address problems arising revealed that 39.5% of the responses either said there was higher support or high support from the top management indicating that there is no regular meetings with projects team to address problems arising from the projects.

Table 4.3 Top management support to the project team during implementation of the projects

	Frequency	Percentage (%)
1. Initial involvement after funding		
Higher support	16	21.1
High support	33	43.4
Little support	22	28.9
No support	5	6.6
Total	76	100
2. Respect for project manager		
Highest support	10	13.2
Higher support	5	6.6
High support	29	38.2
Little support	29	38.2
No support	3	3.93
Total	76	100

3.	Authority to project manager		
	Highest support	9	11.8
	Higher support	12	15.8
	High support	35	46.1
	Little support	14	18.4
	No support	6	7.9
	Total	76	100
4.	Regular meetings		
	Higher support	12	15.8
	High support	18	23.7
	Little support	26	34.2
	No support	20	26.3
	Total	76	100
5.	Assistance with extra resources		
	Higher support	4	5.3
	High support	11	14.5
	Little support	38	50.0
	No support	23	30.3
	Total	76	100
6.	Assistance with procedures and protocols		
	Highest support	2	2.6
	Higher support	10	13.2
	High support	17	22.4
	Little support	35	46.1
	No support	12	15.8
	Total	76	100

7.	Troubleshooting on behalf of the project team		
	Higher support	7	9.2
	High support	11	14.5
	Little support	28	36.8
	No support	30	39.5
	Total	76	100
8.	Providing access to technical expertise		
	Higher support	19	25.0
	High support	21	27.6
	Little support	27	35.5
	No support	9	11.8
	Total	76	100
9.	Trust/freedom in decision making		
	Highest support	9	11.8
	Higher support	4	5.3
	High support	46	60.5
	Little support	14	18.4
	No support	3	3.9
	Total	76	100
10.	Assist in reducing the bureaucracy		
	Higher support	5	6.6
	High support	28	36.8
	Little support	23	30.3
	No support	20	26.3
	Total	76	100

The frequency analysis indicating the factor: Top management Assistance with extra resources when required revealed that 19.8% of the responses either said there was higher

support or high support from the top management indicating the top management did not extra resources required by the project (Table 4.3).

The frequency analysis indicating the factor: Top management Assistance with procedures and protocols revealed that 38.8% of the responses either said there was highest support; higher support or high support from the top management indicating the top management did not assistance with procedures and protocols for project implementation (Table 4.3).

The frequency analysis indicating the factor: Top management Troubleshoots on behalf of the project team revealed that 23.7% of the responses either said there was higher support or high support from the top management indicating the top management did not troubleshoot on behalf of the project team during the implementation of the project (Table 4.3).

The frequency analysis indicating the factor: Top management Providing access to technical expertise revealed that 52.6% of the responses either said there was higher support or high support from the top management indicating the top management provided technical expertise during the implementation of the project (Table 4.3).

The frequency analysis indicating the factor: Top management Trust/freedom in decision making process revealed that 52.6% of the responses either said there was highest support; higher support or high support from the top management indicating the top management gave freedom in decision making to project team during the implementation of the project (Table 4.3, Figure 3).

The frequency analysis indicating the factor: Top management Assist in reducing the bureaucracy revealed that 43.3% of the responses either said there was higher support or high support from the top management indicating the top management did not assist in reducing the bureaucracy during the implementation of the project (Table 4.3).

When the respondents were asked whether the top management support influence the successful implementation of the project, the majority of the respondents, 76.3%, indicated that top management support influence successful implementation of the project while 23.7% said top management support did not influence successful implementation of the project.

When the respondent were asked the extra support they would have liked to have had from senior management or senior executives associated with the project some indicated that they would want the top management to assist with trouble shooting to handle problems arising during the project implementation, others said that they would want a conducive environment for project success by streamlining all bureaucracies while others said that setting up of committees to review compliance to organizational policies during project design and budget preparation would be important for success of project implementation. Other respondents said deployment of more staff to ease the workload and especially the technical staff.

Hypothesis 1

Table 4.4 Test of Hypothesis Ho1: There is no relationship between top management support and successful implementation of biomedical projects.

Cross Tabulation: Did top management support influence the successful implementation of the projects?

Role in the implementation of the project		Yes	No	Total
principal investigator	Count	39	3	42
	Expected Count	32.1	9.9	42.0
co-investigator	Count	11	11	22
	Expected Count	16.8	5.2	22.0
collaborator	Count	0	1	1
	Expected Count	.8	.2	1.0
support	Count	8	3	11
	Expected Count	8.4	2.6	11.0
Total	Count	58	18	76
	Expected Count	58.0	18.0	76.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.088	3	.000
Likelihood Ratio	18.202	3	.000
Linear-by-Linear Association	4.796	1	.029
N of Valid Cases	76		

a 3 cells (37.5%) have expected count less than 5. The minimum expected count is .24.

As shown in the chi-squire test table above the Pearson Chi-square=18.088, df=3, p=0.000 indicating that there is significance difference between observed distribution of data when compared to the expected distribution and therefore the null hypothesis was rejected; *H*o1: There is no relationship between top management support and successful implementation of biomedical projects. The alternative hypothesis H1 was accepted. *H1*: There is statistically significance relationship between top management support and successful implementation of biomedical projects. The top management support is expected to influence projects implementation because KEMRI deals with biomedical projects and most of the work done in the institutes is based on these projects. The number of projects implemented counts in the performance contract of each individual scientist and for the institute.

4.5 Organization Structure on Successful Implementation of Projects

When the respondents were asked whether the organization structure in the institutes support projects implementation, the majority of the respondents, 73.7%, indicated that organization structure in the institute supports projects implementation while 26.3% said it does not support project implementation.

The respondents were asked how fast decisions or flow of information that affects project implementation are. In scale of 5, 5-being extremely fast, 4-very fast, 3-moderately fast, 2-very slow and 1-extremely slow

The respondents were asked to rank some of the organization culture which affects the process of project implementation. 53.9% of the respondent said that approvals of project implementation documents is moderately fast while 46.1% said the process was either very slow or extremely slow (Table 4.5).

The frequency analysis indicating the factor: Projects teams involvement in decision making that affect their projects revealed that 23.7% of the responses either said there involvement was extremely fast or very fast while 52.6% said it was moderately fast indicating that the

management do not involves projects teams in decision making process which affects their projects (Table 4.5).

Table 4.5 organizational rules affecting successful implementation of projects

	Frequency	Percentage (%)
1. Approvals of project implementation documents		
Moderately fast	41	53.9
Very slow	17	22.4
Extremely slow	18	23.7
Total	76	100
2. Projects teams involvement in decision making that affect their projects		
Extremely fast	4	5.3
Very fast	14	18.4
Moderately fast	40	52.6
Very slow	13	17.1
Extremely slow	5	6.6
Total	76	100
3. Flow of information from scientific committees to the project team leader		
Very fast	8	10.5
Moderately fast	45	59.2
Very slow	18	23.7
Extremely slow	5	6.6
Total	76	100

4.	Communication between the projects team leader and different scientific committee		
	Very fast	12	15.8
	Moderately fast	42	55.3
	Very slow	12	15.8
	Extremely slow	10	13.2
	Total	76	100
5.	Consultation on the things that was affects projects		
	Very fast	3	3.9
	Moderately fast	45	59.2
	Very slow	21	27.6
	Extremely slow	7	9.2

To facilitate project implementation process the flow of information from scientific committees to the project team leader is very important. When the respondents were asked how fast is the flow of information from scientific committee only 10.5% who said the flow was very fast while 59.2% indicated that it was moderately fast indicating that any information concerning the projects takes long to get to the project team leader (Table 4.5).

Most of the communication between the projects team leader and different scientific committee is concerning research protocols (proposal) for consideration of implementation and ethical approval. The protocol is sent to scientific committee for review and any comments from reviewers sent back to the projects team leader to do correction. Communication between this projects team leader and different scientific committee is important for easy approval of project implementation documents (Table 4.5).

The frequency analysis indicating the factor: the communication between the projects team leader and different scientific committee revealed that 25.8% of the responses said the communication was very fast while 55.3% said it was moderately fast indicating that there is

room for improving the communication between the projects team leader and different scientific committee for easier implementation of projects (Table 4.5).

The frequency analysis indicating the factor: Consultation on the things that would affects projects revealed that 59.2% of the responses said the consultation moderately fast indicating that it takes long for projects team leader to be consulted on the things that affect projects (Table 4.5).

When the respondents were asked whether the organization structure in the institute influence the successful implementation of the project, the majority of the respondents, 73.7%, indicated that organization structure in the institute influence successful implementation of the project while 26.3% said organization structure in the institute did not influence successful implementation of the project.

When the respondents were asked whether the decision making issues on projects are centralized or decentralized 55.3% said that the decision making issues on projects are centralized while 44.7% said they are decentralized.

Hypothesis 2

As shown in the chi-squire test table below the Pearson Chi-square=11.792, df=3, p=0.008 indicating that there is significance difference between observed distribution of data when compared to the expected distribution and therefore the null hypothesis was rejected; *H*o2: There is no relationship between organization structure in the institute and successful implementation of biomedical projects. The alternative hypothesis H2 was accepted. *H2*: There is statistically significance relationship between organization structure in the institute and successful implementation of biomedical projects. The organization structure at KEMRI which is functional structure takes care of all projects at central level. The structure helps to give chain of command in the issues concerning the projects. The structure is expected to support project for they help to carry out the mandate of KEMRI.

Table 4.6 Test of Hypothesis Ho2: There is no relationship between organization structure in the institute and successful implementation of biomedical projects

Cross Tabulation: Do organization structure in the institute support project implementation?				
Role in the implementation of the project		Yes	No	Total
principal investigator	Count	37	5	42
	Expected Count	30.9	11.1	42.0
co-investigator	Count	13	9	22
	Expected Count	16.2	5.8	22.0
collaborator	Count	0	1	1
	Expected Count	.7	.3	1.0
support	Count	6	5	11
	Expected Count	8.1	2.9	11.0
Total	Count	56	20	76
	Expected Count	56.0	20.0	76.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.792	3	.008
Likelihood Ratio	12.015	3	.007
Linear-by-Linear Association	7.487	1	.006
N of Valid Cases	76		

a 3 cells (37.5%) have expected count less than 5. The minimum expected count is .26.

4.6 Communication System on Successful Implementation of Projects

Communication is one of most challenging and difficult tasks in any project implementation. It is essential for creating an understanding, an approval of the implementation and sharing information between the project team and communicating to the whole organization the results and the goals in each implementation stage.

The questions asked sought to know the communication channels project leader use to communicate within the project team, communication channels the top management use to communicate with the project team.

The frequency analysis indicating the factor: communication channels project leader use to communicate within the project team revealed that 38.2 % of the responses use combination of email &telephone & meetings while 22.4% used emails (Table 4.8).Of worthy noting is the fact that project leaders do not use memos and letters for communication while email, telephone and meetings are the preferred way of communication (Table 4.7).

When the respondents were asked the communication channels the top management use to communicate with the project team 44.7% said top management either use memos or letters. What have been noted is that top management hardly communicates via meeting, only 2.6% of the respondent who indicated that top management uses meeting for communication (Table 4.7).

Table 4.7 Communication channels used by project leaders and top management

		Frequency	Percentage (%)
1.	Communication channels project leaders use		
	Emails	17	22.4
	Meetings	14	18.4
	Email & meetings	15	19.7
	Email &telephone & meetings	29	38.2
	Email & memos	1	1.3
	Total	76	100
2.	Communication channels top management use		
	Emails	9	11.8
	memos	12	15.8
	Meetings	2	2.6
	Letters	22	28.9
	Email & meetings	10	13.2
	Email &telephone & meetings	3	4.0
	Email & memos	18	23.7
	Total	76	100

When the respondents were asked to rank the effectiveness of the communication channels on scale of 5, 5 being extremely effective, 4-very effective, 3-moderately effective, 2-less effective , 1- not effective; 73.7% of the respondents said that emails were either extremely effective or very effective. 36.9% said that telephone was either extremely effective or very effective. 32.9 said that memos were either extremely effective or very effective. 48.7% said that meetings were either extremely effective or very effective while 32.9 said that letters were either extremely effective or very effective (Table 4.8).

Table 4.8 Effectiveness of Communication Channels

	Frequency	Percentage (%)
1. Emails		
Extremely effective	26	34.2
Very effective	30	39.5
Moderately fast	18	23.7
Less effective	1	1.3
Not effective	1	1.3
Total	76	100
2. Telephone		
Extremely effective	4	5.3
Very effective	24	31.6
Moderately fast	35	46.1
Less effective	10	13.2
Not effective	3	3.9
Total	76	100
3. Memos		
Extremely effective	5	6.6
Very effective	20	26.3
Moderately fast	28	36.8
Less effective	23	30.3
Total	76	100
4. Meetings		
Extremely effective	17	22.4
Very effective	20	26.3
Moderately fast	27	35.5
Less effective	6	7.9
Not effective	6	7.9
Total	76	100

5. Letters

Extremely effective	7	9.2
Very effective	18	23.7
Moderately fast	31	40.8
Less effective	7	9.2
Not effective	13	17.1
Total	76	100

When the respondents were asked to rank the effectiveness of communication within the project stake holders, 44.8% of the respondents said that communication to project team & organization on project vision, objectives and benefits were either extremely effective or very effective. When the respondents were asked to rank the effectiveness of communication within the project stake holders on Periodic scheduled project update, 36.9% of the respondents said that communication on Periodic scheduled project update were either extremely effective or very effective. When the respondents were asked to rank the effectiveness of communication within the project stake holders on calls to review the project plan and open issues, 35.5% of the respondents said that communication were either extremely effective or very effective. On timely reporting of issues and resolution 34.2% said that communication were either extremely effective or very effective. The effectiveness of communication within the project team, 44.8% of the respondents said that communication were either extremely effective or very effective. Communication with the funding agent regarding project status, 47.4% of the respondents said that communication were either extremely effective or very effective. When asked to rank the effectiveness of communication to the entire organization regarding the project progress, 31.6% of the respondents said that communication were very effective (Table 4.9).

Table 4.9 Effectiveness of Communication within the project stakeholders

		Frequency	Percentage (%)
1.	Communication to project team & org on project vision objectives and benefits		
	Extremely effective	10	13.2
	Very effective	24	31.6
	Moderately fast	32	42.1
	Less effective	5	6.6
	Not effective	5	6.6
	Total	76	100
2.	Periodic scheduled project update		
	Extremely effective	10	13.2
	Very effective	18	23.7
	Moderately fast	35	46.1
	Less effective	8	10.5
	Not effective	5	6.6
	Total	76	100
3.	Calls to review the project plan and open issues		
	Extremely effective	3	3.9
	Very effective	24	31.6
	Moderately fast	31	40.8
	Less effective	10	13.2
	Not effective	8	10.5
	Total	76	100
4.	Timely reporting of issues and resolution		
	Extremely effective	9	11.8
	Very effective	17	22.4
	Moderately fast	33	43.4
	Less effective	11	14.5

	Not effective	6	7.9
	Total	76	100
5.	Communication within the project team		
	Extremely effective	11	14.5
	Very effective	23	30.3
	Moderately fast	33	43.4
	Less effective	7	9.2
	Not effective	2	2.6
	Total	76	100
6.	Communication with the funding agent regarding project status		
	Extremely effective	17	22.4
	Very effective	19	25.0
	Moderately fast	26	34.2
	Less effective	14	18.4
	Total	76	100
7.	Communication to the entire organization regarding the project progress		
	Extremely effective		
	Very effective	24	31.6
	Moderately fast	26	34.2
	Less effective	19	25.0
	Not effective	7	9.2
	Total	76	100

4.7 Project Team Leader on Successful Implementation of Projects

In this part of study the researcher sought the respondents' views on the influence of project team leader on successful implementation of projects. The project leader is a very important person in project implementation. His leadership attributes determines the successful

implementation of the projects. By applying the appropriate leadership traits a project manager could direct projects effectively and efficiently. The study sought to know the contribution of the project leader characterizes to successful implementation of projects.

The frequency analysis indicating the factor: project leader commitment to successful implementation of the project revealed that 100% of the responses said project leaders were committed to the success implementation of the project.

When the respondents were asked to rank the characteristics of their project leader on scale of 5, 5 being strongly agree, 4-agree , 3- neutral, 2-disagree, 1-strongly disagree on specific characteristics, 75% of the respondents either strongly agreed or agreed that their project leader was able to make decision, 71% of the respondents either strongly agreed or agreed that their project leader understands his/ her role as a project leader, 80.2% of the respondents either strongly agreed or agreed that their project leader has the skills and knowledge to head the project, 71.1% of the respondents either strongly agreed or agreed that their project leader communicate effectively with project team members, 61.8% of the respondents either strongly agreed or agreed that their project leader verifies that tasks are completed on time, 54% of the respondents either strongly agreed or agreed that their project leader has provides communication and coordination across the entire project team, 61.8% of the respondents either strongly agreed or agreed that their project leader provides periodic project updates, 63.2% of the respondents either strongly agreed or agreed that their project leader maintains the project plan, 53.9% of the respondents either strongly agreed or agreed that their project leader well describes the tasks of the project team members, 52.6% of the respondents either strongly agreed or agreed that their project leader hold meeting with stakeholders regularly, 54% of the respondents either strongly agreed or agreed that their project leader involves team members in project decisions, 68.2% of the respondents either strongly agreed or agreed that their project leader know the performance of the projects, 71% of the respondents either strongly agreed or agreed that their project leader control the funds of the projects in order to meet the objectives with the available resources while 60.5% of the respondents either strongly agreed or agreed that their project

leader are always available to help the team members in the areas where they might be faced with technical problems (Table 4.10).

Table 4.10 Characteristics of project leader

		Frequency	Percentage (%)
1.	Able to make decision		
	Strongly agree	30	39.5
	Agree	27	35.5
	Neutral	15	19.7
	Disagree	4	5.3
	Total	76	100
2.	Understand his/her role as a project leader		
	Strongly agree	26	34.2
	Agree	28	36.8
	Neutral	20	26.3
	Disagree	2	2.6
	Total	76	100
3.	Has the skills and knowledge to head the project		
	Strongly agree	34	44.7
	Agree	27	35.5
	Neutral	13	17.1
	Disagree	2	2.6
	Total	76	100
4.	Communicate effectively with project team members		
	Strongly agree	23	30.3
	Agree	31	40.8
	Neutral	16	21.1
	Disagree	6	7.9

	Total	76	100
5.	Verifies that tasks are completed on time		
	Strongly agree	21	27.6
	Agree	26	34.2
	Neutral	25	32.9
	Disagree	2	2.6
	Strongly disagree	2	2.6
	Total	76	100
6.	Provides communication and coordination across the entire project team		
	Strongly agree	16	21.1
	Agree	25	32.9
	Neutral	11	14.5
	Disagree	19	25.0
	Strongly disagree	5	6.6
	Total	76	100
7.	Provides periodic projects update		
	Strongly agree	21	27.6
	Agree	26	34.2
	Neutral	23	30.3
	Disagree	3	3.9
	Strongly disagree	3	3.9
	Total	76	100
8.	Maintains the project plan		
	Strongly agree	19	25.0
	Agree	29	38.2
	Neutral	19	25.0
	Disagree	7	9.2
	Strongly disagree	2	2.6

Total	76	100
9. Well describes the tasks of the project team members		
Agree	26	34.2
Neutral	27	35.5
Disagree	6	7.9
Strongly disagree	2	2.6
Total	76	100
10. Hold meetings with the stakeholders		
Strongly agree	14	18.4
Agree	26	34.2
Neutral	21	27.6
Disagree	12	15.8
Strongly disagree	3	3.9
Total	76	100
11. Involves team members in project decisions		
Strongly agree	12	15.8
Agree	29	38.2
Neutral	28	36.8
Disagree	4	5.3
Strongly disagree	3	3.9
Total	76	100
12. Know the performance of the projects		
Strongly agree	24	31.6
Agree	28	36.8
Neutral	21	27.6
Disagree	3	3.9
Total	76	100
13. Control the funds of the projects		

Strongly agree	28	36.8
Agree	26	34.2
Neutral	17	22.4
Disagree	5	6.6
Total	76	100
14. Help the team members to solve technical problem		
Strongly agree	24	31.6
Agree	22	28.9
Neutral	14	18.4
Disagree	14	18.4
Strongly disagree	2	2.6
Total	76	100

When the respondents were asked to rank the performance of some functions by project leader on scale of 5, 5 being performed perfectly, 4-performed well, -average performance, -poor performance, 1-did not perform at all, 46.1% of the respondents said that the project leader either performed perfectly or performed well in Managing procurement issues, 56.6% of the respondents said that the project leader either performed perfectly or performed well in Managing project schedules, 63.1% of the respondents said that the project leader either performed perfectly or performed well in managing project budget, 65.8% of the respondents said that the project leader either performed perfectly or performed well in managing delivery of quality, 47.3% of the respondents said that the project leader either performed perfectly or performed well in managing project risks, 50% of the respondents said that the project leader either performed perfectly or performed well in managing people and relationship, 55.3% of the respondents said that the project leader either performed perfectly or performed well in manage communications with all key Stake holder (Table 4.11).

Table 4.11 Project leader performance on some functions

	Frequency	Percentage (%)
1. Manage procurement issues		
Performed perfectly	4	5.3
Performed well	31	40.8
Average performance	17	22.4
Poor performance	24	31.6
Total	76	100
2. Manage project schedules		
Performed perfectly	18	23.7
Performed well	25	32.9
Average performance	28	36.8
Poor performance	5	6.6
Total	76	100
3. Manage project budget		
Performed perfectly	22	28.9
Performed well	26	34.2
Average performance	28	36.8
Total	76	100
4. Manage project delivery of quality		
Performed perfectly	19	25.0
Performed well	31	40.8
Average performance	26	34.2
Total	76	100
5. Manage project risks		
Performed perfectly	15	19.7
Performed well	21	27.6
Average performance	38	50.0
Poor performance	2	2.6

	Total	76	100
6.	Manage people and relationship		
	Performed perfectly	6	7.9
	Performed well	32	42.1
	Average performance	34	44.7
	Poor performance	4	5.3
	Total	76	100
7.	Manage communication with all key stakeholder		
	Performed perfectly	18	23.7
	Performed well	24	31.6
	Average performance	34	44.7
	Total	76	100

When the respondents were asked whether project leader performance influence the successful implementation of the project 73.7% said project leader performance influence the successful implementation of the project while 26.3% said project leader performance does not influence the successful implementation of the project.

Hypothesis 3

As shown in the chi-squire test table below the Pearson Chi-square=14.204, df=3, p=0.003 indicating that there is significance difference between observed distribution of data when compared to the expected distribution and therefore the null hypothesis was rejected; *H*o3: There is no relationship between project leader performance and successful implementation of biomedical projects. The alternative hypothesis H3 was accepted. *H3*: There is statistically significance relationship between project leader performance and successful implementation of biomedical projects. The project leader who is the principal investigator plays a very important role in project implementation. The principal investigator (PI) is the person who conceptualizes idea and writes the proposal as well as look for funding from

funding agencies. The project leader knows the project very well and he/she affects the project implementation.

Table 4.12 Test of Hypothesis Ho3: There is no relationship between project leader performance and successful implementation of biomedical projects

Cross Tabulation: Did project leader performance influence the successful implementation of the project?

Role in the implementation of the project		Yes	No	Total
Principal investigator	Count	25	17	42
	Expected Count	30.9	11.1	42.0
Co-investigator	Count	21	1	22
	Expected Count	16.2	5.8	22.0
Collaborator	Count	0	1	1
	Expected Count	.7	.3	1.0
Support	Count	10	1	11
	Expected Count	8.1	2.9	11.0
Total	Count	56	20	76
	Expected Count	56.0	20.0	76.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.204	3	.003
Likelihood Ratio	16.074	3	.001
Linear-by-Linear Association	5.012	1	.025
N of Valid Cases	76		

a 3 cells (37.5%) have expected count less than 5. The minimum expected count is .26.

4.8 Impact of procurement procedures on successful implementation of projects

Procurement of research consumables is a very important aspect of the success of projects. Biomedical research which deals with human pathogens requires all the consumables ready at the time of implementation for the experiments to be carried out smoothly and successfully. Therefore procurements procedures at any institute that deals with biomedical research should be smooth to avoid delays in project implementation.

When the respondents were asked whether the process of procuring consumables for project is smooth 19.7% said yes while 80.3% said no. On the opinion whether correct procurement procedure and guidelines are applied in the projects 39.5% said procedure and guidelines are applied while 60.5% said procedure and guidelines are not applied. When the respondents were asked whether the procurement procedure contribute to the successful implementation of the project 57.9% said it contributes while 42.1% said it does not contribute to the successful implementation of the project.

When the respondents were asked to rank how fast the procurement procedures are, on scale of 5, 5 being extremely fast, 4-fast, 3-moderate, 2-slow, 1-very slow, 7.9% of the respondents said that getting a quotation of consumables required for the project from procurement officers was either extremely fast or fast, 5.3% of the respondents said that reply of the requisition raised by project leader was fast, 3.9% of the respondents said that order of the consumables after the approval of request was fast while delivery of consumables was only rated moderately. This means that majority of the respondent rate the procurement procedure as moderate, slow or very slow (Table 4.13).

Table 4.13 Procurement procedures

	Frequency	Percentage (%)
1. Getting a quotation		
Extremely fast	2	2.6
Fast	4	5.3
Moderate	25	32.9
Slow	33	43.4
Very slow	12	15.8
Total	76	100
2. Reply of the requisition raised		
Fast	4	5.3
Moderate	31	40.8
Slow	18	23.7
Very slow	23	30.3
Total	76	100
3. Order after the approval of request		
Fast	3	3.9
Moderate	10	13.2
Slow	21	27.6
Very slow	42	55.3
Total	76	100
4. Delivery of consumables		
Moderate	41	53.9
Slow	4	5.3
Very slow	31	40.8
Total	76	100

When the respondents were asked to rank how some factors affect procurement of the project consumables, on scale of 5, 5 being Adversely affect, 4- Affect, 3- Moderately affect, 2- Slightly affect, 1- Did not affect at all, 82.9% of the respondents said that long procurement procedures either adversely affect or affect procurement of project consumables, 84.2% of the respondents said that long bureaucracy either adversely affect or affect procurement of project consumables, 59.2% of the respondents said that poor quality supplies either adversely affect or affect procurement of project consumables, 73.7% of the respondents said that procurement of things to be imported takes very long and this either adversely affect or affect procurement of project consumables, 57.9% of the respondents said that delays in delivery of ordered consumables either adversely affect or affect procurement of project consumables (Table 4.14).

Table 4.14 Procurement of the project consumables

	Frequency	Percentage (%)
1. Long procurement procedures		
Adversely affect	48	63.2
Affect	15	19.7
Moderately affect	10	13.2
Did not affect at all	3	3.9
Total	76	100
2. Long bureaucracy		
Adversely affect	45	59.2
Affect	19	25.0
Moderately affect	2	2.6
Slightly affect	7	9.2
Did not affect at all	3	3.9
Total	76	100
3. Poor quality supplies		
Adversely affect	36	47.4

	Affect	9	11.8
	Moderately affect	26	34.2
	Did not affect at all	5	6.6
	Total	76	100
4.	Procurement of things to be imported takes very long		
	Adversely affect	42	55.3
	Affect	14	18.4
	Moderately affect	12	15.8
	Slightly affect	5	6.6
	Did not affect at all	3	3.9
	Total	76	100
5.	Delays in delivery of ordered consumables		
	Adversely affect	35	46.1
	Affect	9	11.8
	Moderately affect	16	21.1
	Slightly affect	13	17.1
	Did not affect at all	3	3.9
	Total	76	100

Hypothesis 4

As shown in the chi-squire test table below the Pearson Chi-square=10.461, df=3, p=0.015 indicating that there is significance difference between observed distribution of data when compared to the expected distribution and therefore the null hypothesis was rejected; *H*o4: There is no relationship between procurement procedures and successful implementation of biomedical projects. The alternative hypothesis H4 was accepted. *H4*: There is statistically significance relationship between procurement procedures and successful implementation of biomedical projects. The delays caused by procurement procedure affect project

implementation. The delay in procurement procedures will cause the project to delay in implementation and completion.

Table 4.15 Test of Hypothesis Ho4: There is no relationship between procurement procedures and successful implementation of biomedical projects

Cross Tabulation: Did procurement structures contribute to the successful implementation of the project?

Role in the implementation of the project		Yes	No	Total
principal investigator	Count	22	20	42
	Expected Count	24.3	17.7	42.0
co-investigator	Count	11	11	22
	Expected Count	12.7	9.3	22.0
collaborator	Count	0	1	1
	Expected Count	.6	.4	1.0
support	Count	11	0	11
	Expected Count	6.4	4.6	11.0
Total	Count	44	32	76
	Expected Count	44.0	32.0	76.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.461	3	.015
Likelihood Ratio	14.828	3	.002
Linear-by-Linear Association	5.956	1	.015
N of Valid Cases	76		

a 3 cells (37.5%) have expected count less than 5. The minimum expected count is .42.

4.9 Combined influence of the independent variables on the dependent variable

The independent variable studied in this project affect in one way or another project implementation process. The study sought to know how the 5 independent variable are ranked on scale of 5, 5 being Adversely affect, 4- Affect, 3- Moderately affect, 2- Slightly affect, 1- Did not affect at all.

When the respondents were asked to rank how the five independent variables affect project implementation on scale of 5, 36.8% of the respondents said that top management support either adversely affect or affect project implementation while 43.4% said top management support moderately affect project implementation , 31.6% of the respondents said that organization structure either adversely affect or affect while 48.7% said organization structure moderately affect project implementation, 21% of the respondents said that Communication system either adversely affect or affect while 59.2% said Communication system moderately affect project implementation, 28.9% of the respondents said that Project team leader adversely affect or affect while 32.9% said Project team leader moderately affect project implementation, 92.1% of the respondents said that Procurement procedures either adversely affect or affect while 7.9% said Procurement procedures moderately affect project implementation (Table 4.18).

Table 4.16 Comparing how the five independent variables affect project implementation

	Frequency	Percentage (%)
1. Top management support		
Adversely affect	3	3.9
Affect	25	32.9
Moderately affect	33	43.4
Slightly affect	5	6.6
Did not affect at all	10	13.2
Total	76	100

2.	Organization procedures		
	Adversely affect	11	14.5
	Affect	13	17.1
	Moderately affect	37	48.7
	Slightly affect	7	9.2
	Did not affect at all	8	10.5
	Total	76	100
3.	Communication system		
	Adversely affect	9	11.8
	Affect	7	9.2
	Moderately affect	45	59.2
	Slightly affect	9	11.8
	Did not affect at all	6	7.9
	Total	76	100
4.	Project team leader		
	Adversely affect	8	10.5
	Affect	14	18.4
	Moderately affect	25	32.9
	Slightly affect	12	15.8
	Did not affect at all	17	22.4
	Total	76	100
5.	Procurement procedures		
	Adversely affect	53	69.7
	Affect	17	22.4
	Moderately affect	6	7.9
	Total	76	100

Table 4.17 Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Top management support	76	4	1	5	3.08	1.04	1.087
Organization structure	76	4	1	5	3.16	1.12	1.255
Communication system	76	4	1	5	3.05	1.01	1.011
Project team leader	76	4	1	5	2.79	1.28	1.635
Procurement procedures	76	2	3	5	4.62	.63	.399

Descriptive statistics comparing the mean of the five independent variables found out that procurement procedures had the highest mean of 4.62 which is approximately 5 and this was ranked as adversely affect meaning that procurement procedures adversely affect project implementation, organization structure, top management support, communication system had a mean of 3.16, 3.08, 3.05 respectively which is approximately 3- moderately affect. These 3 variables moderately affect project implementation. Project team leader had the lowest mean of 2.79 which is approximately 3 and this was ranked as moderately affect meaning that project team leader moderately affect project implementation (Table 17).

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings, conclusions and recommendations of the study. The study had five objective, to establish the role of top management support on successful implementation of biomedical projects, to establish the influence of organization structure on successful implementation of biomedical projects, to establish the influence of communication system on successful implementation of biomedical projects, to assess the extent to which project team leader influences successful implementation of biomedical projects , to investigate the impact of procurement procedures on successful implementation of biomedical projects .

5.2 Summary of Findings

The findings of this study are based on a survey done at KEMRI completed by scientific staff. The findings support the critical success factors and their contribution to successful implementation projects.

The study results strongly indicate that top management support influence successful implementation of the project. The null hypothesis was rejected and alternative hypothesis was accepted. *H1*: There is statistically significance relationship between top management support and successful implementation of biomedical projects.

Based on the findings of this study it appears that organization structure in the institute influence successful implementation of biomedical projects. The null hypothesis was rejected and alternative hypothesis was accepted. *H2*: There is statistically significance

relationship between organization structure in the institute and successful implementation of biomedical projects.

The respondents in this study strongly indicated that effectiveness of communication system is very important for successful implementation of the project.
The study found out that the project leaders are committed to successful implementation of the projects. The null hypothesis was rejected and alternative hypothesis was accepted. *H3*: There is statistically significance relationship between project leader performance and successful implementation of biomedical projects.

The study results found out that procurement procedures adversely affect successful implementation of the projects. The null hypothesis was rejected and alternative hypothesis was accepted. *H4*: There is statistically significance relationship between procurement structures and successful implementation of biomedical projects.

5.3 Discussion of the findings

The discussion below is presented for each research objectives

5.3.1 Role of Top Management Support on Successful Implementation Projects

Top management support and commitment are critical to achieve success implementation of the project. The study findings show that the top management support influence the successful implementation of the project with 76.3% of the respondents, indicating that top management support influence successful implementation of the project.

The roles the top management plays to support implementation of the projects are crucial. The study results shows that more than 50% of the respondents said that the top management supported the project by having initial involvement after the project was funded, top management respects project managers indicating that they recognize project managers role, top management gives authority to project manager to carry out project implementation without any interference, top management provides access to technical

expertise, top management gave trust/freedom in decision making process to project team. This result agrees with Somers & Nelson 2003 who found out that top management support has been consistently identified as the most important and crucial success factor in project implementation. Slevin & Pinto 1996 said that the top management should provide the necessary resources and authority or power for project success the respondents of this study indicated that top management gave authority to project team.

The study results also indicated that less than 50% of the respondents indicated that the top management supported the project implementation by having regular meetings with the project team to address problems arising, top management assistance with extra resources having the lowest percentage of respondent 19.8% declaring support, top management assistance with procedures and protocols had 38.8% respondent, top management troubleshooting on behalf of the project team had 23.7% of the respondent while top management support by assisting in reducing the bureaucracy had 43.3% respondent declaring support of top managements. The top management should improve on the indicated roles. It is important to note Easteves and Pastor (2000) statement that sustained management support is related with sustained management commitment, both at top and middle levels during the implementation, in terms of their own involvement and the willingness to allocate valuable organizational resources.

When the respondent were asked the extra support they would have liked to have had from senior management or senior executives associated with the project some indicated that they would want the top management to assist with trouble shooting to handle problems arising during the project implementation, others said that they would want a conducive environment for project success by streamlining all bureaucracies while others said that setting up of committees to review compliance to organizational policies during project design and budget preparation would be important for success of project implementation. Other respondents said deployment of more staff to ease the workload and especially the technical staff.

The study rejected the null hypothesis after finding out that there is significance difference between observed distribution of data when compared to the expected distribution and therefore the alternative hypothesis was accepted *H1*: There is statistically significance relationship between top management support and successful implementation of biomedical projects.

5.3.2 Organization Structure on Successful Implementation of Projects

Organizational structure influence implementation of projects. The study findings shows that majority of the respondents 73.7%, indicated that organization structure in the institute supports projects implementation. The respondents also gave their views of what they think can be done for the organization structure to support project implementation, some of the respondents said that there is need for reduction of bureaucracy, while others said that researchers should be involved in the process of decision making and should be accorded the rightful place in management, others felt that there should be an office set to coordinate project implementation, majority of the respondents said that procurement structure is a big hindrance to successful implementation of the projects.

Every organization has rules which govern the ways things are done in the organization. There are some rules in KEMRI that have to be followed before the project is implemented. One of them is that the proposals have to get ethical approval by rigorously going through a review in three scientific committees. The approvals of project implementation documents was rated moderately fast by 53.9% of the respondents, none of the respondents rated approval as fast meaning that there is delay in approvals of project implementation document. The response on projects teams' involvement in decision making that affect their projects revealed that 23.7% of the respondent said involvement was fast while 52.6% said it was moderately fast meaning that the management are not fast in involving projects teams in decision making process which affects their projects. To facilitate project implementation process the flow of information from scientific committees to the project team leader is very important. Only 10.5% of the respondents said that the flow of information was fast while

59.2% said it was moderately fast indicating that any information concerning the projects takes long to get to the project team leader.

Most of the communication between the projects team leader and different scientific committee is concerning research protocols (proposal) for consideration of implementation and ethical approval. The protocol is sent to scientific committee for review and any comments from reviewers sent back to the projects team leader to do correction. Communication between this projects team leader and different scientific committee is important for easy approval of project implementation documents. 25.8% of the respondent said that that communication between the projects team leader and different scientific committee was very fast while 55.3% said it was moderately fast indicating that there is room for improving the communication between the projects team leader and different scientific committee for easier implementation of projects. Consultation on the things that would affects projects the study revealed that 59.2% of the respondents said the consultation was moderately fast none of them said it was fast this is an indication that it takes longer than expected for projects team leader to be consulted on the things that affect projects. The study found out that the decision making issues on projects are centralized as indicated by 55.3% of the respondent against the 44.7% of the respondents who said they are decentralized

The study rejected the null hypothesis after finding out that there is significance difference between observed distribution of data when compared to the expected distribution and therefore the alternative hypothesis was accepted *H2*: There is statistically significance relationship between organization structure in the institute and successful implementation of biomedical projects.

5.3.3 Communication System on Successful Implementation of Projects

Communication is one of most challenging and difficult tasks in any project implementation. It is essential for creating an understanding, an approval of the implementation and sharing

information between the project team and communicating to the whole organization the results and the goals in each implementation stage. The sought to know the communication channels project leader use to communicate within the project team, communication channels the top management use to communicate with the project team and effectiveness of the communication within the stakeholders.

The study results found out that communication channels project leader use to communicate within the project team was a combination of email &telephone & meetings with highest percentage of respondents 38.2 % while 22.4% used emails. Of worthy noting is the fact that project leaders do not use memos and letters for communication while email, telephone and meetings are the preferred way of communication. The study also found out that the communication channels the top management use to communicate with the project team is either memos or letters with 44.7% of the respondents. What have been noted is that top management hardly communicates via meeting, only 2.6% of the respondent who indicated that top management uses meeting for communication. Email was ranked as the most effective way of communication with 73.7% of the respondents rating it as extremely effective or very effective, meetings followed with 48.7% of the respondents saying it is either extremely effective or very effective, 36.9% of respondents said that telephone was either extremely effective or very effective, while 32.9 % of the respondents said memos and letters were either extremely effective or very effective.

The study results found out that communication to project team & organization on project vision, objectives and benefits need to be improved with only 44.8% of the respondents saying it was effective. The study also found out that the effectiveness of communication within the project stake holders on Periodic scheduled project update also need to be improved having 36.9% of the respondents saying it was effective. The effectiveness of communication within the project stake holders on calls to review the project plan and open issues had 35.5% of the respondents saying it was effective. On timely reporting of issues and resolution 34.2% said that communication were effective. The effectiveness of communication within the project team, 44.8% of the respondents said that communication

effective. Communication with the funding agent regarding project status, 47.4% of the respondents said that communication was effective. The effectiveness of communication to the entire organization regarding the project progress, 31.6% of the respondents said that communication was effective.

The study findings on the effectiveness of the communication channels, noted that emails were the most effective way of communication with 73.7% of the respondents saying they are very effective. 36.9% said that telephone was very effective. 32.9 said that memos were very effective. 48.7% said that meetings were either very effective while 32.9 said that letters were either extremely effective or very effective. The results noted that communication within the project stake holders was poor, none of the communication had a frequency of 50% meaning that less than half of the respondents said that communication were either extremely effective or very effective. The effectiveness of the communication is very crucial, the study agrees with Esteves & Pastor 2001a,b,c who considers communication as a very important factors for the implementation of projects by many authors. Although the authors also agrees that it is one of most challenging and difficult tasks in any project implementation the need for adequate communication channels is extremely important in creating an atmosphere for successful project implementation. The study also agrees that communication is not only essential within the project team itself, but between the team and the rest of the organization as well as with the client (Chandramouli 2011, PMBOK 2008, Davenport, 1993, Dixon et al., 1994).

5.3.4 Project Team Leader on Successful Implementation of Projects

A project manager is often by default regarded as a project leader, playing a significant role in not merely managing but also leading the project team to achieve the objectives of the project. The project leader is a very important person in project implementation. The project leader needs to have skills and knowledge that would help him/her in leading the project. His/her characteristics and performance depend on the skills and knowledge and experience in projects leadership. His leadership attributes determines the successful implementation of

the projects. By applying the appropriate leadership traits a project manager could direct projects effectively and efficiently. The study found out that project leaders were committed to successful implementation of the project with 100% of the respondent agreeing.

The study noted that 75% of the respondents agreed that their project leader were able to make decision, 71% of the respondents agreed that their project leader understands his/ her role as a project leader, 80.2% of the respondents agreed that their project leader has the skills and knowledge to head the project, 71.1% of the respondents agreed that their project leader communicate effectively with project team members, 61.8% of the respondents either agreed that their project leader verifies that tasks are completed on time, 54% of the respondents agreed that their project leader provides communication and coordination across the entire project team, 61.8% of the respondents agreed that their project leader provides periodic project updates, 63.2% of the respondents agreed that their project leader maintains the project plan, 53.9% of the respondents agreed that their project leader well describes the tasks of the project team members, 52.6% of the respondents agreed that their project leader hold meeting with stakeholders regularly, 54% of the respondents agreed that their project leader involves team members in project decisions, 68.2% of the respondents either agreed that their project leader know the performance of the projects, 71% of the respondents agreed that their project leader control the funds of the projects in order to meet the objectives with the available resources while 60.5% of the respondents agreed that their project leader are always available to help the team members in the areas where they might be faced with technical problems. In each of the 14 characteristics of the team leader more than 50% of the respondents said their leaders have them. In various studies on project success or failure and effective leadership good communication (Ammeter and Dukerich, 2002, Pettersen, 1991; White and Fortune, 2002; White and Fortune, 2002) were found to be important skills required by project managers. This agrees with our study.

On performance of some specific duties; the study found out that 46.1% of the respondents said the project leader performed well in Managing procurement issues, 56.6% of the respondents said project leader performed well in Managing project schedules, 63.1% of the

respondents said the project leader performed well in managing project budget, 65.8% of the respondents said the project leader performed well in managing delivery of quality, 47.3% of the respondents said the project leader performed well in managing project risks, 50% of the respondents said the project leader performed well in managing people and relationship, 55.3% of the respondents said the project leader performed well in managing communications with all key Stake holder. In all the duties the project leaders performed well with more than 50% of the respondents agreeing except for management of procurement issues. This is believed is due to the complexity of the procurement procedures. The study results also noted that 73.7% of the respondent said the project leader performance influence the successful implementation of the project.

The study rejected the null hypothesis after finding out that there is significance difference between observed distribution of data when compared to the expected distribution and therefore the alternative hypothesis was accepted *H3*: There is statistically significance relationship between project leader performance and successful implementation of biomedical projects.

5.3.5 Impact of procurement procedures on successful implementation of projects

Procurement of research consumables is a very important aspect of the success of projects. Biomedical research which deals with human pathogens requires all the consumables ready at the time of implementation, for the experiments to be carried out smoothly and successfully. Therefore procurements procedures at any institute that deals with biomedical research should be smooth to avoid delays in project implementation.

The study found out that the process of procuring consumables for project is not smooth. Only 19.7% of the respondent said it was smooth while all the rest said it was not smooth. 39.5% of the respondents said that correct procurement procedure and guidelines are applied in the projects this is below 50% and therefore most of the respondents feel that the correct procurement procedure and guidelines are not applied. The study also found out that

majority of the respondent 68.4% said procurement structures do not contribute to the successful implementation of the project only 31.6% said procurement structures contribute to the successful implementation of the project. The respondents gave some of the obstacles faced during the procurement and how they can be improved in the open ended questions. Some obstacles indicated includes delays in delivering consumables, poor quality and quantity delivery of reagents, procurement officers having conflict of interest, corruption aimed at making procurement officers profit at the expense of project. The suggestion solution was to overhaul the procurement department and bring people of integrity, to involve the laboratory/other stakeholders in the procurement process, allows the project manager to identify the supplier of the sensitive biomedical material.

The rating of how fast the procurement procedures are was done and 7.9% of the respondents said that getting a quotation of consumables required for the project from procurement officers was fast, 5.3% of the respondents said that reply of the requisition raised by project leader was fast, 3.9% of the respondents said that order of the consumables after the approval of request was fast while delivery of consumables was only rated moderately. This means that majority of the respondent rate the procurement procedure as moderate fast, slow or very slow. There is need for improvement in this area.

The respondents ranked how some factors affect procurement of the project consumables, 82.9% of the respondents said that long procurement procedures affect procurement of project consumables, 84.2% of the respondents said that long bureaucracy affects procurement of project consumables, 59.2% of the respondents said that poor quality supplies affects procurement of project consumables, 73.7% of the respondents said that procurement of things to be imported takes very long and this affects procurement of project consumables, 57.9% of the respondents said that delays in delivery of ordered consumables affect procurement of project consumables.

The respondents gave their suggestions on how they would like the procurement of consumables for research to be conducted and some said that the project stakeholders

should be enabled to purchase consumables without necessitating institutional procurement and putting alternative checks and balances in place, others said that project manager and his/her team should make decisions on the entire procurement process and have a representative in the procurement committee others noted that, procurement and supplies officers should have some training or experience in research. Majority of the respondents said that the institute should find a way of making procurement of biomedical projects fast and effective. Some of the critical factors mentioned for the institute to consider when procuring consumables for biomedical project are delays which become very expensive at the end of the projects, high prices of quotes that drain and stain the project financial status, prompt delivery of consumables, includes biomedical scientists in procurement division to advise the team.

The study rejected the null hypothesis after finding out that there is significance difference between observed distribution of data when compared to the expected distribution and therefore the alternative hypothesis was accepted *H4*: There is statistically significance relationship between procurement structures and successful implementation of biomedical projects.

5.3.6 Combined influence of the independent variables on the dependent

Descriptive statistics comparing the mean of the five independent variables found out that procurement procedures had the highest mean of 4.62 which is approximately 5 and this was ranked as adversely affect meaning that procurement procedures adversely affect project implementation, organization structure, top management support, communication system had a mean of 3.16, 3.08, 3.05 respectively which is approximately 3- moderately affect. These 3 variables moderately affect project implementation. Project team leader had the lowest mean of 2.79 which is approximately 3 and this was ranked as moderately affect meaning that project team leader moderately affect project implementation. The ranking was either 5-adversely affect or 3-moderately affect. It was clear from this comparison that all the five independent variable affect successful implementation of biomedical projects.

5.4 Conclusions

The top management support is very important in successful implementation of projects. The roles played by top managements during project implementation influence successful implementation of projects. The principal investigator who is the project leader are committed to successful implementation of the project but without the top management support and goodwill they cannot be able to implement the projects. The top management should devise a way of assisting the project leaders in project implementation.

For the successful implementation of the projects, organization Structure should support projects. The coordination of projects is easier if the organization structure fully supports projects. The organization structure of KEMRI is functional structure. It is important for the institute to take into consideration of projects and to incorporate the structure that will allow successful project implementation.

Communication is one of most challenging and difficult tasks in any project implementation. It is essential for creating an understanding to all stakeholders. The communication between the project team and top management in KEMRI should be improved. The same is to scientific committee and project team leader. The communication channel that deliver the information at the shortest time which is reliable, effective should be used for easier and faster communication.

The project leader is a very important person in project implementation. The project leader needs to have skills and knowledge that would help him/her in leading the project. His/her characteristics and performance depend on the skills and knowledge and experience in projects leadership. His leadership attributes determines the successful implementation of the projects. By applying the appropriate leadership traits a project manager could direct projects effectively and efficiently. The project leaders should be committed to successful implementation of the project.

Procurement of research consumables is a very important aspect of the success of projects. Biomedical research which deals with human pathogens requires all the consumables ready at the time of implementation, for the experiments to be carried out smoothly and successfully. Therefore procurements procedures at any institute that deals with biomedical research should be smooth to avoid delays in project implementation. The delay in procurement of consumables delays the completion of the projects and hence increases the project budget. The obstacles indicated delays in delivering consumables, poor quality and quantity delivery of reagents, procurement officers having conflict of interest, corruption aimed at making procurement officers profit at the expense of project can be overcome if the procurement procedures have checks and control from top management.

5.5 Recommendations

The study makes the following recommendations that will enhance the successful implementation of biomedical projects

The top management support is very crucial in success implementation of biomedical project. The roles the top management's plays during project implementation greatly affect the overall success of project and should be taken seriously. This should be standardized to all projects to make sure all project gets equal or relatively the same attention from the top management.

The organization that carries out its functions through different projects, should have an organization structure that supports these projects. The adoption of project friendly structure will keenly consider projects and success rate of project will be high and within the time limit given to each projects. It is important for the institute organization structure to have project related structure.

The communication channels that deliver the information at the shortest time which are reliable, effective and efficient should be used for easier and faster communication of issues concerning projects. The bureaucracy of communication which takes long and it's not

effective should be done away with and embrace the faster and effective way of communication.

The project leader needs to have skills and knowledge that would help him/her in leading the project. His/her characteristics and performance depend on the skills and knowledge and experience in projects leadership. The projects leaders should be offered indoor training to enhance their project management skills.

Procurement of research consumables is a very important aspect of the success of projects. The delay in procurement of consumables delays the completion of the projects and hence increases the project budget. The top management should have checks and control of procurements procedures to enhance its effectiveness.

5.6 Suggestions for Further Research

The study gave attention to only few critical success factors and it could not exhaust all the critical success factor that influence successful implementation of biomedical projects. Therefore there is need for more research which will be inclusive of all the critical success factors that influence successful implementation of the biomedical project. The study only focused on KEMRI headquarters. There is need to target the whole population of KEMRI. The study only looked at biomedical projects in KEMRI, other research institutions which deals with biomedical projects should be targeted.

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APPENDICES

Appendix i. Letter of introduction

Date: May 3, 2013

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

REQUEST FOR COLLECTION OF DATA

I Sabina Wangui Wachira, Reg. No. L50/70461/2011, am a post-graduate student at the School of Continuing and Distance Education, University of Nairobi. Am conducting a research titled "**FACTORS INFLUENCING IMPLEMENTATION OF BIOMEDICAL RESEARCH PROJECTS".**

You have been selected to form part of the study. Kindly assist by filling in the attached questionnaire. The information given will be treated in strict confidence and will be purely used for academic purposes. Do not indicate your names or details on questionnaire.

A copy of the final report will be availed upon your request.
Your assistance and cooperation will be highly appreciated

Yours sincerely,

……...
Wachira SabinaWangui
(Student)L50/70461/2011

Appendix ii. Questionnaire

The purpose of this study is to establish the influence of top management support, organization structure, communication system, project team leader and procurement procedures in successful implementation of biomedical research.

This questionnaire is a part of Masters of Arts in Project Planning and Management at the University of Nairobi, and is completely anonymous. Your answer will be treated with confidentially. Please indicate the correct option as honestly and as correctly as possible by checking a TICK (√) on one of the options. For the questions that require your opinion, please complete the blanks.

SECTION A: GENERAL DETAILS (please check all that apply)

PARTICIPANT DETAILS	DESCRIPTION
Age	20-29 ☐ 30-39 ☐ 40-49 ☐ >50 ☐
Sex	Male ☐ Female ☐
Education	Phd. ☐ Masters ☐ Bachelor ☐ Diploma ☐ Others specify
Center	
Designation	Chief research officer ☐ Principle research officer ☐ Senior research officer ☐ Research officer ☐ Assistant research officer ☐ Technologist ☐ Others specify
Project role	Principal investigator ☐ Co-investigator ☐ Collaborator ☐ Support ☐ Others specify
Number of working experience in KEMRI	<2 years ☐ 2-5 years ☐ 6-10 years ☐ >10 years ☐
Number of project involved in	1 ☐ 2-5 ☐ 6-10 ☐ >10 ☐

SECTION B: Critical success factor (please check all that apply)

1. Would you please describe your role in the implementation of this project?

- Oversees institute management ☐
- Principal investigator ☐
- Co-investigator ☐
- Collaborator ☐
- Support PI ☐
- Others specify

2. Have you performed similar role in other project? Yes ☐ No ☐
3. If you answered YES to the previous question- how many projects like this one, have you been involved in the past

- I have been involved in similar project 1 time before ☐
- I have been involved in similar project 2-3 time before ☐
- I have been involved in similar project more than 5 times before ☐

4. Were you involved with the full implementation of the project? Yes ☐ No ☐

If you answered NO to the previous question – with which aspects were you involved in eg. was implementation already on-going?

---

5. In your opinion was the implementation of the project successful? Yes ☐ No ☐

If you answered NO to the previous question –what do you think hindered successful implementation?

---

6. In what ways did the top management support the project team during implementation? Please, rank the following according to 1-no support at all, 2-little support, 3-high support, 4-higher support, 5- highest support

	1	2	3	4	5
Initial involvement after the funding					
Respect for project manager					
Give authority to project manager to carry out project implementation without any interfearance					
Regular meetings with the project team to address problems arising					
Assistance with extra resources when required					
Assistance with procedures and protocols					
Troubleshooting on behalf of the project team					
Providing access to technical expertise					
Trust/freedom in decision making process					
Assist in reducing the bureaucracy					

7. What extra support would you have liked to have had from senior management or senior executives associated with the project?

_____

_____

b) In your opinion, Did top management support influence the successful implementation of the project ☐ Yes ☐ No

8. In your opinion do you think the chain of command (organization structure) in the institute supports projects implementation? ☐ No ☐

If your answer is No to the above question, what do you think should be done on the structure to support project implementation?

_____

_____

9. How would you range the following organizational culture in relation to successful implementation of projects?

	1	2	3	4	5
Top management attitude (1–they have no interest in projects; 5-highly support projects)					
It gives priorities to projects (1 – priorities are not defined; 5 – very high priorities)					
Projects follow the internal regulations (1 – regulations are ignored; 5 – strictly followed)					
Respect of project manager's formal authority (1 – competencies are only on paper; 5 – formal competencies are put into force- very high authority)					

10. How would you rank these factors on a scale, taking 5 as extremely fast, 4 very fast, 3 moderately fast, 2 as very slow , 1 as extremely slow

	1	2	3	4	5
approvals of project implementation documents					
Project teams involvement in decision making that affect their projects					
Flow of information from scientific committees to the project team leader					
Communication between the project team leader and different scientific committee					
Consultation on things that will affects projects					

11. In your opinion is decision making on projects issues centralized or decentralized?

_____

_____

12. In your opinion what is the role of KEMRI organization structure in project implementation? Did KEMRI organization structure contribute or hinder project success?

_____

_____

13. Which communication channels do project leader use to communicate within the project team?

Emails ☐ Telephone ☐ Memos ☐ Meetings ☐ Letters ☐

Others specify

14. Which communication channels do the top management use to communicate with the project team

Emails ☐ Telephone ☐ Memos ☐ Meetings ☐ Letters ☐

Others specify

15. In your opinion how would you rank the effectiveness of the above communication channels in KEMRI on a scale, taking 5-as extremely effective, 4-very effective, 3-moderately effective, 2 less effective , 1- not effective

Communication channels	1	2	3	4	5
Emails					
Telephone					
Memos					
Meetings					

Letters Others specify (as indicated in 9 & 10)						

16. In your opinion how would you rank the effectiveness of communication within the project stakeholders on a scale, taking 5-as extremely effective, 4-very effective, 3-moderately effective, 2-less effective , 1-not effective

	1	2	3	4	5
Communication to project team and organization on project vision, objectives and benefits					
Periodic scheduled project update					
calls to review the project plan and open issues					
Timely reporting of issues and resolution					
Communication within the project team					
Communication with the funding agent regarding project status					
Communication to the entire organization regarding the project progress					

17. In your opinion is the project leader committed to the success of the project?
Yes ☐ No ☐

18. How would you rank the following characteristics of your project leader on a scale, taking 5-as strongly agree, 4-agree , 3- neutral, 2-disagree, 1-strongly disagree

	1	2	3	4	5
Able to make decision					
Understand his/ her role as a project leader					
Has the skills and knowledge to head the project					
Communicate effectively with project team members					
Verifies that tasks are completed on time					
Provides communication and coordination across the entire project team					
Provides periodic project updates					
Maintains the project plan					
Well describes the tasks of the project team members					
Hold meeting with stakeholders regularly					
Involves team members in project decisions					
Know the performance of the projects					
Control the funds of the projects in order to meet the objectives with the available resources					
Always available to help the team members in the areas where they might be faced with technical problems					

19. a) From your perspective how well did the project leader perform the following functions? Please rank the following according to 1-did not perform at all, 2-poor performance, 3-average performance, 4-performed well, 5- performed perfectly

	1	2	3	4	5
Manage procurement issues Manage project schedules Manage project budget Manage delivery of quality Manage project risks Manage people and relationship Manage communications with all key Stake holder (including the project team and other funding agent) Other- please specify and rank					

If you ranked any of these functions under 3 would you please explain why?

_____

_____

b) in your opinion did project leader performance influence the successful implementation of the project? Yes ☐ No ☐

20. In your opinion, is the process of procuring consumables for project smooth?

YES ☐ NO ☐

21. a) In your opinion, are the correct procurement procedure and guidelines applied in the projects? Yes ☐ No ☐

b) What were the main obstacles faced during procurement and how could they be improved?

_____

_____

c) In your opinion, did procurement procedure contribute to the successful implementation of the project? Yes ☐ No ☐

22. From your perspective how fast were the procurement procedures? Please rank the following according to 1-very slow, 2-slow, 3-moderate, 4-fast, 5- extremely fast

	1	2	3	4	5
Getting a quotation Reply of the requisition raised Order after the approval of request					

delivery of consumables Others list					

23. In your opinion how do the following affect procurement of the project consumables? Please rank them according to 1-did not affect at all,2-affect, 3 -moderately affect, 4- slightly affect, 5- adversely affects.

	1	2	3	4	5
Long procurement procedures Long bureaucracy Poor quality supplies Procurement of things to be imported takes very long Delays in delivery of ordered consumables					

24. How would you like the procurement of consumables for research to be conducted?

_____

_____

_____

25. in your opinion are there critical factors you would like the institute to consider when procuring consumables for biomedical project? E.g. time factor, dealing with organisms of importance to the project, dealing with delays etc?

_____

_____

_____

26. In your opinion which of this five factors significantly affect project implementation in KEMRI. Please rank according to 1-did not affect at all,2-affect, 3 -moderately affect, 4- slightly affect, 5- adversely affects.

	1	2	3	4	5
Top management support Organization structure Communication system Project team leader Procurement procedures					

Thank you for your time and your opinions.