Sub-Sahara African Academic Research Publications
March, 2020 Editions

JASD
Journal of African Sustainable Development
Vol.15, No.2, ISSN: 2115-4255

AN INVESTIGATION INTO THE FACTORS AFFECTING CONSTRUCTION PROJECT COSTS IN A.T.B.U CONSTRUCTION PROJECTS

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ABSTRACT
The study investigates the factors affecting construction project costs in Abubakar Tafawa Balewa University (A.T.B.U) Bauchi. The importance of this study was to benefit stakeholders in construction industry in determining the factors which affect construction costs. To facilitate this study, both primary and secondary data collection were used. Twenty eight completed questionnaires returned out of the forty five administered were analysed using mean ranking method with the help of statistical package for social science (SPSS). The result from the study shows that the main factors affecting construction project costs in Abubakar Tafawa Balewa University (A.T.B.U) Bauchi are cost of materials, poor financial control on site, poor purchasing planning and material coordination, fluctuation of price of building materials, contract management, currency exchange rate, and wrong method of estimation. The study concludes that there is a need for clear allocation of responsibility for monitoring and controlling factors affecting construction to qualified individuals or professionals who can handle the project effectively. However, the study recommend that much focus should be placed on the major factors affecting construction project costs in order to reduce the cost of construction cost, enhance construction performance and generate confidence within the construction industry, professionals within the construction industry should become more alive to their responsibilities to avoid conflict in carrying out their duties.

BACKGROUND OF THE STUDY
The Nigerian construction industry continues to occupy an important position in the nation economy even though it contributes less than the manufacturing or other service industries, (Aibinu and Jaboro, 2002).Building and civil engineering

construction (in which public projects are included) in Nigeria was reported to have contributed as much as 3.4% to the gross domestic product of that nation (Federal Office of Statistics, 1998). Inflation is thus felt in the construction sector of the economy by the increase in construction material prices. Piana (2001) stated that inflationary increases in material cost are the major cause of construction cost overruns in Nigeria. These frequent increases give rise to cost overruns, claims, housing supply shortage leading to high cost of urban housing accommodation, construction cost estimate losing usefulness within short periods, difficulty in forecasting and planning, and frequent contract price variations, all of which often leads to project abandonment (Omole, 2000). Building costs are incurred by a contractor in carrying out works and its elements include labour, material, plant and machinery costs and other expenses, categorised into direct and indirect costs. Direct costs are traceable to an activity/work item, contributing enormously (between 65% and 93%) to total project costs (Ayeni, 1997). Studies showed that labour costs vary between 20% and 90%, while material costs vary between 10% and 80% among building trades (Ayeni, 1997). In building elements, material costs vary between 42% and 77%, while labour costs vary between 23% and 58% (Nega, 2008).

Central Bank of Nigeria (CBN) (2002), stressed that inflation is a social malady as well as a pervasive economic process whose effects are felt, to some degree, by every citizen and in all sectors of the economy. Inflation causes serious problem to contractors. Oladipo and Oni (2012) observed that the rate of inflation can cause serious problems in the economic accruals or rate of return to constructors for works undertaken, thus loss of profit. In the traditional procurement method, firm price contracts, where the contractor is paid in arrears. Inflationary forces render submitted bids unrealistic. This has made contractors' quantity surveyors more aware of the need to price inflationary risk at the pre-contract stage.

Statement of the problem

The main problem of constructions in tertiary institutions in Nigeria was the increase in costs associated with the construction projects. This problem has led to government being the sole financer of most of the construction projects in the tertiary institutions. This may be attributed to the influence of the country main industry, "petroleum". Badran (2012) observed, "Expectations of rising prices of building materials are in line with the rise of petroleum oil." As oil price increases, it creates more problems, and these problems, in turn, increase the construction prices even more.

Scope and Limitation

It is believed that construction projects entirely constitute the costs of labour, materials, plant and machinery cost and other expenses. The study will be limited to costs of materials and labour costs.

Significance of the study

An assessment of the study would enable professionals give an economic approach to construction projects such that they would be able to identify the dominating factors leading to high construction cost in Nigeria.

The application of the solutions proffered to minimizing construction costs increase would restore client's confidence, reduce investment risks, and generally boost the viability and sustainability of the construction industry.

LITERATURE REVIEW

An overview of the inflation phenomenon

Inflation refers to a persistent rise in the general price level. It involves a slow but steady rise in general price level. According to Hamilton (2001), inflation is an economic situation when the increase in money supply is "faster" than the new production of goods and services in the economy. Piana (2001) says that it is when price increases in a narrow group of economic goods or services. Iyoha et al (2003) explained inflation to be a condition of general and persistent rise in prices.

Iyoha et al (2003) identified a number of forms of inflation to include: demand-pull, cost push, and open inflation.

1. Demand-pull Inflation: - This type of inflation emanates from excess of demand over supply. If the demand for goods and services increases considerably without a corresponding increase in their supply, price will increase. For example, an increase in income will increase the purchasing power of people. But if this is not matched with increased production, inflation will occur.
2. Cost-push Inflation: - This type of inflation is generated by increase in the cost of acquiring the factors of production. Workers may demand higher wages; the cost of capital and land may have increased generally. Producers are forced to pass part of their higher costs to consumers in the form of higher price in order to maintain their profit margins. If the price increase persists, inflation occurs.
3. Open Inflation: - This is a type of inflation generated by an increase in money supply without a corresponding increase in the volume of

goods and services. Therefore, too much money chases fewer goods, resulting in a rise in the general price level. This could be brought about by excessive bank lending or over-expansion of currency by the central bank.

Construction inflation factors

Construction cost is regarded as a client's irreversible commitment of money on his project from conception to completion. According to Hutchinson (1993), costs are the various construction expenditure directly or indirectly incurred by the construction client. Construction cost at the initial or design stage are incurred to catalyze the production stage. However, Kwakye (1997) believes that the extent of construction cost will depend on the size, type, form, location, complexity, level of specification, tendering, climate, predicted inflation, risks and procurement method. It is important to consider the cost of significant items in the project early enough, since this will give directions necessary for planning and cost reductions procedures.

In a study of the Nigerian Construction Industry, Omoregie and Radfort (2005) sampled the opinions of Contractors, Consultants and Clients and they discovered 15 factors responsible for project delays and construction cost escalation in Nigeria. Their survey revealed price fluctuation as the most severe cause of project cost escalation which is attributed to the limitation in exchange rate which in turn affects construction material prices and general price level.

In another study, Elinwa and Silas (1992) identified 31 essential factors causing High Cost of Buildings with fraudulent practices and kickbacks ranking second (2nd) most important factor in Nigeria. Hussain (1999) noted that fraudulent practices and kickbacks occasioned by greed are perpetuated by some major players in the construction industry. Frimpong, Oluwoye and Crawford (2003), in a review of developing countries such as Ghana identified some factors as underlying causes of delay and cost over runs in ground water construction projects. The five most important factors agreed by Clients, Consultants and Contractors were monthly payment difficulties from agencies, poor contract management, material procurement, poor technical performances and escalation of material prices.

Inadequate production of raw materials by the country

Ashworth (2000) noted that the reason for shortage of materials could be the defective supply of materials occasioned by general shortages in the industry, poor communication amidst sites and head office, poor purchasing planning and

materials coordination. Nigeria still imports cement when her cement production potentials surpass any other African country except Egypt and that the 100 % raw materials required for cement production, is readily available in Nigeria (Badran,2012)

In another development, Jagbora and Owoeye (2004) observed that 90% of the aggregate components for production and delivery of electricity in the country still depends on other developed countries because of incessant supply of electricity.

Supplier manipulation

The major reasons for this factor as observed by Manavazhi and Adhikari (2002) are monopoly control of the market by some suppliers, work stoppages in factories, lack of industrialized materials, fluctuating demands forcing suppliers to wait for accumulation of orders and difficulty in importing raw materials from other countries.

Government policies

Aibinu and Jagboro (2002) revealed that Government deregulation policies aimed at liberalizing the economy since 1986 are responsible for the instability in prices. It is therefore not surprising that fluctuation claims during these periods contribute significantly to additional cost.

Contractor's cartel

According to Omole (2000), the major projects like heavy engineering, super highways and general infrastructure can only be undertaken in Nigeria by a few contractors. These contractors know themselves and therefore an indirect cartel is formed. The contractors on tendering are in a vantage position to decide amongst themselves who gets which contract and at what price. What appears on tendering to be the lowest tender may be over 20% - 30% above the actual value of the job.

Fraudulent practices and kick backs

Wahab (2006) also revealed that there were verifiable cases of corruption in the execution of some of the contracts awarded by the Petroleum (Special) Trust Fund (PTF). The Interim Management Committee (IMC) set up by President Obansanjo found that of the total 181.8billion naira that accrued to PTF for the three years it operated, as much as 25.6 billion naira was wrongly paid to contractors. These include inflated contracts, fraudulent over payment of

contractors by some of the agency officials and undue receipts of interest on funds placed in banks by the agencies.

Political Interference

Omole (2000) reveals that 80 percent of the contractors in Nigeria are indigenous companies. The government agencies, in most cases are guided by the political heavy weight to award contract to party stalwarts at very high prices.

Relationship between management and labour

There is always a gap between the project management and labour.This gap should be kept as small as possible, so that the relationship between management and labour may be strengthened. They should work as a team to build a project with minimum cost. If the relationship between management and labour is bad the morale of the laboures will decrease and production will decrease leading to increased project cost.

Contract Management

Poor contract could be attributed to the manner in which contracts are awarded. In most cases projects are awarded to the lowest bidder (Mansfield, Ugwu and Doran, 1994). Accordingly, Frimpong et al (2003) observed that most contractors in Sub – Saharan African are entrepreneurs who are in the business of making money at the expense of good Management. Consequently, they pay low wages, submit very low bids and have very little, if any ability to plan and coordinate contracts.

Lack of coordination between designers and contractors

Contractors construct the project according to the project design. Normally, if the design has any mistakes, the contractors may apply the mistakes without knowing there are mistakes or without notifying and coordinating with the designer or the client. Implementing designs with mistakes obviously costs a lot of money.

Labour Cost.

Labour is defined as a task that requires the exertion of body and mind or both. Labour is also regarded as an important resource in construction because it is the one that combines all the other resources namely materials, plant equipment and finance in order to produce the various construction products (Wahab,2006). As expressed by Idoro and Jolaiya (2010), consultants via specification, control of

materials, plant costs, profit and overheads are generally controlled by the competition.

Effect of inflation in constructions

Effects are the consequences that will be encountered when cost overruns occur on a construction project. Nega (2008) states that cost overruns have obvious effects for the key stakeholders in particular, and on the construction industry in general. To the client, cost overrun implies added costs over and above those initially agreed upon at the onset, resulting in less returns on investment. To the end user, the added costs are passed on as higher rental or lease costs or prices. To the professionals, cost overrun implies inability to deliver value for money and could well tarnish their reputations and result in loss of confidence reposed in them by clients. To the contractor, it implies loss of profit for non-completion, and defamation that could jeopardize his or her chances of winning further jobs, if at fault. To the industry as a whole, cost overruns could bring about project abandonment and a drop in building activities, bad reputation, and inability to secure project finance or securing it at higher costs due to added risks Nega (2008).

However, Jagboro and Owoeye (2004) and Aibinu and Jagboro (2002) noticed that increase in the prices of building materials has multiplier effects on the industry as it leads to fluctuation in construction costs and the eventual abandonment of projects. Other implications such as completion at the expense of other projects, delay in progress of project works, other valuable projects not being commissioned, rate of employment of construction workers, poor workmanship as a result of the use of low-quality local materials, and inhibited innovations in construction methods were identified by Elinwa and Buba (1993); Idoro and Jolaiya (2010); Okpala and Aniekwu (2001); Oladipo and Oni (2012); and Windapo et al. (2004).

METHODOLOGY

Research Design

The research design for this work is descriptive survey design.

Study Area

The area of the study in this work or research is Abubakar Tafawa Balewa University (A.T.B.U) Bauchi, Bauchi state in both yelwa and gubi campus.

Population Size of the Study

The population of the study involves the client (A.T.B.U) and the contractors of Tetfund construction projects making a population size of 51.

Sampling Size and population size

The sample size was selected according to Krejcie and Morgan (1970) table for determining sample size as cited. From the table, a population size of 51 will have a sample size of 45 .The sampling techniques used for this study was the stratified random techniques as it is obvious that there are different categories of professionals within the Nigerian construction industry and Client organization.

Method of Data Collection

Two set of data were identified as being relevant to the effective conduct of this research namely Primary and Secondary. The primary data which referred to field data were obtained through the use of well-structured questionnaire developed from the initial identification of likely inflationary factors affecting construction project costs in ATBU Bauchi. The questionnaire was divided into section A, B; C, D and E. 45 questionnaires were designed and distributed to the targeted respondents.

Statistical Tools for Data Analysis

The descriptive survey method was used, where well-structured questionnaires were distributed among the client (A.T.B.U) and the contractors of construction projects. Frequency and percentages were used for the descriptive data. These were analyzed by SPSS (Statistical Package for Social Science) having carefully completed the variable view and imputed the extracted data appropriately on the data view. Mean score was used.

RESULTS AND DISCUSSION

Analysis of Respondents Characteristics

Survey responses

Forty five questionnaires were randomly administered (Thirty to Contractors and fifteen to Client). As at the time of compiling this report, a total of twenty eight usable responses were received, representing 62.2% effective response rate.

Table 1: Survey response

S/N	Respondents	Number Issued	Number Returned	Percentage Issued %	Percentage Returned %
1	Contractor`s	30	18	66.7	64.3
2	Client	15	10	33.3	35.7
	Total	45	28	100	100

Table 2: Profession of respondents

Professionals	Frequency	Percent %
Architecture	9	32.1
Builder	5	17.9
Civil engineer	5	17.9
Estate surveyor	1	3.6
Quantity surveyor	8	28.6
Total	28	100.0

Table 2 shows that 32.1% of the respondents were Architectures, 28.6% of respondents were Quantity surveyors, while 17.9% of respondents were Builders and Civil engineers and 3.6% of the respondents were Estate surveyors. This shows that the respondents of various professionals in the building construction industry are capable enough to give positive response.

Table 3: Inflationary factors

Material/labour cost variable factors	Excellent 5	V.Good. 4	Good 3	Poor 2	Not relevant 1	Total	Mean score	Rank
Cost of materials.	16	5	6	1	0	28	4.29	1
Poor financial control on site.`	11	12	3	1	1	28	4.11	2
Poor purchasing planning and material coordination.	13	7	6	1	1	28	4.07	3
Fluctuation of price of material.	9	13	5	0	1	28	4.04	4
Contract management.	5	18	3	2	0	28	3.93	5
Currency exchange rate.	11	8	6	2	1	28	3.93	5
Wrong method of estimation.	12	7	5	3	1	28	3.93	5
Absence of construction cost data.	8	11	8	0	1	28	3.89	6
Economic stability.	7	12	8	1	0	28	3.89	6
High cost of labour.	10	8	8	1	1	28	3.89	6
Fraudulent practice and kickbacks.	11	8	5	2	2	28	3.86	7

High cost of transportation.	8	9	8	3	0	28	3.79	8
Political interference.	6	12	8	1	1	28	3.75	9
Lack of coordination between designers and contractors.	4	14	8	0	2	28	3.64	10
Contractual procedures.	5	8	14	0	1	28	3.57	11
Government policies.	7	5	14	0	2	28	3.54	12
Inadequate production of raw materials.	5	8	12	2	1	28	3.50	13
Waste on site.	8	8	5	4	3	28	3.50	13
Labour Nationality.	8	7	7	2	4	28	3.46	14
Bureaucracy in tendering method.	4	9	10	5	0	28	3.43	15
Inadequate labour availability.	6	5	12	4	1	28	3.39	16
Supplier manipulation.	3	10	9	5	1	28	3.32	17
Previous experience of contractors.	3	9	11	3	2	28	3.29	18
Level of competitors.	5	7	6	8	2	28	3.18	19
Contractor`s cartel.	2	9	9	6	2	28	3.11	20
Insurance cost.	2	9	7	9	1	28	3.07	21
Dispute on site.	3	3	11	10	1	28	2.89	22
Number of construction going on at the same time	3	6	10	3	6	28	2.89	22
Number of competitors.	4	6	5	7	6	28	2.82	23
Relationship between management and labour.	5	2	11	3	7	28	2.82	23
Supplier and cultural impacts	4	1	11	9	3	28	2.79	24
Social and cultural impacts	3	2	11	8	4	28	2.71	25

Table 3, shows that cost of materials (4.29), Poor financial control on site (4.11), Poor purchasing planning and material coordination (4.07), Fluctuation of price of material. (4.04) and Contract management/ Currency exchange rate/ Wrong method of estimation (3.93) are the five most important inflationary factors affecting construction project cost according to the respondents. The table also

reveal Social and cultural impacts as the least factors affecting construction project cost in Nigeria.

Discussion and Findings

From the discovering, cost of material is the most important factor affecting cost of construction projects in Nigeria. This is in consonance with the findings of Abdulaziz and Al – Juwairah (2002) about the factors contributing to construction cost in Saudi Arabia and also poor financial control on site which is rank second was rank fifth in the same finding of Abdulaziz and Al – Juwairah (2002). Fluctuation of prices of materials also has a very significant effect on the cost of construction. It is rank fourth most important factor. Omoregie and Radfort (2005) came to the same conclusion after they studied the factors responsible for project delays and construction cost escalation in Nigeria. Although their survey revealed price fluctuation as the most severe cause of project cost escalation which they attributed to the limitation in exchange rate which in turn affects construction material prices and general price level.

Contractors are of the opinion that poor contract management will affect cost of construction. Kangari (2009) calls it management incompetence. However, It is rank fourth in this study.

The solution proffered in terms of reducing cost in Nigeria as stated earlier comes similar to recommendations of Ashworth (2000) where he observed that profitable firms may be generating their revenues from the elimination of waste at both professional and trade practice levels. He recommended cost reduction measures including: establishing firmly the requirements and features of the project at the onset before getting started, preparing the project team to do its best by getting members to sign off on capabilities and responsibilities, staying diligent about keeping the project the project on the right path through contract clauses that disallow significant changes once the project is underway, effective human resource management through effective motivation, and project tracking involving discerning early what area or paths are leading to dead ends and applying early corrective actions.

Conclusion

Conclusively, the main factor affecting construction project cost as opined by the respondents in the construction industry is cost of materials. Since Quantity Surveyors are cost experts they are in the unique position to examine these factors and take care to estimate, include contingencies in the budget, plan for, and mitigate the adverse effects of these factors on the project cost. Contractors

and Consultants should give an economic approach to construction work such that they would be able to identify the dominating factors leading to high cost of construction in Nigeria such as poor financial control on site, Poor purchasing planning and material coordination and apply the proffered solutions to minimizing same so as to restore client's confidence, reduce investment risks, and generally boost the viability and sustainability of the industry.

Recommendations

The following recommendations are deduced from this study:

1. Much focus should be placed on the major factors affecting construction project cost in order to reduce the cost of construction cost, enhance construction performance and generate confidence within the construction industry.
2. Builders should become more alive to their responsibilities as building production managers that they make use builder`s document.
3. Quantity Surveyors should become more alive to their responsibilities as cost experts ensuring that they make use of correct estimation methods.
4. The Public Procurement Act 2007 established the Bureau of Public Procurement as the regulatory authority responsible for the monitoring and oversight of public procurement, harmonizing the existing government policies and practices by regulating, setting standards and developing the legal framework and professional capacity for public procurement in Nigeria should be emphases.

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