Factors Influencing Successful Implementation Of Biomedical Research Projects: A Case Of Kenya Medical Research Institute

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ABSTRACT

The general objective of this research project was to examine factors influencing successful implementation of biomedical research projects in Kenya Medical Research Institute (KEMRI). These research sought to achieve five specific 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. Regression Analysis model is also used. 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. Statistical Package for Social Sciences (SPSS version 20.0) was used to analyze data. Regression model showed a significance relationship between; top management support P value 0.006, organization structure P value 0.001, project leader performance P value 0.029, procurement procedure P value 0.006 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.

1. INTRODUCTION

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).

2. STATEMENT OF THE PROBLEM

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.

3. GENERAL OBJECTIVE

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

4. SPECIFIC OBJECTIVES

The study sought to achieve following specific objective:

- 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

5. 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.

H03: There is no influence of communication systems and successful implementation of biomedical projects.

*H*o4: There is no relationship between project leader performance and successful implementation of biomedical projects.

*H*o5: There is no relationship between procurement procedures and successful implementation of biomedical projects.

6. LITERATURE REVIEW

6.1 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.

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).

6.2 CRITICAL SUCCESS FACTORS OF PROJECTS

Project success is one of the most debated topics but still the least agreed upon (Pinto & Slevin, 1998 ; Shenhar 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. 1983, 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.

6.3 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.

6.4 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 is 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.

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 above (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), 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). In 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.

6.5 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 need to constantly monitor the progress of the project and provide direction to the implementation teams.

6.6 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).

6.7 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)

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).

6.8 PROJECT TEAM LEADERS COMMITMENT

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).

6.9 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). 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 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).

7. 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.

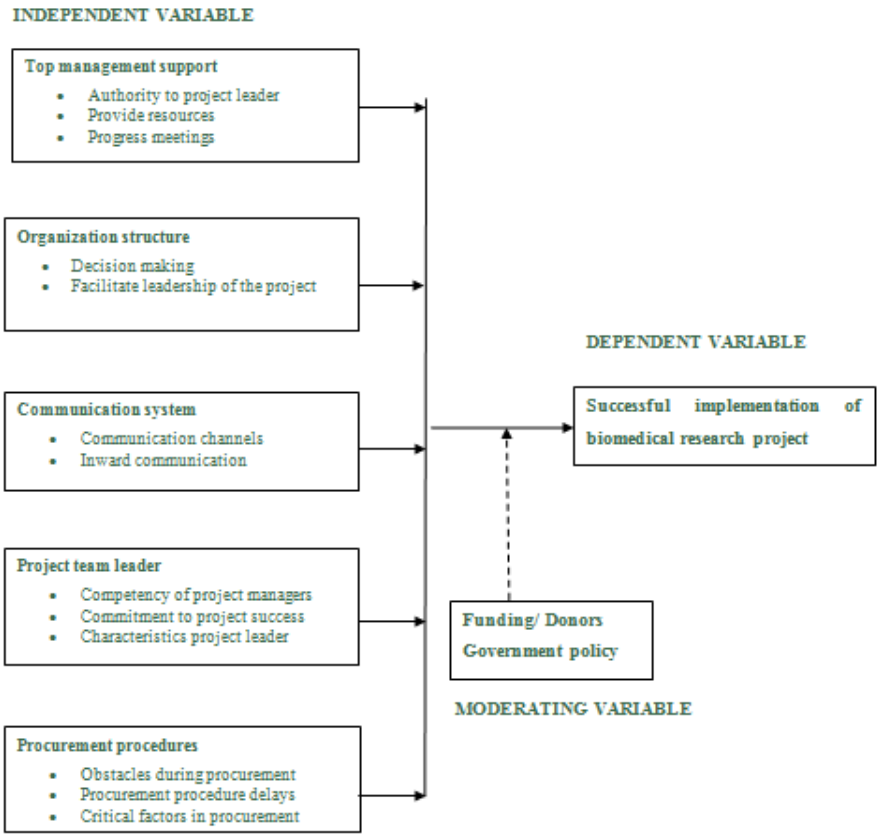

Figure 1: Conceptual Framework on the relationship among variables.

8. 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.

9. RESEARCH METHODOLOGY

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).

9.1 TARGET POPULATION

The population consisted of KEMRI scientific staffs who deal directly with biomedical projects. 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 2 project team member were interviewed this brings a sample size for the study to be 90 KEMRI scientific staff.

9.2 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; 4 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.

9.3 DATA PROCESSING AND ANALYSIS

Data analysis is a practice in which raw data is ordered and organized so that useful information can be extracted (Borg, Gall and Gall, 2007).Quantitative data was analyzed using descriptive statistics, measure of central tendency, measure of dispersion and inferential statistics. Multiple regression analysis was done to establish whether there is any relationship between the dependent and independent variables as prescribed by various scholars (Faraway, 2002; Cohen, West & Aiken 2003). The outcome was predicted by the model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon$$

Where Y= Successful implementation of biomedical projects

α = constant (Intercept)

β = slope (gradient) showing rate dependent variable is changing for each unit change of the independent variable.

X_1 = Top Management support

X_2 = Organization Structure

X_3 = Communication system Effectiveness

X_4 = Project leader performance

X_5 = Procurement procedure effective

ε = Error Term

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.

10. DATA ANALYSIS AND INTERPRETATION

Regression Analysis Output

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.848[a]	.718	.702	.232
a. Predictors: (Constant), procprocej, orgstruc, mgtsupo, commeffct, effecleadship				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.567	5	2.313	42.872	.000[b]
	Residual	4.533	84	.054		
	Total	16.100	89			
a. Dependent Variable: succimpl						
b. Predictors: (Constant), procprocej, orgstruc, mgtsupo, commeffct, effecleadship						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.579	.097		26.678	.000
	mgtsupo	-.069	.024	-.210	-2.835	.006
	orgstruc	-.072	.020	-.225	-3.514	.001
	commeffct	-.094	.024	-.294	-3.903	.000
	effecleadship	-.060	.027	-.175	-2.226	.029
	procprocej	-.078	.028	-.224	-2.810	.006
a. Dependent Variable: succimpl						

Descriptive Statistics							
	N	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
mgtsupo	90	1	5	3.78	.138	1.305	1.703
orgstruc	90	1	5	3.56	.141	1.333	1.778
commeffct	90	1	5	3.57	.140	1.333	1.776
effecleadship	90	1	5	3.54	.131	1.247	1.554
procprocej	90	1	5	3.67	.128	1.218	1.483
succimpl	90	1	2	1.23	.045	.425	.181
Valid N (listwise)	90						

11. RESULTS

Over all Model

The overall models gives R^2 = 0.718. This shows that there is a strong positive correlation between the independent variables and the dependent variable.

HO = β1 = β2=β3 = β4 =β4 = 0

H1 = At least one of the βj is not equal to Zero

From the ANNOVA table the F- test is 42.872 with a p- value of 0.000 which is a good fit for the data since P- value is less than α = 0.05. We reject the null hypothesis and conclude that the model is statistically significant.

Role of top management support on successful implementation of biomedical projects in KEMRI

From the descriptive statistics table, the mean of all independent variable is 3.75. This means that majority of the respondent think that independent variables influence the successful implementation of projects.

The Null hypothesis was that there is no significant relationship between management support and successful implementation of biomedical projects. After regression analysis, p value = 0.006 which is less than alpha (0.05). The conclusion is that management support significantly influences successful implementation of biomedical projects in KEMRI. This is also supported by the mean value of 3.75.

Influence of organization structure on successful implementation of biomedical projects in KEMRI

The Null hypothesis (HO) was that there is no significant association between organization structure and successful implementation of biomedical research in KEMRI. The Alternative hypothesis (H1) was that there is a significant relationship between the independent and dependent variable.

The regression analysis has a p- value of 0.001 which is less that alpha 0.05. The null hypothesis is therefore rejected and the alternative hypothesis adopted that there is a significant relationship between organization structure and successful implementation of biomedical research in KEMRI.

The descriptive analysis gave a mean value of 3.56. The majority of respondents feel that organization structure has positive impact in successful implantation of biomedical projects in KEMRI.

Influence of communication system on successful implementation of biomedical projects in KEMRI

The Null hypothesis (Ho) was that there is no significant relationship between communication systems and successful implementation of biomedical research. The Alternative hypothesis (H1) was that there is a significant relationship between the two variables.

The coefficient table above gives a p- value of 0.000 which is less than alpha value of 0.05. We therefore reject the Null hypothesis and adopt the Alternative hypothesis that communication systems significantly influence successful implementation of biomedical projects in KEMRI.

The descriptive analysis gave a mean value of 3.57. The majority of respondents feel that organization structure has positive impact in successful implantation of biomedical projects in KEMRI.

Extent to which project team leader influences successful implementation of biomedical projects in KEMRI

The Null hypothesis (Ho) was that there is no relationship between project leadership and successful implementation of biomedical research. The Alternative hypothesis (H1) was that there is a significant relationship between the two variables.

The coefficient table above gives a p- value of 0.029 which is less than alpha value of 0.05. We therefore reject the Null hypothesis and adopt the Alternative hypothesis that project leadership significantly influences successful implementation of biomedical projects in KEMRI.

The descriptive analysis gave a mean value of 3.57. The majority of respondents feel that project leadership has positive impact in successful implantation of biomedical projects in KEMRI.

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

The Null hypothesis (Ho) was that there is no relationship between procurement procedures and successful implementation of biomedical research. The Alternative hypothesis (H1) was that there is a significant relationship between the two variables.

The coefficient table above gives a p- value of 0.006 which is less than alpha value of 0.05. We therefore reject the Null hypothesis and adopt the Alternative hypothesis that procurement procedures significantly influence successful implementation of biomedical projects in KEMRI.

The descriptive analysis gave a mean value of 3.67. The majority of respondents feel that project leadership has positive impact in successful implantation of biomedical projects in KEMRI.

12. SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

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.

12.1 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.

12.2 SUGGESTIONS FOR FURTHER RESEARCH

The study gave attention to only few critical success factors and it could not exhaust the entire 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. Other research institutions which deal with biomedical projects should be targeted.

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