

# Factors Affecting Completion of Road Construction Projects in Nairobi City County: Case Study of Kenya Urban Roads Authority (KURA)

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**Abstract-** This study sought to determine the factors affecting roads Construction Projects Completion in Nairobi City County. The study specific objectives was to evaluate how project manager's competency, project funds, project equipment and Information Technology influence efficient road construction projects Completion in Nairobi City County. The target population comprised of all members of staff in all IT, Finance, HR and construction departments. The study applied a descriptive research design. The study population comprised of 2000 members of staff working in KURA in Nairobi. The study applied a stratified random sampling technique to select a sample size of 138 respondents. Questionnaires were used as the main data collection instruments and a pilot study was undertaken to pre-test the questionnaires for validity and reliability. The gathered data was analysed using descriptive statistics aided by Statistical Package for Social Scientists (SPSS) version 22 and findings presented on tables and charts. There was 70% response rate. The study findings reveal that road construction project Completion is greatly influenced by Project Equipment, Project Managers Competency, Project Funds, Project Technology.

**Index Terms-** Project Equipment, Project Funding, Project Management

## I. INTRODUCTION

### K1.1 Background of the Study

Kemps (2012) described project delivery as the world's oldest documented profession. Professionals use a number of definitions to define project efficiency. Road contractor's performance problem appears in many aspects in developing countries. Many road projects fail in time performance, others fail in cost performance and others fail in other performance indicators. In the past there were many road projects which finished with poor performance because of many evidential reasons such as: obstacles by client, non-availability of materials, road closure, amendment of the design and drawing, additional works, waiting the decision, handing over, variation order, amendments in Bill of Quantity (B.O.Q) and delay of receiving drawings. There are other indicators for problems of road contractor's performance in developing countries such as project management, coordination between participants, monitoring, and feedback and leadership skills. In addition, political, economic and cultural issues are three important indicators related to

failures of road projects' performance in the Country (Becerik, 2007).

The importance of identifying an organization's performance is evident throughout the world-wide markets, the results of which are to attract future investment, increase share value and attract high caliber employees. Therefore, it is important to consider how an organization's performance is measured and how it can be communicated to the wider market i.e. how can it be understood and interpreted by the potential investors, employees and customers. The basis of formulating performance indicators that achieve the latter have been in operation as early as the beginning of our century (Chan & Mohan 2009). Those performance indicators have traditionally concentrated on finances e.g. return on investment, sales per employee, and profit per unit production, which as Chen (2007) suggests "financial measures are useful - but they tend to measure the past - and they tend to measure the easily-measurable." The apparent inadequacy of financial measures for contemporary businesses has been identified by a number of authors (Arditi and Mochtar, 2006).

In Nairobi City County, efficient construction projects can provide a solid platform for reviving the economy and for building a more balance and independent economy during stable political conditions. In 2013, neglect of such systems, services, and institutions, however, has harmed the efficient of life of the residents and their health and environment (Kemps, 2012).

The consequences may rather be in terms of loss in productivity, additional expenditures by way of rework and repair, re-inspection and retest in the short term. In the long term, poor efficient can hurt reputation, and if the company continues in the same way it might have to close its shop for want of new projects. If a number of construction companies of a country start neglecting the efficient aspects in their projects, this also starts reflecting on the reputation of the country (Hyvari, 2006). Helping the construction companies to identify the critical attributes responsible for achieving the desired efficient level (success factors) and also to find the attributes adversely affecting the project efficient (failure factors) has been the motivating factor behind this study. It is realized that maximization of the success factors and minimization of failure factors will ensure the construction industry realizes its efficient goals. Realizing these aspects, the present study was undertaken to suggest ways to improve efficient as well as to take care of certain critical factors that may lead to loss of efficient (Iyer and Jha, 2006).

### **1.1.1 Global Perspective on Road Construction Projects Delivery**

Construction Industry is the backbone for economic development. Kenny (2007) mentions that “construction sector role in economic development is Undeniable”. In view of its importance, large investments were made by governments all across the globe for many years. In view of its identity as world oldest engineering division, construction process and practices has evolved over the centuries. As, Kenny (2007) mentions, “During last 100 years, technology in construction has developed drastically paving way for modern buildings and scientific designs”. Also, the importance of construction was aptly brought out by Leesard (2011) who says that “Large engineering projects are important not only because they transform the physical landscape and change the quality of human life, but because they are the crucibles in which new forms of collaboration are developed”. Now, during last few decades there has been increasing importance to improve the practices and quickly contribute to the growing needs of society.

History of construction projects can be traced back to Egyptian Pyramids, early Greek settlement around Mediterranean, Roman Empire constructions of temples and structures in medieval age (Lewis, 2008). As it is known that in the 18th Century is Renaissance period which saw much significance to architecture and industrial revolution. Also, 19th century saw large improvements in construction industry particularly in railways and buildings. Marasini, and Dawood (2006) mentions that during 1959– 1969, the construction of Suez Canal was an international project of great proportions and contractors had gained experience in the construction of large buildings, railways, petrochemicals, dams and reservoirs. Lewis, (2008) mentions that Great Britain was first to go global with railway construction and the first major international construction company was built up by Pearson in Great Britain at about the turn of the century. Now there are massive projects constructed all over the world, driving the national economy.

Reschke and Schelle (2010) mentions that large engineering projects such as airports, transport, power, oil and gas constitute most important business sectors in the world. This massive infrastructure investment has led to the emergence of companies such as Vandevoorde and Vanhoucke (2006) who assert that “Construction is a \$3.5 trillion industry worldwide, amounting to between 6 and 8 percent of GDP in most countries”.

### **1.1.2 Kenyan Perspective on Road Construction Projects Delivery**

Work on providing construction services in Nairobi has made considerable progress since the ministry of transport assumed responsibility for them, but the construction companies have had to build from a low base, including a huge backlog of rehabilitation and development work, few institutions, and very little funding. So, they have had to work in every difficult physical, social, political, economic and institutional circumstance. For a number of reasons, the performance of construction projects has not been as impressive, fundamentally because of the government failure to establish a coherent institutional and policy framework (World Bank, 2008).

Performance is related to many topics and factors such as time, cost, quality, client satisfaction; productivity and safety.

Construction industry in the Kenya suffers from many problems and complex issues in performance. For example, construction of 10 dwelling units at Nairobi Area suffered from poor performance because of delay for about 3 months. There are many realistic reasons such as closures, amendment of drawings and amendment of the design and delayed funds release. In addition, there are other different reasons affecting construction projects performance in the Kenya such as poor management and leadership; inappropriate participants; poor relations and coordination; absence of motivation, control, monitor or decision making systems; inadequate infrastructure, political problems; cultural problems and economic conditions (Strenman, 2012).

While individual organizations have been measuring their performance for many years, there has been little consistency in the data, and the way it has been published. The performance can be measured by key indicators for evaluation (Wang and Huang 2006). The purpose of Key performance indicators (KPIs) is that clients want their projects delivered: on time, on budget, free from defects, efficiently, right first time, safely, by profitable companies. So, Regular clients expect continuous improvement from their construction team to achieve year-on-year: reductions in project costs and time. In addition, the Key Performance Indicators (KPIs) can be used for benchmarking purposes, and will be a key component of any organization move towards achieving best practice. Clients, for instance, assess the suitability of potential suppliers or contractors for a project, by asking them to provide information about how they response to a range of factors. Some information will also be available through the industry’s benchmarking initiatives, so clients observe how potential suppliers compare with the rest of industry in a number of different areas (Weil, 2005).

Construction supply chain companies will be able to benchmark their performance to enable them to identify strengths and weaknesses, and assess their ability to improve over time. The KPIs framework consists of seven main groups: time, cost, quality, client satisfaction, client changes, business Performance, health and safety (Vandevoorde and Vanhoucke, 2006).

In Kenya, there are many construction projects fail in performance. In addition, performance measurement systems are not effective or efficient to overcome this problem. Construction projects performance problem appears in many aspects in the Kenya (Weil, 2005). There are many constructed projects fail in time performance, others fail in cost performance and others fail in other performance factors. In 2009 there were many projects which finished with poor performance because of many evidential reasons such as: obstacles by client, non-availability of materials, road closure, amendment of the design and drawing, additional works, waiting the decision, handing over, variation order, amendments in Bill of Quantity (B.O.Q) and delay of receiving drawings (Strenman, 2012). There are other factors for problems of performance in Kenya such as project management, coordination between participants, monitoring, and feedback and leadership skills. In addition, political, economic and cultural issues are three important indicators related to failures of projects' performance in the Kenya.

### **1.1.3 Kenya Urban Roads Authority (KURA)**

Kenya Urban Roads Authority, commonly abbreviated as KURA is a state corporation whose mandate is to offer guidance in the construction, maintenance and management of the urban

road network in the country. KURA is a state parastatal under the Ministry of Transport and Infrastructure established under the Kenya Roads Act 2007. KURA has 47 Regional Offices spread in each of the 47 counties as stipulated in the current constitution. Each office is headed by a Regional Manager (RM) who represents the Director General (DG) in each County. The Finance Act 2009 set up Constituency Roads Committees in each constituency in Kenya which, under the assistance of each Member of Parliament, advises KURA on the formulation of an annual roads program and the roads to be included in it. These committees thus prioritize projects within their jurisdiction and which are hence implemented under the supervision of KURA.

## 1.2 Statement of the Problem

In Kenya Construction projects are facing challenges of non-Completion. Many construction projects fail due to factors like time in efficiency, lack of adequate funds and lack of advance working equipment. Kenya Urban Road Authority, (2013) reported there were many projects which were not completed due to obstacles by client, non-availability of materials, poor infrastructure, lack of funds and lack of project managers competency.

Local studies have not focused on factors affecting roads Construction Projects delivery in Nairobi City County. Musa (2012) did a study on effects of total quality management on performance of Companies in Kenya a case study of Inter build Company Limited. He found that human resource management and resource management affects performance of the building company to a great extent. Bundi (2011) did a survey on challenges in the management of procurement services within Kenya Urban Roads Authority. She found that political interferences and inadequate allocations of funds hinder completion of KURA activities even though the authority fully implements procurement policies. Nyamwaro (2011) did a study on analysis of challenges facing project implementation a case study of Ministry of Roads Projects. The study deduced that poor communication and lack of awareness on POA which is also used in the implementation of the Ministry's Projects were the main challenges facing project implementation.

Despite previous studies focusing on ministry of road and its associates, none has focused on the factors influencing the roads Construction Projects Completion in Nairobi City County. The researcher was motivated to fill knowledge gap by evaluating factors influencing road construction projects Completion in Kenya with focus to Nairobi County, to determine how manager's competence, funds, equipment and Technology influence efficient delivery of road construction projects in Nairobi City County.

## 1.3 Objectives of the Study

### 1.3.1 General Objective

To determine factors affecting roads construction projects Completion in Nairobi City County: A case of Kenya Urban Roads Authority (KURA).

### 1.3.2 Specific objectives

1 To evaluate how project managers competency influence road construction projects Completion in KURA, Nairobi City County.

- 2 To establish the influence of project funds on road construction projects Completion in KURA, Nairobi City County.
- 3 To what extent does project equipment influence road construction projects delivery in Nairobi KURA, City County.
- 4 To examine whether project technological innovation influence road construction projects Completion in KURA, Nairobi City County.

## 1.4 Research questions

- 1 How does project managers competency influence road projects Completion in KURA, Nairobi City County?
- 2 To what extent does project funding influence road projects Completion in KURA, Nairobi City County?
- 3 How does project equipment influence road projects Completion in KURA, Nairobi City County?
- 4 To what extent does project technological innovation influence road projects Completion in KURA, Nairobi City County?

## 1.5 Significance of the Study

The encouraged public sector management/policy makers on the importance of roads construction projects Completion. The study determined the factors affecting roads construction projects Completion in Nairobi City County so as to identify the areas where urgent action need to be taken to safeguard the interest of the sector. The study helped in application of theoretical training to policy makers to address practical problems in the sector, and to provide insights to today's and the future managers on the importance of properly road construction completion. The study encouraged further researchers on the area to research as it's not exhaustive. The study also benefited scholars who would wish to undertake further studies aimed at establishing factors affecting roads construction projects Completion.

## 1.6 Scope of the study

The study was conducted at the KURA Blue shield towers, Upper hill in Nairobi. The study targeted a population 1200 respondents from the KURA in order to determine the factors affecting road construction project Completion. A good sample should be adequate and representative of the underlying population. A sample of 10% or 20% is an adequate sample in a descriptive study of this nature as supported by (Mugenda and Mugenda, 2003). Sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population. The researcher used random sampling to select sample size of 120 respondents which represented 10% of the population. The study was scattered across the employees of various departments, that is, IT, Finance, HR and the construction departments which took a period of one month.

## 1.7 Limitation of the Study

The study experienced limitation such as projects management resistance to give information.

Some respondents refused to answer questions, thus the sample size of 138 respondents from which 110 filled in and returned the questionnaires making a response rate of 80%. The study only looked at factors affecting roads construction projects

Completion in Nairobi City County: A case of Kenya Urban Roads Authority (KURA) hence Private sectors were not included in the study so that their views on factors affecting roads construction projects Completion in Nairobi City County.

## II. LITERATURE REVIEW

### 2.1 Introduction

This chapter researched and sourced literature ranging from academic books and journals that address the factors affecting efficient delivery of roads construction for the purpose of this study. Academic articles stimulate and provide theoretical understanding relevant literature on the aspects pertaining to the efficient performance on road construction among KURA. It comprises the conceptual framework, theoretical review, and empirical review, and critique of the review.

### 2.2 Theoretical Framework

A Theoretical framework is a set of statements or principles devised to explain a group of facts or phenomena especially one that has been repeatedly tested or is widely accepted and can be used to make predictions about natural phenomena (Lucia, and Lepsinger, 2009). Theories are analytical tools for understanding, explaining, and making predictions about a given subject matter. It comprises the conceptual frame work, theoretical review, and empirical review, critique of the review and the research gap of the study.

#### 2.2.1 Management Theory

Management is the process of designing and maintaining an environment in which individuals, working together in groups, efficiently accomplish selected aims (Koontz and Weihrich, 2000). In its expanded form, this basic definition means several things. First, as managers, people carry out the managerial functions of planning, organizing, staffing, leading, and controlling. Second, management applies to any kind of organization. Third, management applies to managers at all organizational levels. Fourth, the aim of all managers is the same to create surplus. Finally, managing is concerned with productivity this implies effectiveness and efficiency.

Managing, like all other practices whether medicine, music composition, engineering, accountancy, or even baseball is an art; it is know-how. It is doing things in the light of the realities of a situation. Yet managers can work better by using the organized knowledge about management. It is this knowledge that constitutes science. However, the science underlying managing is fairly crude and inexact. This is true because the many variables with which managers deal are extremely complex. Nevertheless, such management knowledge can certainly improve managerial practice. Managers who attempt to manage without management science must put their trust to luck, intuition, or what they did in the past (Gardiner, 2000). In managing, as in any other field, unless practitioners are to learn by trial and error, there is no place they can turn for meaningful guidance other than the accumulated knowledge underlying their practice; this accumulated knowledge is theory. For practical purposes, all managers must develop three sets of skills, namely; conceptual, technical, and human (Peterson 2004).

#### 2.2.2 Agency Cost Theory

Agency theory is the branch of financial management theory that looks at conflicts of interest between people with different

interests in the same assets. This most importantly means the conflicts between: shareholders and managers of companies, shareholders and bond holders. The theory explains the relationship between principals, such as a shareholders, and agents, such as a company's managers. In this relationship the principal delegates (or hires) an agent to perform work. The theory attempts to deal with two specific problems: how to align the goals and principal of funds management so that they are not in conflict (agency problem), and that the principal and agent reconcile different tolerances for risk.

The case fund managers faced major problems in implementing finance theory, especially with MPT and CAPM when estimating stock returns, and when using optimization routines to find the efficient frontier and the optimum risk, return portfolio. The problems arose, in part, because of the limitations of public domain data and because of the uncertainty implicit in forecasting stock risk and return characteristics. These problems also arose because of the many controversies and fundamental problems facing finance theorists laid the foundations of modern portfolio theory (Minocha, 2005). He stated that investors seek a risk/return trade off by seeking to maximize returns for a given level of risk or to minimize risk for a given level of return. He argued that a portfolio manager needed to know the weighting of for each of  $N$  stocks,  $N$  estimates of expected return and of variance of return, and  $N(N-1)/2$  estimates of covariance of return between each pair of stocks in the portfolio. This information could be used to generate a large number of feasible portfolios which were dominated by a smaller number of efficient risk/return portfolios lying on the efficient frontier.

Risk averse, rational portfolio managers could choose one of these portfolios to reflect their or their clients risk/return preferences (utility). Given the above input data the portfolio selection problem could be solved to find the optimal solution using a quadratic programming approach. This approach was further simplified by the development of the Capital Asset pricing model by Sharpe and Lintner in the 1960s. They identified a single factor, linear model, in which a company's Beta measured the stock's return volatility relative to that of the market overall. This model reduced the number of covariance (now company to market return) to be estimated to the number of stocks in the portfolio. This much simplified the estimation and portfolio construction decision process.

Markowitz (2005) argued that finance theory tells us what is to be estimated in the form of future risk and return and how estimates for specific shares are to be combined to form estimates for the portfolio as a whole. However, theory does not tell us how to make the estimates of return, variance and covariance. These parameters are not known with certainty and some form of estimation bias is inevitable, given that some combination of historic data and/or forward looking subjective or expectancy data has to be used.

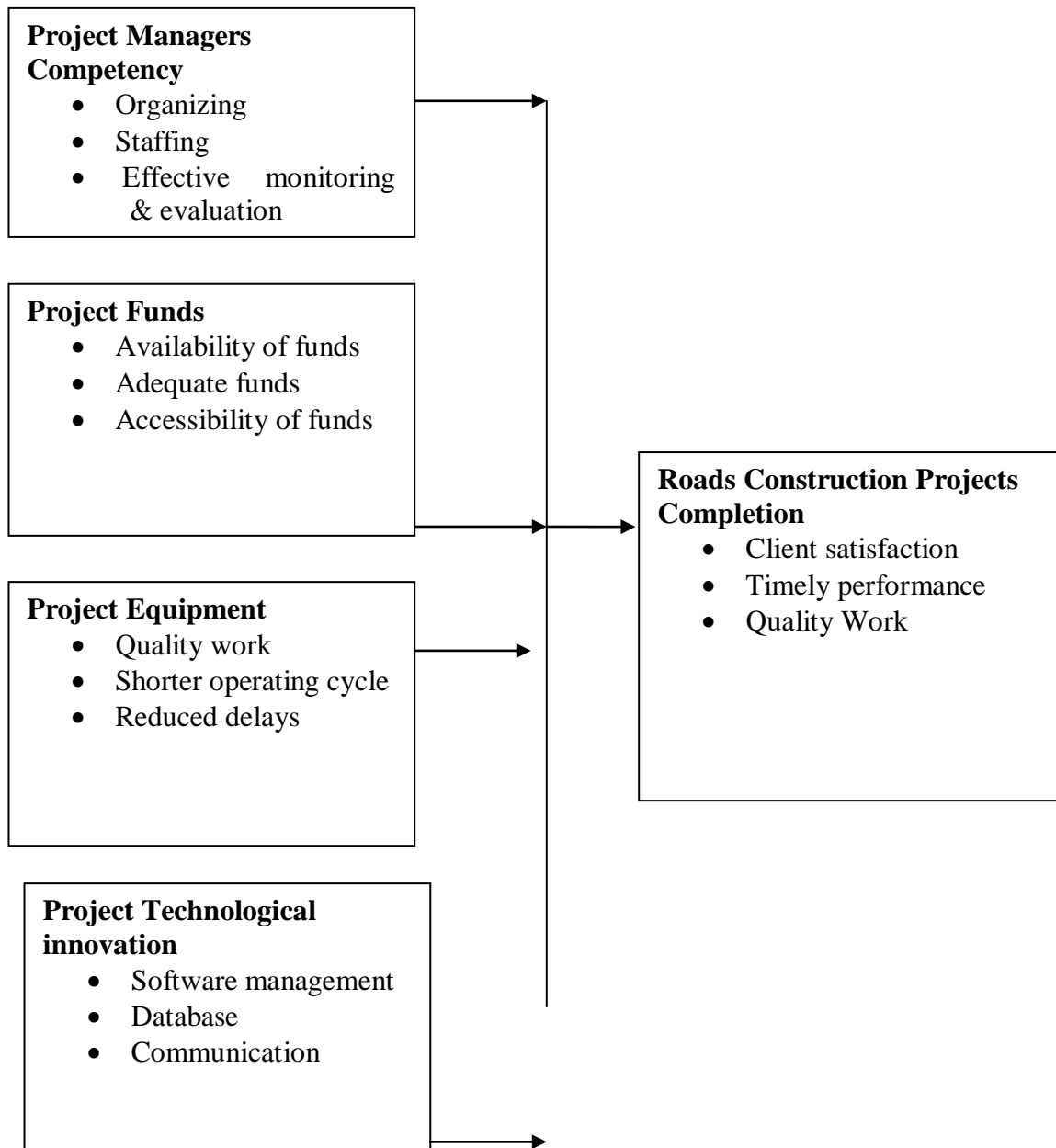
#### 2.2.3 Change Agency Theory

Change agency theory has been found to be of particular relevance to understanding innovation associated with electronic construction project, where financial, managerial, informational and technological constraints tend to restrict innovativeness and entrepreneurship (Mole, 2002) agents can either be internal or external. Internally the owner of institutes and other sectors forces can act as champions, advocates and leaders of change

(McElroy, 2010). According to Ross (2008), technology simplifies and reduces task needing manual skill and strengths especially in factories and either forms of production property applied can increases productivity. The use of reprogram able robots for such tasks as welding spraying material handling and other helps to eliminate dirty or harassers and repetitive work robots and computer aid manufacturing (CAM) as well as reducing costs improving quality and the consistency of finished quality and the consistency of finished products. The unused technology requirements enhance problem solving skills and the ability to interpret, and is thus likely to lead to widening gap between skilled and non-skilled workers (Leslie, 2005).

According to Johnson, Kast and Rosenzweig (2012), creating an effective technology infrastructure is vital. An effective technology infrastructure is vital to all institutions. Infrastructure directly affects the quality of service experienced by international and external users of the system in terms of speed and responsiveness to their requests for information. The selection of the software components of information is systematic. In this chapter we turn our effect to the hardware and men work components. Understanding the jargon of technology involved in the selection of information and communication technology is major challenge for non-literature office staff and business managers (DiMaggio, 2008).

### 2.3 Conceptual Framework



**Independent Variables**

**Dependent variable**

**Figure 2.1 Conceptual Frame Work**

### 2.3.1 Project Managers Competency

Competence is the ability of an individual to do a [job](#) properly. A competency is a set of defined behaviors that provide a structured guide enabling the identification, evaluation and development of the behaviors in individual employees (Chan and Mohan 2009). Competencies are also what people need to be successful in their jobs. Job competencies are not the same as job task. Competencies include all the related knowledge, skills, abilities, and attributes that form a person's job. This set of context-specific qualities is correlated with superior job performance and can be used as a standard against which to measure job performance as well as to develop, recruit, and hire employees.

Competencies provide organizations with a way to define in behavioral terms what it is that people need to do to produce the results that the organization desires, in a way that is in keep with its culture. By having competencies defined in the organization, it allows employees to know what they need to be productive. When properly defined, competencies, allows organizations to evaluate the extent to which behaviors employees are demonstrating and where they may be lacking (Dubois and Rothwell 2006). For competencies where employees are lacking, they can learn. This will allow organizations to know potentially what resources they may need to help the employee develop and learn those competencies. Competencies can distinguish and differentiate your organization from your competitors. Competencies can provide a structured model that can be used to integrate management practices throughout the organization. Competencies that align their recruiting, performance management, training and development and reward practices to reinforce key behaviors that the organization values.

Monitoring is the systematic and routine collection of information from projects and programmes for four main purposes. Monitoring is a periodically recurring task already beginning in the planning stage of a project or programme. Monitoring allows results, processes and experiences to be documented and used as a basis to steer decision-making and learning processes. Monitoring is checking progress against plans. The data acquired through monitoring is used for evaluation. Evaluation is assessing, as systematically and objectively as possible, a completed project or programme. Evaluations appraise data and information that inform strategic decisions, thus improving the project or programme in the future (Dubois and Rothwell, 2007).

### 2.3.2 Project funds

"Funding" is the act of providing financial [resources](#), usually in the form of [money](#), or other values such as effort or time, to finance a need, program, and project, usually by an organisation or government. Generally, this word is used when a firm uses its internal reserves to satisfy its necessity for cash, while the term '[financing](#)' is used when the firms acquires capital from external sources (Gyula, 2008) . Available funds may also refer to funds that can be withdrawn from a margin account at a brokerage firm, where margin loans are still outstanding.

### 2.3.3 Project Equipment

Equipment are the tools, machines, or other things that you need for a particular job or activity Tangible property (other than land or buildings) that is used in the operations of a business.

Examples of equipment include devices, machines, tools, and vehicles (Hyvari, 2006).

Krazner (2005) defined construction equipment as to heavy-duty vehicles, specially designed for executing construction tasks, most frequently ones involving earthwork operations. They are also known as heavy machines, heavy trucks, construction equipment, engineering equipment, heavy vehicles, or heavy hydraulics. They usually comprise five equipment systems: implement, traction, structure, power train, control and information Heavy equipment functions through the mechanical advantage of a simple machine, the ratio between input force applied and force exerted is multiplied. Some equipment uses hydraulic drives as a primary source of motion.

### 2.3.4 Project Technological Innovation

Technology is the collection of techniques, methods or processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation. Technology can be the knowledge of techniques, processes, etc. or it can be embedded in machines, computers, devices and factories, which can be operated by individuals without detailed knowledge of the workings of such things. Technology has many effects. It technology has helped develop more advanced economies (including today's global economy) and has allowed the rise of a leisure class (Karim and Marosszeky, 2009). Various implementations of technology influence the values of a society and new technology often raises new ethical questions. Examples include the rise of the notion of efficiency in terms of human productivity, a term originally applied only to machines, and the challenge of traditional norms. Innovation is a new idea, more effective device or process. Innovation can be viewed as the application of better solutions that meet new requirements, inarticulate needs, or existing market needs. This is accomplished through more effective [products](#), [processes](#), [services](#), [technologies](#), or [ideas](#) that are readily available to [markets](#), [governments](#) and [society](#). The term innovation can be defined as something original and more effective and, as a consequence, new, that "breaks into" the market or society.

While a novel device is often described as an innovation, in economics, management science, and other fields of practice and analysis innovation is generally considered to be a process that brings together various novel ideas in a way that they have an impact on society (Kenny, 2007). Innovation is the process of translating an idea or invention into a good or service that creates value or for which customers will pay. Innovation involves deliberate application of information, imagination and initiative in deriving greater or different values from resources, and includes all processes by which new ideas are generated and converted into useful products. In business, innovation often results when ideas are applied by the company in order to further satisfy the needs and expectations of the customers. Innovation is synonymous with risk-taking and organizations that create revolutionary products or technologies take on the greatest risk because they create new markets (Lehtonen, 2007).

### 2.4 Empirical Review

The following section reviewed studies done on the same area of study targeting the four study objective as done by other scholars;

#### 2.4.1 Project Managers Competency

Archer (2006) mentioned that apart from project management practices, there has to be equal importance to other factors such as personnel and team management. Also, apart from decision making tools, construction industry depends on the manager's ability to take decisions. The main reason for the challenger disaster is that the decision makers did not heed the warnings from engineers about the ice on the launch pad (Spencer and Spencer, 2008). A similar experience from USA, where the crew went on a strike for 24 hours against the wishes of ground control staff, demonstrates the need for exemplary decision making skills to avert disasters. Though systems and process are in place, both the disasters are due to failure of human abilities. In practice, construction managers such as project managers, project controllers are the drivers of the project and the success of the project depend on their ability to take corrective actions appropriately. Sarshar, Haigh and Amaratunga (2007) mentions that project success factors had ignored the qualities of project manager and it was concluded that the competence of the project manager has a measurable impact on the performance of the project.

Also the research by Pearman (2006) indicated that engineering and construction projects need project managers with qualities such as conscientiousness and transactional styles leadership. Burn (2008) mentions that, transactional leadership is all about the exchange between the leader and subordinate. This appears suitable for short term benefits which are more valued in constructions. However, Gyula (2008) mentions that "transactional leadership is not at all a leadership, but just a managerial quality" cited in Al-Momani (2010), mentions that effective leaders change their decision making styles and their research indicated that in complex situation, decision making involves, probing, respond, and create environments, increase levels of interactions for achieving goals. Jackson (2010) mentions that the project manager should have an open positive 'can do' attitude, common sense, open mindedness, adaptability, inventiveness, prudent risk taker, fairness and commitment. Jugdev, and Muller, (2005) mentions that a "successful construction manager must have a solid understanding of leadership philosophy in the construction delivery process". They further mention that construction manager should develop the team including teaching, counseling and involvement. Apart from leadership skills, project managers in construction projects should be very communicative. The study by Iyer and Jha (2005) indicates that project communication as an important measure. Also, the research by Jugdev and Muller (2005) mentions that project manager communicates both in formal and informal methods.

The project Manager play a critical role in communicating with multiple participants like contractor's management, owner, client's engineers, execution team, control teams, design teams, suppliers, sub-contractors, local authorities and other stakeholders. The main portion of Project Manager's communication is directed towards managerial issues. The research by Karim and Marosszeky (2009), also mentions that: Written communication constitutes 52% time, Meetings constitutes 28%, Electronic communication constitutes 20%. Functional division shows construction instructions as 30%, materials & equipment 11%, quality management 13%, allocation of manpower 30%, cost control 16%.

Apart from leadership qualities and communication, industrial relations are also an important aspect in construction projects. Brown and Adams (2000), mentions that a construction project involve, "coordination between separate enterprises and workers with varied responsibilities, skills, and roles" making the management complex and sensitive. In view of the industrial relation issues, project manager seldom have time to devote to technicalities and analysis. So a dedicated control engineer/manager are required to guide the project manager and the corporate management on all aspects of the project. Jha and Iyer (2006) mentions that the apart from project manager, the role of project coordinator has become critical for project success and involves activities such as planning, coordinating, analyzing and organizational understanding, which are again similar to 'control manager/ engineer'.

Jackson (2010) established that the riskiest and important aspect of project control is in estimating productivity. Also, Jackson (2010) mentions that "forecast is to predict the final cost and schedule outcomes on a project while the work is still in progress". So, predicting project outcomes based on the information available need special skilled & experienced managers. This point was emphasized by Kemps (2012) who says that "the human factor helps to smooth out the work's progress". Pearman (2006) announces that many UK based construction companies are sourcing experts from US and other countries. The role of experienced managers is always on demand and they contribute in planning the project and also in controlling the project. Also the project control division, engineers, managers are the medium of communication between the project manager and other corporate managers such as finance, legal, human resources and directors. So the role of the control team, managers is crucial and sensitive involving human relationship. However this aspect is required to be ascertained from the industry. This study would provide literature and evidence, so that greater importance can be made for employing managers with appropriate skills (PMI, (2007).

#### 2.4.2 Project funds

Chen (2007) mentions that for a project to be successful there should be adequate fund allocated to finance its completion. Jackson (2010) added that project funds availability is an important factor that influences delivery of a project. Sambasivan and Soon (2007) stated that reports are an essential way of keeping everyone informed and therefore managers should manage the project, plan for the project and monitor. Also the structure of the industry is fragment with increasing number of small companies and consolidation of large companies. Strenman (2012) says that the international construction is dominated by very large contracting firms such as Bechtel, Skanska and Taisei Corporation, who undertake large volumes of work. Construction process is labor intensive includes management of difficult site condition, bulky materials.

Construction companies are diversified, have low fixed assets, have positive cash flow, and subcontract extensively (Gyula, 2008). Hackley (2006) says that the "strategic systems are the determinant of the success or failure of Large engineering projects". Strenman (2012) noted that "Construction projects are inherently complex and dynamic". Also, every construction project is unique having its own set of stakeholders and unique

environment. Construction industry is diverse with projects ranging from small to large and very large contracts such as \$14.7 billion Channel Tunnel Project and \$20 billion Hong Kong International Airport (Chan & Mohan 2009). The environment governing every project changes rapidly and cannot be compared to each other. So, the governing principle connecting all construction projects can be said as 'Project Management Practice'. Collis and Hussey (2009) indicate that "Management in construction, on the other hand, has always been based on experience and organizational talent". In most of the construction projects, technicalities are frozen during design phase. Dai, Cao and Su (2006) mentions that the important category in constructions is construction firm i.e. Contractor because; Contractor gives real shape to the product following the design. So, the main issue lies in managing resources, material, equipment, stakeholders effectively by the contractor.

Hyvari (2006) argues that main contractor is employed to build what designers have specified and contracting was a response to the sophistication of industrialization. Also the issues such as economies of scale, employment, multiple use of plant etc., are some issues which made 'contracting business popular and viable.

Construction projects typically involve a sponsor who funds and owns the project. The sponsor/ sponsors are normally large public bodies such as local government or multilateral agencies. Karim and Marosszky (2009) says "A considerable portion of public investment goes to construction –not least, governments remain the dominant provider of infrastructure services worldwide, accounting for 78 percent of investment 1984-2003".

As cited by Kenny, Kim et al. (2008), the sponsor engages various consultants to undertake design, supervise and project management of the work. Also the sponsor engages various contractors as per procurement strategy and contract documents. Speaking about contract documents, Jackson (2008) mentions that the every aspect of the project will be controlled by contract documents and the work of contractor is judged by them. Lam, Wang, Lee and Tsang, (2007), also mentions that contractor is not involved in actual design. Major construction contracts worldwide are governed by FIDIC (Federation Internationale Des Ingenieurs-Conseils) and New Engineering Contracts.

These model contracts are understood to bring balance in power & advantage for both employer and contractor. So a typical contracting company manages various contract agreements. When it comes to performance, large contracting companies such as Bechtel, Skanska, Fluor, engage better project management tools such as Primavera3, Six-Sigma etc. which increase the control mechanism and improves the predictability of project outcomes. In spite of all the best practices, predictability of project outcomes is still an issue of concern.

Sambasivan and Soon (2007) mentions that failure to achieve targeted time, budgeted cost and specified quality result in various unexpected negative effects on the projects. Becerik, (2007) mentions that if the project meets technical performance and achieves high level of satisfaction among key players and various stakeholders, and then the project is considered as overall success. Also, Leslie (2005) mentions that important aspect about success is perception and further quotes that "If the right people perceive that the project was a success, and then it was, for all practical purposes". The reasons for success and delays are

mostly attributable to differing and vested interests of participants and stakeholders.

Also, performance measurement is a neglected issue in construction industry. Now large organizations are implementing performance measurement models to improve business process such as balance score cards and EFQM Excellency models. Performance management models can help construction organizations develop strategy for sustaining long term business objectives.

Callinicos (2008) mentions that by adopting performance management models, construction organizations can develop coherent approach to changes, continuous improvement, and innovative solutions. Gyula (2008) quoted that "Construction has begun to apply up-to-date information technologies, data management and client/ server systems. Great efforts are being made to devise integrated information systems that can be used by different clients, designers, general contractors and subcontractors". Davis, Schoorman and Donaldson (2007), through their case study approach identifies that long working hours, honesty, integration of knowledge into practice, distance between projects and corporate operations, are few main barriers in improving business in large construction organizations. In view of this, a further study of success factors for performance improvement of construction projects is very much needed.

#### 2.4.3 Project Equipment

Sanders and Thomas (2010) stated that material management is one of the most important factors in construction industry. Productivity can be affected if required materials, tools, or construction equipment for the specific are not available at the correct location and time. Selection of the appropriate type and size of construction equipment often affects the required amount of time it is, therefore, essential for site managers to be familiar with the characteristics of the major types of equipment most commonly used in construction. In order to increase job-site productivity, it is beneficial to select equipment with the proper characteristics and a size most suitable for the work conditions at a construction site. Laborers require a minimum number of tools and equipment to work effectively to complete the assigned task. If the improper tools or equipment is provided, productivity may be affected (Chen 2007). The size of the construction site and the material storage location has a significant impact on productivity because laborers require extra time to move required materials from inappropriate storage locations, thus resulting in productivity loss.

Krazner (2005) mentioned that project equipment is necessity and should influence performance by saving cost; also he added that project equipment enhances increased production. Fringenti (2010) mentioned that project controlling is a combination of monitoring, evaluating and taking corrective action. Chan (2011) has elaborated that a loose project management can result in a project getting out of control and on the other hand extreme and over reactive control can bring the project to a standstill. They further mentioned that controlling a project too tightly makes team members nervous and may lead to be less creative. Angus et al. (2000) also confirms that "monitoring and controlling of a project must be done very carefully". The balance between the three controlling aspects varies from project to project and also from time to time in the



same project. Also, the balance depends on the maturity of the organization. So, it is more than necessary for companies to implement best practices in control process. Jackson (2004) mentions that information and good reporting system are essential for an effective project control system. The process established should enable accessing quality information from projects. Chan and Mohan (2009) mention that, performance information is easier to get than progress information which is subjective. The success of the St. Lucie Unit 2 nuclear power project can be attributed to timely reporting of results, skilled personnel, and team work for solving problems, quality improvement program, indicators, and incentives. This explains the reason for balance between process approach and ability approach in controlling (Cleland et al., 2008).

Also, Cleland et al. (2008) though various cases such as New England power company, Iowa Public service co, NEPCO Supra Re Salem Nuclear Generating Station, Minnesota Power and Light company, mentions that the strict contract laws prove shadowy behavior, poor qualities of project managers, improper use of project management tools as factors for project failures. This again brings out the importance of balance between the tools and abilities. Construction companies when confronted by cost and time overruns, becomes un-balanced in control approach i.e. they either overdo (or) under do controlling process in terms of monitoring, evaluation or corrective actions. As, Jackson (2004) mentions that tracking deviations between actual and planned performance throughout the project will help in taking corrective actions.

Many times, actual progress do not match the planned progress making it essential to keep the management, client engineer, and sponsor, informed of the progress and the precise conditions that can effect each occurrence. Ross (2008) mentions that controlling includes monitoring, but it also includes taking timely, corrective action to meet project objectives or goals. So, depending upon the extent of variation between planned and actual, the management should initiate appropriate control actions. Leslie (2005) mentions that most information is analyzed by variance i.e. difference between planned and actual performance and it is the management which is will determine what is useful in analyzing individual situation. Also, Changes in time, cost, scope and quality leads to variations and many times variations leads to cost escalation than savings (Archer, 2006).

#### **2.4.4 Project Technological Innovation**

Sometimes the detailing become complicated and cannot be explained by simple tools such as bar charts, CPM charts, EV curve etc. So, the construction companies should use modern project management tools based on Information technology for effective monitoring. Similarly, DiMaggio (2008) mentions that factual and quantitative information should be computerized to speed preparation, collation and assimilation. However, construction is technology shy and does not extensively use information technology. Polonsky and Waller (2005) mentions that construction sector uses extensive information for decision making process, but does not use much information available elsewhere for example internet and other software products. Shandler (2006) mentions that there are large varieties of software project management product, which can be used effectively for monitoring process. Apart from stochastic SS

curves and network charts, monitoring practice today has become advanced using latest Information technology (IT) tools.

The use of IT improves better coordination and communication among project teams and participants. It increases the speed of communication and decreases documentation errors. Stake (2005) research on a budgeting process in a Korean company identifies (a) differences in budget estimations between the field and office (b) Incorrect calculations (c) Insufficient budget tracking are few of the reason related to delays and waste in control processes.

This is true to many medium and large construction companies and can be overcome by establishing standardized IT tools across various departments. Further, the concept of using World Wide Web (WWW) in construction was first postulated by (Ulrich & Brockbank, 2005). Now the concept of web and its associated technologies are being studied for effective use in construction projects. Typically large construction projects are located in remote areas, where communication methods are restricted. In such situation World wide web (www) will effectively reduce the inefficiency in communication and increases the effectiveness in implementing the planning and control. Vandevoorde and Vanhoucke (2006) mentioned how the extensive use of IT technology has been used by large organizations for effective monitoring of construction projects. Also, Minocha (2005) quotes "Information and communication technology (ICT) is identified as an effective facilitator for improving information integration." They mention that web based project management system WPMS.

#### **2.4.5 Project Completion**

Ahmad and Schroeder (2011) stated that project Completion is a key indicator for the level of performance a company is able to provide correct and in-time deliveries to its customers. It is a quantitative measure to benchmark an organization against, when it comes to translate project management and performance.

Archer (2006) defines project Completion as "Controlling process that ensures that project objectives are met by monitoring and measuring progress regularly to identify variances from Plan, so that corrective action can be taken when necessary" and further identifies controlling process to have links with planning and executing process. Also, Weil (2005) mentions controlling as a three step process i.e. measuring progress, evaluating what remains to be done, and corrective action to achieve or exceed the objectives. While, Mitnick (2005) quotes "The performance monitoring subsystem is charged with observing the transformation process and reporting deviations from the expectations to the decision making subsystem so that it can initiate corrective action where necessary" Jackson (2008) mentions "In project management, control is based on a comparison of baseline plans and contracts with actual events, and deciding what to do (i.e. re-planning) when the two do not match" as cited in (Gardiner 2005). Also, Ross, (2008) mentions that the three gorges project cost was perfectly controlled within the approved budget as cited in Shandler (2006). So, in practice, it is possible to achieve perfect control of the project.

Minocha (2005) mentions that Base line plans, Cost budgets, Risk management Plan, Quality Plan, Contract document are the best inputs for monitoring road construction. Again, Lucia and Lepsinger (2009) mentions that change requests shall form the

main ingredient to changes to planned documents. In view of this, monitoring is starting stage of 'Project controls' and involves report generation. Lewis (2008) mentions that efficient monitoring and control systems will enable project participants to receive relevant and accurate information in a consistent and timely manner. Marasini and Dawood (2006) mentions that a typical report include executive summary, bar chart, variations to time, cost and scope including risks. However the quality of information is important. As, Jackson (2008) mentions that the work sites are busy and do not provide monitoring personal with much needed information. So, getting complete and accurate data from field is very important and is also a weak link in the project control process. Lewis (2008) also mentions that monitoring report should focus on project targets, vulnerable work sections, productivity growth/decline, projected completion date and budget and outcome. Lucia and Lepsinger (2009) mentions that a typical project reporting to be produced at regular intervals to project manager and other senior management and client and further mentions that reports should be made in a way which can be understood by non-specialists. However, there it is necessary to know how much quality information is being produced by the project controllers and how much time is being spent on data collection and what kinds of skills are required for such activity.

Again, as per Kenny (2007), 'Monitoring' includes planning parameters, risks, stakeholder involvement, milestone reviews, commitments, data management, progress reviews and 'Managing' includes analyze and take action. Janes (2010) mentions that informal project control mechanisms exist when the projects are small and the team members are highly motivated and decision regarding formal control system should be based on risks involved and cost of control system. He further mentioned that in construction projects, the complexities are large and require dedicated control system. Karim and Marosszeky (2009) mention that the projects are dynamic and carried out in changing environments needing monitoring and control actions. Though Jackson (2010) had elaborated the details of controls are various knowledge areas, there is always a need to understand the key success factor, which when implemented effectively will enhance the control procedures in any organization.

Lam et al. (2007) researched on 'critical success factors' across 63 publications and identified more than twenty factors which can influence project success. Also, the frame work by Sambasivan and Soon (2007) broadly classified success factors as project efficiency, impact on customer, business success and preparing for the future. However achieving all the set criteria in any given project is difficult. There are also some criticisms on the concepts of success factors. Vandevorde and Vanhoucke (2006) mentions that there is no agreed understanding of success concept, also, Jugdev and Muller (2005) mention that "project success is a complex and ambiguous concept and it changes over the project and product life cycle". However, in spite of the ambiguity, its continued relevance in better understanding of goals is widely accepted by industry and academia. Jugdev and Muller (2005) say that success factors in 21st century are more about rationale agreement before start of the project.

### **2.5 Critique of Existing Literature**

Gyula (2008) observed that "Management in construction, on the other hand, has always been based on experience and

organizational talent". In most of the construction projects, technicalities are frozen during design phase. Gyula (2008) mentions that the important category in constructions is construction firm i.e. Contractor because; Contractor gives real shape to the product following the design. So, the main issue lies in managing resources, material, equipment, stakeholders effectively by the contractor.

Jackson (2010) asserts that the main contractor is employed to build what designers have specified and contracting was a response to the sophistication of industrialization. Also the issues such as economies of scale, employment, multiple use of plant are some issues which made 'contracting business popular and viable.

### **2.6 Research Gaps**

Studies that have been reviewed previously have not adequately indicated extensively the factors affecting roads construction projects Completion in Nairobi City County. Most of these previous studies are limited to small and medium enterprises in Kenya. The previous studies they have not indicated the importance of managers competence, funds, equipment and Technology Nairobi City County. Pearman (2006) indicated that engineering and construction projects need project managers with qualities such as conscientiousness and transactional styles leadership. Burn (2008) noted that transactional leadership is all about the exchange between the leader and subordinate. These studies failed to highlight the factors affecting roads construction projects Completion in Nairobi City County.

### **2.7 Summary**

Project management is becoming an important skill set in industry, and many companies seek graduates trained in project management core competencies. Identifying the most important core competencies is an important input into curriculum development. With the changing work place and increasingly global market that businesses now operate in, both the hard skills defined by the Project Management Body of Knowledge (PMBoK) and interpersonal, soft skills are in demand for today's Project Managers. This study is designed to determine the effect of manager's competencies, for effective project managers. The study also identifies gaps between these important project management competencies and the current performance of project managers with respect to delivery of roads construction projects. Krazner (2005) mentioned that project equipment is necessity and should influence performance by saving cost; also he added that project equipment enhances increased production.

## **III. RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter describes the various methodologies that will be used in the study. This includes the research design, the targets population, sampling technique, data collection instrument, data collection procedures, data processing and data analysis.

### **3.2 Research Design**

The study adopted descriptive research design in examining the factors influencing road construction projects Completion. The descriptive survey design method will be appropriate and useful in exploring how internal factors affecting roads construction projects Completion in Nairobi City County: A case

of Kenya Urban Roads Authority (KURA). This research design was used because it is an efficient approach of collecting descriptive data regarding characteristics of a sample of a population, current practices, conditions or needs.

According to Sekaran and Roger (2011), research design is a master plan that specifies the methods and procedures for collecting and analyzing the needed information. Cooper and Schindler (2006) argue that research design constitutes the blue print for the collection, measurement and analysis of the data to achieve fore stated objectives. It's a structure for investigating so conceived as to obtain answers to research questions and for testing hypothesis (Kothari, 2004).

### 3.3 Target Population

Target population is defined as a universe of the study as all members of a real or hypothetical set of people or events to which an investigation wishes to generalize results. Mugenda and Mugenda (2003) describes the target population as a complete set of individuals with some common characteristics to which the researcher want so generalize the results of the study. Therefore target and study population of this study will consist of employees in the given departments in KURA: IT, Finance, HR and Construction departments within Nairobi region. The IT department comprised of 50 employees; Finance department comprised of 50 employees; the Human resource department comprised of 100 employees while the construction department comprised of 1000 employees. Therefore, the target population of the study comprised of 1200 employees. The targeted population of this study is believed to have experience and knowledge in the area of study in factors affecting the road construction projects Completion in Nairobi County. As shown in table 3.1

**Table 3.1: Target Population**

Category	No. of employees	Percentage
IT Dept.	50	4.2%
Finance Dept.	50	4.2%
HR Dept.	100	8.3%
Construction Dept.	1000	83.3%
<b>Total</b>	<b>1200</b>	<b>100%</b>

Source: KURA (2015)

### 3.4 Sample and sampling techniques

#### 3.4.1 Sampling Frame

A sample is a finite part of a statistical population whose properties are studied to gain information about the whole. A good sample should be adequate and representative of the underlying population. A sample of 30% is an adequate sample in a descriptive study of this nature as supported by Gay (2005). Sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population. For this study purposive sampling will be used to

select the respondents since departments have a small number of personnel directly involved in remuneration process. The researcher used simple random sampling procedure to select a sample that represented the entire population. This procedure will be preferred since all the target population had an equal chance of being selected. Mugenda and Mugenda (2003) points out that simple random sampling method ensures inclusion of small groups which otherwise could have been omitted entirely by other sampling methods. A sample size of 10 % is justifiable since according to Mugenda and Mugenda (2009) 10% of the sample gives unbiased representation of all respondents' opinions in the targeted population and this assists in generalization of research findings when the study design is descriptive.

#### 3.4.2 Sampling Techniques

The sample will be calculated using Fishers (1925) which has ideal formula for populations of targeted population 1200,  $n = \frac{z^2 \cdot p \cdot q}{d^2}$  (Fisher *et al.*, 1991)

d2

Where:

n = sample size

z = 1.96 corresponding to 95% confidence level

p = 10% which is the proportion of employees in from different targeted department of IT, finance, HR, and construction. This proportion was taken under the assumption that with the KURA employees being in Nairobi where many road construction projects are going on they may be having knowledge and some similarities may exist between employees and their organization.

q = 1 - p

d = margin of error set at 5%

Substituting the values:

$n = \frac{1.96^2 \cdot 0.1 \cdot (1-0.1)}{0.05^2} = 138$

Percentage

4.2%

#### 3.5 Data collection instruments

Mugenda and Mugenda (2003) define data as facts of known or available information. Data are more than information of experiences or memories of a teller of a life story. They are all the relevant materials, past and the present, serving as the bases for study and analysis. Data collection therefore is the process of gathering such information from all the available sources with the main purpose of using such data in a research or a study. The data collection was done by use of questionnaires containing open ended and closed ended questionnaires. The questionnaires were prepared thematically on the basis of the research questions. Drop and pick methods were used, follow up were done by use of emails and research assistants (Orodho, 2004).

#### 3.6 Data Collection Procedures

The data was collected using both primary and secondary methods. According to Mugenda and Mugenda (2003) primary data is where the researcher collects first hand data through the use of instruments such as surveys, experiments, case studies and questionnaires. Questionnaires were used in data collection. According to Boslaugh (2007), secondary data is information

collected by someone else for some other purpose Secondary sources to be used included books, magazines and the internet that involves; looking into already done materials.

### 3.7 Pilot Testing

According to Mugenda and Mugenda (2003), a pilot test is a method that is used to test the design and/or methods and/or instrument before carrying out the research. It involves conducting an initial test, the protest sample is between 1% and 10 % depending on the sample size. The protest questionnaires were distributed equitably to the selected respondents in order to gather a cross-sectional feeling of respondents. This helped in ascertaining the reliability and validity of the instrument.

#### 3.7.1 Validity Test

Validity refers to the extent to which an instrument measures what is supposed to measure, data need not only to be reliable but also true and accurate. If a measurement is valid, it is also reliable (Mugenda and Mugenda, 2003). To establish the validity of the data collection instruments, the research instruments will be given to HR, IT, Finance and Construction department. The managers and staffs will be expected to tick if the item in the questionnaires addresses the influence of the efficient performance in organizations. The content of the responses given by the managers and staffs will be checked against the study objectives and rated using a scale of 1(very relevant) to 4 (not very relevant). The Content Validity Index will be used to determine the validity by adding up all the items rated using a scale of 3 and 4 by the managers and dividing the total sum by the total number of items in the questionnaires. The coefficient of the data gathered from the pilot study was computed with assistance of Statistical Package for Social Sciences (SPSS).

#### 3.7.2 Reliability Test

Reliability refers to the consistence, stability, or dependability of the data. Whenever an investigator measures a variable, he or she wants to be sure that the measurement provides dependable and consistent results (Cooper & Schindler, 2003). A reliable measurement is one that if repeated a second time gives the same results as it did the first time. If the results are different, then the measurement is unreliable (Mugenda & Mugenda, 2003). To measure the reliability of the data collection instruments an internal consistency technique using Cronbach's alpha will be applied. Cronbach's alpha is a coefficient of reliability that gives an unbiased estimate of data generalizability. An alpha coefficient of 0.75 or higher indicated that the gathered data is reliable as it has a relatively high internal consistency and can be generalized to reflect opinions of all respondents in the target population.

### 3.8 Data Analysis and Presentation

Analysis of data was done in order to answer the four research questions of this study. Data collected was sorted, classified and coded then tabulated for ease of analysis. The data was summarized and categorized according to common themes. The SPSS (version 22) computer software was used to aid the analysis as it is more users friendly and most appropriate for analysis of Management related attitudinal responses (Martin and

Acuna, 2002). Descriptive statistics was employed to analyse the data.

The results were analysed and presented on frequency distribution tables, pie charts and bar charts. Here the interest was to focus on frequency of occurrence across attributes of measures. A multivariate regression model was applied to determine the relative importance of each of the variables with respect to factors affecting roads construction project Completion in Kenya. The regression model was used as follows:

$$Y = a + B_1 \cdot X_1 + B_2 \cdot X_2 + B_3 \cdot X_3 + B_4 \cdot X_4 + B_5 \cdot X_5 + e$$

Where;

Y= Construction Project Completion (Dependent Variable)

a = Constant

b<sub>1</sub>, b<sub>2</sub>, b<sub>3</sub> and b<sub>4</sub>= coefficients

X<sub>1</sub>= Project Managers competency (Independent Variable)

X<sub>2</sub>= Project Funds (Independent Variable)

X<sub>3</sub>= Project Equipment (Independent Variable)

X<sub>4</sub>= Project Information technology (Independent Variable)

e = error term

## IV. DATA ANALYSIS AND INTERPRETATIONS

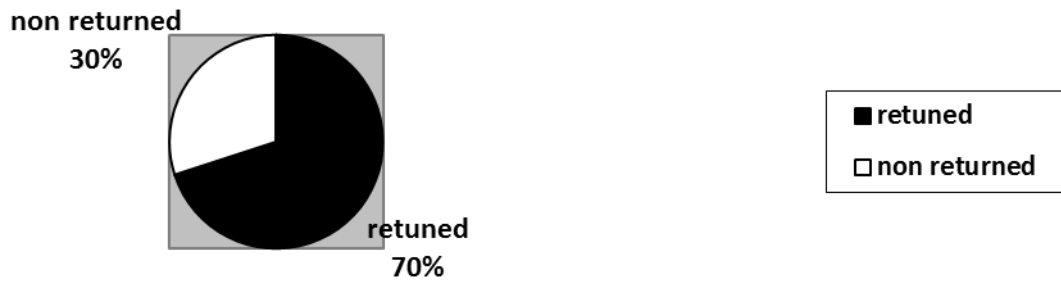
### 4.1 Introduction

The chapter represents the empirical findings and results of the application of the variables using techniques mentioned in chapter three. Specifically, the data analysis was in line with specific objectives where patterns were investigated, interpreted and implications drawn on them.

### 4.2 Response Rate

From the data collected, out of the 138 questionnaires administered, 117 were filled and returned, which represents 70% response rate. This response rate is considered satisfactory to make conclusions for the study. Mugenda and Mugenda (2003) observed that a 50% response rate is adequate, 60% good and above, while 70% rated very good. This collaborates with Bailey (2000) assertion that a response rate of 50% is adequate, while a response rate greater than 70% is very good. This implies that based on this assertion, the response rate in this case of 70% is therefore very good. The recorded high response rate can be attributed to the data collection procedures, where the researcher pre-notified the potential participants (business owners/managers/directors or business partner) of the intended survey, utilized a self-administered questionnaire where the respondents completed and these were picked shortly after and made follow up calls to clarify queries as well as prompt the respondents to fill the questionnaires. The findings are shown as in figure 4.1 below

**Figure 4.1: Response Rate**



**4.2 Reliability Analysis**

The reliability of an instrument refers to its ability to produce consistent and stable measurements. On the basis of reliability test it was supported on the scales used in this study

that captured the constructs. Reliability of the constructs is shown below in table 4.1.

**Table 4.2: Results of Pilot Coefficients Reliability Analysis**

Construction Project Completion	Reliability Cronbach's Alpha	Comment
Project Managers Competency	0.923	Accepted
Project Technology	0.932	Accepted
Project funds	0.811	Accepted
Project equipment	0.862	Accepted
Construction Project Completion	0.933	Accepted

Bagozzi (2004) explains that reliability can be seen from two sides: reliability (the extent of accuracy) and unreliability (the extent of inaccuracy). The most common reliability coefficient is the Cronbach's alpha which estimates internal consistency by determining how all items on a test relate to all other items and to the total test - internal coherence of data. The reliability is expressed as a coefficient between 0 and 1.00. The higher the coefficient, the more reliable is the test. In this study to ensure the reliability of the instrument Cronbach's Alpha was used. Cronbach Alpha value is widely used to verify the reliability of the construct. Therefore, Cronbach Alpha was used to test the reliability of the proposed constructs. The findings indicated that Project Managers Competency had a coefficient of 0.923, Project

technology had a coefficient of 0.932, Project funds of 0.811, Project equipment of 0.862 and Construction Project Completion of 0.933. All constructs depicted that the value of Cronbach's Alpha are above the suggested value of 0.5 thus the study was reliable (Nunnally & Bernstein, 2004).

**4.4 Profile of the respondents**

**4.4.1 Gender of the respondents**

This section shows the gender disparity of the respondents. The study sought to determine the gender distribution of the respondents in order to establish if there is gender disparity at Tourism Fund. From the findings it's indicated that 73% were male and 27% were female.

**Table 4.2: Gender**

		<b>Frequency</b>	<b>Percent</b>
Valid	M	80	73
	F	30	27
	<b>Total</b>	<b>110</b>	<b>100.0</b>

**4.4.2 Age brackets of the respondents**

This section sought to determine the ages of the respondents in the KURA. The findings are shown as in table 4.3 below

**Table 4.3: Age**

		<b>Frequency</b>	<b>Percent</b>
Valid	18-30 years	44	40.0
	31-40 years	42	38.2
	41-50 years	12	10.9
	above 50 years	12	10.9
	<b>Total</b>	<b>110</b>	<b>100.0</b>

From the findings, it was noted that most respondents were between the ages of 18-30 years old, this age bracket was noted to have the highest percentage of 40.0% respondents. From the findings, it can be inferred that the respondents were old enough to provide reliable insights relevant to the study.

**4.4.3 Level of Education of the respondents**

The study sought to seek the level of education of the respondents. Below shows the findings on the level of education of the respondents on table 4.4

**Table 4.4: Education Level**

		<b>Frequency</b>	<b>Percent</b>
Valid	O/A-level	33	30.0
	Diploma Level	41	37.3
	Bachelor's level	13	11.8
	Masters level	13	11.8
	PHD level	10	9.1
	<b>Total</b>	<b>110</b>	<b>100.0</b>

From the responses in the questionnaires it was noted that majority of the respondents (37.3%) were diploma level. The study, from this findings could generally infer that most respondents were well educated and knowledgeable and would therefore provide relevant information on the areas of researcher study.

**4.5 Project Managers Competency**

The study sought to identify how project managers competency influences road construction projects Completion in KURA, Nairobi City County.

According to the respondents project managers competency influences road construction projects Completion in KURA. Respondent stressed that project managers competency influences road construction projects Completion. The findings are shown as in table 4.5 below

**Table 4.5: Project Managers Competency**

	N	Mean	Std. Deviation
a. To what extent does Organizing influences road construction projects Completion in KURA, Nairobi City County	110	3.6727	1.19716
b. Indicate the extent to which you agree that Staffing influences the road construction projects Completion in Nairobi City County	110	3.6091	1.12597
c. To what extent does Effective monitoring influences the road construction projects Completion in Nairobi City County	110	3.4000	1.35592
d. To what extent does Effective evaluation influences the road construction projects Completion in Nairobi City County	110	3.8000	1.17153
Valid N (listwise)	110		

The findings indicate that majority of the respondents agreed that project managers competency influences road construction projects Completion in KURA, Nairobi City County. This was shown by the majority who agreed that Effective evaluation influences the road construction projects Completion in Nairobi City County attained a mean of 3.8000, Staffing influences the road construction projects Completion in Nairobi City County attained a mean of 3.6091, Organizing influences road construction projects Completion in KURA, Nairobi City County attained a mean of 3.6727 and monitoring influences the road construction projects Completion in Nairobi City County attained a mean of 3.4000. This indicated that project managers competency influences road construction projects Completion in KURA. The findings agreed with Archer (2006) who mentioned

that apart from project management practices, there has to be equal importance to other factors such as personnel and team management. Also, apart from decision making tools, construction industry depends on the manager’s ability to take decisions.

**4.6 Project Technology**

The study sought to identify how project technology influence road construction projects Completion in KURA, Nairobi County. As mentioned by the respondent to their own views project technology influence road construction projects Completion in KURA. The findings are shown as in table 4.6 below

**Table 4.6: Project Technology**

	N	Mean	Std. Deviation
a. To what extent does Software management influence road construction projects Completion in KURA, Nairobi County?	110	3.61818	1.180746
b. To what extent does Database influences road construction projects Completion in KURA, Nairobi County? Nairobi City County	110	4.2909	1.09499
c. Indicate the extent to which Communication influences the road construction projects Completion in Nairobi City County	110	4.0364	1.32670

d. Indicate the extent to which Creativity influences road construction projects Completion in KURA, Nairobi City County 110 3.6091 1.12597

Valid N (list wise) 110

From the findings it was indicated that majority of the respondents agreed that project managers competency influences road construction projects Completion in KURA, Nairobi City County. This was shown by the majority who agreed that Database influences road construction projects Completion in KURA, Nairobi County scored a high mean of 4.2909, Software management influence road construction projects Completion in KURA, Nairobi County attained a mean of 3.61818, Communication influences the road construction projects Completion in Nairobi City County, attained a mean of 4.0364 and Creativity influences road construction projects Completion in KURA, Nairobi City County attained a mean of 3.6091. This indicated that project technology influence road construction

projects Completion in KURA, Nairobi County. The findings agreed with Stake, (2005) who stated that the use of IT improves better coordination and communication among project teams and participants. It increases the speed of communication and decreases documentation errors.

**4.7 Project funds**

The study sought to determine how project funds influences road construction projects Completion in KURA, Nairobi City County. Majority of the respondents addressed that project funds influences road construction projects Completion in KURA. The findings are shown as in table 4.7 below

**Table 4.7: Project funds**

	N	Mean	Std. Deviation
a. To what extent does Availability of funds influences road construction projects Completion in KURA, Nairobi County?	110	3.7455	1.26662
b. Indicate the extent to which Adequate funds influences road construction projects Completion in KURA, Nairobi County?	110	3.8909	1.23664
c. To what extent does Management of funds influences the road construction projects Completion in KURA, Nairobi County?	110	3.4455	1.39189
d. Indicate the extent to which Cost saving influences road construction projects Completion in KURA, Nairobi County?	110	3.6182	1.18075
e. Indicate the extent to which Accessibility of funds influences road construction projects Completion in KURA, Nairobi County?	110	3.6182	1.18075
Valid N (listwise)	110		

From the finding it was noted that majority of the respondents agreed that Project funds influences road construction projects Completion in KURA, Nairobi County. Majority agreed that adequate funds influences road construction projects Completion in KURA, Nairobi County and this was shown by the mean score of majority 3.8909, Availability of funds influences road construction projects Completion in KURA scored a high mean of 3.7455, Management of funds influences the road construction projects Completion in KURA scored a high mean of 3.4455 Cost saving influences road

construction projects Completion in KURA scored a high mean of 3.6182 and Accessibility of funds influences road construction projects Completion in KURA scored a high mean of 3.6182. The findings show that the variables had a significance influence to the study. The findings agreed with Aitken (2000) for a project to be successful there should be adequate fund allocated to finance its completion. Also the findings agreed with Jackson, (2010) added that project funds availability is an important factor that influences delivery of a project.

**4.8 Project Equipment**



The study sought to determine how project equipment influences road construction projects Completion in KURA, Nairobi City County. Respondent gave their own opinion how project technology influences road construction projects

Completion in KURA. Majority mentioned on how project technology influences road construction projects Completion in KURA. The findings are shown as in table 4.8 below

**Table 4.8: Project Equipment**

	N	Mean	Std. Deviation
To what extent do you agree that Quality work is influenced by project equipment's of road construction projects Completion in KURA, Nairobi City County	110	3.5273	1.29720
Indicate the extent to which you agree that Shorter operating cycle is influenced by project equipment's in road construction projects Completion in KURA, Nairobi City County	110	3.6182	1.18075
To what extent do you agree that Plant & machinery influences road construction projects Completion in KURA, Nairobi City County	110	3.7182	1.06772
Indicate the extent to which you agree that project Level of advancement is influenced by project equipment's in road construction projects Completion in KURA, Nairobi City County	110	3.2273	1.39720
Valid N (listwise)	110		

From the finding it was noted that majority of the respondents agreed that project equipment influences road construction projects Completion in KURA, Nairobi County. The researcher found that majority agree that road construction projects Completion in KURA, Nairobi City County influence Efficiency which attained a mean of 3.7182, Quality work is influenced by project equipment's of road construction projects Completion in KURA, Nairobi City County scored a high mean of 3.5273, Shorter operating cycle is influenced by project equipment's in road construction projects Completion in KURA, Nairobi City County scored a high mean of 3.6182, and project equipment's in road construction projects Completion in KURA

scored a high mean of 3.2273. the study established that majority of the respondents agreed that the study variables had a significant influence on KURA construction project completion. The findings agreed with Sanders and Thomas, (2011) who stated that material management is one of the most important factors in construction industry. Productivity can be affected if required materials, tools, or construction equipment for the specific are not available at the correct location and time.

**4.9 Project Completion**

The study sought to determine factors affecting roads construction projects Completion in Nairobi City County. The findings are shown as in table 4.9 below

**Table 4.9: Project Equipment**

No	Factors Project Completion	N	Mean	Std. Deviation
a	To what extent do you agree that road construction projects Completion in KURA, Nairobi City County influence on client satisfaction	110	3.3273	1.29721
b.	Indicate the extent to which you agree that road construction projects completion in KURA, Nairobi City County influence timely performance	110	3.5222	1.38075

c.	To what extent do you agree that road construction projects completion in KURA, Nairobi City County influence quality work	110	4.0258	1.46772
d.	To what extent do you agree that road construction projects Completion in KURA, Nairobi City County influence meeting budget	110	3.7258	1.56722

According to the study majority agreed that road construction projects Completion in KURA, Nairobi City County influence Quality Work attained a higher mean of 4.0258, followed by the respondents who agreed that road construction projects Completion in KURA, Nairobi City County influence Meeting budget with a mean score of 3.7258, also the respondents agreed that road construction projects Completion in KURA, Nairobi City County influence client satisfaction, the question on road construction projects Completion in KURA, Nairobi City County influence Timely performance also scored a significance mean of 3.5222 which was strong showing that majority agreed with the influence it has on road construction projects. The findings agreed with Ahmad and Schroeder, (2011) who stated that project Completion is a key indicator for the level of performance a company is able to provide correct and in-time deliveries to its customers. It is a quantitative measure to benchmark an organization against, when it comes to translate project management and performance.

**4.10 Inferential Statistics**

This section presents a discussion of the results of inferential statistics. Correlation analysis was used to measure the strength

of the relationship between the independent variables i.e. the relationship between project equipment, project managers competency, project funds, and project technology. Regression analysis established significance relationship of each of the variables on influence of road construction projects Completion in KURA, Nairobi City County.

**4.10.1 Correlations Analysis**

The Spearman's product-moment correlation coefficient (or Spearman's correlation coefficient for short) is a measure of the strength of a linear association between two variables and is denoted by r. Spearman's correlation was used to measure the degree of association between variables under consideration i.e. independent variables and the dependent variables. Spearman's correlation coefficients range from -1 to +1. Negative values indicates negative correlation and positive values indicates positive correlation where Spearman's coefficient <0.3 indicates weak correlation, Spearman's coefficient >0.3<0.5 indicates moderate correlation and Spearman's coefficient >0.5 indicates strong correlation. The findings are shown as in table 4.10 below

**Table 4.10: Correlations Analysis**

		Project managers competency	Project technology	Project funds	Project equipment	Project Completion
<b>Project Managers Competency</b>	Pearson Correlation	1				
<b>Project Technology</b>	Pearson Correlation	.453	1			
<b>Project Funds</b>	Pearson Correlation	.125	.397	1		
<b>Project Equipment</b>	Pearson Correlation	.317	.373**	.368	1	
<b>Project Completion</b>	Pearson Correlation	.217	.373**	.168	.417	1

A correlation coefficient is a coefficient that illustrates a quantitative measure of some type of correlation and dependence, meaning statistical relationships between two or more random variables or observed data values (Mugenda & Mugenda 2009). The study in table 4.10 above show that all the predictor variables on Project Managers Competency, Project Technology, Project Funds and Project Equipment were shown to have a positive association between them at a significant level and hence included in the analysis.

#### 4.10.2 Model Summary

Analysis of variance (ANOVA) is a collection of statistical models used to analyze the differences among group means and their associated procedures (such as "variation" among and between groups), developed by statistician and evolutionary (Orodho, 2004).

The following are the results of regression analysis. The findings are shown as in table 4.11 below

**Table 4.11: ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.382	4	6.595	2.560	.004 <sup>b</sup>
	Residual	270.537	105	2.577		
	<b>Total</b>	<b>296.918</b>	<b>109</b>			

a. Dependent Variable: Construction Project Completion

b. Predictors: (Constant), Project Equipment, Project Managers Competency, Project Funds, Project Technology  
The study from findings of the regression model above established that taking all the independent variables into account notably; (X<sub>1</sub>) Project managers competency, (X<sub>2</sub>) Project technology, (X<sub>3</sub>) Project funds and (X<sub>4</sub>) Project equipment constant at Zero influences of Construction Project Completion at a significance level of .004 which means the study variable had a high positive significance.

#### 4.10.3 Regression Coefficients results

The findings are shown as in table 4.12 below

**Table 4.12: Regression Coefficients Results**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error			
1	(Constant)	.945	.053		.898	.371
	Project managers competency	.198	.092	.206	2.159	.533
	Project technology	.149	.198	.084	.751	.454
	Project funds	.192	.142	.129	1.353	.179
	Project equipment	.147	.156	.103	.944	.347

a. Dependent Variable: Construction Project Completion

The regression model above has established that taking all the independent variables into account notably; (X<sub>1</sub>) Project managers competency, (X<sub>2</sub>) Project technology, (X<sub>3</sub>) Project funds and (X<sub>4</sub>) Project equipment constant at Zero influences construction project Completion.

$$Y = \beta_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e,$$

$$Y = .945 + X_1.198 + X_2.149 + X_3.192 + X_4.147 + .053$$

Y is the dependent variable (Construction Project Completion); (X<sub>1</sub>) Project managers competency, (X<sub>2</sub>) Project technology, (X<sub>3</sub>) Project funds and (X<sub>4</sub>) Project equipment. The results presented also shows that taking all other independent variables at zero, a unit increase in Project managers competency leads to a .198 increase in construction project Completion; a unit increase in Project technology leads to .149 increase in Construction Project Completion; a unit increase in Project funds leads to .192 increase in Construction Project Completion and a unit increase in Project equipment leads to .147 increase in Construction Project Completion. From the inferences findings it can be concluded that Project Equipment, Project Managers Competency, Project Funds and Project Technology influences Construction Project Completion.

This chapter gave a summary of the major findings on the influence of Construction Project Completion in KURA, Nairobi City County. The chapter draws the study conclusions and discusses major recommendations and gives suggestion for further studies.

#### 5.2 Summary of the Findings

### V. UMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

The main objective of this study was to establish the influence of road Construction Project Completion in KURA, Nairobi City County. The study found out that road Construction Project Completion is greatly influenced by Project Managers Competency, Project Technology, Project Funds and Project Equipment. The study drew conclusion that road Construction Project Completion is greatly influenced by Project Managers Competency, Project Technology, Project Funds and Project Equipment.

#### **5.2.1 Project Managers Competency**

From the study majority agreed with the following variable on Project Managers Competency that organizing influences road construction projects Completion in KURA, Nairobi City County, Staffing influences the road construction projects Completion in Nairobi City County, evaluation influences the road construction projects Completion in Nairobi City County and monitoring influences the road construction projects Completion in Nairobi City County. The study drew conclusion that road Construction Project Completion is greatly influenced by Project Managers Competency, Project Technology, Project Funds and Project Equipment.

#### **5.2.2 Project Technology**

From the study majority agreed with the following variable on Project Technology that Software management influence road construction projects Completion in KURA, Nairobi County, Database influences road construction projects Completion in KURA, Nairobi County, Nairobi City County, which Communication influences the road construction projects Completion in Nairobi City County and Creativity influences road construction projects Completion in KURA, Nairobi City County. The study drew conclusion that road Construction Project Completion is greatly influenced by, Project Technology,

#### **5.2.3 Project funds**

From the study majority agreed with the following variable on Project funds that Availability of funds influences road construction projects Completion in KURA, Nairobi County, Adequate funds influences road construction projects Completion in KURA, Nairobi County, Management of funds influences the road construction projects Completion in KURA, Nairobi County, Cost saving influences road construction projects Completion in KURA, Nairobi County and Accessibility of funds influences road construction projects Completion in KURA, Nairobi County. The study drew conclusion that road Construction Project Completion is greatly influenced by Project Funds.

#### **5.2.4 Project Equipment**

The study revealed that respondent agreed with the following statement on Project Equipment showing that Quality work is influenced by project equipment's of road construction projects Completion in KURA, Nairobi City County, Shorter operating cycle is influenced by project equipment's in road construction projects Completion in KURA, Nairobi City County, Plant & machinery influences road construction projects Completion in KURA, Nairobi City County and project Level of advancement is influenced by project equipment's in road construction projects Completion in KURA, Nairobi City County.

#### **5.2.5 Project Completion**

From the study majority of respondent stressed that Project Completion influences on road construction projects Completion in KURA, Nairobi City County influence on client satisfaction, road construction projects completion in KURA, Nairobi City County influence timely performance and road construction projects Completion in KURA, Nairobi City County influence meeting budget.

### **5.3 Conclusion**

#### **5.3.1 Project Managers Competency**

The study concluded that Project Managers Competency, Project Technology, Project Funds and Project Equipment greatly influence towards road Construction Project Completion. From the findings it was found that

#### **5.3.2 Project Technology**

The study concluded that Project Technology is the major contributor towards road Construction Project Completion. The findings indicate that majority of the respondents agreed that project managers competency influences road construction projects Completion in KURA, Nairobi City County. This was shown by the majority who agreed that Effective evaluation influences the road construction projects Completion in Nairobi City County attained a mean of 3.8000.

#### **5.3.3 Project funds**

The study concluded that Project Funds greatly influence towards road Construction Project Completion. From the findings it was indicated that majority of the respondents agreed that project managers competency influences road construction projects Completion in KURA, Nairobi City County. This was shown by the majority who agreed that Database influences road construction projects Completion in KURA, Nairobi County scored a high mean of 4.2909.

#### **5.3.4 Project Equipment**

The study concluded that Project Equipment is the major contributor towards road Construction Project Completion. From the finding it was noted that majority of the respondents agreed that Project funds influences road construction projects Completion in KURA, Nairobi County. Majority agreed that adequate funds influences road construction projects Completion in KURA, Nairobi County and this was shown by the mean score of majority 3.8909.

### **5.4 Recommendations**

The study recommended that Managers Competency, Project Technology, Project Funds and Project Equipment greatly influence towards road Construction Project Completion. From the findings it was found that

#### **5.4.1 Project Managers Competency**

The study findings established that there is a significant positive relationship between Project Managers Competency, Project Technology, Project Funds and Project Equipment. Thus the study recommended that Managers Competency is important in construction firms since it influence project completion. The study recommends that the Project Managers Competency influences road construction project Completion greatly. Thus the study recommended that training of employees in construction firm is a requirement to improve performance.

#### **5.4.2 Project Technology**

The study recommends that the Project technology influences road construction project Completion greatly. Project

technology was found to have a great influence in construction project. Software management was found with a great influence road construction projects Completion in KURA, Nairobi County, thus the study. Thus the study recommended that adoption of technology in construction firm is a requirement to improve performance.

#### 5.4.3 Project funds

The study recommended that the Project funds influences road construction project Completion. Availability of funds influences road construction projects Completion in KURA, Nairobi County, Adequate funds influences road construction projects Completion in KURA, Nairobi County and Management of funds influences the road construction projects Completion in KURA finally Accessibility of funds influences road construction projects Completion in KURA, Nairobi County.

#### 5.4.4 Project Equipment

The study recommends that the Project Equipment road construction project Completion greatly. Majority of the respondents agreed that Quality work is influenced by project equipment's of road construction projects Completion in KURA, Nairobi City County. The study established that majority of the respondent agreed that Shorter operating cycle is influenced by project equipment's in road construction projects Completion in KURA, Nairobi City County.

#### 5.5 Suggestions for Further Studies

The researcher suggested that since the study was conducted to evaluate influences road construction project Completion in KURA, Nairobi County other study should be conducted in other counties and also different variables should be employed. The following areas of further research were identified from the study.

- i. Further study should be done on the key performance indicators (KPIs) in order to identify the causal relationships between completion of road construction projects and KPIs
- ii. A study should also be conducted in order to assess the resource mobilization approaches and capacity needs for effective completion of road construction projects
- iii. A comparative study should also be done on the effectiveness of contract documentation in different types of projects to allow for generalization.

#### REFERENCES

- [1] Ahmad, S., & Schroeder, G., (2011). The impacts of electronic data interchange on delivery performance. *Production and Operations Management*, 10(1), 16-30.
- [2] Al-Momani H., (2010), Examining service quality within construction processes, *Technovation*, 20, 643-651
- [3] Archer, M., (2006). *Culture and agency: The place of culture in social theory*. Cambridge University Press.
- [4] Callinicos, A., (2008). *Making history: agency, structure, and change in social theory* (3). Brill.
- [5] Becerik B., (2007). A review on past, present and future of web based project management and collaboration tools and their adoption by the US AEC industry, *International Journal of IT in Architecture, Engineering and Construction*, 2, No.3, 233- 248
- [6] Brown A., & Adams J., (2000), Measuring the effect of project management on construction outputs: a new approach, *International Journal of Project Management*, 18, 327-335
- [7] Cavaliere S., Terzi S. & Macchi M., (2007). A Benchmarking Service for the evaluation and comparison of scheduling techniques, *Computers in Industry*, 58, 656-666
- [8] Chan P., & Chan M., (2004). Developing a benchmark model for project construction time performance in Hong Kong, *Building and Environment*, 39, 339-349
- [9] Chan, A. P. (2001). Time–cost relationship of public sector projects in Malaysia. *International Journal of Project Management*, 19(4), 223-229.
- [10] Chan W., & Kumaraswamy M., (2006). An evaluation of construction time performance in the building industry, *Building and Environment*, 31, No. 6., 569- 578
- [11] Chan W., & Mohan M., (2009). Compressing construction durations: lessons learned from Hong Kong building projects, *International Journal of Project Management*, 20, 23-35
- [12] Chen, S. P. (2007). Analysis of critical paths in a project network with fuzzy activity times. *European Journal of Operational Research*, 183(1), 442-459.
- [13] Cheung, O., Suen H. & Cheung, W., (2004). PPMS: a Web based construction Project Performance Monitoring System, *Automation in Construction*, 13, 361- 376
- [14] Collis, J. & Hussey, R. (2009) *Business Research: A Practical Guide for Confederation of International Contractors Association and UNEP construction industry—a Review*, *Building and Environment*, 40:135–141
- [15] Creswell, J., (2007). *Research Design: Qualitative, Quantitative and Mixed Methods*
- [16] Dai, H., Cao, G. & Su, H., (2006). Management and Construction of the Three Gorges. December 2006, 24, 1225–1229.
- [17] Davis, H., Schoorman, D., & Donaldson, L., (2007). Toward a stewardship theory of management. *Academy of Management review*, 22(1), 20-47.
- [18] DiMaggio, P., (2008). Interest and agency in institutional theory. *Institutional patterns and organizations: Culture and environment*, 1, 3-22.
- [19] Johnson, A., Kast, E., & Rosenzweig, J., (2012). The theory and management of systems.
- [20] Leslie, M., (2005). A theory of agency. *Causal cognition: A multidisciplinary debate*, 121-141.
- [21] Lewis, L., Hagstrom, E., Loomis, G., Wolff, A., & Herweijer, H. (2012). Efficient delivery of siRNA for inhibition of gene expression in postnatal mice. *Nature genetics*, 32(1), 107-108.
- [22] Dissanayaka S., & Kumaraswamy M., (1999). Comparing contributors to time and cost performance in building projects, *Building and Environment*, 34, 31- 42
- [23] Dubois, D., & Rothwell, W. (2006). *The Competency Toolkit (Volumes 1 & 2)*. HRD Press
- [24] Dubois, D., & Rothwell, W. (2007). *Competency-Based Human Resource Management*. Davies-Black Publishing
- [25] Fisher, R. A. (1925). *Statistical methods for research workers*. Genesis Publishing Pvt Ltd.
- [26] Fisher, R. A., & Yates, F. (1949). *Statistical tables for biological, agricultural and medical research. Statistical tables for biological, agricultural and medical research., (Ed. 3.)*
- [27] FIDIC (2007), *General Conditions of Contract for Building and Engineering works* Florence, KY, USA
- [28] Gunduz, M., & Hanna, S., (2005). Benchmarking change order impacts on productivity for electrical and mechanical projects, *Building and Environment*, 40, 1068-1075
- [29] Gyula, S., (2008) *Construction: Craft to Industry*, Spon Press, London, UK
- [30] Hackley, C., (2006) *Doing research projects in marketing, management and consume research*, Taylor and Francis Group, the USA
- [31] Hyde, F., (2007). Recognizing deductive processes in qualitative research, *Qualitative methods*.
- [32] Hyvari, I., (2006). *Success of Projects in different organizational Conditions, Project Institutions, Risks & Governance*, MIT Press Cambridge, MA, USA
- [33] Iyer K. & Jha N., (2005). Factors affecting cost performance: evidence from Indian construction projects, *International Journal of Project Management*, Vol. 23, PP. 283-295
- [34] Iyer, C. & Jha, K., (2006). Critical Factors Affecting Schedule Performance in China, *Building and Environment*, Vol. 41, PP. 915-925

- [35] Jackson K., (2010) Fundamentals of Project Performance Measurement.: [http://alarcos.inf-cr.uclm.es/doc/pgsi/doc/otros/pmbok-2000.pdf]
- [36] Jackson, B. (2008) Construction Management Jump Start, Sybex, Incorporated, Key relationship-based determinants of project performance in China, *Building and Environment*, 41, 915-925
- [37] Janes, J., (2010). Survey research design, *Library Hi Tech*, 19(4), 419-421, MCB UP
- [38] Jugdev, K., & Muller, R., (2005). A retrospective look at our evolving understanding of Project Performance Measurement: [http://alarcos.inf-cr.uclm.es/doc/pgsi/doc/otros/pmbok-2000.pdf]
- [39] Karim K. & Marosszeky M., (2009). Process monitoring for process re-engineering - using key performance indicators, International conference on construction process reengineering, CPR 99, Sedney UNSW 12-13 July, Building Research Center.
- [40] Kemps, M., (2012). Fundamentals of Project Performance Measurement, San diego[http://alarcos.inf-cr.uclm.es/doc/pgsi/doc/otros/pmbok-2000.pdf]
- [41] Kenny, C. (2007) *Construction, Corruption, and Developing Countries*, World Bank
- [42] Kerzner, H. (2005) 'Project Management – A systems Approach to planning, scheduling
- [43] Kim Y., Han H, Kim H., & Park H., (2008). Structuring the prediction model of project performance for international construction projects: A comparative analysis, *Expert Systems with Applications*.
- [44] Koo B., Fischer M., & Kunz J., (2007). A formal identification and sequencing process for developing sequencing alternatives in CPM schedules, *Automation in Construction*, 17, 75-89
- [45] Kuprenas, J. A., & Nasr, E. B. (2007). Cost performance comparison of two public sector project procurement techniques. *Journal of management in engineering*, 23(3), 114-121.
- [46] Lam C., Wang D., Lee Patricia K., Tsang T., (2007). Modelling risk allocation decision in construction contracts, *International Journal of Project Management Leadership and Management in Engineering*, January 2003:56
- [47] Leesard, R., (2011) *Strategic Management of Large Engineering Projects: Shaping Journal of knowledge management*, 4(3), 195-203.
- [48] Lehtonen, P. (2007). Role of single-project management in achieving portfolio management efficiency. *International Journal of Project Management*, 25(1), 56-65.
- [49] Lewis, J. (2007). *Mastering project management: Applying advanced concepts to systems thinking, control & evaluation, resource allocation*. McGraw Hill Professional.
- [50] Lucia, A., & Lepsinger, R., (2009). *The Art and Science of Competency Models: Pinpointing Critical Success Factors in Organizations*. Pfeiffer Macmillan. The UK.
- [51] Mahoney, J., & Thelen, K. (Eds.). (2009). *Explaining institutional change: ambiguity, agency, and power*. Cambridge University Press.
- [52] McElroy, M., (2010). Integrating complexity theory, knowledge management and organizational learning. *Journal of knowledge management*, 4(3), 195-203.
- [53] Mitnick, B., (2005). The theory of agency. *Public Choice*, 24(1), 27-42.
- [54] Marasini, R., & Dawood, N., (2006) Innovative managerial control system (IMCS): a Market Research: *An International Journal*, 3(2): 82-89, MCB UP
- [55] Maxwell, J., (2005). *Qualitative Research Design: an interpretive approach (2nd Ed.)*, Measures of Web-Based Construction Project Management Systems: Professionals' Michigan, USA
- [56] Minocha, S., (2005) *Dissertation Preparation and Research Methods*, 2nd Ed., model, *International Journal of Project Management*, 24(): 53-65, Elsevier Science Ltd
- [57] Mugenda, O., & Mugenda, A.G. (2003): revised. *Research Methods; Quantitative Qualitative Approaches: ACTS Press, Nairobi*.
- [58] Mugenda, O. M. (1999). *Research methods: Quantitative and qualitative approaches*. African Centre for Technology Studies.
- [59] Mugenda, M., & Mugenda, G. A. (2009). *Research methods, qualitative and qualitative approaches*. Acts Press Nairobi.
- [60] Nitithamyong, P. & Skibniewski, J. (2006) *Success/Failure Factors and Performance* Norwegian University of science and Technology, NTNU. <http://www.concept.ntnu.no/> November 11, 2007
- [61] Orodho, J., (2003). *Essentials of educational and social science research methods*. Nairobi: Mazola Publishers.
- [62] Orodho, J. A. (2004). *Techniques of writing research proposals and reports in education and social sciences*. Nairobi: Masola Publishers.
- [63] Orodho, A. J., & Kombo, D. K. (2002). *Research methods*. Nairobi: Kenyatta University, Institute of Open Learning.
- [64] Orodho, J. A. (2009). *Elements of education and social science research methods*. Nairobi/Maseno, 126-133.
- [65] Payne, J., & Turner, R., (2009) *Company –wide project management: planning and control of programs of projects of different types*, *International Journal of project management*, 17(1):55-59
- [66] Peansupap, V., & Walker, D. H. (2005). Factors enabling information and communication technology diffusion and actual implementation in construction organisations. *Electronic Journal of Information Technology in Construction*, 10(14), 193-218.
- [67] Pearman, R., (2006) *Contractors look abroad for high-rise expertise*, *Contract Journal*, 435 (6597) Pearson Education Ltd., Essex
- [68] PMI (2007). *Organizational Project Management Maturity Model (OPM3)*, Retrieved Policy Research Working Paper No. 4271, June 2007.
- [69] Polonsky, J., & Waller, D., (2005). *Designing and Managing a Research Project: A business student's guide*, Sage, the USA
- [70] Potter, W., (2006). *An analysis of thinking and research about qualitative methods*, LEA, Publishers, New Jersey.
- [71] Reschke, H., & Schelle, H., (2010). *Dimensions of Project Management – Fundamentals, techniques, Organization, Application*, Springer-Verlag Berlin, Heidelberg, Germany Retrieved: 2007-11-11
- [72] Richards, H. M., & Schwartz, L. J. (2012). Ethics of qualitative research: are there special issues for health services research?. *Family Practice*, 19(2), 135-139.
- [73] Robinson, S., Carrillo, M., Anumba, C., & Al-Ghassani, M., (2005). Review and implementation of performance management models in construction engineering organizations, *Construction Innovation*. Vol. 5:203–217
- [74] Ross, S. (2008). The economic theory of agency: The principal's problem. *The American Economic Review*, 134-139.
- [75] Rumsey, J. (2011). *Statistics for dummies*. John Wiley & Sons. Viewpoint, *Journal of Construction Engineering and Management*, January 2006
- [76] Sambasivan, M. & Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry, *International Journal of Project Management*, 25: 517–526
- [77] Sarshar, M., Haigh, R. & Amaratunga, D. (2007). Improving project processes: Best Practice Case Study, *Construction Innovation*, 4:69–82
- [78] Saunders, M., Lewis, P. & Thornhill, A. (2007). *Research Methods for Business* September / October 2009,570.
- [79] Shandler, D. (2006). Competency and the Learning Organization. *Crisp Learning*. *International Journal of Project Management*, 25: 517–123
- [80] Spencer, M., Cherniss, C. & Goleman D. (2009). "The economic value of emotional intelligence competencies and EIC-based HR programs", in *The Emotionally Intelligent Workplace: How to Select for, Measure, and Improve Emotional Intelligence in Individuals, Groups and Organizations*. San Francisco, CA: Jossey-Bass/Wiley
- [81] Spencer, L., & Spencer, S. (2008). *Competence at Work: Models for Superior Performance*.
- [82] Stake, R. E. (2005). Qualitative case studies. In NK Denzin & YS Lincoln (Eds.), *The handbook of qualitative research* (pp. 443-461).
- [83] Strenman J. D. (2012) 'System dynamics modelling for project management' Sloan School Students, 3rd Ed, Pearson Education Limited, England
- [84] Ulrich, D. & Brockbank, W. (2005). *The HR Value Proposition*. Boston: Harvard Business School Press Undergraduate and Postgraduate Students, 2nd Ed, Palgrave Macmillan LTD, UK.
- [85] Vandevoorde, S., & Vanhoucke, M. (2006). A comparison of different project duration forecasting methods using earned value metrics. *International journal of project management*, 24(4), 289-302.
- [86] Wang, H. J., Zhang, J. P., Chau, K. W., & Anson, M. (2004). 4D dynamic management for construction planning and resource utilization. *Automation in Construction*, 13(5), 575-589.

- [87] Wang, X., & Huang, J. (2006). The relationships between key stakeholders' project performance and project success: Perceptions of Chinese construction supervising engineers. *International Journal of Project Management*, 24(3), 253-260.
- [88] Weidl, G., Madsen, A. L., & Dahlquist, E. (2003, September). Applications of object-oriented Bayesian networks for causal analysis of process disturbances. In *Proc. 44th Scandinavian Conf. Simulation and Modeling* (pp. 17-19).
- [89] Weil, D. (2005). The contemporary industrial relations system in construction: Analysis, observations and speculations. *Labor history*, 46 (4), 447-471.
- [90] World Bank, (2008). *Infrastructure Assessment, Finance, Private Sector and Infrastructure Group. Middle East & North Africa*, December 2004

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