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DETERMINANTS OF TIMELY COMPLETION OF ROAD CONSTRUCTION PROJECTS FINANCED BY KENYA ROADS BOARD IN KISUMU COUNTY

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Abstract

Kenya government roads has committed large sums of money in the roads infrastructure through Kenya Roads Board (KRB). Despite the importance of road infrastructure and the billions of dollars committed to it, road construction projects are never completed on time. The purpose of the study was to assess the determinants of timely completion of road construction projects in Kisumu County, Kenya. The specific objectives were; to establish the extent to which top management support determines timely completion and to assess the extent to which effective procurement process influences timely completion of road projects. The study adopted a descriptive survey design. Research questionnaires and interviews were used to collect data from 43 respondents based on their suitability. Relative importance index (RII) was adopted to determine the ranking of different determinants in order of importance in timely completion of road construction projects. The study found out that top management support (RII= 0.8340)

was more critical in determining the timely completion of road construction projects in this study than effective procurement process (R=0.5899). This study recommends that all stakeholders in road construction projects should give careful consideration to top management support related factors as significant determinants for timely delivery of road construction projects.

Keywords: Determinants, management, procurement, construction, time bound

INTRODUCTION

The study sought to investigate determinants of timely completion of road construction projects in Kisumu county with reference to road projects financed by Kenya Road Board (KRB). Kenya Roads Board was formed by an Act of Parliament no 7 of 1999 which provided for its establishment, powers and functions. The date of commencement of this Act was 1st July 2010 with the headquarters in Nairobi. The object and purpose for which the Board was established is to oversee the road network in Kenya and coordinate the maintenance, rehabilitation and development funded by the Board and to advise the Minister on all matters related thereto. The Fund came into existence in 1993 through an Act of Parliament, to facilitate the maintenance of public roads. The Kenya Roads Board (KRB) administers the funds and works in collaboration with various implementing agencies like KeNHA, KeRRA, KURA and KWS (Oronje *et al,* 2014).

According to Macharia and Ngugi (2014), to increase the chances of a project succeeding it is necessary for the organization to: (i) have an understanding of what are the critical success factors or in other words what are the factors that are critical in determining the success of a project, (ii) systematically and quantitatively assess these critical success factors, anticipating possible effects, and then choose appropriate methods of dealing with them. Gaturu and Muturi (2014) indicated that the completion of projects in a timely manner is often a critical factor and measure of project success and the success of any project is highly dependent on its completion time from start to delivery of results. The completion of projects in a timely manner has a direct bearing on management decisions such as budgets, targets and standards (Westerveld, 2003). Kariungi (2014) similarly stated that completion of projects within schedule is a major contribution towards the competitive edge in organizations. This is based on the realization that the achievement of the targeted objectives is determined by the ability to deliver the targeted output within the stipulated time.

In the United Kingdom, Akintoye et *al,* (2005) contends that effective procurement, project implementation ability, government guarantees, and favourable economic conditions are critical success factors (CSFs) for public-private partnership projects. In Lithuania, Gudiene,

Ramelyte and Banaitis (2013) stated that project management's experience, project value, project manager's experience, experience of contractor, project size, competence of project team members, clear and realistic goals, decision making effectiveness of project management, and technical capability of project management are the most important success factors for construction projects.

Similar studies have been carried in Kenya with a wide range of success factors identified. Ondari, and Gekara (2013) considers management support, design specifications, contractor's capacity and supervision capacity as influencers of successful completion of roads projects in Kenya. In the same way, Meroka (2011) contends that financial viability, management, market analysis and quality of project management to be success factors of industrial and commercial projects in Kenya. Mono (2013) concludes that contractor's experience, contractor cash flow, site management, employer's ability to honour contractor's certificates on time, and adequacy of funding from external sources to be determinants of successful delivery of housing construction projects in the Ministry of Housing in Nairobi, Kenya.

Wanjiku (2012) contends that financial issues, human resources conditions, site characteristics and design quality aspects to be factors influencing performance of contractors of government funded building projects in Kirinyaga County. Wambugu (2012) identifies strategy, project term capacity, project communication, monitoring and evaluation, and client consultation as factors influencing success of Constituency Development Funds (CDF) projects in Nyeri County. Moreover, Kabutu (2013) argues that top management support, technology, training and competence, organizational resource, and funds management to be success factors for offshore software development and implementation projects in public organizations.

Statement of the problem

The delays in road construction projects have negatively impacted on both the social and economic benefits in Kenya that would have accrued if the projects were completed on time. For example the Rural Access Road project delayed for 3.5 years. The objective of this project was to develop farm to market center access. The aim was to increase the growth rate of agriculture production in the affected districts, which would in turn improve the livelihoods of the people, provide access to critical facilities like health and education centers. According to the Project Completion Report, other than the delayed completion, only 56 percent of the construction target was achieved. This therefore means, the districts were deprived of the expected benefits that they would have enjoyed had the project been completed according to schedule. The Kakuma-Lokichokio Road project is an infrastructure project that was also affected by delayed completion. This was a project by the African Development Bank. The loan was signed in

December 1983, declared effective in March 1987, works commenced 26 months later than the expected time and the overall delay at completion was 32 months. The objective of the project was to provide access to the Turkana District which is a remote isolated location whose population had no access to critical facilities, (World Bank, 2011).

The World Bank financed Kakamega-Webuye road project of the 2011 period was behind schedule due to poor performance by the contractor working on road section. A decision was made to terminate the contract and have the contractors working on the adjoining road sections of Kisumu-Kakamega and Webuye-Kitale under the project undertake the works through VOs. However, the contractor challenged the intention to terminate and took the matter directly to court without seeking arbitration as provided for under the contract. The hearing took place on July 23, 2014. The Standard on 11th September, 2014 reported that construction works on a 41km St Mary-Gitugi-Mioro Road in, Mathioya constituency that was under construction by Nyoro Construction Company stalled for two years and the residents demonstrated against the delay.

The Thika Super Highway also known as Thika Highway Improvement Project (THIP) was funded by loans from the African Development Bank and the Chinese government. The project officially broke ground in December 2009 following the signing of an agreement between the Government of Kenya and three Chinese construction firms. It was originally expected to be completed in July 27, 2011 but was actually completed in November 2012 (UoN, 2013). However, Nyandika, O. F and Ngugi, K. (2014) stated the initial deadline of the Thika super highway project was July 2011, which was later revised to July 2013.

These persisting challenges in road infrastructure projects in Kenya inspired the researcher to attempt to identify the critical factors that need to be tackled head on to produce a successful project time management outcome in Kisumu County.

Research objectives

The general objective of this study was to establish the determinants for timely completion of road construction projects financed by Kenya Roads Board in Kisumu County, Kenya.1.4 Specific objectives

The study was guided by the following specific objectives:

i) To establish the extent to which top management support determines timely completion of road construction projects in Kisumu County.

ii) To assess the extent to which effective procurement process determines timely completion of road construction projects in Kisumu County.

Justification of the study

This study sought to solve the problems of delay in the delivery of road construction projects which is associated with late completion, interferences with budget estimates, legal battles and sometimes abandonment of projects. It also sought to prevent the beneficiaries from loosing the project benefits that would have accrued from early delivery of the road construction projects. It is therefore important that factors that determine timely completion of road construction projects are spelt out failure to which these goals cannot be achieved. The findings of this study would also help inform decision makers and other stakeholders on key issues that have incriminations on road construction projects.

Scope of the Study

This study focused mainly on identifying the factors that determines the timely completion of road construction projects funded by Kenya Roads Board in Kisumu County. Respondents were restricted to the owners (road agencies), civil engineering consultants and road contractors who were involved in KRB funded road projects in Kenya. The specific project survey targeted KeNHA and KURA supervised roads in Kisumu County that had been completed or partially completed within the past five years.

LITERATURE REVIEW

This chapter discusses the theoretical and conceptual framework of timely completion of road construction projects in Kisumu County. It also discusses the literature related to determinants for timely completion of road construction projects funded by Kenya Roads Board in Kisumu County. It particularly focuses on establishing the extent to which top management support , effective procurement process, disbursement of fund procedures and external environment determine timely completion of road projects in Kisumu county. These are considered the pillars whose study will unravel which of them will be most influential in successfully completing construction projects (Meroka, 2011).

Top management team theory

According to Nyandika & Ngugi, (2014), top management team theory (TMTT) has raised widespread concern in the academic community. Different from traditional strategic management theory, which emphasizes on purely economic and technological processes or information process, TMTT studies the strategic choice and organizational performance determinants from the process of cognitive psychology of top management team (TMT), which overturns the economic man hypothesis in traditional theory and proposes the hypothesis of

limited rationality proposed by the Carnegie school (Müller & Jugdev, 2012). As the cognitive psychological process of TMT is too complicated, TMTT invokes prior marketing research on demography to suggest that managerial characteristics and its heterogeneity (such as age, work experience, educational background, etc.) are reasonable proxies for underlying differences in cognitions, values, and perceptions process, which could be good predictor to predict organizational outcome (such as strategic choice, organizational performance, etc.) ,(Nyandika & Ngugi, (2014)). Nyandika and Ngugi, 2014 finally concluded that in relation to this study, the skills and the support of the top management is paramount in the success of development projects. It reduces the timeline of a projects as it helps to smoothen the communication process

Resource Dependence Theory (RDT)

According to Nyandika & Ngugi (2014), resource dependence theory (RDT) is concerned with how organizational behaviour is affected by external resources the organization utilizes, such as raw materials. The theory is important because an organization's ability to gather, alter and exploit raw materials faster than competitors can be fundamental to success. Some commentators encourage organizations to view customers as a resource predisposed to scarcity. Resource dependence theory is underpinned by the idea that resources are key to organizational success and that access and control over resources is a basis of power. Resources are often controlled by organizations not in the control of the organization needing them, meaning that strategies must be carefully considered in order to maintain open access to resources. Organizations typically build redundancy into resource acquisition in order to reduce their reliance on single sources e.g. by liaising with multiple suppliers, (Davis, and Cobb, 2010)

The procurement of external resources is an important tenet of both the strategic and tactical management of any company. Resource dependence theory has implications regarding the optimal divisional structure of organizations, recruitment of board members and employees, production strategies, contract structure, external organizational links, and many other aspects of organizational strategy. Organizations depend on multidimensional resources: labor, capital, raw material, etc. Organizations may not be able to come out with countervailing initiatives for all these multiple resources. Hence organization should move through the principle of criticality and principle of scarcity. Critical resources are those the organization must have to function. For example, a burger outlet can't function without bread. An organization may adopt various countervailing strategies—it may associate with more suppliers, or integrate vertically or horizontally, (Hillman, Withers and Collins, 2009).

Resource dependence concerns more than the external organizations that provide, distribute, finance, and compete with a firm. Although executive decisions have more individual weight than non-executive decisions, in aggregate the latter have greater organizational impact. Managers throughout the organization understand their success is tied to customer demand. Managers' careers thrive when customer demand expands. Thus customers are the ultimate resource on which companies depend. Although this seems obvious in terms of revenue, it is actually organizational incentives that make management see customers as a resource (Boyd, B., 1990).

The basic argument of resource dependence theory can therefore be summarized as follows: organizations depend on resources; these resources ultimately originate from an organization's environment; the environment, to a considerable extent, contains other organizations; the resources one organization needs are thus often in the hand of other organizations; resources are a basis of power; legally independent organizations can therefore depend on each other; power and resource dependence are directly linked; organization A's power over organization B is equal to organization B's dependence on organization A's resources; power is thus relational, situational and potentially mutual.

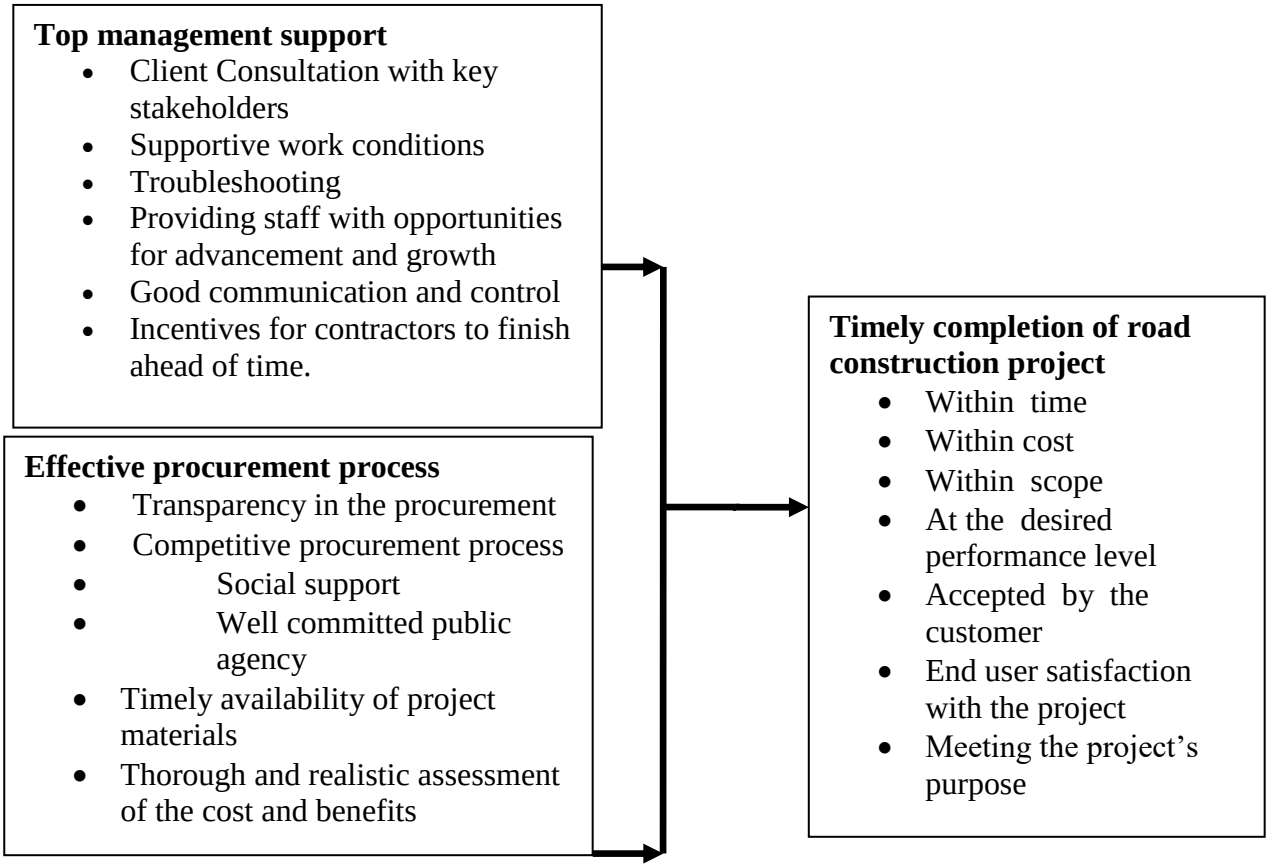
Conceptual framework

Kariungi (2014) defines conceptual framework as a detailed mental formulation of ideas that give direction to a study. It enables the interaction between and independent variables to be portrayed (Kothari, 2004). According to Mugenda (2008), conceptual framework is concise description of the phenomena under study accompanied by a graphical or visual depiction of the major variables of the study. Macharia and Ngugi (2014) defines conceptual framework as a diagrammatical representation that shows the relationship between dependent variables and independent variables. In this study the conceptual framework looks at the relationship between the determinants for timely completion of Kenya Roads Board funded road construction projects in Kisumu County.

The conceptual framework shown in Figure 1 is a schematic diagram which illustrates the relationship between the dependent variable, the change that we are interested in , that is, timely completion of Kenya Roads Board (KRB) funded road infrastructure projects and the independent variables (directly affecting the dependent variables), that is, top management support and effective procurement process. These were stated in the introduction section of this paper. The technology transfer represents the moderating variable in that it behaves like an independent variable by having a contributing effect on the timely completion of KRB financed road projects in Kisumu county but not enough to be considered significant. Lastly project

attributes like, for example, funding duration represents the extraneous variable which we lack control over.

Figure1: Conceptual framework



The concept of timely completion of road construction projects in Kenya

Due to the importance of construction sector to a nation, many researchers have studied this sector's operations and their findings have indicated that most projects are never completed on time due to delays. According to Faridi and El-sayegh, (2006), delay is considered one of the most frequent problems in the construction industry and these delays have an adverse impact on project completion in terms of time, cost, quality and safety. Factors contributing to these delays have been identified as inadequate readiness for implementation causing delays in procurement of contractors, loan conditionality's affecting late release of funds, poor performance of contractors, low capacity of the implementing agencies, poor supervision of works and contract management in responding quickly in resolving contractual issues when they arise. In addition, failure by government and other funding agencies to release counterpart funds in good time, delays in payment to contractors and the resulting cash

problems during construction, design changes, conflicts in work schedules of sub-contractors, slow decision making and executive bureaucracy in owner's organizations, design errors, labor shortage and inadequate labor skills among others. According to Salunkhe1 and Patil (2014), the reasons for time overruns as reported by various project implementing agencies are delay in land acquisition, delay in equipment erection, inadequate mobilization by the contractor, delay in forest clearance, fund constraints, change in scope of work, cancellation of tender, law & order problem, delay in supply of equipment, slow progress of civil work, escalation in cost.

In Pakistan, it is very rare case that large construction project is completed on the time specified or agreed upon. Around 80 percent construction projects in Pakistan faced delays, and only 20 percent of construction projects were completed within scheduled time duration and estimated cost. In Kampala, Uganda northern by-pass which was to take two and a half years instead took more than five years and the cost had similarly gone up by more than 100 percent. Delays also lead to cost over-runs, and less and less work is performed despite the increase in construction budgets (Ssepuuya, 2008). In Lao People's Democratic Republic, the Champasack Road Improvement Project (CRIP) was completed in May 2001 after a delay of 23 months. The objective of the project was to rehabilitate and improve the 200 km road with aim to improve transport services in the southern region (African Development Bank, 2005). In Ghana, the construction industry is an important sector to the economy. This sector contributes an average of 8.5% of GDP (Kessides, 1993). The sector has employed about 2.3% if the economically active population in 2002 (Ndulu, 2006). Unfortunately the sector faces a major construction delay which is endemic and its economic and social impact is often discussed. According to the study by Frimpong *et al,* (2003) that investigated factors that cause delays and cost overruns in the underground projects in Ghana, it was found that the causes cut across all construction projects.

Kenya like the other developing countries has had its fair share of delayed infrastructure projects. The delays negatively impacted on both the social and economic benefits that would have accrued if the projects were completed on time. The Rural Access Road project delayed for 3.5 years. The objective of this project was to develop farm to market center access. The aim was to increase the growth rate of agriculture production in the affected districts, which would in turn improve the livelihoods of the people, provide access to critical facilities like health and education centers. According to the Project Completion Report, other than the delayed completion, only 56 percent of the construction target was achieved. This therefore means, the districts were deprived of the expected benefits that they would have enjoyed had the project been completed according to schedule. The Trunk Roads, feeder and settlements project as well as the second highway project also experienced long delay extending to three years. The

Kakuma-Lokichokio Road project is an infrastructure project that was affected by delayed completion. This was a project by the African Development Bank. The loan was signed in December 1983, declared effective in March 1987, works commenced 26 months later than the expected time and the overall delay at completion was 32 months. The objective of the project was to provide access to the Turkana District which is a remote isolated location whose population had no access to critical facilities (World Bank, 2011). Sondu Miriu Hydro Power Infrastructure Project in Kisumu County stalled for a period of four years. The purpose of this project was to stabilize power and ease energy crisis in Nyakach, Kasipul-Kabondo and Kano Planes. This had an adverse effect to the industries and households. These delays were a cost to the government, development partners and the community with the subsequent social and economic losses.

Timely completion of road construction projects

According to Greer (1999), a project is successful if it satisfies all three legs of the triple Constraint, namely, performance (specification), cost and time. Thomsett (2013) in an extensive examination of 20 failing projects over a period of 18 years expanded this criteria of success as: "satisfies stakeholder groups, meets functional requirements, meets quality expectations and requirements, within cost, within deadline, delivers sustained and actual benefits and provides the team with professional satisfaction and learning". Although the causes for project success and failure have been the focus of numerous research studies, there has been no consensus on the issue. Pinto and Slevin (1987) argue that in spite of extensive research there has been limited convergence on the components and causes of project success. The word success when applied to projects is very illusive. De Wit (1988) and many other researchers make a distinction between project success and project management success. For instance, they contend that project success is measured by comparing the project outcomes to the overall objectives of the project; whereas project management success tends to be measured against the traditional measures of performance, namely, cost, time and quality. Moreover, a further distinction is made between project success criteria and project success factors. In De Wit's (1988) view, success criteria refer to the measures by which success or failure of a project or business will be evaluated; whereas success factors are those inputs to the management system that lead directly or indirectly to the success of the project or business.

It was also found that delivering project success is more difficult than delivering project management success, because it predictably involves aspects which may be beyond the control of the project team. With these second order controls, both goals and methods are prone to change; whereas project management success may be achieved by holding goals constant but

changing practices to meet the predetermined goals. Cooke-Davies (2002) argues that the ultimate aim of an organization should be to introduce practices that allow the enterprise to resource fully a portfolio of projects that are rationally and dynamically matched to the corporate strategy and business objectives. This view is further enhanced by Sutton (2005) who contends that projects are not dichotomous, it is not a matter of success or failure, but that there are degrees of success and failure. He identifies four distinct levels of success, each having its own discipline, tools and techniques. Thus, excellence at each level is critical for absolute success. It is quite unfortunate that majority of construction projects fail to meet the schedule baselines. This phenomenon is equally applicable to all levels of projects that is, from major, capital, mega or giga-projects. Due to this unhealthy trend, the industry has virtually become infamous across the globe. It is also worth mentioning here that, construction industry potential has never been fully exploited despite the fact that this sector is the major contributor in Gross Domestic Product of a country.

Construction Industry acquires diversified range of stakeholders like; design professionals, architects, engineers, contractors, sub-contractors, suppliers and owners. Similarly it is also directly or indirectly affected by external factors and actors like government regulatory agencies, environmental agencies, law and order, market hegemonic forces, force majeure, lack of accessibility to the site and poor soil conditions. These all internal and external factors and actors play a substantial role towards time performance of construction projects. According to Haseeb (2011), there is an ongoing debate over this retrogressive phenomenon with a purpose to eliminate, deflect or mitigate their effects and occurrence. Project Management Institute's famous Project Management Body of knowledge (PMBOK-4th Edition) advocates the philosophy of Project Integration Management. The basic aim for Project Integration Management is to synchronize and harness, all the subsidiary plans in order to achieve project goals on time and within budget. Unfortunately this aspect is neglected or forgotten, as a result of which projects are subjected to or confronted with massive constructability issues, conflicts and clashes, design errors, frequent change orders, cost overruns and late completions. In the worst scenarios, some projects are completely abandoned when contractor disserts out of frustration from the jobsite.

Top Management Support and timely completion of road construction projects

Consensus on the definition of Top Management Support (TMS) is still lacking Glaister *et al*, (2010). Some authors define it as devoting time in proportion with cost and potential benefits, (Young & Jordan, 2008). Others however, define it as the degree to which top management understands the importance of the project function (Chen and Moger, 2001). However,

although the definition is in doubt, there is general agreement that top management support for projects, or indeed for any implementation, is of great importance indistinguishing between ultimate project success or failure (Schultz and Slevin, 2013). Project management is not only dependent on top management for authority, direction, and support, but ultimately the conduit for implementing top management's plans, or goals of the organization (Beck, 1983). Bhatti, (2005) observes that the degree of management support for a project will lead to significant variations in the clients' degree of ultimate acceptance or resistance to that project or product.

Sustained management support is related with "sustained management commitment", both at top and middle levels during the implementation, in terms of their own involvement and the willingness to allocate valuable organizational resources (Esteves and Pastor, 2000). Management support is, therefore, important for accomplishing project goals and objectives and aligning these with strategic business goals. Top management support is needed throughout the implementation phase of a project (Nah *et al.* 2001) and it must be committed with its own involvement and willingness to allocate valuable resources to the implementation effort (Cooper and Kleinschmidt, 1987), According to Cooke-Davis, (2002).), "top management needs to constantly monitor the progress of the project and provide direction to the implementation teams". Nah *et al*. (2001) also observes that top management has "an overall responsibility for accepting and approving the project initiatives outlined in the information technology strategic plan, including funding and prioritization of projects before they are initiated". In the context of small business, (Toney and Power, 1997) proposed and validated a measure of top management support. Their measure consists of: level of support for the project; frequency of attendance at project meetings; level of involvement in information requirements analysis; and level of involvement in decision-making relating to the project.

Effective procurement process and timely completion of road construction projects

Procurement is the acquisition of goods, services and/or infrastructure at the best possible total cost of ownership in the right quantity and quality, at the right time, in the right place for the direct benefit or use of governments, corporations or individuals, generally via a contract (Ganuza, 2007). According to Kariungi (2014) procurement is the entire process of acquiring materials, property and services required for a particular project. The process starts with the identification of need, followed by a decision on procurement requirements. The process continues through risk assessment, identification and evaluation of alternative solutions, contract award, delivery and payment of the property or service. World Health Organization report (2007) explains that an effective procurement process ensures that materials are available at the right time, right quantity, for the right client, and at a reasonable price and

quality. Ombaka (2009) further emphasizes that it does not merely entail the act of buying, but a wide range of business, operational, information technology, legal systems, safety and risk management, all undertaken to address an organization's needs. The ability to satisfy desired needs depends on the speed at which the good is delivered; otherwise a negative externality is created on the end users. According to Kagiri and Wainaina (2009), donors require the recipient to follow specific rules (i.e., procurement guidelines) for identifying the contractor who constructs the road and to set up specific financial management systems to oversee the use of donor funds. These often donor specific rules and guidelines are meant to ensure that donor resources are used efficiently and economically, but at the same time can lead to fragmentation and aid complexity. Procurement is an important aspect and if not managed well, then project aid can be withheld, disbursements can be delayed, contracts can be cancelled and worse still contractors debarred from doing business with development partners which can be a costly affair. According to Akintoye *et al.* (2005), the critical success factor components of effective procurement are: (i) Transparency in the procurement; (ii) Competitive procurement process; (iii) Good governance; (iv) Well committed public agency; (v) Social support and (vi) Thorough and realistic assessment of the cost and benefits.

Kenya through The Public Procurement and Disposal Act, 2005 created the Public Procurement Oversight Authority (PPOA), the Public Procurement Advisory Board (PPAB) and the continuance of the Public Procurement Complaints, Review and Appeals Board as the Public Procurement Administrative Review Board (PPARB). The PPOA is mandated with the responsibility of (a) ensuring that procurement procedures established under the Act are complied with, (b) monitoring the procurement system and reporting on its overall functioning, (c) initiating public procurement policy and (d) assisting in the implementation and operation of the public procurement system by (i) preparing and distributing manuals and standard tender documents and (ii) providing advice and assistance to procuring entities. Unfortunately, development partners still find the country systems in the developing countries weak and therefore to guard their interests, they insist on using their procurement guidelines.

It is evident from the discussions above that procurement is an important aspect of the project implementation and has many parties involved namely development partners, government, implementing agencies and contractors. Procurement delays can therefore arise on the projects from various parties involved. The contractors are responsible for the procurement of materials and equipment in all the contracts. For multi-contract projects, where the engineer had dual role of designer and supervisor on the civil contracts, many factors interplay leading to delays. On some contracts, there are delays by contractors in releasing of procurement drawings, delays in provision of design information from supply, contractors to the

engineers, designers to prepare procurement drawings. Delays are also experienced in the tendering system, preparation of the bidding documents, and approval by the development partners on the documentation submitted as it has to meet the set standards. The several approval stages in procurement can also lead to delays especially in high-value contracts as they have to go the highest levels for approval.

At the World Bank, high value contracts are approved by the Regional Procurement Management and might therefore take longer than the low value contracts (McCarthy and Tiong, 1991). Murray *et al,* (2002) cites that stringent conditions for pre-qualification and tendering, lack of transparency in the procurement of public works, and lack of affirmative policies for the promotion of local contractors as contributing factors to the lack of effectiveness and mediocre performance of donor-funded projects, even resulting in unfair competition and corruption. For donor-funded projects in the construction sector that are normally focused on infrastructure development and maintenance, procurement management is essential to timely completion, which may sometimes involve several procurement processes in order to deliver complex construction projects. Lengthy and cumbersome procedures at the project preparation stage often cause delays and have resulted in projects taking several years to come to fruition. As a result, projects were often out of date by the time they began – project objectives were no longer relevant or appropriate; technology specified in the project design was obsolete – but the procedures involved were so lengthy and complex it inhibited those involved from making the necessary changes.

Critique of the existing literature relevant to the study

The current literature is mainly on the critical delay factors on road construction projects. There is no specific literature on determinants of timely completion of Kenya Road Board financed road construction projects in Kenya. The few studies that have been comparative are not comprehensive in their outlook. For example, a study conducted done by Nduko *et al.,* (2016) looked at evaluation of institutional factors influencing timely completion of road projects in Rwanda, funded through government external financing with a focus on World Bank and AfDB funds. It did not look at internal financing sources which was the case in this study. Similarly they only dwelt with institutional factors of which the clients or stakeholders might had control over. They did not look at external environmental factors such as political environment and climatic factors which are key issues in timely completion of road construction projects. The current study looked at both institutional factors, and external environment related factors of which the client or stakeholders might had not been able to manipulate. Similarly a study conducted by Wambui, Ombui and Kagiri (2015) on factors affecting completion of road

construction projects in Nairobi City County: Case study of Kenya Urban Roads Authority (KURA) only dwelt in institutional factors but not external environment related factors. There is thus a need to conceptualize and systematize the analysis framework of the determinant of timely completion of road construction projects in Kenya, and their interactions, in the few schemes that are successful, and in the many others that fail to yield the expected results. Such inductive research, carried out in a variety of settings, could lead to a level of knowledge that would be helpful to policy makers' and road management in their decision making process on project management and lead to effective performance of road construction projects in Kenya.

Research Gap

Ondari, and Gekara (2013) carried a study on factors influencing successful completion of road projects in Kenya. They generally focused on road projects and their study did not include KRB funded road projects which are under the study. Macharia and Ngugi, (2014) studied determinants of successful completion of power projects in Kenya Power and Lighting Company. The study focused on power projects in Kenya which are different from road construction projects which are under the study. Many research studies, including those of Chalabi and Camp (1984); and Sambasivan and Soon (2007) on construction industry in Sub-Saharan African countries have dwelt on critical delay factors construction projects. Thus the researcher envisions filling this research gap. In this regard, the researcher poses the following research questions: to what extent does top management support, effective procurement process, disbursement of funds and external environment influence timely completion of road construction projects in Kisumu County.

Summary of literature reviewed

This chapter has provided an in-depth literature of the various factors determining timely completion of KRB funded road construction projects, both general and specific cases. The chapter started with an introduction and went on to look at predicator variables influencing determinants for the timely completion of road construction projects in Kisumu County. Since the variables influencing the successful and early delivery of road projects are seen to be quite diverse, the study reviewed specific ones which are top management support, effective procurement process, disbursement of funds and external environment related factors. The chapter further looked at other key constructs and concepts that are relevant to the study such as experience in the road construction field, number of projects executed in the last five years, highest level of education of respondents, the primary role of the respondents in the road

construction field, the respondent's perception on factors influencing timely completion of road construction projects.

RESEARCH METHODOLOGY

Research design

This was a cross sectional survey research design whereby study subjects enrolled in the study were drawn from an accessible population of staff from main road owners, that is, Kenya National Highways Authority Kenya and Kenya Urban Roads Authority (KURA), consulting civil engineering firms and NCA registered road construction companies. A list of consulting engineering firms were obtained from the secretariat of the Association of Consulting Engineers of Kenya situated in Nairobi. The road construction projects under study and the identity of the road construction firms involved in the road construction projects were obtained from the records at the KeNHA and KURA offices in Kisumu County.

The study was carried out through a quantitative research approach based on survey research design through use of questionnaires which were delivered to participants in person to obtain primary data. The questionnaires were administered through drop and pick later method to the respondents. The Participants filled in the questionnaires in their own time without any assistance from the researcher. The questionnaires were collected from the participants after a period of about three weeks. This approach removed any undue pressure from the respondents and gave them the freedom to fill in the questionnaires as truthfully as possible.

The survey was conducted to assess the determinants for timely completion of KRB funded road construction projects in Kisumu County. The survey is a very popular method of gathering information as it allows inputs from various sources such as clients, key informants, and target populations, and it helps to build consensus solutions (McKillip, 1986). The study was conducted by employing descriptive method through collection of primary data in order to answer questions concerning the subject of study. Kotler and Amstrong (2010) observes that this method is the best suited for gathering information where the researcher wants to know about people's feelings, attitudes or preferences concerning on or more variables through direct questioning.

Target Population

This study was conducted using target population drawn from Kenya National Highways Authority (KeNHA), Kenya Rural Roads Authority (KURA), consulting engineering firms and NCA registered road construction firms. The researcher targeted this population because the subjects possessed adequate knowledge in the area of road construction projects and

had followed very closely the developments of road construction projects, and at the same time had hand-on experience with road constructions. The size of the target population from which the sample was drawn as 132 comprising of 52 road owners, 37 project engineers/ consultants and 43 contractors.

Determination of sample size

The sample size of the number of respondents were obtained using coefficient of variation proposed by Nassiuma (2000). Nassiuma asserts that in most surveys or experiments, a coefficient of variation in the range of 21% to 30% and a standard error in the range of 2% to 5% is usually acceptable. The Nassiuma formula does not assume any probability distribution and is a stable measure of variability. Therefore, a coefficient variation of 21% and a standard error of 2% were used in this study. The lower the coefficient of variation (CV) and error margin (e), the more reliable the sample is. The convention is CV ≤ 30% and e ≤ 5% in decimal. The lower limit for coefficient of variation and standard error were selected so as to ensure low variability in the sample and minimize the degree of error. Nassiuma formula is shown in equation 1.

Equation 1: $$S = \frac{N(Cv^2)}{Cv^2 + (N-1)e^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \; (1)$$

Where, S = the sample size

N = the population size

CV = the Coefficient of Variation

e = standard error

Therefore, the sample size of respondents was:

$$S \text{ (respondents)} = \frac{132\,(0.21^2)}{0.21^2 + (132-1)\,0.02^2} = 60.3 \text{ respondents, approximately } 60$$

Proportions were used to determine the sample size from each stratum using the formula in equation 2:

Equation 2: $$s = \frac{x \times 60}{132} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \; (2).$$

Where:

s is the sample size from each stratum

x is the target population in each stratum.

Sixty (60) respondents were proportionately allocated to the road owners, consultants and contractors as shown in the table 1. A simple random sampling was used to select 24 road owners, 17 consultants and 19 contractors

Table 1: Summary of distribution of sample size

S/N	Strata	Population size	Sample size from calculation	Sample size taken
1	Road owners	52	23.6	24
2	Consultants	37	16.8	17
3	Contractors	43	19.5	19
	Total	**132**	**59.8**	**60**

The road owners were the future owners (clients) of the road projects who were involved in management and supervision during the construction stages of the project and were also be the beneficiaries in the disbursement of the funds from Kenya Roads Board. The samples included management at middle and senior levels from Kenya National Highways Authority (KeNHA), Kenya Urban Roads Authority (KURA) and County Government of Kisumu working in the area of study. They must have had experience in road construction works for at least five years

Consultants were drawn from consulting engineering firms that dealt with design and construction of roads. The consultants were identified from the register of the Association of Consulting Engineers of Kenya.

Contractors were drawn from road construction firms involved main road construction companies and who were contracted by the road agencies to carry out the implementation of the road construction projects in Kisumu County and were road contractors registered with the National Construction Authority (NCA). They must have had experience in road construction works for at least five years and at the same time executed road construction projects for at least five million and above.

Sampling technique

Multi-stage sampling, was used to categorize road owners, consultants and contractors, and then selecting a sample size within each chosen strata by simple random sampling. Multi-stage sampling involves selecting a sample in at least two stages; large groups or strata are selected to contain more population units than are required for the final sample. Population units are chosen from selected strata to derive a final sample in stage two. Multi-stage sampling is

convenient, economical and efficient. It, however, has lower accuracy due to higher sampling error.

Simple random sampling technique was used to select the final sample so that each and every one in the target population had an equal chance of inclusion. Croswell (2003) emphasizes the importance of selecting a representative sample by use of a sampling frame. From the sampling frame the required number of subjects, respondents , elements of firms is selected in order to make a sample. According to Oso and Onen (2005), simple random sampling technique means the researcher ensures that a sample is selected without bias from the target population. From each stratum the researcher selected respondents through simple random sampling (SRS), based on the proportion of each stratum in the population to give a total of 39 respondents. The random sampling frequently minimizes the sampling error in the population and in turn increases the precision of any estimation method used (Cooper and Schindler 2006).

Research instruments

Research data was collected using survey research design method. The data collection instrument used in the study was a self-administered questionnaire comprising of both closed- and open- ended questions. This has advantages of collecting the required information at a low cost per respondent, the respondents may give more honest answers in the absence of the researcher, the answers are more standardized for closed-ended questions, and they can fill the questionnaire at their convenience. Closed- ended questions provide objective quantitative data whereas the open-ended questions, provide general subjective insight into the study subject (Cargan, 2007). The design of the research instruments was based on determinants for timely completion of KRB financed road construction projects in Kisumu County. The questionnaire comprised of parts. Part A captured general information of the respondents whereas part B focused on independent variables determining timely completion of road construction projects in Kisumu County.

Pilot Study

The questionnaire was piloted to test if it yielded the required information. The pilot study was carried out in Nyando and Kisumu west sub-counties both in Kisumu County. Five respondents were chosen from each sub-county on convenience, and all of whom had similar characteristics as the target population. The instrument was pilot-tested among representatives from each stratum namely the staff from road owners, consulting civil engineering and construction firms. They were asked to respond on any ambiguities and also to give comments about the length,

structure and wording of the questionnaire. This facilitated altering and refining the questions accordingly to meet research objectives so as to achieve the ultimate aim of obtaining reliable and valid survey data (Fink, 2006).

Validity of the Instruments

Validity of a questionnaire refers to the extent to which it measures what it claims to measure Mugenda & Mugenda (2003). It is the degree to which results obtained from the analysis of the data actually represent the phenomena under the study. The instrument at face value had seem to be a reasonable way to gain the information required and was well designed. This also established criterion-related validity. It satisfied the content criterion through inclusion of adequately representative indicators of the concepts measured. To improve validity, the instrument was pilot-tested among representatives from each stratum namely the staff of road owners (KeNHA, KURA), consulting civil engineering and construction firms. To ensure validity of test scores before its release, the questionnaire was subjected to review from a group of experts in the same field.

Reliability of the Instruments

Mugenda and Mugenda (2003) defines reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated trials. Berg (1998) explains that, the use of consistent and systematic line of questions for even unanticipated areas is particularly important for reliability and for possible replication of a study. The researcher used consistent and systematic questions in the questionnaires. The questions related to the subject of the study. Of key importance, instruments were initially piloted to small numbers of respondents to verify whether the questions were easy to understand, appropriate to the research topic and unambiguous (Fellows and Liu 2008), and to gain some idea of the time required to administer the questionnaire. It was also important to get feedback and input on other important issues that may be worthy of consideration, that the initial instrument may have missed. This also gave the researcher an indication of whether the instrument was measuring the right concept, hence its validity and reliability.

Data collection procedures

A given number of variables contributing to the timely completion of the road projects in the construction industry was first identified by reviewing previous studies and literature on this subject. Since they were identified through literature review, it was thought prudent that the identified variables be further confirmed by professionals in the road infrastructure industry

before developing the questionnaire instrument. This preliminary list of variables was presented to a team of road construction experts drawn from all sectors of study population, during face-to-face interview.

The variables were grouped into broad categories to facilitate objective analysis. The grouping considered variable relationships with each other as well as similarity in characteristics. For example variables such as client consultation with key stakeholders, supportive work conditions, troubleshooting, providing staff with opportunities for advancement and growth, good communication and control and incentives for contractors to finish ahead of time were grouped together under the broad category of top management support; The Variables such as Transparency in the procurement, competitive procurement process, timely availability of resources, well committed public agency, social support, and thorough and realistic assessment of the cost and benefits were grouped together under the broad category of effective procurement process. Other variables such as number of steps in the procurement process**,** communication on the funds flow process, uncomplicated approval procedures**,** processing of number objections by financing institution**,** timely availability of project funds and prompt payments made to contractors were grouped together under the broad category of disbursement procedures. The rest of the variables including good weather conditions, Accessible credit facilities to target beneficiaries, good subsurface conditions (e.g., soil, low water table, etc.), low interest rates, goodwill from the government and stable political environment were grouped together under the broad category of external environment

The expert interview session was structured in two sections. The first section introduced the research topic and aimed to identify the respondent's extent of involvement in road construction projects. The second section discussed the determinants for timely completion of road construction projects, as gathered from literature review while addressing more speculative question of how these variables apply to road construction projects in Kenya.

Prior to distribution, a review of the questionnaire was conducted by a group of experts in the same field. These experts were prompted by the researcher to answer the preliminary questionnaire. The aim of this review was to pre-test the suitability and comprehensibility of the questionnaire.

A questionnaire-based survey was conducted to draw the views of experienced public and private sector professionals on these variables. The identified questionnaire respondents were humbly requested to rate the variables according to their level of agreement. They were given the option of answering the questionnaire in a soft copy that was included in an email or completing it in a hard copy, which was then returned to the researcher.

To identify the determinants for timely completion of road construction projects, two questionnaires were developed for seeking the opinion of the respondents through survey research design. The first contained personal details and personal experience of respondents in road construction. The second questionnaire contained an exhaustive list of determinants for timely completion of road construction projects. A total of twelve (12) determinants were considered for ranking by the Relative Importance Index (RII) method. These determinants were grouped in two (2) categories namely top management support and effective procurement process related factors.

The questionnaire was designed in such a way that the stratification of the data was easy for analysis. The questions involved recording the contribution of each variable to success in timely completion of road construction projects on a Likert rating scale of: 1- Strongly disagree; 2-Disagree; 3-Neutral; 4-Agree; 5-Strongly agree.

Data analysis techniques

Data analysis usually involves reducing accumulated data to manageable size, developing summaries, looking for patterns, and applying statistical techniques (Cooper and Schindler, 1987). In this study, qualitative data collected from the questionnaires was analyzed by collecting all the relative data, assimilating and categorizing similar responses and summarizing the responses (Matindi, & Ngugi, 2013). The data entry, cleaning and analysis were done using Statistical Package for Social Scientists (SPSS) for windows version 10 and Excel 2007 statistical software.

Information from the data obtained for each of the four specific objectives was listed and employed to pencil in conclusions on the research questions in the study. The information from the questionnaires was tabulated to compute the frequency distribution of the event under study.

Relative Importance Index (RII)

The relative importance index, RII, was computed for each determinant to identify which ones were most significant. The determinants were ranked based on based on RII values. From the ranking assigned to each determinant, the most important determinants for timely completion of road construction projects in Kisumu County were identified. According to Fugar and Agyakwah-Baah (2010), the formula for calculating the relative importance index (RII) for factors determining construction success is similar to that of Bhirud and Kakade (2015) as indicated in equation 4.

Equation 4: $RII = \frac{\Sigma PiUi}{N(n)}$ …….. *(4)*

Where,

RII = relative importance index

Pi = respondent's rating of factors for timely completion of road construction projects.

Ui = number of respondents placing identical weighting/rating on factors for timely completion of road construction projects.

N = sample size

n = the highest attainable score on factors for timely completion of road construction projects

According to Doloi and Young (2009), use of RII gives a direct descriptive interpretation for factors determining construction projects success and therefore, it is very suitable to be exploited as the method of analysis in similar studies. Kometa, Olomalaiye and Harris (1994) (as cited in Sambasivan & Soon, 2007) used the Relative Importance Index (RII) method to determine the relative importance of various causes of delays in construction projects. The same method was adopted in this study

Calculation of overall average

The RII analysis was done independently for the three categories of respondents i.e. contractors, consultants and owners. Based on the relative importance index of each determinant for timely completion of road construction projects, ranking of these factors was done for the three categories. To obtain the final ranking of the determinants, overall average was determined. The overall average was calculated using the following expression:

Equation 5……

$$RII\ (Overall\ average) = \frac{N_1 x\ RII\ of\ contractor + N_2 x\ RII\ of\ consultant + N_3 x\ RII\ of\ owner}{N_1 + N_2 + N_3}$$

where,

N1 = number of contractors

N2 = number of consultants

N3 = number of owners

RESULTS AND DISCUSSIONS

Distribution of respondents by sector and country

The study sought to establish the various sectors in which the respondents belonged. The study had three sectors of the respondents and table 2(a) presents the type of sector with their response rate. The table illustrates that the majority of respondents 41.9 % were from road agencies, 25.6% were from consulting firms and 32.5% of them were from construction forms. Table 2(b) shows that majority of the respondents (90.7%) were Kenyans, followed by Ugandans (7.0%) and lastly Sudanese (2.3%).

Table 2(a): Distribution of respondents by sector

Sector	Frequency	Percentage (%)
Road owners	18	41.9
Consultants	11	25.6
Contractors	14	32.5
Total	**43**	**100.0**

Table 2(b): Distribution of respondents by country

Country	Frequency	Percentage (%)
Kenya	39	90.7
Uganda	3	7.0
Sudan	1	2.3
Total	**43**	**100**

Response rate according to respondents' sector

A total of forty three (43) responses were received out of 60 sampled respondents from the target population representing a response rate of 71.7%. This was considered an adequate response rate for making inferences and conclusions (Cooper & Schindler, 2006). From the column of percentage of returned questionnaires, 41.9% of respondents were staff from road implementing agencies, 25.5% were from the consulting firms and 32.6% were from construction firms. This information was important since it ensured all the sectors involved in the road construction project implementation were included for the study due to their varied roles in project implementation.

Table 3: Questionnaire response return rate of respondents according to sector

Respondents	Number of questionnaires		Percent return	Percent of total returned	Cumulative percent
	Sent	Filled			
Road agencies					
KeNHA	12	10	83.3	23.3	23.3
KURA	12	8	66.7	18.6	41.9
Private sector					
Consulting civil engineering firms	17	11	64.7	25.5	67.4
Contracting firms					
KeNHA projects	10	8	80.0	18.6	86.0
KURA projects	9	6	66.7	14.0	100.0
Total	**60**	**43**	**71.7**	**100**	

Socio-Demographic profile of the study respondents

Gender of respondents

The results in table 4 illustrates that there was a significant variation in gender distribution. There were more males 25 (58.1%) than females 18 (41.9%) who participated in the study. This result indicates that gender equity among the respondents was not realized in this study. However, the narrow numerical range of gender implied that the views expressed in these findings were gender sensitive and therefore could be taken as representative of the opinions of both female and male gender as regards to factors that determine timely completion of road construction projects in Kisumu County.

Table 4: Gender of respondents

Gender	Frequency	Percentage (%)
Male	25	58.1
Female	18	41.9
Total	**43**	**100.0**

Age bracket of respondents

The study sought to find out the age bracket of the respondents. This was to enable in determining the age distribution for the respondents. The results in table 5 show that 7.0% of

the respondents indicated that they were aged below 30 years, 20.9% were aged between 31 and 40 years, 53.5% were aged between 41 and 50 years, 18.8% were aged between 51 and 60years and none of the respondents was aged above 60 years. Thus the largest number of respondents (53.5%) was in the age bracket of 41 to 50 years. The results indicated that there was a significant ($p<0.05$) difference in variation among age groups since the expected uniform distribution across age group of 20% in each age bracket was not achieved. This was an indication that respondents had varied age distribution and therefore had different experiences as far as factors determining timely completion of road construction projects were concerned.

Table 5: Age bracket of respondents

Age Bracket	Frequency	Percentage (%)
Below 30 years	3	6
31-40 years	9	21
41-50 years	23	53
51-60 years	8	20
Over 60 years	0	0

Highest level of education of respondents

4.2% of the respondents had certificate, 8.3% of them had Diploma, 53.5% had undergraduate degrees, 26.6% had Master's degree and 7.4% had PhD as their highest level of education. Thus the most common highest level of education of the project staff was first degree level (53.5%). None of the respondents had secondary education as the highest level of education. Majority (95.8%) of the respondents had a minimum of diploma, with the first degree forming the bulk (53.5%) of the respondents and few (7.4%) with PhD level of education. These results as shown in table 6 indicate that the majority of respondents were well learned.

Table 6: Respondents' highest level of education

Level of education	Frequency	Percentage (%)	Cumulative (%)
Secondary	0	0	0
Certificate	2	4.2	4.2
Diploma	4	8.3	12.5
First degree	23	53.5	66.0
Master Degree	11	26.6	92.6
PhD Degree	3	7.4	100.0
Total	**43**	**100**	

The primary role of the respondents in the road construction field

The study involved stakeholders in road implementing agencies, contracting institutions and consulting civil engineering firms to examine the determinants for timely completion of road construction projects financed by the KRB in the road sub-sector in Kisumu county. As such the study sought to establish the primary role of the respondents in these categories.

Table 7: Distribution of respondents according to primary roles in the organization

Primary role	**Road agencies**		**Consultant**		**Constructor**	
	Frequency	%	Frequency	%	Frequency	%
CEO	4	22.2	2	18.2	3	21.4
Site Engineers	5	27.8	3	27.3	4	28.6
Project managers	4	22.2	3	27.3	5	35.8
Financial Advisers	3	16.7	1	9.1	1	7.1
Others	2	11.1	2	18.1	1	7.1
Total	**18**	**100**	**11**	**100**	**14**	**100**

According to the study results, site engineers and project managers topped the list each with 27.9% of the respondents. This was followed by chief executive officers and with 21.0% of the respondents. Position with the lowest respondents was financial advisers (11.6%) and the rest of the rest of the respondents (11.6%). The majority of respondents being site engineers and projects managers were expected since the research study were concentrated on the road sub-sector. The results further implied that the various stakeholders had significant information sought by the study which is essential in coming up with recommendations on determining factors for timely completion of road construction projects financed by the Kenya Roads Board in Kisumu county. The variation in primary roles of the respondents depicted the variation in opinions of the stakeholders from the diverse designations involved.

Experience in the road construction field

The length of service/working in a road construction project determines the extent to which one is aware of the issues sought by the study. In the wake of technological advancements and globalization, there are likely to be many changes in institutional and operating environment that the respondents should know when responding to the issues sought by the study. The study therefore sought to establish the length of time that the respondents had been involved in the road construction works. The respondent's level of experience in road construction works are presented in table 8. The study showed that 44.4% of road owners, 45.5% of consultants and

50.0% of contractors had experience in the road construction field for 11to 15 years, 16 and above years and 11 to 15 years respectively.

Table 8: Length of time the respondents have been involved in road construction works

Duration in years	Road owners		Consultants		Constructors	
	Frequency	%	Frequency	%	Frequency	%
1 to 5	1	5.6	0	0.0	1	7.4
6 to 10	3	16.7	2	18.2	2	14.3
11 to 15	8	44.4	4	36.3	7	50.0
16 and above	6	33.3	5	45.5	4	28.6
	18	**100**	**11**	**100**	**14**	**100**

The study results depicted in table 8 reveal that 4.7% of the respondents indicated that they had an experience of between 1 to 5 years in road construction projects, 16.3% of them had worked in the road construction projects for a period of 6 to 10 years, 44.2% of them had a working experience of 11 to 15 years, while 34.9% of the respondents indicated that they had an experience of more than 15years in road construction.

Number of projects executed in the last five years

The number of road projects executed in the past years determines the level of experience in handling road projects. The aim of this study was to find out if the respondents had executed road construction projects in the past five years. The results are depicted in table 9. The study showed that 44.4%, 36.4% and 35.7% of road owners, consultant and contractors respectively had executed more than thirty road construction projects in the last five years.

Table 9: Frequency and percent of number of projects executed in the last five years

Number of executed road projects	Owner		Consultant		Contractor	
	Frequency	**%**	**Frequency**	**%**	**Frequency**	**%**
1 to 10	2	11.2	2	18.2	3	21.4
11 to 20	5	27.7	2	18.2	4	28.6
21 to 30	3	16.7	3	27.2	5	35.7
More than 30	8	44.4	4	36.4	2	14.3
Total	**18**	**100**	**11**	**100**	**14**	**100**

Key factors influencing timely completion of road construction projects

The aim of this study was to investigate the factors that determine timely completion of KRB financed road construction projects in Kisumu County. As such respondents were required to indicate in their opinion the key factors that determine timely completion of road construction projects in Kenya.

Table 10: Key factors for timely completion of road construction projects

Factors	Frequency	%
Project manager commitment to the goals	22	6.4
Project team motivation	39	11.3
Project manager technical capabilities	20	5.8
Definition of work and its field	8	2.3
Competent project manager	25	7.2
Providing adequate financial resources to the end of the project	42	12.1
Competent and multidisciplinary project team	35	10.1
Commitment to the project	6	1.7
Access to resources	37	10.6
The executive experience of the contractor team about the project subject	30	8.7
Ability of analyzing the project problems	2	1.0
Providing a Safe Working Environment for Employees	5	1.4
Efficiency in paying contractors by the employer	8	2.3
Efficiency in in paying workers by contractors	11	3.2
Efficient procurement procedures.	24	6.9
Efficient release of project funds by financing institution	32	9.2
Total	**346**	**100**

The study established that providing adequate financial resources to the end of the project (12.1%), project team motivation (11.3%), access to resources (10.6%), competent and multidisciplinary project team (10.1%), efficient release of project funds by financing institution (9.2%) and the executive experience of the contractor team about the project subject (8.2%) are most significant factors in determining timely completion of road construction projects in Kenya. Other significant factors include competent project manager (7.2%), efficient procurement procedures (6.9%), project manager commitment to the goals (6.4%) and project manager technical capabilities (5.8%). The least significant factors for determining timely completion of road construction projects included: ability of analyzing the project problems (1.0%), providing a

safe working environment for employees (1.4%), commitment to the project (1.7%), efficiency in paying contractors by the employer (2.3%) and definition of work and its field (2.3%

Respondents' rating of study variables on timely completion of road construction projects with responses treated as a whole

Tables 11 and 12 show aggregated the number of responses for each likert level in each question in order to determine the percentage responses for each item and at the same time determining their relative importance indices (RII) with all the responses treated as a whole. Relative Importance Index (RII) was used to analyze data of study variables' influence on timely completion of road construction projects. This index quantifies the relative importance of the study variables as were outlined in chapter one, that is, top management support and effective. The aim of the analysis was to establish the relative importance of the factors identified as responsible for timely completion of road construction projects in Kisumu County. The score for each factor is calculated by summing up the scores given to it by the respondents. The relative importance index (RII) for all the determinants of timely completion of road construction projects was calculated using equation 1(a) or (b) in chapter three. The rate for scoring ranged from 5 (Strongly agree), 4 (Agree), 3 (Neutral), 2 (Disagree) and 1 (Strongly disagree) on the Likert Scale.

Top management support and timely completion of road construction projects

The first objective was to assess the extent to which top management support related factors affects road construction projects in Kisumu County. The research undertaken established that top management support related factors had a high impact on road construction projects in Kisumu County with an aggregated relative importance index of 0.8318 and was ranked as the most significant determinant in timely completions of road construction projects in Kisumu County. The respondents attributed this to the six (6) factors of; supportive work conditions (RII=0.9210), providing staff with opportunities for advancement and growth (RII=0.8465), good communication and control (RII=0.8466), troubleshooting (RII=0.8233), client consultation with key stakeholders (RII=0.7953) and inceptives for contractors to finish ahead of time (RII=0.7581). Based on rating of determinants according to their criticality as suggested by Bhirud and Kakade (2015), in the appendix IV, the research established that supportive work conditions, providing staff with opportunities for advancement and growth, good communication and control and troubleshooting were extremely critical, whereas client consultation with key stakeholders and incentives for contractors to finish ahead of time were very critical in determining the timely completion of road construction projects in Kisumu County. The study

also revealed that 80.6% of the respondents agreed that the top management support group of factors were critical in determining the timely completion of road construction projects, whereas only 10.5% of them disagreed.

Table: 11: Percentage and Relative Importance Index analyses (RII) of influences of top management support related factors with responses treated as a whole

Code	SA	A	N	D	SD	RII
A1	25	5	4	5	4	0.7953
%	**58.1**	**11.6**	**9.3**	**11.6**	**9.3**	
A2	29	11	2	0	1	0.9210
%	**67.4**	**25.6**	**4.7**	**0.0**	**2.3**	
A3	23	12	2	2	4	0.8233
%	**53.4**	**27.9**	**4.7**	**4.7**	**9.3**	
A4	20	17	3	2	1	0.8465
%	**46.5**	**39.5**	**7.0**	**4.7**	**2.3**	
A5	20	15	5	2	1	0.8466
%	**46.5**	**34.9**	**11.6**	**4.7**	**2.3**	
A6	20	12	6	3	2	0.7581
%	**46.4**	**27.9**	**14.0**	**7.0**	**4.7**	
Overall %	**48.8**	**31.8**	**8.9**	**4.7**	**5.8**	0.8318

KEY:

SA : Strongly Agree A: Agree N: Neutral SD: Strongly Disagree D: Disagree

A1: Client Consultation with key stakeholders

A2: Supportive work conditions

A3: Troubleshooting

A4: Providing staff with opportunities for advancement and growth

A5: Good communication and control

A6: Inceptives for contractors to finish ahead of time

Effective procurement process and timely completion of road construction projects

The second objective of the study was to establish the extent to which procurement procedures determine road construction projects in Kisumu County. The research undertaken established that effective procurement process related factors came sendon overall in hierarchy in as far as determining timely completion of road construction projects in Kisumu county was concerned with an aggregated relative importance index (RII) of 0.5899. The respondents attributed this to the six (6) factors of; timely availability of project materials (RII=0.9256), Transparency in the

procurement (RII=0.9163), thorough and realist assessment cost and benefits (RII=0.6511), competitive procurement process (RII=0.4000), well committed public agency (RII=0.3581) and social support (RII=0.2883) as presented in Table 12. Based on rating of determinants according to their criticality as suggested by Bhirud and Kakade (2015), in the appendix IV, the research established that thorough and realistic assessment of the cost and benefits, transparency in the procurement and timely availability of resources were extremely critical, whereas competitive procurement process, well committed public agency and social support were fairly critical in determining timely completion of road construction projects in Kisumu county. The latter factors therefore had minimal influence in early delivery of road construction projects. The study also revealed that percentage of respondents' agreement (46.6%) that the effective procurement process group of factors was critical in determining the timely completion of road construction projects was almost equally the same as their disagreements (47.2%). This result supports the findings by Kariungi (2014) for a similar study carried out in Kenya Power and Lighting Company projects in Thika who noted that timely availability of materials and works has a significant impact on early project delivery.

Table 12: Percentage and Relative Importance Index analyses of influences of effective procurement process related factors with responses treated as a whole

Code	SA	A	N	D	SD	RII
B1	31	9	1	1	1	0.9163
%	**72.1**	**20.9**	**2.3**	**2.3**	**2.3**	
B2	2	1	1	30	9	0.4000
%	**4.7**	**2.3**	**2.3**	**69.8**	**20.9**	
B3	1	1	1	10	30	0.2883
%	**2.3**	**2.3**	**2.3**	**23.3**	**69.8**	
B4	2	4	2	10	25	0.3581
%	**4.7**	**9.3**	**4.7**	**23.3**	**58.1**	
B5	30	11	1	1	0	0.9256
%	**69.8**	**25.6**	**2.3**	**2.3**	**0.0**	
B6	20	8	10	4	1	0.6511
%	**46.5**	**18.6**	**23.3**	**9.3**	**2.3**	
Overall %	**33.4**	**13.2**	**6.2**	**21.7**	**25.5**	0.5899

KEY:

SA : Strongly Agree A: Agree N: Neutral SD: Strongly Disagree D: Disagree

B1: Transparency in the procurement

B2: Competitive procurement process

B3: Social support

B4: Well committed public agency

B5: Timely availability of project materials

B6: Thorough and realistic assessment of the cost and benefits

Relative performance index (RII) and ranking of determinants with responses treated according to each category of respondents

The data was analyzed from the perspectives of road owners, contractors and consultants. Each individual determinant's RII perceived by all respondents was computed for overall analysis. From the ranking assigned to each determinant, factors determining timely completion of road construction projects in Kisumu County were able to be identified. Table 13 gives the ranking of determinants based on the responses of each category of respondents (road owners, contractors and consultants). The table shows that all categories of respondents agreed that top management support related factors (RII=0.8340**)** were more significant as determinants for timely completion of road construction projects in Kisumu County than effective procurement process related factors (RII=0.5899).

The top three variables that necessitated top management support as critical in determining timely delivery of road construction projects included; supportive work conditions (RII=0.9256), good communication and control (RII=0.8642) and providing staff with opportunities for advancement and growth (RII=0.8515). Supportive work conditions is a very important determinant for timely completion the road construction projects because employees in companies with supportive work conditions such as medical schemes and other benefits have higher levels of affective commitment to the organization and express lower turnover intentions, regardless of whether the employee individually benefited from the policy. Work-family benefits have a positive influence on employees' attachment to the organization because they signified corporate concerns for employee wellbeing. Other supportive work conditions which should be emphasized for enhancing timely delivery of the construction project include: provision of positive feedback and encouragement; engaging employees in open, two-way communication; respecting, mentoring and empowering employees; recognizing that employees have a life outside of work, and offering support and flexibility to balance conflicting demands.

Effective communication is vital to the successful completion of any construction project. Good communication can improve teamwork and lead to better project collaboration. Poor communication can result in misunderstandings, delays and problems down the road.

Communication is simply the exchange of information in order to convey a message and good communication involves being able to transmit your message so it is received and understood by the intended recipients

Table 13: Relative Importance Indices (RII) and ranking for determinants of timely completion of road construction projects according to each category of respondents

Category	Item code	Road owners		Consultants		Contractors		Overall average	
		RII	Rank	RII	Rank	RII	Rank	RII	Rank
Top	A1	0.7667	7	0.7455	9	0.8714	4	0.7954	7
management	A2	0.9556	1	0.9455	1	0.8714	4	0.9256	1
support	A3	0.7111	8	0.8182	4	0.8571	7	0.7860	8
	A4	0.8556	5	0.8182	4	0.8714	4	0.8515	4
	A5	0.8333	6	0.8909	2	0.8829	3	0.8642	3
	A6	0.7111	8	0.7636	7	0.8857	2	0.7814	9
Mean		**0.8056**		**0.8303**		**0.8733**		**0.8340**	**1**
Effective	B1	0.8889	3	0.7455	8	0.8286	8	0.8326	5
procurement	B2	0.3889	10	0.4182	10	0.4000	10	0.4000	10
process	B3	0.2556	12	0.3637	12	0.2714	11	0.2884	11
	B4	0.3333	11	0.4000	11	0.1276	12	0.2834	12
	B5	0.9000	2	0.8000	6	0.9857	1	0.9023	2
	B6	0.8778	4	0.8364	3	0.7714	9	0.8326	5
Mean		**0.6074**		**0.5940**		**0.5641**		**0.5899**	**2**

KEY:

Item code	Factor
A1	Client Consultation with key stakeholders
A2	Supportive work conditions
A3	Troubleshooting
A4	Providing staff with opportunities for advancement and growth
A5	Good communication and control
A6	Incentives for contractors to finish ahead of time
B1	Transparency in the procurement
B2	Competitive procurement process
B3	Social support
B4	Well committed public agency
B5	Timely availability of project materials
B6	Thorough and realistic assessment of the cost and benefits

Overall ranking of determinants of timely completion of the road construction projects with responses treated as whole

Table 14 is a summary of table 13 and it shows ranking according to categories of determinants of timely completion of the road construction projects with responses treated according to each category of study subjects. The table shows that top management support related factors (RII=0.8340) were more critical than effective procurement process related factors (RII=0.5899) as determinants for timely completion f road construction projects. The study further found out that all categories of study subjects {Road owners (R=0.8056); Consultants (RII=0.8303) and Contractors (R=0.8667)} concurred that top management support related factors were more important factor for determining timely delivery of road construction projects.

Table 14: Overall ranking of categories of determinants for timely completion with responses treated according to each category of study subjects

Category	**Road owners**		**Consultants**		**Contractors**		**Overall average**	
	RII	Rank	RII	Rank	RII	Rank	RII	Rank
Top management support	0.8056	1	0.8303	1	0.8667	1	**0.8340**	**1**
Effective procurement process	0.6074	2	0.5940	2	0.5641	2	**0.5899**	**2**

Overall average ranking of categories of determinant related factors affecting the timely completion of road construction projects

Table 14 is an extract from table 13 and it shows the overall average ranking of top management support and effective procurement process related factors that determine timely completion of the road construction projects. The ranking in decreasing order of importance were; supportive work conditions (RII=0.9256), timely availability of project materials (RII=0.9023), good communication and control (RII=0.8642), providing staff with opportunities for advancement and growth (RII=0.8515), transparency in the procurement (RII=0.8326), thorough and realistic assessment of the cost and benefits(RII=0.8326), client Consultation with key stakeholders (RII=0.7954), troubleshooting (RII=0.7860), incentives for contractors to finish ahead of time (RII=0.7814), competitive procurement process (RII=0.4000), well committed public agency (RII=0.2834), social support (RII=0.2884).

Table 15: Overall average ranking of categories of determinants related factors

Factor	Overall average	
	RII	Rank
Supportive work conditions	0.9256	1
Timely availability of project materials	0.9023	2
Good communication and control	0.8642	3
Providing staff with opportunities for advancement and growth	0.8515	4
Transparency in the procurement	0.8326	5
Thorough and realistic assessment of the cost and benefits	0.8326	5
Client consultation with key stakeholders	0.7954	7
Troubleshooting	0.7860	8
Incentives for contractors to finish ahead of time	0.7814	9
Competitive procurement process	0.4000	10
Well committed public agency	0.2834	11
Social support	0.2884	12

SUMMARY OF FINDINGS

Top management support related factors and timely completion of road construction projects

The findings presented in this paper indicate the central role of the top management support related factors in timely completion of road construction projects. The research undertaken established that top management support related factors had a strong influence in early competition of roads as it was ranked the second top most determinant in timely completion of road construction in the study area. The respondents attributed this to the six (6) factors of; supportive work conditions, good communication and control, providing staff with opportunities for advancement and growth, troubleshooting, client consultation with key stakeholders and inceptives for contractors to finish ahead of time

Road owners perceived supportive work conditions, good communications and control and providing staff with opportunities for advancement and growth as the top three most important determinants for timely completion of road construction projects. The top three factors, in decreasing order of significance, perceived by consultants as critical in determining timely completion of road construction were; supportive work conditions, providing good communications and trouble shooting. Consultants and road owners concurred that supportive work conditions was the most important factor in determining timely completion of road construction projects. Contractors perceived incentives for contractors to finish ahead of time

and good communications and control as very important in determining timely completion of road construction projects. They also perceived client consultation with key stakeholders, supportive work conditions, providing staff with opportunities for advancement and growth as equal in importance in determining timely completion of road construction projects.

The top three overall top management support related factors perceived all categories of respondent as most important in determining timely completion of road construction projects, arranged in decreasing order of criticality were; supportive work conditions, good communication and control and providing staff with opportunities for advancement and growth. The factor that was of least significance according to all categories of respondents was client Consultation with key stakeholders, followed by incentives for contractors to finish ahead of time and then troubleshooting.

Effective procurement process related factors and timely completion of road construction projects

Road owners believed that timely availability of project materials, transparency in the procurement and thorough and realistic assessment of the cost and benefits were the most critical in determining timely completion of road construction projects. Consultants were in agreement with road owners that the top three most important factors for determining timely completion of road construction projects were; thorough and realistic assessment of the cost and benefits, timely availability of project materials and transparency in the procurement. Contractors shared similar views with those of road contractors by indicating that timely availability of project materials, transparency in the procurement and thorough and realistic assessment of the cost and benefits were the three top most determinants of timely completion of road construction projects.

The top three overall effective procurement related factors perceived all categories of respondent as most important in determining timely completion of road construction projects, arranged in decreasing order of criticality were; timely availability of project materials, transparency in the procurement and thorough and realistic assessment of the cost and benefits. The factor that was of least significance according to all categories of respondents was social support, followed by well committed public agency.

Overall ranking of determinants of timely completion of road construction projects

All the categories of respondents were in agreement that top management support related factors was more important factor in determining timely completion of road construction projects than effective procurement related factors.

The top three most significant category of determinant related factors affecting the timely completion of road construction

The top three most significant category of determinant related factors critical in determining timely completion of the road construction projects as perceived by all categories of respondents, in decreasing order of importance were; supportive work conditions (RII=0.9256), timely availability of project materials (RII=0.9023), good communication and control (RII=0.8642).

CONCLUSIONS

The purpose of the study was to assess the determinants of timely completion of road construction projects in Kisumu County, Kenya. The conclusion of this study provides answers to the research questions which were: to establish the extent to which top management support determines timely completion of road construction projects and to assess the extent to which effective procurement process determines timely completion of road construction projects.

The research found out that top management related factors were more critical in determining timely completion of road construction project ts in Kisumu County that effective procurement process related factors. The research further found out that out of the twelve (12) variables that were identified from the two groups of determinants, those in the top three list included supportive work conditions, timely availability of project materials and good communication and control .

In view of the findings of this study the following conclusions are deduced; top management related factors demonstrated strong influence in timely completion of road construction projects in Kisumu county; The determinants perceived as most influential in promoting timely completion in road construction projects can lead to better performance within the road construction industry and they are likely to minimize time and cost overruns and improve the quality of deliverables.

This study provided a forecasting tool to enable categories of respondents to rapidly determine the factors that promote timely completion of road construction projects; Identifying factors determining timely completion of road construction projects would assist in taking proactive measures for successful management the projects.

This study will benefit academicians and professionals involved with road construction projects; The finding will also be useful for effective management for all type of road construction projects, thus helping to raise the overall level of productivity in road construction industry

RECOMMENDATIONS

In light of the study findings, the following recommendations are made to enhance timely completion of road construction projects in Kenya; The implementing agencies in road construction projects should commit to embracing the top management support related factors as very critical in successful delivery of road construction projects in a timely manner. Top management should provide the necessary support to both technical and operational staff in the road construction activities for effective achievement of goals. Specific emphasis should be on the need to accord supportive work conditions to all project participants because employees in companies with supportive work conditions, for example, medical schemes, have higher levels of affective commitment to the organization and express lower turnover intentions, regardless of whether the employee individually benefited from the policy.

There should be an effective procurement process to ensure that materials are available at the right time, right quantity, for the right client, and at a reasonable price and quality for the project work. The implementing agencies should: Streamline procurement procedures; adopt contract watch mechanisms to ensure satisfactory utilization of procured materials for road construction; hold frequent procurement and financial management clinics for project teams to build capacity; implementing agencies to work closely with the Bank teams for clarity on the procurement documentation requirements with the aim of reducing the back and forth communication which causes delays. Transparency procurement of goods and services should prevail in order to enhance timely completion; Measures should be put in place to ensure thorough and realistic assessment of the cost and benefits of the project. Finally, the study recommends suitable procurement management manual to be simulated to current public procurement works policy manual.

AREAS FOR FURTHER RESEARCH

Further research should focus on the role of other determinant factors such as financing and project mission, project schedule/plan, technical tasks, monitoring and feedback. Use of a larger sample could be useful as it will reduce the element of bias which was a probable limitation in this study. There is need for further research to examine the partnerships between different infrastructure projects implementing agencies and the strategies they utilize to enhance timely completion of construction projects. The understanding of strategies employed by agencies will facilitate the formulation and adoption of integrated and comprehensive strategies for timely project completion. Future studies could also use a quantitative approach to tease out some of the unquantifiable dynamics such as people's attitudes and feelings that cannot be adequately captured in a qualitative study such as this one.

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