

RISK MANAGEMENT PRACTICES AND PERFORMANCE OF CONSTRUCTION PROJECTS IN NAIROBI CITY COUNTY GOVERNMENT, KENYA

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ABSTRACT

Risks in construction projects cannot be eliminated, however through proper risk management practices, the risks facing the construction projects can be minimized. Government funded projects are proclaimed to lag behind in their construction and tend to consume high costs of building and maintenance due to various factors. The study sought to establish the influence of risk management practices on performance of projects by the Nairobi City County Government, Kenya. The specific objectives were to determine the effect of design risk management practices, legal risk management practices, construction risk management practices and contract risk management practices on performance of projects. The performance of the Nairobi county government funded construction projects was evaluated by project sustainability, consumer acceptability, timeliness and cost. The study was anchored on the following theories; agency theory and uncertainty theory. Empirical literature reviewed scholarly studies on design risk, legal risk, contract risk and construction risk management practices and their influence on performance of projects. The study used a descriptive research design. The population of study involved contractors, consultants and project engineers for 10 construction projects across the Nairobi City County. This consisted of 380 respondents involved in projects from the companies. A sample of

190 respondents was taken from the population. The primary data was collected by use of self-administered survey questionnaire. Data analysis was done by use of descriptive and inferential statistics such as frequencies, percentages, mean scores and standard deviation. A regression analysis was conducted to establish the correlation between the variables. The study revealed that the most prevalent risk management practices employed by the Nairobi City County government on construction projects were costing of projects, project designing, and dispute over land and construction. The risk management practices; legal risk management, construction risk and contract risk management were found to have an inverse relationship with the construction project performance while design risk management had a positive one. The study recommended that for the construction department and constructors to mitigate risks involved in the project implementation process there is need for proper project design, legal approval and policy requirements adherence, proper planning to ensure all resources are available to effect the construction project and proper contracting with every stakeholder being appreciated and involved in the project planning and formulation process.

Key Words: *project risk management strategies, project performance, National Hospital Insurance Fund, Kenya*

INTRODUCTION

The traditional project success has viewed narrowly as the achievement of intended outcomes in terms of specification (quality), time and budget, Atkinson (2009). Dvir (2006) say this tends to

give the project manager an “operational mindset”. The definitions of project management success have since become more inclusive and emphasize the importance of working with stakeholders to define needs, expectations, and project tasks. Turner (2004) suggests that project managers should be measured on a wider set of objectives and not just the achievement of time, cost and functionality goals. Project management success focuses upon project process and in particular the successful accomplishment of cost, time and quality objectives. It also considers the manner in which the management process was conducted. Project success deals with the effects of the final product. There is need for the power sector project stakeholders to understand what constitutes project success in view of the many capital intensive projects they implement.

Effective project implementation or simply put, project success can be measured on the basis of time, cost and quality (performance), commonly known as the triple constraint. These three factors represent the Key Performance Indicators (KPIs). To establish whether a project has been effectively implemented, or better still, if the project has been successful, one has to go back to the initial project goals of time, cost and quality (performance) and be able to measure the extent of their individual achievement.

The construction industry is vital to every country’s economy. The role and the importance of the industry in the development of a country need not be over emphasized. The Kenyan construction industry contributes significantly in terms of scale and share in the development process of the country. According to the Kenya Bureau of Statistics, the construction industry contributed 4.2%, 4.1%, 4.2%, and 4.4% towards the Gross Domestic Product (GDP) for the years 2010, 2011, 2012 and 2013 respectively. This is apparent that the output from the construction industry is a major and integral part of the national output, accounting for a sizeable proportion in the Gross Domestic Product (GDP) of the country. In Kenya the industry employed 100,100 people in 2010, 106,000 people in 2011, and 116,100 people in 2012 and 130,300 people in year 2013 (Republic of Kenya, 2014).

Despite the importance of the sector to the economy, it is beset by a number of challenges that require introspection and understanding of the inherent risks management practices. In recent years, poor performance of construction projects has provoked an increased interest into the nature and mechanism of risk management and analysis (Smith et al., 2006). They have observed the industry as having a very poor reputation for coping with the adverse effects of change, with many projects failing to meet deadlines and cost and quality targets. There are many risk management practices factors that affect the construction industry. For instance, Mbeche and Mwandali (2006) in their studies have established that project time and cost are greatly affected. 70% of project initiated are found to have time overruns of over 50 % while 50 % of the project have cost escalation exceeding 20 percent. This is attributed to risk management factors influencing the project objectives. Other empirical studies have documented a legion of causes of delay in performance of projects, some related to risk management practices.

Sambasivan and Soon (2007) identified causes of delays in the completion of construction projects, including contractor's improper planning, poor site management, inadequate experience, inconsistent flow of payments for completed work, poor management of sub-contractors, inconsistent communication between parties, as well as shortage of materials, equipment, and labor. In South Africa, a government report linked infrastructural project delays with changes in project design, inconsistent flow of financial resources, and contractor's lack of capacity to deliver (Government of South Africa, 2009). In Ghana, delay in payments, poor contractor management, delays in material procurement, poor technical performances, and escalation of material prices were identified as key factors accounting for about 80% of delays in the completion of infrastructural projects (Frimpong, Olowoye, & Crawford, 2003).

As evidenced from the critical review of the literature, projects are continuing to fail (Flyvbjerg et al., 2003; Kutsch & Hall, 2005; Kutsch et al., 2011; Mulcahy, 2003; Raz et al., 2002; Sharma et al., 2011; Standish Group, 2006, 2009) and complexity is increasing (Hillson & Simon, 2007; Philbin, 2008; Vidal et al., 2011). The literature questions the ability of general prescribed industry risk management standards to effectively deal with complexity and irrationality (Smith & Irwin, 2006). Furthermore there is criticism in the literature of the ability of current general prescribed industry risk management standards to effectively manage uncertainty and risk (Atkinson et al., 2006; Chapman & Ward, 2002, 2003b; De Meyer et al., 2002; Stoelness & Bea, 2005). Effectively managing uncertainty and risk in complex environment in particular appears to be an important element towards enabling project success (Hillson & Simon, 2007; Raz et al., 2002; Zwikael & Ahn, 2011).

The project management literature has been shown to contain concepts suggested as important to improving the management of uncertainty and risk, particularly in complex project environments. These concepts are referred to in this thesis to be 'in advance' of mainstream standards. They include explicit opportunity management (Hillson, 2002, 2004a; Olsson, 2007; Zhang, 2011), the uncertainty management paradigm (Chapman & Ward, 2003a, 2003b; Ward & Chapman, 2003), a constructively simple approach to the evaluation and interpretation of estimates (Chapman et al., 2006), risk attitude (Hellier et al., 2001; Hillson & Murray-Webster, 2005, 2008; Slovic, 1987; Smallman & Smith, 2003) and complexity theory concepts (Cooke-Davies et al., 2007). Critical of probabilistic risk management approaches in particular; other researchers have taken these further and suggested wider approaches as more appropriate in the management of uncertainty. Pender (2001) is critical of PMBoKs (2001) traditional use of probability theory. He indicates that probability-based risk management theory does not explain the important aspects of observed project management practice.

Construction risk management practices have been mostly found to exhibit dynamism and continuity across a project's life cycle (Chan et al., 2009; Nieto-Morote & Ruz-Vila, 2010). Mark, Cohen and Glen (2004) have defined a risk management practice as potential for complications and problems with respect to the completion of a project and the achievement of a project goal. In addition, the impact or consequences of this future event must be unexpected or unplanned

(Chia, 2006). Construction project risk management practices can be defined as an uncertain event or condition that, if it occurs, has a negative effect on at least one project objective, such as time, cost, or quality (Jomaah, Bafail, & Abdulaal, 2010). Unmanaged risks are therefore threats to project delivery. Failure to adequately deal with risks has been shown to cause cost and time overruns in construction projects (Andi, 2006). Trying to eliminate all risks in construction projects is impossible. However, it is well accepted that a risk can be effectively managed to mitigate its' adverse impacts on project objectives, even if it is inevitable in all project undertakings.

Project Performance

Managing risks involves: planning, identifying, analyzing, developing risk handling strategies, monitoring and control. Project team members particularly clients, consultants and contractors should eliminate / mitigate delays when playing their respective roles. Risk management practices in construction projects are associated with contexts of the projects as well as personnel involved. According to Kishk and Ukaga (2008) the performance of any project is judged by the satisfaction of stakeholders' needs and is measured by the extent of meeting standards laid down at the start of the project. This is in regard to delivery of construction projects by contractors within budget, time, quality, environment, safety and performance. Construction projects are considered successful when delivered within scheduled duration, allocated budget, and specified quality (Majid, 2006; Owolabi et al., 2014). Delay in the completion of construction facilities is a critical challenge with a global dimension, often leading to increased costs due to time extension or acceleration as well as loss of productivity, disruption of work, loss of revenue through lawsuits between contractual parties, and project abandonment (Sambasivan & Soon, 2007; Owolabi et al., 2014).

Many SSA economies experience losses amounting to billions of dollars, as a result of delayed completion of infrastructural projects, which undermines the noble goal of poverty reduction (Gutman et al., 2015). Delay in the completion of infrastructural projects has significant cost implications, which in turn bears far-reaching consequences in the lives of citizens, especially in developing countries like Kenya. Studies conducted in various contexts have deduced that although delay in the completion of construction projects is a global phenomenon, it appears to be more common in developing than in developed countries (Sambasivan & Soon, 2007; Alaghbari et al., 2007; Aziz, 2013). Among the developed countries, delay in the completion of infrastructural projects has been reported in Canada, the United States, Australia, and Britain, among others.

In Canada for instance, De Souza (2009) attributed delays in the completion of infrastructural projects to various factors, including reduced funding by sponsors, communication breakdown, delayed disbursement of funds, poor site management by contractors, and tedious legislative procedures. In the United States, SNL Financial (2010) reported delay in the completion of a pipeline project connecting Florida State and Bahamas, particularly due to design changes. In

Kenya, delays in the completion of infrastructural facilities have been associated with factors, such as poor financial management by government agencies, inadequate designs, and poor management of the construction process by contractors (Talukhaba, 2009). Arguably, these factors are compounded by secondary factors, such as poor management of materials and equipment by contractors, inadequate recognition and response to risks emanating from the physical and socio-economic environments, as well as inadequate regard for stakeholders' needs (Talukhaba, 2009). Another study conducted by Ondari and Gekara (2013) reported significant correlation between project delays and factors, such as management support, design specifications, contractor's capacity, and supervision capacity. This study will assess if risks have a significant influence on the completion of public projects by the Nairobi City County Government, Kenya.

The Nairobi City County is one of the 47 devolved units in Kenya whose capital is the country's capital city. The Nairobi City County is the creation of the Constitution of Kenya 2010 and successor of the defunct City Council of Nairobi. It operates under the auspices of the Cities and Urban Areas Act, The Devolved Governments Act and a host of other Acts. The Nairobi City County is charged with the responsibility of providing a variety of services to residents within its area of jurisdiction. These include the services that were hitherto provided by the defunct City Council and the ones that have been transferred from the national government. The former include Physical Planning, Public Health, Social Services and Housing, Primary Education Infrastructure, Inspectorate Services, Public Works, Environment Management while the latter include Agriculture, Livestock Development and Fisheries, Trade, Industrialization, Corporate Development, Tourism and Wildlife, Public Service Management.

Risk Management Practices

Risk Management of the activities in a proposed baseline is evaluated to determine their potential for risk towards a construction project. This evaluation assesses all activities against a set of screening categories typically in the areas of construction, interface control, safety, regulatory and environmental, security, design, resources and space migration. There are diverse causes and manifestations of risks in projects. Wanyona (2005) attributes risks related to project finance to the ineffective cost planning and control of building projects by the cost consultants. Because of the complex nature of construction projects, this approach has resulted to delays, litigation and even bankruptcy. Kishk and Ukaga (2008) note that the degree of risk management process undertaken during the project lifecycle impacts directly on the project success. Failure to manage construction risks in a systematic way makes the project suffer in cost overruns, delayed completion, non-completion or may fail to meet the quality specifications and the benefits they were intended for.

Management of construction projects involves a great deal of managing risks. Managing risks involves: planning, identifying, analyzing, developing risk handling strategies, monitoring and control. Project team members particularly clients, consultants and contractors should eliminate /

mitigate delays when playing their respective roles. Cohen and Palmer (2004) identify sources of construction risks to include changes in project scope and requirements; design errors and omissions; inadequately defined roles and responsibilities; insufficient skilled staff; force majeure; and new technology. Baloi and Price (2003) categorize construction risks as technical, social, construction, economic, legal, financial, natural, commercial, logistics, and political. Similarly, Mills (2001) lists three most important risks to include: weather, productivity of labour and plant and quality of material. Other researchers such as Finnerty (2006), and Miller and Lessard (2001) have categorized same risks in addition to demand, supply, regulatory, operational, completion and sovereign.

Risk management practices in construction projects are associated with contexts of the projects as well as personnel involved. Al-Kharashi and Skitmore (2008) point out that the main cause of delay in construction sector for public projects is the lack of qualified and experienced personnel. A study by Ahmed, Azhar, Castillo and Kappagantula, (2002) identified ten most critical causes as building permits approval, change order, changes in drawings, incomplete documents, inspections, changes in specifications, decision during development stage and shop drawings and approval. Sambasivan and Soon (2007) identify ten most important causes of risks in the construction industry to be contractor's improper planning, contractor's poor site management, inadequate contractor experience, inadequate client's finance and payments for completed work, problems with subcontractors, shortage in material, labor supply, equipment availability and failure, lack of communication between parties, and mistakes during the construction stage.

Construction Projects in Nairobi City County Government, Kenya

Many projects fail due to risk management practices in the implementation of the construction projects by the Nairobi's county government. In 2009 there were many projects which finished with poor performance because of many evidential poor risk management, non-availability of materials, road closure, amendment of the design and drawing which are entailed in projects design risks, additional works, waiting the decision, handing over, variation order, amendments in Bill of Quantity (B.O.Q) and delay of receiving drawings (Strenman, 2012). Nonetheless there are other factors for problems of performance in Kenya such as project management, coordination between participants, amongst other factors.

Construction risks have been mostly found to exhibit dynamism and continuity across a project's life cycle (Chan et al., 2009; Nieto-Morote & Ruz-Vila, 2010). Mark, Cohen and Glen (2004) have defined a risk as potential for complications and problems with respect to the completion of a project and the achievement of a project goal. In addition, the impact or consequences of this future event must be unexpected or unplanned (Chia, 2006). Construction project risks can be defined as an uncertain event or condition that, if it occurs, has a negative effect on at least one project objective, such as time, cost, or quality (Jomaah, Bafail, & Abdulaal, 2010). Risks are therefore threats to project delivery. Failure to adequately deal with risks has been shown to cause cost and time overruns in construction projects (Andi, 2006). Trying to eliminate all risks

in construction projects is impossible. However, it is well accepted that a risk can be effectively managed to mitigate its' adverse impacts on project objectives, even if it is inevitable in all project undertakings. Sources of risks includes inherent uncertainties and issues relative to company's fluctuating profit margin, competitive bidding process, weather change, job-site productivity, the political situations, inflation, contractual rights, and market competition (Karimi Azari et al., 2011). It is important for the construction companies to face these risks by assessing their effects on the project objectives. Risk management helps in deciding which of the project is more risky, planning for the potential sources of risk in each project, and managing each source during construction (Zayed, Amer, & Pan, 2008). It is important that risk is distinguished from uncertainty. Smith, Merna, and Jobling, (2006) defines uncertainty as a chance of occurrence of some event where the probability and distribution is not known. They distinguish uncertainty from risk as being where the outcome of an event or a set of outcomes can be predicted on the basis of statistical probability. This implies that there is some knowledge about a risk as opposed to an uncertainty about which there is no knowledge.

STATEMENT OF THE PROBLEM

Performance of projects fails due to poor implementation of risk management practices in place. There are a number of well-established techniques and tools used for managing project risks in large organizations (White and Fortune, 2002); there has been little research publications on the tools and techniques used in managing project risks in small projects and performance (Bryde, 2003). It has been observed and decried by the public and other users of Government funded projects that they always lag behind in time, which conversely have a bearing on cost, due to various factors. Among such, as observed by Waihenya (2011), Seboru (2006), Kivaa (2000), Talukhaba (2009), Mbatha (2006) and Baradyana (2006) are variation in cost of building materials, changes in design of building, changes in finishes by client, contractor running out of money to run projects for some time, hiring extra tools during construction not anticipated, under-estimation of cost of construction by the project Quantity Surveyor, application of wrong time estimation model and increment weather patterns, among many others. Most of the existing studies based on risk management practices and performance of public projects point at the contractor as the sole contributor to delays and project failure and ignore the complexity of risks in the entire phase of project implementation such as Waihenya (2011), Seboru (2006), Kimani (2004), Kivaa (2000), Talukhaba (2009), Mbatha (2006) and Baradyana (2006). According to the Nairobi City County Government (2017), most construction projects in the city by delegated contractors are always facing challenges of delays, budget overruns, change of designs due to disputes over invasion of human settlements to the road reserves and illegal construction of buildings on public land, public utilities and along power lines. This had made construction of roads, government buildings, water and sewage systems and power lines expensive and taking more time than planned. This study sought therefore to fill this research gap by investigating the totality of the causes and effects of project design risks, legal risks, construction risks and

contract management risks on performance of construction projects by the Nairobi City County Government, Kenya.

GENERAL OBJECTIVE

The general objective of the study was to investigate the influence of risks management practices on the performance of construction projects in Kenya

SPECIFIC OBJECTIVES

1. To establish the influence of Design Risk on the performance of construction projects by the Nairobi City County Government, Kenya.
2. To determine the influence of Legal Risk towards the performance of construction projects by the Nairobi City County Government, Kenya.
3. To find out the influence of construction Risk on the performance of construction projects by the Nairobi City County Government, Kenya.
4. To assess the influence of contract management Risk on the performance of construction projects by the Nairobi City County Government, Kenya.

THEORETICAL LITERATURE

Agency Theory

This theory was proposed by Smith &Stulz (1985). The Agency theory extends the analysis of the firm to include separation of ownership and control, and managerial motivation. In the field of corporate risk management agency issues have been shown to influence managerial attitudes toward risk taking and hedging. Theory also explains a possible mismatch of interest between shareholders, management and debt holders due to asymmetries in earning distribution, which can result in the firm taking too much risk or not engaging in positive net value projects (Mayers& Smith, 2012). Consequently, agency theory implies that defined hedging policies can have important influence on firm value (Fite&Pfleiderer, 1995). The latter hypotheses are associated with financing structure, and give predictions similar to financial theory.

Managerial motivation factors in implementation of corporate risk management have been empirically investigated in a few studies with a negative effect (Faff & Nguyen, 2012). In the absence of the traditional equity-owner, responsible for assuming the residual risk and guarantee of debt repayment, project-financing arrangements are often accompanied by detailed and complex contracts which specify the exact nature and duration of the relationships between various participants in the project. It becomes necessary to carefully identify the risks that may occur over the life of the project, from conception to operation, and allocate those risks to the participants who are best able to manage them (Zou, Zhang & Wang, 2013)

To manage various types of risk the project sponsor or financial advisor may develop a matrix of project participants and risk components associated with the project to identify risk allocation

and the various contractual agreements which allocate risk (Minato (2012) agency risk may be reduced or eliminated by the competition between project managers in managerial labour markets (Hamimah, 2010). As project size increases, the two functions usually attributed to the project manager; management and risk bearing, may be treated as naturally separate factors of production within a set of contracts known as the project managed by the project management team. Although individual project stake-holders act from self interest, they realize that their own individual destinies depend, to some extent, on the success of the project management team in its competition with other project management teams. As the number of project stakeholders increases, the potential agency incentive problems, associated with the separation of ownership and control of the project, would tend to be resolved by the discipline exerted on project managers by managerial labour markets both within and outside the project (Akintoye & MacLeod, 2012).

The theory links that principal who is the county government of Nairobi and the agent who are the implementers of the construction projects in the County. The principal assumes that the agent acts in the best interest of the success of the project and beneficiaries. This overlooks the interest of the agent who may compromise on the quality for profitability.

Uncertainty Theory

Uncertain theory was introduced by Liu (2010) due to generalization of domain of uncertainty. Uncertainty theory was also applied to uncertain logic by Li and Liu (2010) in which the truth value is defined as the uncertain measure that the proposition is true. Furthermore, uncertain entailment was proposed by Liu that is a methodology for calculating the truth value of an uncertain formula when the truth values of other uncertain formulas are given. Uncertainty is, of course, not a neglected concept in project management. Early development of activity network techniques in the 1950s, such as PERT (Program Evaluation and Review Technique), recognized the possibility of variation in task durations. These techniques were extended in the 1960s to incorporate probabilistic branching for instance Graphical Evaluation and Review Technique. Qualitative approaches, such as the Synergistic Contingency Evaluation and Review Technique, and Analysis of Potential Problems, were developed to guide project managers to prepare for uncertainty with risk prevention and contingency planning (Henriksen&Uhlenfeldt, 2010).

This extensive literature on project planning has developed our understanding of scheduling tasks in complex and uncertain projects, describing such well -known techniques as the critical path method (CPM). There is also extensive knowledge on how to handle the relationships with the stakeholders, utilizing such tools as contract formalization and enforcement, responsibility charts, force field analysis, and conflict management. Foreseen uncertainties are identified, but uncertain, influences in a project management. Uncertainty risk also affects how project management should approach stakeholder management. The project team in one of our samples liked to utilize the phrase proactively occupy the white spaces in the contract. This meant that, through anticipating uncertainties, they could proactively write in the contingencies reflecting

these uncertainties, possibly staking out a claim before other stakeholders had thought of it. Thus, foreseen uncertainty requires disciplined risk management, the identification of potential risk that could affect the project followed by the planning of preventive measures to block adverse events and multiple contingent courses of action that are then triggered by the events (Young & Jordan, 2012).

Progress tracking demands monitoring not only with activities have been completed, but also to the uncompleted project activities. The project manager must not only be able to trouble shoot, but also function as a reactive consolidator of what has been achieved up to a certain stage in the project. All risks the incidents in the environment, or certain outcomes of the project work) must be constantly monitored and communicated to project stakeholders. Flexible contingent actions, depending on outcomes of key influence parameters, should be anticipated in the decision tree (Zwikael & Ahn, 2011). This theory indicates that all risks emanate from uncertainties that a foreseen in the implementation of a project. For the construction project therefore the theory supports planning, monitoring, management and mitigation of risks associated with design, legal, contract and actual project implementation.

EMPIRICAL REVIEW

Design Risk and performance

Ann et al. (2004) referred to simulation as being the process of replicating the real world on a set of assumptions and conceived models of reality. Simulation can be applied to construction, and other industries (Banks et al, 2006). Simulation is one method to quantitatively assess project construction risks. It is normally used to prevent large complex project or systems because it is much less expensive to experiment with models than real systems. Its duration, cost and value can characterize the flow processes. The value is referred to the satisfaction of the requirements of the client.

Only the activities that can be converted to form valuables for the client are the ones that add value to the product. Huovila et al. (2007) suggested the model shown in Figure 1 for the design process. A methodology to introduce continuous improvement of the design process was designed to give response to the problems identified. This methodology incorporates the elements suggested by the interviewees and some of the recommendations given by (Huovila et al., 2007). Several researches on factors affecting construction project completion have proposed either general factors (Sanvido et al., 1992) or specific factors (Chua et al., 1999). In building construction, Sanvido et al. (1992) found four CSFs: a well-organized and cohesive facility team; a series of contracts allowing to encourage the various specialists to behave as a team without conflicts and to allocate risk and reward correctly; experience in various aspects of similar facilities; and timely, valuable optimization information from related parties in the planning and design phases.

Ogunlana (2009) studied in critical success factors in large scale construction projects in Thailand. Their study emphasized that success factors vary across various projects. Their findings revealed project planning and control, project personnel and involvement of client as critical factors influencing project success. Ann et al. (2006) in their study, investigated on CSFs in construction project briefing process as prerequisite to achieving success in project performance. This process involves the interpretation of clients 'actual views and requirements to project participants. Their study considered open and effective communication, clear and precise briefing documents, clear intention and objectives of client and clear project goal and objectives as critical success factors.

Ugwu et al. (2007) identified nine top critical success factors that would act as enablers for successful implementation of ICT projects in construction as cost of development, top management support, availability of appropriate tools, development team knowledge and understanding of construction processes, ease applications, clear definition and understanding end user, clear communication, standardization issues and change management of organization level. Talukhaba (1999) while carrying out a study on high rise building projects in Nairobi finds out that there are specific variables that significantly cause project delays. These specific variables are to a large extent connected with project participants, the process, and both the physical and social economic environments of the project. These stakeholders inevitably interact to achieve a project.

For example, the client, the design team, the contractors and subcontractors constitute the participants. Disputes, claims, approvals, and payments certificates are associated with the process whereas the building materials financial resources and construction equipment's constitute the socio-economic environment. Rock, underground water, and rain are attributes of the physical environment

Legal Risk and Performance

Project governance is the framework which ensures that the project has been correctly conceived and is being executed in accordance with best project management practice and within the wider framework of the organization's governance processes. (CDPRD, 2014) found that Government funded construction projects in Kenya are numerous with some of them successful, others taking too long to be completed and others seem to be completely abandoned. World Health Organization report (2007) explains that an effective procurement process ensures that materials are available at the right time, right quantity, for the right client, and at a reasonable price and quality. Ombaka (2009) further emphasizes that it does not merely entail the act of buying, but a wide range of business, operational, information technology, legal systems, safety and risk management, all undertaken to address an organization's needs. The ability to satisfy desired needs depends on the speed at which the good is delivered; otherwise a negative externality is created on the end users.

Mwakio (2012) reports that the authority is expected to eliminate the events of unscrupulous contractors who shoddy jobs in construction work thus leading to collapse of buildings. This will see an improvement in the building industry as contractors will have to comply with the regulations of the authority. Kenya has over a spate of time seen huge residential and commercial buildings caving in leading to destruction of property and loss of lives with initial findings pointing to substandard work on the side of construction. Bolton, (2006) reported that appropriate legal frameworks and institutions at national level to oversee road construction projects are essential to operational national policies, protect property rights, and generate equitable returns on private investments through efficient tariff structures and levels, service standards and expansion targets. Project legalities have developed from the broader concepts of corporate governance.

Corporate governance is concerned with a set of relationships between an organization's management, its board, its owners and other stakeholders. It provides the structure through which the objectives of the company are set, the means by which achievement of those objectives is agreed and how company performance against those objectives is monitored. Sonugaetal,(2002) found out that the project environment in many developing countries is unstable and characterized by rapid change of markets, shift of funding sources, frequent change of government policies and the business environment. In addition, projects in those countries are affected by prevalence of corruption, war, drought and governments political priorities. For example in Nigeria, the cost of construction materials was reported to have shown a 400% increase over a period of two years because of change in government policies devaluation of its currency and inflation.

Government has the ultimate responsibility to provide access to services and to ensure that public – private partnership does not alter the basic responsibility of government. According to a study by Kelechi (2004), Policy making requires a strong legitimate institutional structure for decision making and policy enforcement. Kelechi further observes that policy formulation, among other things, requires a strong representative government which is seen as legitimate and relevant to the masses which will result in a strategy for domestic revenue mobilization through acceptable taxation policies that the citizen will be willing to comply with because they appreciate and relate to it. It also requires that policies be made on the basis of strategic options and choices be rooted in the states realistic efforts at internal resource mobilization.

In Kenya, policy formulation process influences environmental exploitation, considerations of indigenous perspectives, creation of educational awareness, empowering of the beneficiaries, capacity building, considerations of consumer interest and local peoples' involvement in decision-making. All the above have either direct or indirect influence on the timely delivery of construction projects.

Contract Risk and Performance

As Lowe (2013) points out, a contract is the foundation of the establishment and maintenance of a favorable relationship between the contractor and contracting authority. It also forms a basis for the acceptance of the project deliverables hence ensuring the achievement of value for money. If a contract fails to address the relevant issues required in the agreement, such as, word ambiguities, it becomes hard for the contracting company to base a positive working relationship with the contractor. In spite of that, certainly there are activities that the contracting company can carry out upon awarding a contract so as to boost the contractor's performance and subsequently the effectiveness during the contract implementation.

Adenikinju (2005) graded productivity performance in Nigeria to be below average. His findings revealed technical inefficiency as a major influence to the decline. The result showed that technical efficiency declined by -1.29 percent per annum for the period of 1962-2000 while technical change declined by -1.01 percent annually over the same period. Unidentified project status also limits successful contract management in an organization. This is usually experienced due to poor communication among the contract parties. To solve this, it is valuable to integrate a communication plan in the contract. This will enhance timely contract status updates. Aman, Hamzah, Amiruddin and Maelah (2012) assert, contract management may also suffer from inadequate skilled resources. Contract management normally suffers because of unavailability of appropriate resources to implement it. Therefore, it is indispensable to have a project team from each contract parties (Dimitri, Piga&Spagnolo, 2006).

Jaselkis and Ashley (1991) investigated the impact of the project team, planning and control efforts as they relate to achieving overall project success, better-than expected schedule performance and better-than-expected budget performance. As in previous research, this research also used the discrete choice model as the analysis method. The results demonstrated that the key success factors affected the project outcomes differently. For example, increasing the number of budget updates 'has better schedule and overall project performance. Implementation of a constructability program seems to have a significant impact on achieving overall project success and better schedule performance – especially on fixed-price contracts. Reducing team turnover has more significant impact on improving budget performance than it does in achieving better schedule or overall project performance.

A study by Enshassi, Mohamed and Abushaban(2009) on factors affecting the performance of construction projects in the Gaza Strip found out that contractors should consider political and business environment risks in their cost estimation for overcoming delay because of closures leading to materials shortages. There should be adequate contingency allowances in order to cover increases in material cost. Proper motivation and safety systems should be established for improving the productivity performance of construction projects in the Gaza Strip. Greater application of health and safety factors is necessary to overcome problems of safety performance. Contractors are counseled to minimize waste rates through project implementation

for improving cost. They should be more interested in conformance to project specification to overcome disputes, time, and cost performance problems.

Quality materials should be of a greater interest for contractors in order to improve cost, time, and quality performance. This can be done by applying quality training and meetings that are necessary for performing an improvement. Contractors are urged to be more interested in sequencing of work according to schedule. In addition, contractors should have a cost engineer in their projects to successfully control costs.

Construction Risk and Performance

Management of construction projects involves a great deal of managing risks. Managing risks involves: planning, identifying, analyzing, developing risk handling strategies, monitoring and control. Project team members particularly clients, consultants and contractors should eliminate / mitigate delays when playing their respective roles. Cohen and Palmer (2004) identify sources of construction risks to include changes in project scope and requirements; design errors and omissions; inadequately defined roles and responsibilities; insufficient skilled staff; force majeure; and new technology. Baloi and Price (2003) categorize construction risks as technical, social, construction, economic, legal, financial, natural, commercial, logistics, and political.

Similarly, Mills (2001) lists three most important risks to include: weather, productivity of labour and plant and quality of material. Other researchers such as Finnerty (2006), and Miller and Lessard (2001) have categorized same risks in addition to demand, supply, regulatory, operational, completion and sovereign. Time related risks identified by Zouet al (2006) that are have influence on project delivery are: tight project schedule, design variations, excessive approval procedures in administrative government departments, variations by the client, incomplete approval and other documents, unsuitable construction program planning and inadequate program scheduling. Aiyetanet al (2008) point out that the three most significant factors that adversely impact construction project delivery time performance are: quality of management during construction; quality of management during design, and design coordination.

Construction projects are carried out within a specified time the scenario that calls for proper time management in particular eliminating all avenues of delays and disruptions. A study by Kumaraswamy and Chan (2008) on causes of construction delays in Hong Kong found differences in perceptions as to causes of delays by different groups of participants in building and civil engineering works. They suggested that biases of different industry groups might direct blame for delays to other groups. Noulmanee et al(2009) investigated causes of delays in highway construction in Thailand and concluded that delays can be caused by all parties involved in projects; however, main causes come from inadequacy of sub-contractors, organizations that lack sufficient resources, incomplete and unclear drawings and deficiencies between consultants and contractors.

Al-Momani (2000) investigated causes of delay in 130 public projects in Jordan and found that main causes of delay were related to designer, user changes, weather, site conditions, late deliveries, economic conditions and increase in quantity. Al-Kharashi and Skitmore (2008) points out that the main cause of delay in Saudi Arabia construction sector for public projects is the lack of qualified and experienced personnel.

A study by Ahmed, Azhar, Castillo and Kappagantula, (2002) identified ten most critical causes in Florida as building permits approval, change order, changes in drawings, incomplete documents, inspections, changes in specifications, decision during development stage and shop drawings and approval. Sambasivan and Soon (2007) identify ten most important causes of delay in Malaysian construction industry contractor's improper planning, contractor's poor site management, inadequate contractor experience, inadequate client's finance and payments for completed work, problems with subcontractors, shortage in material, labor supply, equipment availability and failure, lack of communication between parties, and mistakes during the construction stage.

RESEARCH METHODOGY

Research Design

A research design is a statement of the essential elements of a study and constitutes the blue-print for the collection, measurement and analysis of data (Cooper & Schindler, 2008) hence a logical and systematic plan prepared for directing a research study (Shajahan, 2005). The study adopted a descriptive survey design. Sekran (2007) observed that descriptive survey research is intended to produce statistical information about aspects of a phenomenal being studied by administering a questionnaire to a sample of individuals. The descriptive design was particularly ideal because all the data on the indicators of risk management practices and performance of projects was in numerical form suitable for quantitative description. The qualitative data was analyzed quantitatively by use of five point Likert scale items in the questionnaire. Descriptive surveys are designed to obtain information about the current status of a phenomenon or to answer questions like where, what, how, why, when, and who. The study used descriptive research which refers to the investigation in which data is collected and analyzed in order to describe the specific phenomena in its current trends, current events and linkages between different factors at the current time (Kothari, 2004).

Target Population

According to Ngechu (2004), a population is a well defined or set of people, services, elements, events, group of things or households that are being investigated. In this study, the target population composed of employees at various construction projects in Nairobi City County Government in Kenya. The study involved 100 Contractors, 80 consultants/Specialists and 200 project engineers who are involved in construction projects in Nairobi City County. The

population included the contractors, project engineers and consultants who are involved in construction projects in Nairobi City County. A total population of 380 was targeted.

Sampling Design

The sampling plan describes how the sampling unit, sampling frame, sampling procedures and the sample size for the study. The sampling frame describes the list of all population units from which the sample was selected (Cooper & Schindler, 2003). Kothari (2010), a representative sample is one which is at least 30% of the population. Therefore 50% of the 308 respondents was selected using random sampling technique, hence the study's sample size was 190.

Data Collection Instruments

According to Ngechu (2004) there are many methods of data collection. The choice of a tool and instrument depends mainly on the attributes of the subjects, research topic, problem question, objectives, design, expected data and results. This is because each tool and instrument collects specific data. Also, Best & Kahn (2004) posit that data may be collected by a wide variety of methods. Primary data is gathered and generated for the project at hand. Primary data is information gathered directly from respondents and for this study the study will use questionnaires. The study used of a questionnaire administered to each member of the sample population. The questionnaire had both open and close-ended questions. The close-ended questions provided more structured responses to facilitate tangible recommendations. The closed ended questions were used to test the rating of various attributes and this helped in reducing the number of related responses in order to obtain more varied responses. The open-ended questions provided additional information that may not have been captured in the close-ended questions. The questionnaire were carefully designed and tested with a few members of the population for further improvements. This was done in order to enhance its validity and accuracy of data to be collected for the study.

Data Analysis and Presentation

Orodho (2005) points out that analysis means, categorizing, ordering, manipulating and summarizing of data to obtain answers to research questions. The researcher edited the completed questionnaires and the secondary data collection forms to ensure completeness and consistency. Data clean-up follow; this process involved editing, coding, and tabulation in order to detect any anomalies in the responses and assign specific numerical values to the responses for further analysis. The data was quantitatively analyzed using descriptive and inferential statistics with the aid of SPSS software. The output of the analysis were tables, percentages, means and figures which helped establish the role of risk management practices on the performance of connection projects by the Nairobi City County Government, Kenya. A multiple linear regression analysis was applied to examine the effect of the critical risks on the performance of construction projects. The following algebraic expression of the analytical model was applied:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: Y = performance of construction projects; X_1 = Design risks; X_2 = legal risks; X_3 = construction risks; X_4 = Contract risks; ε = Error term

The regression coefficients are represented by $\beta_0, \beta_1, \beta_2, \dots, \beta_5$. x_1, x_2, \dots, x_4 are the independent variables and ε provides for the random variation in y that x variables are not able to explain.

RESEARCH RESULTS

The study revealed that the most prevalent risk management practices employed by the Nairobi City County government on construction projects were costing of projects, project designing, disputes over land and construction. The risk management practices are taken depending on uncertainty involved in the process of project design, implementation and evaluation. Risk mitigation should be done after every review of the project life cycle

Design Risk and Performance

92% of the respondents indicated that project design affects the execution of construction projects in Nairobi City County since design constraints limit the range of potential design solutions. It was realized that design risk management practices significantly affected the performance of projects in the construction sector. This indicates that there is a positive relationship between design risk management practices and performance of projects

Construction Risk and Performance

Constructors have the highest risk in fixed price contracts and least in the cost type contracts. In construction type of projects, they have fixed price contracts which have the highest risk given a fluctuating nature of cost of raw materials, resources and human resource for the project. It was revealed that most constructors do not have a defined project scope implying that projects objectives are not established and expected deliverables are also not identified. The constructors mostly don't have an execution plan implying that no clear implementation procedure is available giving room for failure. Additionally the constructors fail due to lack of calculated risk given that most construction projects are often exposed to risks arising either from unforeseen circumstances or natural hazards.

Contract Risk and Performance

Most constructors were found to lack a project schedule, proper engineering process, procurement plan, site evaluation plan, design basis and above all didn't embrace proper project management skills and procedures giving room for incomplete or failed construction projects.

Lack of ethics by the contractors, poor supervision of contractors by the county government and lack of clarity in the contract documents awarded to the contractors contribute to a great extent to the failure of construction projects by the county government while Disagreements on contract changes with contractors on scope of their work contributes to a moderate extent with a correlation coefficient or R is 0.39 which indicates that contract management risk has a significantly positive but limited relationship with performance of construction projects implemented by counties in Kenya. The coefficient of variation or R² is 0.15 lesser and distant from 1 indicating a limited influence of contract management risk on project performance. There is an inverse relationship between contract management risk and performance of projects.

Legal Risk and Performance

Contractors were found to be colluding with the staff to scape quality checks and overpricing of services by contractors within the Nairobi City County government while to a lower extent were the conflicts of contractors were timely resolved indicating a low profile given to their challenges and creating a loop hole through insufficient supervision and quality checks. The construction projects in Nairobi City County were found to be facing legal suits on the land where they are located or pass through. Some of legal risks which have given rise to legal suits in the construction sector undertaken by the public sector include technical risks, logistical risks, environmental risks, management related risks, financial risks and socio-political risks which are either emanating external or internal sources. 81% of the respondents indicated that the county government loses raw materials. Some of most prevalent risks that are involved in the construction of projects is availability of raw materials, political unrest, security of materials and available of labour four and above all government policy. Lack of monitoring of contractors and breakdown in communication between government and contracts has been the major hindrance in completing the construction projects in Nairobi City County. There is an inverse relationship between construction risk and implementation and completion of construction projects in Nairobi City County.

REGRESSION ANALYSIS

Table 1: Coefficient of Determination (R²)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Sig.
1	0.632	0.699	.5810	.60112	0.000

The four independent variables that were studied, explain 69.9% of the performance of construction projects in Nairobi City County as represented by the R². The coefficient of determination indicates that the independent variables are close to the mean. This therefore means that other factors not studied in this research contribute 30.1% of the performance of construction projects in Kenya. Coefficient of determination findings as explained by the P-value

of 0.004 which is less than 0.05 (significance level of 5%) confirms the existence of correlation between the independent and dependent variables.

Table 2: ANOVA

Model	SS	df	MS	F	Significance
Regression	621.54	5	521.4	676.005	0.0942
Residual	361.41	312	0.950		
Total	782.44	317			

From the ANOVA table above, the value of F calculated is 676.005 while F critical is 599.521. Since the value of F calculated is greater than F critical, the overall regression model was significant and therefore a reliable indicator of the study findings. In terms of p values, the study indicated 0.000 which is less than 0.05 and therefore statistically significant.

Table 3: Multiple Regression Analysis

Variables	Unstandardized		Standardized	T	Sig.
	Coefficients	Coefficients	Coefficients		
	B	Std. Error	Beta		
(Constant)	1.012	0.2501		3.611	.0000
Design risks management practices	0.064	0.1139	0.1550	2.650	.0001
Legal risks management practices	-1.252	0.0481	0.0327	3.534	.0000
Construction risks management practices	-1.069	0.0714	0.2325	3.686	.0010
Contractor risks management practices	-0.99	0.0501	0.0384	2.450	.0005

In addition, the researcher conducted a multiple regression analysis so as to determine the relationship between performance of construction projects and the four variables. As per the SPSS generated table, the equation becomes:

$$Y = 1.012 + 0.064X_1 - 1.252X_2 - 1.069X_3 - 0.99\beta_4X_4$$

Where: Y = performance of construction projects in Nairobi City County, X₁ = design risks management practices, X₂ = legal risks management practices, X₃ = construction risks management practices and X₄ = contractor risks management practices.

According to the regression equation established, taking all factors (design, legal, contraction and contractor risks management practices) constant at zero, the performance of construction projects as a result of risk management practices will be 1.012. Further, taking all other independent variables at zero, a unit improvement in design risks management practices will lead to a 0.0644 increase in performance of construction projects. A unit increase in legal risks management practices will lead to a 1.252 decline in performance of construction projects; a unit

increase in construction risks management practices will lead to a 1.069 decrease in performance of construction projects while a unit increase in contractor risks management practices will lead to a 0.99 decline in performance of construction projects in Nairobi City County. This infers that legal risks contributed more to the poor performance of construction projects of the county government followed construction risks management practices.

At 5% level of significance and 95% level of confidence, design risks management practices had a 0.000 level of significance, legal risks management practices had a 0.0001 level of significance, construction risks management practices showed a 0.0010 level of significant, while contractor risks management practices showed a 0.0005 level of significance. Hence construction risks management practices is the most significant factor in contributing to the performance of construction projects in Kenya followed by contractor risks management, legal risks management and design risks management practices respectively. The t critical at 5% level of significance at $k = 4$ degrees of freedom is 2.315. Since all t calculated values were above 2.315 then all the variables were significant in explaining the performance of construction projects in Nairobi City County, Kenya. The study concurs with Mwakio (2012) in his study on construction projects by the government of Kenya however his study indicated a negative relationship between all risks on the performance of projects while this study indicates a positive influence between design risk management and project performance.

CONCLUSIONS

Construction projects are very complex and can pose various internal and external risks. A strict set of codes, laws, and regulations must be followed during the construction process to best avoid these risks. Unfortunately, there is no way to completely avoid risks as there are bound to be unknown factors that arise over the course of a project. Poor design risk management leads to poor implementation of a project which as a result leads to cost overruns, prolonged execution period and compromise on quality of the projects. This indicates that design risk management is instrumental in ensuring success of construction projects in Nairobi City County.

Poor designing is a risk involved during the planning and formulation of the project plan. During construction those entrusted with the work may make mistakes or execution procedure be below expectations which will compromise the end result this may affect the project to an extent of halting it. Disputes over land are ever there in the County of Nairobi. Due diligence therefore needs to be done in consultation with the Ministry of Lands and Housing to ensure that all the paper work is done. Costing is most porous process which keeps on changing due a variety of factors. The project cost may escalate depending on the externalities this may end up making the project more expensive than expected but with proper planning and implementation all this can be avoided.

In the early stage of a project only some of these constraints may be known, while others become apparent as the design progresses. These could include (among many others): available

technology, plant, materials, labour and so on, the budget, specific performance requirements, site form, boundaries and conditions, neighboring properties, access, planning and building regulations restrictions and completion date. It is often argued that design constraints are helpful in the development of a design, as they limit the number of feasible options and point towards an obvious solution. In the absence of any constraints at all, it can be difficult to know where to start, or to justify developing one particular solution in preference to any other.

RECOMMENDATIONS

The study recommended that for the construction department and constructors to mitigate risks involved in the project implementation process there is need for proper project design, legal approval and policy requirements adherence, proper planning to ensure all resources are available to effect the construction project and proper contracting with every stakeholder being appreciated and involved in the project planning and formulation process.

For the risks to be mitigated there is need to determine what risks are most likely to affect the project, which risks are the most important and document them. The constructors need to assess the risks carefully and identify the implications that these risks might have on their project. The stakeholders need to monitor risk responses that have been implemented as planned and determine if the risk exposure has changed. In the final stage of risk control, monitor risk metrics and milestones and the effectiveness of the risk management actions

The study also recommended that as a contractor and to avoid this escalation of risks, it requires that you determine and document the list of specific project goals, tasks and deadlines. The stakeholders need to ensure that the scope of work is defined, objectives are established and

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