FACTORS AFFECTING THE PERFORMANCE OF PAVEMENT ROAD CONSTRUCTION PROJECTS IN UGANDA

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Abstract:
This paper is intended to identify the factors affecting road construction projects performance in Uganda through review of literature. Many road construction projects in Uganda and in many countries are never completed within the estimated time and cost in addition to the numerous quality problems. Other issues of concern include: change of scope, health and safety issues, functionality and environmental anxiety. It is rational to determine the most significant factors affecting paved road project performance and decisively deal with so that the scarce resources are directed where they are most needed.
Findings have revealed that poor project planning and poor management of the implementation have remained the major factors affecting paved road project performance. The solution to the road construction project performance problem will not only help in the tackling of Uganda National Development Plan of strengthening the country’s underdeveloped physical infrastructure, but will also help in dealing with the Millennium Development Goals (MDGs) 1, 7 and 8 of: eradication of extreme poverty, ensuring environmental sustainability and developing a global partnership for development respectively. The academicians, policy makers, construction parties and all other stakeholders will benefit from this information with consequences of better road networks that will spur social-economic transformation and development across Uganda, Africa and globally.

Keywords: Construction, Paved Roads, Performance, Uganda

BACKGROUND

The performance of road construction projects has been a subject of concern in Uganda and many countries for quite some time. The problem of underperformance is not only affecting the road construction projects but also the construction industry (Meyer, Witt, Kashiwagi & Kashiwagi, 2010). Studies show that construction projects and the industry at large have performed poorly in both the developed and under developed countries (Takim & Akintoye, 2002). Faridi and El-Sayegh (2006) asserts that shortage of skills of manpower, poor supervision and poor site management; unsuitable leadership; shortage and outdated equipment are among the factors that contribute to construction delays and subsequent performance problem.

A study in South Africa (Hanson et al., 2003) reveals that conflict, poor workmanship and incompetence of contractors are among the factors affecting project performance.

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According to the United Nations Relief and Works Agency (UNRWA, 2006), there is no exception in Palestine as many local construction projects report poor performance due to: unavailability of materials; excessive amendments of design and drawings; poor coordination among participants, ineffective monitoring and feedback, and lack of project leadership skills and regional conflicts.

In Uganda out of the 21,000km of Uganda’s national roads, only 21% are paved (MoWT, 2010). United States has 21 kilometres of roads per 1000 people, while Uganda has about 0.126km per 1000 people yet 97% of Uganda’s cargoes are transported by roads. The National Development Plan (NDP, 2010) identifies the major physical infrastructure deficits that are constraining the country’s development potential as lying in the sectors of transport, energy, water for production and communications. In response a number of major roads in Uganda have been earmarked for reconstruction besides the poor project performances. The mission of Uganda National Roads Authority (UNRA) to develop and maintain a national roads network responsive to the economic development needs of Uganda is being hampered by poor road project performance. The goal to optimize the quality, timeliness, cost effectiveness, guarantee safe and efficient movement of people and goods throughout the country (MoWT, 2011) have all become very difficult to achieve. The identification of the factors affecting road project performance in Uganda is therefore very crucial if paved roads construction project performance is to improve.

**DILEMMA IN PAVEMENT ROAD CONSTRUCTION**

Many road projects in Uganda are never completed within the estimated time, cost, quality and scope. Health and safety considerations, environmental concerns, functionality issues, low profitability and difficulty in satisfying the project parties have all remained a tight spot. Several researches have been done on construction project performance aimed at improvement, but the problem continues to manifest itself.

The developed countries like the United States of America, Germany and Britain, have however given hope that something can still be done to reduce the severity of the problem and this has only been through research and development. According to National Highways Authority of India (NHAI, 2013), 15 kilometres per day of new highways (pavement) is being added to the Indian national network. This came out as a result of increased research and use of Information Technology for better monitoring and tracking of works and the man power. Kampala Northern-By-Pass highway in Uganda on the other hand was constructed at a rate of 0.01km per day with time and cost overruns of 83% and 46% respectively. A report from MoWT (2011) indicates that one kilometre of flexible pavement road in Uganda cost up to US dollars 570,692/= which can construct a similar road in concrete yet the later has a longer life. It is therefore important to identify the specific significant factors affecting project performance in Uganda and deal with. Reduced pavement road project performance affects governments, consultants, contractors, suppliers and the overall economic and social transformation subsequently affecting national and global development.

**Objectives**

The aim of this study was to use literature review to identify the factors affecting the performance of pavement road construction projects in Uganda in order to provide contribution for pavement construction project improvement.
Rationalization for the Study

In order to contribute towards the improvement of road transport and to the industry, knowledge of the factors affecting road project performance and development is indispensable. This knowledge will help the academia and other stakeholders in forging a benchmark for an improved road project performance. The result will be an efficient and effective road network enhancing mobility, thereby maximising economic and social benefits significant in bringing about national and international development. If a solution to the problem of poor road project performance is not urgently dealt with, road construction projects may well continue to underperform.

LITERATURE REVIEW

This section is the main body of the study and presents a review of relevant books, journals, abstracts, and case studies regarding the performance of pavement construction projects. The critical factors affecting project performance have previously been investigated among construction project actors and owners of the companies with different answers. Others think the clients are the once responsible, while others point fingers at the contractors (Alinaitwe, 2008; Low & Chuan, 2006).

In an earlier study (Alinaitwe et al., 2007) a number of factors that are influenced by the clients and can affect the progress of work were found to include; design changes, stoppages due to disputes between contractors with owners, stoppages because of insolvency, lack of adherence to regulatory requirements, and inspection delays. Many though think the initiation and the initial planning done by the client and the consultants determines the future direction (Wang, 1994). Performance is about how well something can be done and to measure project performance, a number of performance indicators such as time, cost, quality, client satisfaction, client changes, business performance, functionality, profitability, health and safety (Cheung et al., 2004; Shahrzad & Hamidreza, 2011) have been considered.

To establish the performance factors, project success has been widely considered by many scholars as an indicator of good performance. Project success can be categorised into the objective measures of time, cost, safety and environmental considerations and subjective measures of quality, functionality and satisfaction of project participants (Chan & Chan, 2004; Crawford & Pollack, 2004). According to Cho (2009), most past studies done on project performance and the characteristics that affect such performance consist of simple presentations of the relationship between project performance and a few characteristics. Cho (2009) asserts that important characteristics like the effects of relevant political, legal and economic systems, market conditions, importance for the project to be completed on time, form of and the division of responsibilities and liabilities, specific location, weather and environmental concerns, level of technological advancement, project life span, value of a project, and quality of a project are all left out.

The Construction Industry

Globally numerous researches have been carried out all pointing to the fact that the construction industry has performance problems in both developing and the developed countries. A study by Tindiwensi (2006) identifies parameters to measure construction industry performance which include: the economic performance indicators, quality performance indicators; environmental and informal sector performance indicators.

This study cannot be done in isolation of the construction industry because of the direct impact it has on projects. Secondly construction projects form one of the most important constituents of the industry. The construction industry has an important role of transforming the various resources into constructed: physical, economic and social
infrastructure necessary for socio-economic development. The factors affecting construction project performance thus directly impacts on the performance of the construction industry and hence national and global developments.

**CONSTRUCTION PROJECTS**

Chitkara (2005) describes ‘construction projects’ as high-value, time bound, and special construction missions with predetermined performance objectives. Construction project development involves numerous parties, various processes, different phases and stages of work and a great deal of input from both the public and private sectors (Wang, 1994). The level of performance in carrying out construction project development activities depend heavily on the quality of the managerial, financial, technical and organisational performance of the respective parties. Ten parameters for benchmarking construction project performance have been developed as a result of various studies (Takim & Akintoye, 2002; Cheung et al. 2004; Shahrzad & Hamidreza, 2011). Seven of these include: cost, time, cost predictability, time predictability, defects, client satisfaction with the product and the service; and three company performance indicators of safety, profitability and productivity.

Focuses however have to be directed to project characteristics in analysing project performance (Ling, 2004) as characteristics like: complexity, size and construction type are known to affect projects. Bennett (1991) includes the economic situation as an important characteristic that cannot be left out. Environmental characteristics like politics, local market situation and legislation had also earlier been cited to have influence on project performance (Tukel & Rom, 1998).

**Construction Project Performance and its Measurement**

Project performance can be explained using “two success concepts” (Baccarini, 1999): project management success and product success. The first concept focuses upon the successful accomplishment of the project time, cost and quality, which can be measured in terms of meeting the project budget, schedule, and conformance to functional and technical specifications respectively. The later concept deals with the effects of the project’s final product with three key components which are; to satisfy the project goal, purpose and stakeholders. Another criteria for evaluating project performance (Pheng & Chuan, 2006) is by firstly relating to the owner, users, stakeholders, and the general public (looks at projects from macro view point of overall goals of functionality and benefits) and secondly the developer and the contractor; the groups of people who look at project performance from the micro viewpoint (Completion time, cost, quality, safety and profitability).

Performance measurement is an integral part of construction and any other business management (Albert, 2004). To be able to know the goals of a project are being delivered requires identification of indicators of their success (Key Performance Indicators, KPI) and using them to keep an eye on the way they are performing. Performance indicators are measurable facts necessary to prove that a planned effort has achieved the desired result. When indicators can be measured with some degree of precision and without ambiguity they are called measures. Performance measurement on the other hand is the systematic way of evaluating the inputs and outputs of a construction activity, a tool for continuous improvements (Love, et al., 2000). Ogunlana and Shamas, (2009) reveals three major areas of concern for improvement: project planning and control; personnel; and involvement of client. Construction projects require good planning before the actual execution and then control on its way with full involvement of the client.

In construction the output of the requirements at the analysis stage determines the output of the entire development process. They indicate the origination and initiation phase,
where major decisions are made, regarding the project’s objectives and planning for the execution. The outcome of this earlier activities determine the kind of and the successes of activities that should be undertaken (Ogunlana & Shamas, 2009). Setting clear, realistic, identifiable goals by all project participants is vital. It allows the team members to know where they stand at the moment, how far they stand from the goal, what they need to do to achieve success, and when they are going to get there.

**Construction Participants**

*Construction clients*

Studies indicate that little attention is given to the performance of the clients in the construction industry and there is a paucity of research that allows one to better understand the key roles of clients (Alinaitwe, 2008). Low and Chuan (2006) argue that poor project performance may not necessarily be due to the incompetence of anyone else but the client’s actions before, during and after the project. Client’s influence is one of the key contributing factors resulting in lack of commitment and contractor’s inefficiency in the project (Hemanta, Sawhney & Iyer, 2012).

*Government*

The infrastructure has historically been the domain of government, from buildings, roadways to waterways to subways. Safety, training, hiring, and wage bargaining are each enmeshed within the huge public sector expenditures on construction industry services (Gerald, 1997). In most countries, roads are predominantly funded and constructed by the state and in Uganda, the MoWT’s role of policy formulation, regulation, setting standards; strategic planning, monitoring and evaluation greatly influence road project performance and development.

*Construction consultants*

The nature of the tasks assigned by the clients to consultants varies (Chitkara, 2005 & Anderson, 2009) but generally consists of: Project feasibility engineering investigations, coordination of designs and drawing works. They also estimate, plan; budge; prequalify construction agencies; and award contracts to the successful bidders; designing project organisations for executing works and developing standard operating procedures and systems; developing detailed construction plans; supervising works; including administration of contracts and controlling of project time, cost, quality and scope management. These are the activities that determine the future actions and success.

*Contractors*

Construction contractors play an important role in the construction business as they execute most of the construction works. A competent construction contractor is one of the indispensable conditions of a proper process and completion of a construction project according to Xiaohong (2011).

**METHODOLOGY**

This section presents the procedure and details on how this research was carried out. It has the research design regarding what, where, when, how much, by what means the inquiry was carried out. Kothari (2004) emphasises on this. This research was an exploratory study, both qualitative and quantitative in nature, involving extensive desk studies of secondary data from previous studies. The study was carried out in Uganda and on paved road construction
projects. The study was meant to identify the factors affecting paved road construction project performance using literature review. Information on projects that were carried out from 2008 to 2013 were collected and studied as this is the period the government of the republic of Uganda embarked on serious pavement road construction.

FINDINGS AND DISCUSSIONS

According to engineering audit of Uganda National Roads Authority (UNRA, 2009), and the reviewed literature, the following were found to be the major factors affecting road construction projects in Uganda.

Poor planning and poor management by UNRA

Weaknesses were observed in the planning, supervision and monitoring of work contracts by UNRA. There were many projects going on at the same time creating a contract management crisis to UNRA leading to ineffective monitoring. This signifies poor initial planning yet it is the determinant of the future of projects. In India however, the use of information technology in monitoring made it possible to improve on road project performance.

Lack of experience

UNRA is currently using Small-Medium Local contractors and consultants who are not well versed with contractual issues leave alone engaging them long after the projects have started. This is a symptom of lack of capacity to take up the tasks at hand and has put on a lot of pressure on the UNRA Staff with consequences of ineffectiveness.

Coordination

The research was able to establish that there is no clear linkage between UNRA activities with the National Road Sector Master Plan. There is no roadmap for implementation of this plan. Three major areas that affect project performance include project planning and control; personnel; and the involvement of client (Ogunlana & Shamas, 2009). With lack of coordination between the personnel and the client, chances of good performance become very slim.

Late engagement of consultants

It was observed that some of the projects had been awarded to contractors prior to having a supervising consultant in place. This again is a sign of poor planning. Contract management aspects are better handled when the supervising consultant is first in place and has reviewed the contract documentation.

Inadequate Controls during road construction

In construction, performance is predominantly measured using time, cost, quality and scope. The costs of construction for a number of projects were noted to be high and inconsistent. Comparison of project costs within the same geographical area indicate that the rates of constructing a kilometer of a road vary by great margins, for example, the rate/Km for the construction of Soroti-Dokolo road was approximately $423,077 while that of Dokolo-Lira road was $540,000. This is an indication that there is poor cost analysis and control during tendering and award of contracts.

Scarcity of Road Construction Materials

Scarcity of good gravels in certain areas demands for concerted efforts and research in utilising the locally available soils for road building (for example use of stabilizers). In some areas of Uganda there is lack of adequate and suitable materials such as gravel and
aggregates. Transportation of such materials over long distances is a big cost to the projects. This is partly responsible for the poor quality in addition to workmanship problems. In Palestine a similar problem was reported (UNRWA, 2006).

**Delayed commencement of works**

Clause of the Special Conditions of Contract (PPDA, 2005) states that contractors are expected to start work, 14 days after signing of the contract. The actual start dates were reportedly extended by months later with subsequent misuse of advance payment. In some cases it was a result of failure to avail a supervising consultant in time.

**Lack of capacity**

Most contractors were reportedly found to lack the equipment and money to handle road projects. They ended up misusing the advance payment which greatly affected the progress of the works hence the delayed completion of the contract. From the progress of most works among other factors it was evident that the contractors had poor cash flow that affected the financial capacity to undertake the contracts.

**Expiry of guarantees**

Advance payment guarantee, performance security and insurance cover were allowed to expire without any recovery, and putting the entity at risk of financial loss and failure to achieve the intended goals of the projects. There were also cases of failure by the client to verify the authenticity of the securities putting the government at great risks of financial loses.

**Delay to make decisions**

UNRA reportedly delayed to take decisions regarding issues raised by supervising consultant. These delays impact negatively on the smooth implementation of works and eventually lead to claims. In one of the roads where the project had a time overrun of 100%, the consultant had recommended the contractor to be stopped and the contract cancelled. The Government delayed in making decision until there was public outcry about the inconveniences. Timely decisions should be made by the authorities (Consultants/UNRA) to avoid unnecessary delays and eventual cost implications.

**Failure to address Road Safety**

Safety of road users was not adequately addressed. There were cases of lack of road signs and speed control humps in some areas yet improved roads are known to lead to higher vehicle speeds and presents risks to road users. In some cases, the signs were reportedly vandalized. There is need to adopt the use of concrete.

**Project Characteristics**

Complexity, size and construction type were found to seriously affect projects. Other characteristics of concern include: economic situation, politics, local market situation and legislation which must all be seriously addressed. Kampala northern by-pass is one such road that was affected due to its complexity and design changes.

**Other factors**

Other factors noted include: stakeholder’s lack of continual participation, attitude to service, excessive amendments of design and drawings; ineffective monitoring and feedback, and lack of project leadership skills. Procurement systems, project team performance, conflict between the project parties, poor workmanship, and external conditions were all reportedly found to
lead to poor project performance. Project Managers’ ignorance & lack of knowledge; faulty project conceptualization; and aggressive competition during tendering were also found to affect project performance.

CONCLUSIONS AND FURTHER RESEARCH

From the findings it can be concluded that poor project planning and poor management of the implementation are the major factors affecting paved road project performance. Most studies pointed out the factors and gave recommendations without implementation frameworks for improvement. What is more realistic is how the results from the several studies on project performance can be harmonised for improvement implementation.

REFERENCES


