Influence of Types of Risks on Performance of Distribution Projects: A Case of Kenya Power and Lighting Company in Nairobi County

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Abstract

Management of project risks is recognized as an essential tool in management of projects in an organization, whether profit or non-profit. The general objective of this study was to evaluate the influence of technological and completion risks on the performance of distribution projects by Kenya Power and Lighting Company within Nairobi County. The study was guided by two research objectives which were: to establish the extent to which technological risk influences performance of distribution projects and to determine the influence of completion risk on performance of distribution projects. In order to answer the research questions, the study adopted a descriptive survey design. The participant group for this study consisted of 108 employees of Kenya Power and Lighting Company Limited, engaged in the planning, designing, finance, and execution of distribution projects within Nairobi County. The data collection instrument used in the study was a structured questionnaire. Data was analyzed using quantitative and qualitative methods. The resulting information .was presented descriptively and illustrated by use of tables. The results of the study found that there were challenges in management of completion and technological risks within the organization's systems. The study recommended Kenya Power and Lighting Company improves management of these risks through enhanced training of supervisors, employment of qualified contractors, improvement of procurement systems and enhancing innovative skills of staff through training from within and without.

Key Words: technological risk, completion risk.

1. Introduction

1.1 Background to the Study

As organizations operate in local and global highly dynamic markets with new and ever changing competitive pressures and customer requirements, they frequently implement risk management practices in the expectation of addressing the challenges that arise from the changing environment (Teller, 2013).Growth in the numbers and monetary value of projects across all facets of industry has meant that the discipline of project management has undergone significant changes and improvements, including importance. The implementation of projects is challenged by management of both risks and uncertainties.

Management of project risks (known-unknown) is a mature component of project management discipline. Its foundation is the triple constraint paradigm (TC-paradigm) namely: scope, schedule and cost (Lechler et al., 2013).Project risk management can be defined as the processes of conducting risk management through planning, identification, analysis, planning of response and risk control. (PMI, 2013). The objective of project risk management is to increase the likelihood and impact of positive events and decrease the likelihood and impact of negative events on the project. Project risk has its origins in the uncertainty present in all risks. Globally, risk management in the context of project management varies depending on the level of maturity in project management in a particular country.

The attitude towards project risk management level is reflective of the maturity level in project management. In the US and major economies in Western Europe, a strong project management process integrated with risk management makes it easier to embed risk management into the culture of the organization, and the business is more open to seeing both the upside opportunities and the downside risks. In the case of China, Ms Cindy Qin, a project management professional in China, during the 2005 PMI Global Conference proceedings, noted that despite over twenty years of learning, practicing and receiving a large degree of acknowledgment and application in China, there was still a great gap between its situation in China and its application in the world. In Africa, countries such as Nigeria and Kenya the lower level of project management maturity is reflected in the lack of adequately trained project management practitioners who would apply project and risk management skills, stakeholder management and communication, low maturity level in project management, need for program and portfolio approach to management of the cluster of projects in order to obtain maximum synergy and lack of adequate funding, (Guarino and Dirie, 2014).

Kenya Power and Lighting Company Limited (hereinafter referred to as "KPLC") organizational structure can be described as strong matrix which reflects a blend of functional and projective characteristics. A mixed project and functional structure, or matrix organization, is desirable for managing certain projects within desired cost, schedule and performance standards (Cleland and Ireland, 2007). Strong matrix organization structures have many of the characteristics of the projective organization and have full-time project managers with considerable authority and full time project administrative staff (PMI,2013).It is therefore imperative for a project-based organization such as KPLC to implement a project risk management plan that is robust with proper project risk management culture and knowledge, project team members who will be "speaking" the same language, and will leverage common analytical abilities to identify and mitigate potential risks as well as exploit opportunities in a timely fashion (Boukhari, 2013).

1.2 Statement of the Problem

Hartman and Ashrafi (1997) in their study noted that in power utilities, though measurements of project success through scope, duration, finance, quality, risk and customer satisfaction were well known, issues in respect to project selection factors were not clearly defined., poor scope management, breakdown in communications and lack of contingency planning led to poor project performance. Recent incidents during planning and implementation of several distribution projects within Nairobi County, has exposed difficulties experienced by KPLC in implementing distribution projects, within Nairobi County, this included last minute re-location of a proposed substation site due to unavailability of land, suspension of implementation of a substation due to objections by neighbouring landowners (World Bank,2012). These phenomena have motivated initiation of this study on the influence of technological and completion risks on performance of electricity distribution projects in Nairobi County.

1.3 Purpose of the Study

The purpose of this study is to study the influence of technological and completion risks on the performance of electricity distribution projects by Kenya Power and Lighting Company Limited within Nairobi County, Kenya. This study was guided by the following two research questions: -

I. How does technological risk influence performance of distribution projects in KPLC, Nairobi County?
II. How does completion risk influence performance of distribution projects in KPLC, Nairobi County?

2. Review of the Literature

2.1 Concept of Risk and Project Management

A project is set up to change a given initial situation. Risk and uncertainty are greatest at the start of the project and decrease over the life of the project as decisions are reduced and deliverables are accepted by the project owner (PMI, 2013). During the course of the project, different factors can be influenced in order to achieve the project goal. Project activity is undertaken in an environment of uncertainty arising from a range of sources including technical or operational issues, commercial or financial constraints, management issues and external dependencies (Hillson, 2006). Uncertainty which has potential to affect achievement of project goals is seen as a cause of risk and influences success of a project. Robustness to uncertainty is important when we concentrate on the pernicious possibilities entailed by the unknown.

However, opportunities can be propitious and surprises can be beneficent.A project practitioner or manager needs to identify risks that threaten the project and develop strategies of control the risks through mitigation. In addition, the PM has to communicate with stakeholders early and as often as necessary and explain the nature of the risks, (Alderton, 2014). Stakeholders, among others, are sponsors of the project, financiers and beneficiaries of the project. Project managers and stakeholders who are not aware or understand the risks that could affect a project are powerless to do anything about it. Risk management has developed into a mature discipline with its own processes, tools and techniques and consensus, across professional disciplines, over the main concepts and practices, (Hillson, 2003).The attitude to risk by the organization and project manager is influenced by a number of factors broadly classified into three themes: risk appetite, risk tolerance and risk threshold, (PMI,2013).Risk appetite is the degree of uncertainty an entity is willing to take on in anticipation of a reward. Risk tolerance is the degree, amount or volume of risk that an entity will withstand. As globalization of business activities has increased, organizations have engaged in partnerships with other entities to leverage on such partnerships and deliver project objectives in shorter durations. This has increased project risks several times as the source of risks is not just the technical part of the project but now involve social, cultural, technological and organizational (Thamhain, 2013).This approach to project risk has led to a shift in project risk management paradigm to now view project risk management as part of the organization efforts to achieve tactical and strategic goals through projects (Hillson,2013) and to assist the PM view sources of risk from a far wider field than the traditional sources, (Thamhain, 2013).

2.2 Technological Risk and Project Performance

The development of new technologies and the implementation of such technologies in new applications is a continuous effort to close technological and logistical knowledge gaps. This introduces risk generated by the lack of knowledge and its resulting uncertainty (Regev et al, 2006). If a project requires new or unproven technology, test facilities or a pilot plant will need to be constructed to test the feasibility of the processes involved (Finnerty, 2013). Technological risk arises when the unproven technology, when applied on the scale proposed for the project, fails to perform as expected or experiences obsolescence prematurely. The use of tested technology eliminates unexpected technological surprises and risk. The design and ultimately the technical feasibility can be influenced by other factors such as the environment and costs of the new technologies to be utilized. Conversely, where risks are greatest then the project sponsor will expect a higher return for the use of unproven technology by way of increased productivity or service level using efficient production technology. Mitigation against technological risks is carried out through use of external consultants who advice on the efficacy of the new technologies and furnishing of operational performance guarantees by the project contractor, ensuring all stakeholders, including customers, lenders and project sponsors, are appraised on the need for the new technology and its benefits (Finnerty,2013; Pourian and Woody, 2015).

2.3 Completion Risk and Project Performance

Completion risk entails the risk that a project might not be completed. Completion risk has a financial and technical aspect. Financial aspect of completion risk occurs when the financial requirements to complete a project escalate due to rise in inflation, shortages of critical supplies in executing the project, underestimation of construction costs that cause an increase in capital expenditures needed to enable completion to operational level and rendering the project financially unsustainable. Technical aspect of completion risk occurs when technical processes employed in project execution are found to be technically infeasible or environmentally objectionable (Odeh and Battaineh, 2002). The processes include breakdown in supervision of the contractor, employment of an incompetent contractor and usage of defective parts or components in the project facility. Mitigation, in both aspects, include provision of guarantees in technology employed in the project during execution and operation, furnishing by project contractors of performance guarantees to cover against failure to complete the project (Finnerty, 2013).

3. Research Design

The research design selected for the study was descriptive survey design.

3.1 Participants

A sample of 108 participants was selected from a target population of 149 personnel, working for the power utility within Nairobi County.

Their duties were closely involved with project activities ranging from planning and implementation of projects, supervising internal and external contractors, approving finance for the projects, logistics and procurement, legal, property, way leaves, safety, health and environment.

3.2 Data Collection and Response Rate

The study used primary data collected through the use of questionnaires. The proposed questionnaires were structured and composed of close ended, multiple choice questions. The multiple responses provided a list of possible alternatives from which the participants were required to select the answer that best describes their situation. It was expected the responses from the participants would provide as honest answers as possible and generate quantifiable data. A similar questionnaire was administered to all the participants. The initial target sample for the study was 108 participants. 108 questionnaires were circulated to randomly selected participants in the target population. Out of the 108 self-administered questionnaires, 82 were duly completed and returned.

4. Data Analysis and Presentation

The completed questionnaires were edited for completeness and consistency. The data was coded to enable the responses to be grouped into various categories. The data collected was analyzed using descriptive statistics. The descriptive statistics used were frequencies, counts, and percentages. Data, analysis was carried out using computer software -Statistical Package for Social Sciences-which aided to find parameters of frequency and mean. Frequency analysis provided clear numerical indications of agreement and disagreement on certain issues examined. These were presented in percentages. Tables were used to summarize responses for further analysis and to facilitate comparison. Qualitative data analysis sought to make general statements on how categories or themes of data are related. Key research questions were used to guide the analysis of qualitative data collected from analysis.

5. Research Findings

This study measured the influence of two types of risks-technological risk and completion risk-on performance of electricity distribution projects by Kenya Power and Lighting Company Limited, within Nairobi County-. The findings of the study are presented with respect to the general objective of the study and the two research questions.

5.1 Findings related to General Objective of the Study

The general objective of the study was to determine the extent and influence of types of risks on the performance of distribution projects in KPLC within Nairobi County. The views of the participants regarding the performance of distribution projects in Nairobi County are shown in Table 1.The results indicate that 54 (65.85%) respondents agreed that the organization had systems in place for effectively managing project scope, budget and schedule, 52 (63.41%) respondents agreed that the organization instituted systems to effectively manage resources allocated to projects, 31 (37.80%) respondents agreed that the organization had instituted appropriate monitoring and control systems to ensure adequate co-ordination and control of projects and 38 (46.34%) agreed that the organization had quality control systems to ensure achievement of customer satisfaction. The mean score for the responses was 3.62 which indicated that majority respondents agreed to the statements regarding performance of distribution projects, by KPLC, in Nairobi County.

5.2 Findings related to Research Question # I

The first research question asked," To determine the influence of technological risk on performance of distribution projects in KPLC, Nairobi County. Results from the study shown in Table 2, indicated that 50 (60.98%) respondents agreed that there were adequate tools and equipment to enable effective use of technology in project implementation, 35 (42.68%) respondents agreed that KPLC encouraged innovation of new methods in implementation of projects and 47 (57.32%) respondents agreed that there were systems which ensure it has trained personnel to handle technological changes. Overall, 44 (53.66%) respondents agreed that organizational systems for managing technological risk improved project performance. This is further supported by a mean of 3.55 that was obtained.

5.3 Findings related to Research Question # II

The second research question asked," How does completion risk influence performance of distribution projects in KPLC, Nairobi County?

The results of the finds shown in Table 3 indicate that 64 (78.49%) respondents agreed that KPLC had systems which ensured projects were technically viable, 48 (58.54%)respondents agreed that there were systems in place which checked and controlled preparation of project estimates, 34 (41.46%) respondents agreed that procurement systems adequately addressed material requirements for projects, 33 (40.24%) respondents agreed that KPLC had systems to effectively handle disputes in projects, 39 (47.56%) respondents agreed that there was enough supervisory capacity to ensure smooth implementation and completion of projects and 33 (40.24%)respondents agreed that there were systems to ensure contractors engaged to implement projects had effective capacity to implement projects to completion. The average mean obtained was 3.43.

6. Discussions of the Study

The purpose of the discussion is to interpret and describe the significance of the study findings in light of what is already known about the research problem being investigated, and to explain any new understanding or fresh insights about the problem taking the findings into consideration.

6.1 General Objective of the Study

One of the key findings from the study was that KPLC employees involved in implementation of distribution projects within Nairobi County were concerned about the performance of the projects. Their concerns demonstrated their determination to ensure the projects fulfilled organization goals and objectives. This was demonstrated by the extent of their agreement with the statements in the questionnaire in support of project performance.

6.2 Research Question # I-Technological Risk and Project Performance

In regard to research question I, the findings implied that KPLC has endeavored to ensure provision of tools and equipment to its personnel as part of measures necessary for successful performance of projects. Macharia and Ngugi (2014) recommended in their study that integration of information technology in the implementation of projects had a positive influence on successful completion of projects. A similar implication can be drawn in respect to provision of other modern tools and equipment-such as computer firmware, including computer aided designs-by the organization to ensure newer technologies are applied in implementation processes. However, on the aspect of encouraging innovation of new methods in implementation of projects, KPLC needs to improve on the capability of its staff in creation of new innovations in managing technological risk within distribution projects. This is confirmed by Wekesa (2012), in his study on managing technological change in KPLC, stated that communication and continuous training were necessary ingredients to create capacity for successful implementation of technological change. This finding is further corroborated by Amboka and Ssemugenyi (2014) who noted that training focused on quality and quantity of work improves the productivity of staff. Organizational systems should encourage project team staff to device innovative methods in managing technological risk within distribution projects.

6.3 Research Question # II-Completion Risk and Project Performance

In regard to research question II, the findings implied that KPLC had adequate systems for establishing technical viability, checking, and controlling development of project estimates. This further confirms that management of technical planning and design processes for distribution projects ensured that completion risks arising from poor planning and design were mitigated (Finnerty, 2013). However, on procurement systems the results implied that organizational systems for handling procurement of materials are weak. This is corroborated by Oginda (2013) who, in his study on the procurement function at KPLC, stated that existing procurement systems had several handicaps which prevented adequate procurement of materials. The handicaps included: lack of trained procurement staff to schedule timely procurement of materials, corruption among procurement officers and suppliers, procurement of sub-standard quality of materials and poor co-ordination between procurement officers and the project team leaders responsible for planning and implementing distribution projects In regard to systems for handling dispute resolution, the results indicate that respondents did not have confidence in dispute resolution mechanisms, especially between KPLC and the contractors' it engages to implement the projects. Furthermore, the results reflected weaknesses in the technical processes employed during project execution, including under-estimation of construction costs and eventual disputes with contractors (Finnerty, 2013). This is further exacerbated by the poor dispute resolutions mechanisms between KPLC and contractors.

This study finding is corroborated by Kowuor (2012) who noted that KPLC was experiencing challenges in supervision of contractors besides the fact that competency levels of some contractors was wanting.
There is need for KPLC to improve its systems for handling project contracts and disputes arising thereof. In addition, the supervisory abilities of KPLC personnel supervising internal and external contractors need to be improved through additional technical and management trainings (Odeh and Battaneih, 2002).

7. Conclusions of the Study

The main purpose of the study was to investigate the influence of two specific types of risks to performance of distribution projects within Nairobi County. The types of risks considered in the study were technological and completion risks. In terms of the stated research objectives, the following conclusions can be drawn from the study: -

7.1 General Objective of the Study

The study confirmed that technological and completion risks have a significant influence on the performance of distribution projects within Nairobi County. The study further confirmed that there were deficiencies in the organizational processes and systems dealing with monitoring and control of project performance and quality control of projects inputs and deliverables.

7.2 Research Question #1-Technological Risk and Project Performance

The study confirmed KPLC has managed aspects of technological risks, through provision of tools and equipment to enable effective use of technology in projects. However, KPLC management needs to develop and nurture innovation among its staff engaged in implementation of projects. In addition, KPLC should endeavour to continuously train its project team personnel in the latest technologies and processes of developing, planning, financing and implementing projects. The benefits will be greater project performance and successes.

7.2 Research Question #2-Completion Risk and Project Performance

The study confirmed that KPLC, organizational systems were adequate in ensuring projects were technically viable However, challenges exist in procurement systems and supervisory capabilities of staff supervising implementation of distribution projects in Nairobi County.

Table 1: Participants' views on Project Performance

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Likert Mean
KPLC has systems in place for efficiently managing project scope, budget, and schedule.	10	6	12	40	14	3.87
KPLC has instituted systems to effectively manage resources allocated to projects.	11	10	9	44	8	3.72
KPLC has instituted appropriate monitoring and control systems to ensure adequate co-ordination and control of projects.	7	10	34	25	6	3.41
KPLC has quality control systems to ensure achievement of customer satisfaction.	9	14	21	34	4	3.46
Average	**9.25**	**10**	**19**	**35.75**	**8**	**3.62**

Table 2: **Participants' views on Technological risks**

Technological Risk Factors	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Mean**
KPLC has adequate tools and equipment to enable effective use of technology in project implementation.	3	12	17	43	7	3.53
KPLC encourages innovation of new methods in implementation of projects.	9	9	29	29	6	3.49
KPLC has systems which ensure it has trained personnel to handle technological changes.	12	14	9	41	6	3.62
Overall Index	**8**	**11.67**	**18.33**	**37.67**	**6.33**	**3.55**

Table 3: Participants' views on Completion risks

Completion Risk Factors	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**	**Mean**
KPLC has systems which ensure projects are technically viable.	3	6	9	58	6	3.76
KPLC has systems which check and control preparation of project estimates.	12	4	18	38	10	3.80
KPLC Procurement systems adequately address material requirements for projects.	5	24	19	30	4	3.11
KPLC has systems to effectively handle disputes in projects	10	15	24	32	1	3.35
KPLC has effective supervisory capacity to ensure smooth implementation and completion of projects.	9	19	15	30	9	3.44
KPLC has systems to ensure Contractors engaged to implement projects have effective capacity to implement projects to completion.	7	21	21	24	9	3.11
Overall Index	**7.67**	**14.83**	**17.67**	**35.33**	**6.5**	**3.43**

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