

*Full Length Research Paper*

# Measuring the performance of contractors in government construction projects in developing countries: Uganda's context

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Traditionally, the success of projects is measured on time, cost and quality parameters; although, most construction projects in Uganda have not performed well on each of these parameters. In this paper, we identify important indicators that are useful for measuring contractors' performance in Uganda's context. The paper develops a simple performance measurement framework for measuring performance of contractors. It also identifies a set of challenges faced by contractors in Uganda that need the attention of policy makers and those in managerial positions. The findings are original and add to the stock of existing knowledge in understanding the unique context of the construction industry in developing countries.

**Key words:** Performance management, construction projects, customer satisfaction.

## INTRODUCTION

There is probably no sector that has significant implications on the daily lives of human creatures than the construction industry. It is universally accepted that for example, the wells and bore holes where human beings get water as a source of life, the buildings where we live and work, the roads and bridges we drive on, the utility distribution systems we use, the railways, airports, ferries and harbours we travel and trade from, dams and power lines that give us electricity, are all products of this vital industry. The construction industry accounts for a significant portion of the world's gross domestic product. In the developing world, the construction sector provides a substantial source of employment to the majority of poor citizens of those countries. In this connection, the sector offers a sound basis for revenue collections that enable governments collect direct and indirect taxes to provide public services.

In developing countries, the biggest customer of the private construction industry is the government (Okpala and Aniekwu, 1988). The intrinsic complexity, uncertainty

and dynamics of most construction projects create difficulties for even the best project managers (Nguyen et al., 2004). This complexity extends to even attempting measuring the sector's performance. In Uganda, construction firms pay direct taxes to local and central government through the normal taxable incomes and mandatory taxes before participating in public procurement as provided by the county's procurement legal regimes. In an indirect way, these firms still pay taxes through the materials they purchase for construction works in various government projects.

Construction project development involves numerous parties, various processes, phases and stages of work and a great deal of inputs from both the public and private sectors with the major aim of bringing the project to a successful conclusion (Takim and Akintoye, 2002). The level of success in carrying out construction projects depends on the quality of management, financial, technical and organizational performance of the respective parties. This needs taking into account the associated risk

**Table 1.** Showing construction real GDP growth rates, 2003/04 to 2007/08.

FY	2003/04	2004/05	2005/06	2006/07	2007/08
% contribution	10.0	14.9	23.2	14.3	6.0

Source: Uganda Background to the Budget 2008/09.

management, business environment, economic and political stability. The finished product in any industry requires satisfying a certain standard to provide customer satisfaction and value for money (VFM).

In the construction industry, achieving quality of the finished product is no less than in any other industry (Chan and Tam, 2000). A construction project is acknowledged as successful when it is completed on time, within budget, and in accordance with specifications and in accordance to stakeholder's satisfaction (Takim and Akintoye, 2002). In the same argument, Teo and Ofori (1999) inform us that the main rationale and impetus for the development and implementation of procurement arrangements for construction projects is to increase the likelihood of the participants in the construction process to satisfy the client's objectives. However, as recently observed by Eshassi et al. (2009) the business environment for the construction sector continues to change rapidly. In such circumstances the changes from the environment affect the way contractor's performance is measured.

In South Africa for example, Hanson et al. (2003) informs us of several factors including conflict, poor workmanship, and incompetence of contractors identified as dissatisfaction factors negatively affecting project performance). Relatedly, a study by Mbachu and Nkando (2007) in South Africa established that quality and attitude to service were some of the factors that affected delivery of projects. Such contextual analysis enables us have unique examples for understanding the measurement challenges for contractor performance.

In Uganda, the liberalization of the economy since the 1990s promoted development in all sectors. Our interest in this paper, however, is directed to the building and construction sectors. In line with the requirements of the development partners, the Government of Uganda reformed its road sub-sector in an effort to accelerate its economic growth. In the past 10 years, a lot of emphasis was placed on the development and maintenance of the national road network. The Government's commitment in this effort was manifested by increased funding to the sub sector to a tune of Ushs 1.1 trillion budgeted for the FY 2008/2009. This sector is estimated to have grown by an average of 5.7% per annum for the last 10 years with benefits to the entire economy. The country's economy has more than doubled; estimated to have had an average growth of about 6.0% per annum. The country's GDP series which estimate the real size of the economy (measured at factor cost) indicates an 8.9% p.a estimate during FY2007/08 compared to a 7.4% in FY2006/07.

The contribution of the construction industry to the real GDP growth is shown in Table 1.

In line with the subject of procurement, Rwelamila et al. (1999) informs us that most African construction practitioners adopt procurement approaches, which do not consider local factors, leading to inconsistent and unpredictable outcomes. He suggests that the poor construction performance in most African countries emanates from lack of adequate consideration for cultural issues of project management parties (Rwelamila et al., 1999). Uganda has not had a known construction policy for several years. Consequently, for a long time, the private sector represented by an association of contractors [the Uganda National Association of Building and Civil Engineering Contractors (UNABCEC)] has been pressurizing government to put in place such a policy to spell out the required standards and processes for an effective construction industry. In return, the government has now accepted such pressures and a policy now approved by cabinet awaits Parliamentary approval. With the policy in place standards to bring value for money in construction services has received significant attention. Contractors will be expected to follow prescribed procedures as well as their services to the required standards and quality; failure of which would attract sanctions.

### Purpose of the study

In the last few years, multiple works about supply chain performance management have appeared in the specialized literature, although this discipline is relatively recent (Saiz et al., 2007). Since the late 1980s, performance management in government has received increasing interest fostered by the „re-inventing government“ movement (Osborne and Gaebler, 1992). Performance measurement has been viewed as critical for realizing the short and long terms goals of an organization. Its results can be used by decision makers to improve programme performance.

Increasing the efficiency of public services has been promoted by new public management theorists. Due to this new approach to running government business, cutting through red tape, minimizing public waste and value for money have been important drivers for the introduction of performance measurement in the public sector as suggested to us by Greiling, (2006). While studies have been done to measure the performance of the entire public sector machinery, limited scholarly studies have been done to the study of contractor

performance and an understanding of the challenges that contractors themselves encounter in delivering their crucial services. In this study, we sought to undertake such a study as a way of exploring the measurement indicators for the performance of contractors in Uganda's context. Secondly, our study was driven by the desire to identify the industry-specific challenges that affect contractors and presumably limit them from offering quality services. In this regard, our study aimed at providing answers to two important questions: namely (1) what critical performance measurement variables should be considered for assessing contractors' performance in Uganda? and; (2) what major challenges are faced by contractors in Uganda? By answering such questions, a ground work for subsequent empirical studies on this sector would be provided to the academic community but also lessons of application to the practicing managers will be discerned.

## LITERATURE

Neely (2005) tells us that performance measurement is the process of quantifying the efficiency and effectiveness of actions. For a performance measurement system to be regarded as a useful management process, it should act as a mechanism that enables assessment to be made, provides useful information and detects problems, allowing judgment against certain predetermined criteria to be performed. More importantly, the system should be reviewed and updated as an ongoing process (Ong and The, 2008).

With the increased interest in performance measurement, a systematic shift of emphasis from financial performance measures to non-financial measures of performance has emerged quite significantly. Traditional accounting and financially-oriented performance measurement systems are no longer adequate to evaluate the firm's performance. Traditionally performance measurement involved management accountants through the use of budgetary control and the development of purely financial indicators such as return on investment (Chenhall, 1997). As Busi and Bititci, (2006) ably observe performance measurement has developed into a relatively broad body of literature to cover both financial and non-financial measures but the areas of under-development still exist. Measuring performance of government should draw a considerable amount of attention from professional associations, scholars and practitioners as suggested to us by Holzer and Kloby, (2005).

For construction projects, there have been different measurement indicators. The generally perceived factors that influence quality performance can be grouped under the headings of client, project, project environment, project team leaders, project procedures and project management procedures (Chan and Tam, 2000). Research has documented that sophisticated and specialized clients having a better chance of success are

critical variables. The nature of the client (whether from the public or private sector), the clarity of the project mission, their competency in terms of ability to brief, make decisions, and define roles, have been found to significantly contribute to the quality of a project (Naoum, 1991). According to Walker (1994), project scope, nature of the project and complexity of the project- (the project characteristics)- also have an influence on the performance of projects; in addition to the environment in which a project operates.

Unlike in Uganda, other developing countries have witnessed a number of studies that have examined the factors affecting the performance of projects. For example, Farid and El-Sayegh (2006), gives us interesting findings on the significant factors causing delays in the United Arab Emirate (UAE) construction industry. The study reports shortage of skills of manpower, poor supervision and poor site management, unsuitable leadership, shortage and breakdown of equipment as some of the major causes of delays in construction projects. In a recent study of the factors affecting the performance of construction projects in the Gaza Strip, Enshassi et al. (2009), reports to us a large number of related performance factors such as time, cost, quality, client satisfaction, client changes, business performance, health and safety, productivity and innovation, and environmental characteristics, among others. In a study of the Thai highway contractors, Praserttrungruang and Handikusumo (2007) observed that the construction business is a sector that relies primarily on high utilization of machinery. Further, Day and Benjamin, 1991, contend that equipment has long been considered as one of the key factors for improving contractors' capability in performing their work efficiently and effectively. However, contractors usually face difficulties in getting all the equipments they need, especially capital investments, in the acquisition phase, due to financial constraints. It is estimated that the procurement of equipment constitutes up to 36% of the total construction project cost (Yeo and Ning, 2006). As the project progresses to the implementation phase, the problems of contractors also change. One of the major problems faced during this phase is the high breakdown rates of the equipment and accidents from unskilled operator abuse as well as poor training on equipment use (Edwards and Nicholas, 2002; Gann and Senkar, 1998). Other problems in the subsequent phases relate to maintenance and determining the economic life of the equipments before their disposal.

While these factors may be regarded in the context of a particular study, they can be applicable in other contexts. Naoum, (1991) believes that the changes in the environment can create uncertainty not only regarding prices but also in terms of investment in the work of the organization, which will affect the demand for the building. In this same debate, the procedures adapted during the construction process, like the form and method of tendering, are key variables for quality performance

(Serpell and Alarcon, 1998). Together with a project team, a group of construction professionals and personnel from one or more organizations can combine to fulfil the necessary design, detailing and construction functions comprising the construction project that is committed to their professional work ethics and construction projects and can achieve excellent performance. Beale and Freeman (1991) believe that the performance of the project team on construction projects will, to a great extent, depend on the skills and experience of several key project leaders.

## METHODOLOGY

The methodology adopted in the study was two-fold. Firstly, there was administration of a self administered questionnaire to a group of construction professionals. These professionals included engineers who prepare solicitation documents (SDs) for construction works, supervise works and certify completion of works and the rest of these engineers were managers and policy makers under the central and local government levels but coordinated by the Uganda National Roads Authority. In this category, 133 respondents out of the expected 167 randomly selected respondents returned the usable survey questionnaire suggesting a response rate of 76.9%. The returned questionnaires were checked for completeness before quantitative data was entered into the SPSS package, cleaned and then subjected to preliminary analysis partially check for outlier variables. The study tested for the reliability of the data using Cronbach alpha coefficient which returned a value of 0.85. We used exploratory factor analysis to determine content and construct validity.

Secondly, we conducted in-depth interviews with the representatives of the Uganda National Association of Building and Civil Engineering Contractors (UNABCEC), as well as Ministry of Works and Transport officials, to get their own view of the performance of the construction sector in Uganda. In this way, we benefited from methodological triangulation and validation of results which had been obtained from the first categories upon whom the questionnaire was administered.

The first set of results for this study was generated from 133 respondents. In terms of gender, 103 (77.4%) were male respondents compared to only 30 (22.6%) who were female respondents. This information reflects the long perceived gender differences between men and women. Traditionally, the construction and engineering professions have been the dominated by males as opposed to females which resorted to social science and education subjects. It is only in the late 1990s when the Government of Uganda initiated a deliberate gender affirmative policy, which has seen majority of the females now join traditionally male dominated disciplines.

Our study involved 21 (15.8%) of the respondents as having been in top management positions, compared to 84 (63.2%) in middle management and 28 (21.1%) in lower management positions. The respondents had different levels of experience in the construction sector. For example, of the 133 study respondents, 65 (48.9%) had experience in central government construction sector, 35 (26.3%) in the local government construction sector while 32 (24.1%) had their experience in both the public and private sectors.

## RESULTS AND DISCUSSION

### Descriptive analysis Results

Before the multivariate techniques (factor analysis), we

examined the descriptive results for 20 variables using means and standard deviations to get the normality of our data. We tested for reliability coefficient and the questionnaire results were found to be reliable ( $\alpha = 0.85$ ) (Table 2).

Nineteen variables were used to measure respondents' perceptions on the performance of contractors in the construction sector of Uganda. A comparative analysis of the results for each of the items presented in Table 2 reveals important information concerning the strength of each of the performance measurement indicator as related by the study respondents. Items with a high mean score suggest key areas where contractors' performance in the context of Uganda is satisfactory and those areas with low means suggest the lowest evaluation by the respondents and in which contractors in Uganda need improvement. For example, one of the items with low mean score is on contractors providing adequate training to their employees as a strategy of ensuring success of the construction projects.

When respondents' opinions were sought on the extent to which contractors in Uganda actually provided training to their employees, it was found that the majority of respondents disagreed that this was the practice in the construction sector in Uganda. It was found, for example, that of the 102 male respondents, 25 (24.5%) strongly disagreed that contractors provided training to their employees and 49 (48.0%) disagreed suggesting that overall, 74 (72.5%) of the male respondents disagreed that contractors were providing training to their employees. Of the 30 female respondents, 22 (73.3%) of the respondents also disagreed. This contradicts the findings of Beale and Freeman (1991) who confirmed that the performance of the project team on construction projects will to a great extent depend on the skills and experience of several key project leaders and once the construction firms in Uganda do not invest in improving the skills of their employees, through training, the performance of construction firms will remain poor as demonstrated by the numerous client complaints.

Respondents who had long experience also shared the above perception. This was for both respondents who had working experience at the central and local government levels. The study found that of the respondents who had less than 5 years of working experience, 30 (75%) believed that contractors were not providing adequate training to their employees. 25 (62.5%) respondents with working experience of between 5 and 10 years, did not support this fact while 44 (77.5%) respondents with more than 10 years of experience, also disagreed. This was a high number of the 53 respondents who were in this category.

### Factor analysis results

After examination of the descriptive results, we applied exploratory factor analysis to identify some of the most

**Table 2.** Descriptive results for the performance measurement indicators.

<b>Performance measurement items</b>	<b>M</b>	<b>SD</b>	<b>N</b>
Contractors' ability to do the right job first time	3.28	1.35	133
Contractors' ability to adopt to changes and meet needs	3.28	1.08	133
Contractors' ability to provide their own resources	3.10	1.20	133
Contractors' ability to complete work on time	3.10	1.16	133
Contractors' ability to identify problems and deficiencies	3.37	1.16	133
Contractors' ability to quickly correct deficiencies	2.68	1.11	133
Contractors providing adequate training to their employees	2.15	0.97	133
Contractors' ability to keep the environment clean	2.83	1.14	133
Contractors' ability to keep clients' facilities clean	2.95	1.12	133
Contractors' ability to keep work place safe	2.44	1.10	133
Contractors' ability to avoid wastage of water	2.65	1.17	133
Contractors' ability to minimize interruptions of operations	3.01	1.06	133
Contractors' ability to use high quality materials	3.02	1.13	133
Contractors' ability to restore operations after an emergency	3.04	1.12	133
Contractors' ability to handle hazardous materials	2.68	1.08	133
Contractors' ability to adopt to new methods of work	3.20	1.16	133
Contractors' ability to work as team players	3.33	1.09	133
Contractors being reasonable in contract changes	3.08	1.04	133
Contractors' ability to provide correct documentation and invoices	3.27	1.09	133

important performance indicators critical for measuring the performance of contractors in Uganda. In Table 3, we present the results from this factor analysis computation.

Enshassi et al. (2009), in a recent study of the factors affecting the performance of construction projects in the Gaza Strip, provided a useful categorization of critical performance measures for construction projects. Their analysis suggested that the factors which affect contractors' performance, included cost, time, quality, productivity, client satisfaction, regular and community satisfaction, people, healthy and safety, innovation and learning as well as environmental. In our study, the factor analysis results loaded on five principal components. The strength of each item in a factor component is determined by its factor loading.

The first principal component had five contractor performance measurement items with the lowest factor loading being 0.51 and the highest being 0.70. All the items that loaded on this component had a percentage variance of 27.5%. We noted that all the items that loaded on the component relate to the quality dimensions clients expect from the contractors on a construction project. The study thus concluded that the quality factors are the most important measures of contractors' performance in Uganda. These results confirmed the findings by Enshassi et al. (2009) where quality related factors were found to be important measures of contractors' performance. The most important quality performance indicators in our current study include:

1. Contractors' ability to provide training to their staff as a

short and long term strategy of meeting client expectations.

2. The contractors' ability to identify problems and then making correction of deficiencies (following specifications).

3. The contractors' ability to safeguard client's facilities and assets.

4. The ability of the contractors to keep equipments clean (quality of equipment).

Table 3 results indicate that the second component had three major items with a total variance of 7.8% and their factor loadings ranged from 0.69 to 0.70. The ability of the contractors to do the right job at the right time, ability to provide their own employees and resources, whenever need arose, and their ability to adapt to the changes and meeting clients' needs, were identified as the critical performance measures under this component. These factors combined two items under client satisfaction measures and environmental characteristics suggested by the Gaza study.

The third principle component with a total variance of 7.0% had four items and these were found to be cost measures of contractors' performance. The study found that in Uganda's context, the cost related factors were the ability of the contractors to efficiently use materials, to work as team players (efficiency of human resources), to manage hazardous materials (since their mismanagement would have cost implications) and to keep the workplace clean.

The last principle component in our study was

**Table 3.** Factor analysis results for the performance measurement indicators.

<b>Component items</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Contractors providing training to their employees	0.70				
Contractors having ability to correct deficiencies in their work	0.61				
Contractors having ability to safeguard client's facilities and assets	0.60				
Contractors having ability to identify problems and deficiencies	0.53				
Contractors having ability to keep their equipments clean	0.51				
Contractors having the ability to do the right job the first time		0.70			
Contractors having ability to provide their employees and resources		0.69			
Contractors having ability to adapt to changes and meet client needs		0.69			
Contractors having the ability to efficiently use materials			0.78		
Contractors having the ability to work as team players			0.70		
Contractors having ability to manage hazardous materials			0.56		
Contractors having ability to keep work place clean			0.54		
Contractors having ability to use high quality supplies				0.69	
Contractors having an ability to restore normal operations after an emergency				0.68	
Contractors having ability to minimize interruptions to client's operations				0.54	
Contractors being reasonable when it comes to contract changes					0.75
Contractors having ability to present correct invoices					0.55
Percentage variance	27.5%	7.8%	7.0%	6.4%	5.9%

(KMO = 0.801, Chi-Square = 636.658, sig.0.000).

**Table 4.** The most important measures of project performance in Uganda.

<b>Performance measurement variables</b>	<b>Factor loading</b>
Contractors' ability to use resources efficiently	0.78
Contractors being reasonable when it comes to contract changes	0.75
Contractors' ability to work as team players	0.70
Contractors providing training to their employees	0.70
Contractors having the ability to do the right job the first time	0.70
Contractors' ability to use high quality supplies	0.69

associated with environmental measures of contractors' performance. On the basis of these components, we extracted the most important measures of contractor performance in Uganda as illustrated in Table 4.

From the analysis of the results, we confirmed that there are a number of key indicators for measuring the performance of contractors in Uganda. A deeper analysis of the emerging results suggest that the factors which should be considered for performance measurement of contractors in Uganda should have a set of quality, cost, capacity, ethical and environmental related performance indicators (Figure 1).

Contractor performance is judged based on their (i) ability to use resources efficiently, (ii) concern on being reasonable during contract modifications, (iii) ability to structure and work with teams, (iv) ability to continuously improve their internal employee capabilities through training, (v) do the right job at the right time, and (vi) use of high quality of supplies and materials. These are

expected of all contractors despite the set of challenges such contractors may face in growing economy like Uganda (Figure 2).

Our study found that the industry has not yet been organized to form a Registration Board like is the case in other East African Counties such as Tanzania. However, there is an association of contractors that regulates the members (Uganda National Association of Building and Civil Engineering Contractors-UNABCEC), while the professionals in the industry are respectively regulated through the Engineers', Quantity Surveyors' and Architects' Registration Boards. There is the Uganda Association of Consulting Engineers (UACE), which is an association that brings engineering consultants and consulting firms in Uganda under one umbrella. Through this association, members are able to interact and map out solutions to problems facing their industry, carry out joint research and regulate their profession. This helps in keeping the quality of engineering work at its best. The

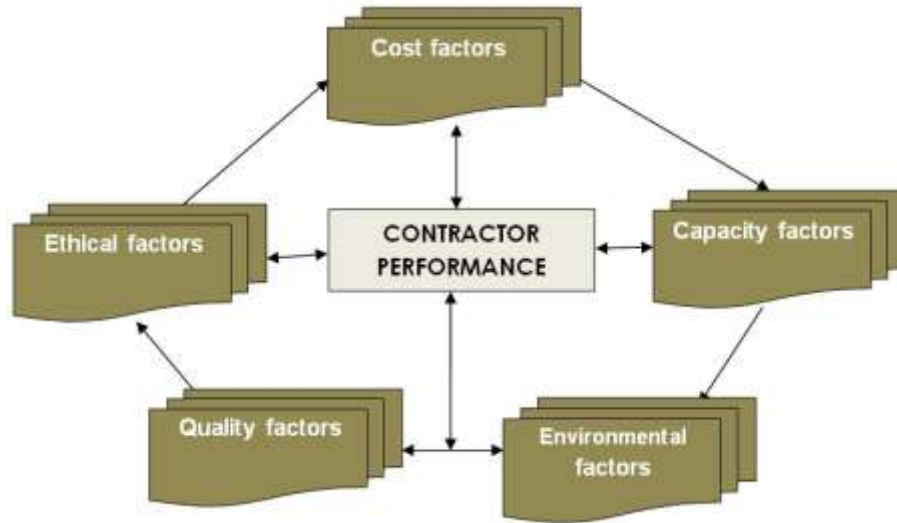


Figure 1. Contractors' performance framework in Uganda.



Figure 2. Contractor performance.

biggest mission of UACE is to develop and promote the consulting industry in Uganda. UACE also helps member consultants to keep current in technology. The association works hand in hand with other technical and engineering bodies to improve the state and to promote the use of technology in the country.

**Conclusion**

The purpose of this study was to examine the key performance measurement variables for the construction industry in Uganda. It was also to identify the challenges faced by contractors in Uganda. In this paper, the key

performance measurement variables in evaluating the performance of contractors in Uganda have been examined. A number of opinions from the different stakeholders, knowledgeable in the sector, on the challenges faced by contractors were assessed and a framework matrix on the fundamental challenges faced by contractors developed. It is our contention that the measurement of performance of contractors in a sector which is critical for the country's development is essential for policy making, a managerial decision making and, above all, improving the performance of the sector. The paper has discussed key themes of interest to the managers of the construction firms, the client organisations and the policy makers in government. Improvements in the performance of the construction sector require the commitment and involvement of each of the stakeholders. Our results are original and appeal to both local and international audiences. These results confirm the international literature on the critical performance measurement variables within the construction sector.

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