# A Study into the Factors Hindering Development of the Construction Industry in Uganda

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# ABSTRACT

The construction industry in Uganda has over the past decade experienced a boom in activities. This is as a result of the rapid population growth that is triggering the demand for housing and infrastructure. Despite the surge in activities, the industry continues to exhibit low levels of technology utilisation, contractors have continued to employ old methods of construction culminating in long construction cycles, increased costs of construction and environmental degradation. The research was conducted to take the form of a quantitative research study. The research sought the views of various respondents towards the factors hindering development of the construction industry in Uganda. Key findings revealed that the level of development in the construction industry is still very low, and the major factors contributing to this in order of priority as per the findings from the research are financial capacity, lack of research and development, economics and costs, corruption, political interference, and general levels of development. The research recommended areas that would improve the levels of development as; increase levels of funding to research and development, avail cheap funding options for project execution, enforce laws and regulations governing the industry, improved coordination between players in the industry and increase the levels of professionalism in the industry. The findings from the research can be utilized by the practitioners in this field as a policy guide to improve the levels of productivity, improve quality, time and cost of construction.

Keywords: Construction, Factors, Industrialisation, Performance, Productivity

#### **1.0 INTRODUCTION**

The goal of this paper is to identify the main factors hindering development of the construction industry in Uganda. The building and construction industry is one of the most important in modern economies, as it contributes greatly to the gross domestic product (GDP) of most nations, improving the livelihood of the citizens of the nation and acts as a catalyst for development of other economic sectors in the nation. The construction industry in Uganda is facing the challenge of demand for infrastructure as exhibited in the low level of adequate shelter for its citizens; this is amplified by the population growth that is registered at 2.5% per annum (UBOS 2005). Infrastructure must be provided at a pace to match the population growth through improved technologies. However this is not the case in Uganda at the moment. The construction industry continues to utilise obsolete technologies that have contributed to environmental degradation and increased project duration/cycles and costs. Tindiwensi (2006) highlighted that the industry in Uganda needs to be regulated for it to achieve development and contribute to economic growth of the nation. Previous research in developing nations have identified problems as poor rates of investment in research and development (R&D), fragmented supply chains, and lack of coordination between academia and industry in research activities (Dulaimi et al., 2002) as the cause to slow pace of technology introduction/utilization in the construction industry.

The main research objective aimed at investigating the factors hindering development of the construction industry in Uganda. The specific objectives of this research were: to investigate the levels of development exhibited within the construction industry in Uganda; to identify the factors that are hindering advancement in technology within the construction industry; and to prioritise the factors be used as guide for decision making in the construction industry, and recommend ways of improving on the methods, techniques and technology in use in the construction industry. The research aimed at providing vital information for academicians, contractors, policy makers, law enforcers and bodies concerned with regulation of the construction industry pertaining improved levels of technology in the construction industry in order to improve the performance of the industry.

# 2.0 LITERATURE REVIEW

### 2.1 Need for Industrialisation

The construction industry today is challenged with trying to provide the much required services and products for an ever increasing population the world over. There is thus need for rapid changes in the construction industry. These changes are necessary because the next few decades will see enormous migration into urban centres where competition for services will be enormous. It is forecasted that by 2015, 55% of the world's population will live in urban areas (Maas, and Van Gassel, 2005). Industrialization therefore is seen as one of the philosophies that can be employed to boost the levels of productivity in the construction industry, to deliver the desired infrastructure expeditiously to an ever growing population.

Industrialization as an organization process refers to continuity of production implying a steady flow of demand; standardization; integration of different stages of the whole production process; a high degree of organization of work; mechanization to replace human labour whenever possible; research and organized experimentation integrated with production (Foster, 2000). In simple terms industrialisation is the process of introducing technologies in construction to make activities easier to undertake. In Uganda, more than 25% of the population do not have adequate shelter (UBOS, 2005). Modern construction methods are needed to deliver infrastructure expeditiously for the ever increasing population. Owing to the declining labour productivity which is typical of many countries, productivity on sites has to be addressed using modern construction techniques that are less labour intensive but with high productivity out put.

Industrialization emphasizes the need for simplicity in construction. It has been observed that productivity is dependant on the detail of design (Gray, 1983). According to (Gray, 1983), including the details of the production process in the design is significant and that when the initial design includes these details, the benefits can be increased fourth fold. Cost reductions in excess of 10% of the building capital costs have been achieved within the original design Industrialization emphasizes the need for coordination of the participants to a project, however there is also need for the parties to coordinate the construction activities, allowing for pre-planning of these activities. Construction activities can be considered as a series of small batches for the whole to be efficient, implying that input must be maximized. All activities should be independent and thus wholly self contained without the outside environment affecting the production process within the activity. To achieve simplicity, the work within the activity integrates repetition, standardization and known skills (Gray, 1983).

#### **2.2 Productivity and Performance**

Studies carried out on the UK and USA construction industry, revealed that high performance took into consideration the following aspects:

a). Complete self-contained pieces of work where possible. The activities should be independent of each other and also be completely self-contained units of work, which make a complete contribution to the total growth of building works.

b). Sizes of work volume to achieve consistency and high rates of production. The volume of work in each activity must be of size that will permit maximum utilization of the resources.

c). Parallel activity working whereby designs should be identified to allow for more than one activity to be carried out at the same time.

# 2.3 Indicators of Industrialisation

# 2.3.1 Productivity

Productivity measures how much the industry can produce per unit input. From the clients' perspective, higher productivity leads to lower costs, shorter construction programs, and better value for money and higher return on investment. From a contractor's point of view, higher productivity will lead to a more competitive edge, increased customer satisfaction, higher turnover and increased profits. From the nations' point of view, higher productivity leads to more efficient use of scarce financial resources, greater incentive to invest, more jobs and economic prosperity (Malcolm and Duff, 2001). A nation exhibiting high levels of productivity will depict high levels of industrialisation.

# 2.3.2 Management

For industrialisation to be realised in the industry, management in the key sector areas (firms, implementers, policy makers) has to be perfected. It has been noted that ineffective management has been cited as the primary cause of poor productivity rather than an unmotivated and unskilled workforce (Sanvido, 1983). There is no doubt that management effectiveness ultimately determines profitability in most cases. Four primary ways of increasing productivity through management include: (1) planning; (2) resource supply and control; (3) supply of information and feedback; and (4) selection of the right people to control certain functions (Sanvido, 1983).

# 2.3.3 Performance

The annual report 2005/2006 of the Construction Industry Development Board (CIDB) in South Africa identifies contracts completed within budget, time and degree of client satisfaction as a measure of performance.

# 3.0 METHOD

The method adopted to achieve the objectives of the research was that of a quantitative research method. This was so because the research concept sought views of various respondents towards the factors hindering development of modern technology (industrialisation) in the construction industry in Uganda. This research sought to determine the impact of the factors on the level of industrialisation of the construction industry. This culminated in the prioritizing of the factors, and conclusions on the factors that have great impact to hindrance of industrialization.

The population targeted for this study were construction firms registered with the Uganda National Association of Building and Civil Engineering Contractors (UNABCEC). This association was chosen because construction firms were the entity most affected by the levels of industrialisation. This association brings together firms that are actively involved in construction Particular interest was given to those firms that were actively involved in construction works for the past 10 years in the area of Kampala, and Wakiso district since construction activities are seen to be relatively higher as compared to other districts of the nation. The nature of the sample for the research was stratified according to the way the association (UNABCEC) grouped the construction firms. The research therefore adopted Cochran's formulae to generate the sample using tables (Bartlet *et al.*, 2001). The sample size from the table was calculated as 103.

Reliability can be expressed in terms of stability, equivalence, and consistency. Reliability was determined using a correlation coefficient (reliability\_coefficient in this context). A correlation coefficient is a measure of relationship that varies from -1 < 0 < 1 and the further the number is from zero, the stronger the correlation. Reliability coefficients of 0.70 or higher are generally considered to be acceptable for research purposes (Nunnally, 1978). Multi-

variant data analysis was used to determine linear correlations between factors, and in this study, it was used to investigate factors that had similar characteristics. That is, an increase in one factor shows a similar characteristic in the other. Such factors were then grouped together and similar conclusions were made.

# 4.0 ANALYSIS AND DISCUSSION

To analyse the data, the research was guided by the research questions as follows;

i) What are the various factors hindering technology adoption in the Ugandan construction industry?

ii) What is the order of priority of these factors in relation to their contribution towards hindrance to technology advancement in the Ugandan construction industry?

iii) What are the interventions that can be adopted to address the current levels of industrialisation of the construction industry?

The response report from the questionnaires is as in Table 1. The categories of companies by Uganda National Association of Building and Civil Engineering Contracts (UNABCEC) are that the technical and financial capacity reduces from A to E.

Category of companies as	Questionnaires sent	Number	
classified by UNABCEC	out	returned	Percentage
А	39	25	64.1
В	24	14	69.2
С	13	9	58.3
D	13	9	81.8
E	11	5	38.5
Total	100	62	62.0

#### Table 1: Response rate of Questionnaire

Under question (i) above, the levels of industrialisation were determined by the following indicators; level of pre-fabrication, degree of Standardisation, degree of mechanisation, levels of research and development, contracts completed within time and budget, professionalism, advancement in contractual arrangement, and extensive use of automation and robots (Richards, 2005; Ayman *et al.*, 2005; and Powl and Skitmore, 2005). Under (ii) the research identified these factors using literature relevant to the research subject matter and interviews with stakeholders in the construction industry. Under (iii), two criteria were adopted for prioritising the factors identified namely: Mean rating of the factors was calculated using the formula

$$R_m = \frac{\sum R_x}{I} \tag{1}$$

Where,  $R_m$  – Mean rating of that particular factor,  $R_x$  – Rating given by the respondent and I – Number of raters. The Relative importance index from the rankings was calculated using the formula

Re *lative* Im *por* tan *ceIndex*(*RII*) = 
$$\frac{\sum w}{AN}$$
 (2)

Where RII = Relative Importance Index; w = weighting as assigned by each respondent in the range of 1–5; A = the highest weight (5); N = total number of valid responses (Ayman *et al.*, 2005).

Under (iii), the research sought views of respondents on what methods can be adopted by the stakeholders in the construction industry to guide the industry into adopting modern

technology. These were categorised into two categories: Individual firm level involvement, government/national level involvement.

# 4.1 Reliability of Ratings

Results from the reliability analysis gave results as follows: N of Cases = 62.0, N of Items = 23, value of alpha coefficient = 0.7634. The value obtained from the analysis was 0.764 which is greater than the 0.70 a value recommended by Nunnally (1978) for results to have significant reliability. This implied that the data from the rating of the factors was reliable.

The results from the analysis using formulae stated previously yielded priorities as indicated in Table 2.

			Std.			Ranking
FACTOR	Mean	Variance	Deviation	Sum	RII	0
Financial Capacity	4.63	0.42	0.65	287	0.93	1
Lack of adequate research						
and development	4.42	0.60	0.78	274	0.88	2
Economics and costs	4.25	0.89	0.94	264	0.85	3
Corruption	4.13	0.55	0.74	256	0.83	4
Political interference	4.04	1.09	1.04	251	0.81	5
General level of technology	4.04	1.00	1.00	251	0.81	6
Levels of Professionalism	4.04	1.26	1.12	251	0.81	7
Clients capacities and						
expectations	4.04	1.43	1.20	251	0.81	8
Poor Financial Planning	3.96	0.74	0.86	245	0.79	9
Market Forces (inflation)	3.92	1.21	1.10	243	0.78	10
Continuity of						
work/construction volume	3.83	1.19	1.09	238	0.77	11
Regulation/standards	3.63	0.94	0.97	225	0.73	12
Complexity of work	3.58	1.38	1.18	222	0.72	13
Designs	3.58	1.38	1.18	222	0.72	14
Nature of work in industry	3.54	1.13	1.06	220	0.71	15
Procurement systems	3.50	1.48	1.22	217	0.70	16
Political instability	3.50	1.65	1.29	217	0.70	17
Current infrastructure in the						
nation	3.38	1.38	1.17	209	0.68	18
Size of contracts	3.33	2.06	1.43	207	0.67	19
Inadequate participation						
from foreign firms	3.29	1.52	1.23	204	0.66	20
Lack of coordination						
between parties in the						
construction industry	3.17	1.28	1.13	196	0.63	21
Structure and Organization						
of the Construction Industry	3.17	1.62	1.27	196	0.63	22
Environmental factors	2.50	1.30	1.14	155	0.50	23

**Table 2:** Results from Rating of Factors

#### 4.2 Multi-Variate Analyses

A correlation that was run to determine factors that had linear relationship revealed the following groupings.

• Nature of work in industry, complexity of work, structure and organisation of the construction industry, size of contracts in nation and designs were grouped together.

- Second group consisted of procurement systems, poor financial planning, and Political instability.
- The third grouping consisted of lack of adequate research and development, general levels of development, and regulation and standards.
- Fourth grouping consisted of financial capacity, corruption, levels of professionalism.
- Fifth grouping consisted of inadequate participation from foreign firms (FDI), environmental factors, market forces (inflation).
- The sixth grouping consisted of client's capacities and expectation and lack of coordination between parties in the construction industry.
- The seventh grouping consisted of political interference and continuity of work/construction volume.
- The factor of economics and cost, and current infrastructure in the nation were analysed and found to have no accompanying factor.

# 5.0 CONCLUSION AND RECOMMENDATIONS

The research was used to identify and prioritise the factors that affect the development of the construction industry. Lack of financial capacity and lack of research and development in the industry are of most critical importance. Most construction firms in Uganda lack adequate capital to finance their activities. This implies that firms are reluctant to invest their funds on new technologies (maintenance and running costs) while still faced with the challenge of actual execution of work. This scenario is further amplified by low profit margins, corruption and continuity of construction work (construction volume handled). The costs of improved technology remain too high for most construction firms to acquire. Firms approached during the research confirmed that they are reluctant to invest in research because of the costs and its immediate impact is difficult to evaluate.

The research in seeking a way forward for the industry in achieving technology advancement categorised these measures into;

- i) Government national level inducers and
- ii) Individual firm level inducers.

At the Government Level, the following interventions are recommended:

- Accessibility to capital at cheap rates. Capital must be made available to construction firms at affordable rates.
- Regulate the construction industry as a business entity. This will guide the practitioners on the way they go about their business with emphasis on employment of indigenous professionals.
- Encourage research and development through unifying organisations such as Engineers registration board (ERB), Uganda institute of Professional Engineers (UIPE), and government institutions.
- Government to enact favourable employment policies that will encourage professionalism and conducive working environment.
- Governments to encourage foreign investments so as to improve the level of technology in the nation through technology transfer.
- Procurement procedure in the industry should be altered to encourage competition not only based on lowest bidder but also on the methods, management and project duration stipulated by the contractor.

At the Individual firm Level, the following are recommended:

- Improved communication systems through the use of information technology. Records of tried and tested technologies must be documented and can be referenced in future to develop improved models.
- Firms must create policies that encourage staff development for improved productivity/efficiency and thereby encouraging innovation in construction.

- Firms must encourage adequate staffing levels, were qualified personnel are employed to fill the various positions within the firm. Firms must develop management structures based on competencies as compared to favouritism and relationships.
- Improve the coordination/awareness between stakeholders of the industry through exhibitions, workshops and seminars. This creates the awareness of the new construction materials and techniques elsewhere in the world.
- Firms must exhibit proper financial management through hiring competent personnel. This will go a long way in improving the financial management in the individual firms.

While conducting the study, areas were identified that provided gaps and questions. However, this study provides the relevant information needed by these gaps to further drive the industry to development. The following areas were identified for further research;

- Effect of modern construction technologies on the levels of productivity in the construction industry,
- Contribution of improved productivity in the construction sector on the Ugandan economy, and
- Degree of reliance of the construction industry on other development sectors should be established.

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