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## Severity Rank of Factors Affecting Construction Cost by Clients, Consultants and Contractors

**D. O. Mac-Barango (Ph.D)**  
Department of Quantity Surveying,  
Rivers State University,  
Port Harcourt,  
Nigeria.  
dumomacb@yahoo.com

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### **Abstract**

*The cost of construction is a function of several variables. This research examines several of these variables with a view to revealing the proportional contribution to cost of construction as observed by clients consultants and contractors. The research seeks to identify the main factors influencing construction cost, (ii) to determine severity rank of the factors, (iii) to determine if significant differences exist between the severity rank of these factors as observed by clients, consultant and contractors. Using structured questionnaire surveys as well as stratified sampling method it obtains data from clients, contractors and consultants group. The research implored the statistical package for social science (SPSS) to analyze the data obtained from the questionnaire surveys. Spearman's rank correlation as well as student's t-test provided the basis for analysis of the factors and ascertaining, if significant differences exist between the severity rank of the factors. Research findings based on the severity rank revealed that the following factors: poor financial control on site, absence of frequent design changes, government policies, contractual procedures adopted are the most important factors that influence cost of construction, etc. The research concludes as follows: the three groups (clients, consultants and contractors) ranked and identified the most important factors affecting construction cost to be same. There were however significant differences on the rank of these factors as assessed by the three groups. The research recommends that the three key players should undertake execution of construction works with deliberate and due diligence towards mitigating that most important factors as ranked.*

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**Keywords:** *Cost of Construction, Contractors, Client/Consultants, Construction Cost Determinants.*

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### **Introduction**

The construction industry according to Leibing (2001) can be subdivided into two major areas of activity, namely building and civil engineering. They tend to complement each other and many building contracts include some civil engineering work and vice versa. In general, building work satisfies man's need for shelter and includes such diverse buildings as residential, offices, schools, hospitals etc. civil engineering works covers all the essential service needed to make the buildings operative. Distinctive examples of civil engineering works include roads, bridges, reservoirs, power stations etc. construction work is undertaken in both the public and private sectors, and the relative proportions vary over time. Construction work covers site acquisition, design, contract, site operation (construction). Operations and management, it has a great impact on the economy of all countries. The construction industry consist of all business involved in the construction of houses, office, building, high ways and bridges as well as those that offers specialized works such as electricians, plumber and masons, typically involved in the construction of all types of structures (Szymansk, 2008). The construction industry is defined in

accordance with Division 45 of the Revised 2003 Standard Classification to include the following: General construction and demolition work; establishments engaged in building and civil engineering work not specialized to be classified elsewhere. Construction and repair of buildings: established engaged in construction, improvement and repair of both residential and non-residential buildings, including specialists engaged in sections of construction and repair work such as bricklaying and the erection of steel and concrete structures etc. Civil engineering construction of roads, railways, airports, running ways, bridges, tunnels, pipelines, etc. Installations of fixtures and fittings including: gas fittings, plumbing, electrical fixture and fittings, etc. Building competition work; include establishments engaged in work such as painting and decorating, plastering, on site joinery, etc. (Cartlidge 2009). Construction is the major component of new investments. The construction industry plays a very significant role in the socio-economic development of any nation. The interrelationship between the construction industry and the broader economy emanates largely from three of the industry's characteristics namely: The public sector client as with the ability to produce investment or capital goods which contribute significantly to the national gross, domestic product (GDP) and as a source of employment both directly and indirectly by its multiple effects (Chitkara 2011).

The place of the construction industry and its activities is beginning to be better understood and appreciated in terms of the basic requirement which the client needs from the contractors and the consultant, the best quality work (Product) with minimum or considerable cost at a required time delivery. The achievement of this objective is seen as common criteria for project success of any construction projects. By considering the above objective, there are forces of actions that surround the basic element (Quality, Cost and time). These forces of actions, construction related, variables, socio economics, environmental site, construction waste related features and political factors are various factors that influence achieving project objectives. These factors operating intandem, with the basic elements (quality, cost and time), the pervasive complexity associated with successful project delivery of construction projects becomes increasingly difficult to manage.

The code of practice for project management summarizes typical expectations thus; the client expects that effective project management will enable the project's completion, by the time when it is wanted, of a standard and quality that is required and a price that is competitive (Chartered institute of Building, 2002). Toole (2003), has revealed that a close coordination is necessary among a large number of specialized but interdependent organization and individuals to achieve the cost, time and quality goals of a construction project.

The cost of constructing a project is a fundamental issue for the vast majority of construction clients. Indeed a fundamental question often asked by at the initial stage of a project is what is it going to cost me? And can we achieve it any more cheaper? Providing answers to such questions is a key objective of Quantity Surveyors, whose duty is to predict the likely cost of construction work and to manage the project in a manner that ensure that the clients approved budget is not exceeded. This is a challenging task, which frequently involves one-off unique, purpose made characteristics in constructing that particular project. In this situation the QS will need to explain the cost of construction work is influence by a wide range of factors.

The fundamental project costs are based on the actual cost of land, materials, labour, plant. Added to these costs are site overhead, head office cost and the profit in the locations where the project is being carried out. Direct costs are predominantly the labour, plant, materials and subcontractor costs involved in executing the works. The direct costs have to include allowances for materials handling and wastage, plant idle time, erection and dismantling of temporary works such as piling and consumable materials not built into the permanent works. On-costs are cost

which can be directly attributable to a contract and broadly include site staff, transport costs, welfare and site office costs, insurance and bonds. The direct cost and the on-cost together represent the costs to the contractors in undertaking the contractor. The direct costs plus the on-costs are called “the cost estimate”. The difference between the cost estimate and contractor’s selling price is the mark-up usually contains three elements, an allowance for company overheads, an allowance for risk and an allowance for profit. There is a fourth element that is the discounts obtained, or expected to be obtained a material purchase and sub-contracts. If these discounts have not been deducted the “cost estimate already has an allowance included when considering what further allowances for overheads, risk and profit to add this fourth allowance will be evaluated. These basic costs will vary depending on the numerous factors that influence cost of construction in different locations. Also in many parts of the world, particularly in Nigeria, there are other costs which are allowed for, this is the crux of this research, it investigates several of these costs which in addition to the basic costs are allowed for and their impact on cost of construction.

Cost overruns, delays and other problems tend to be proportionally monumental (Gould 2002). Cost is one of the primary measures of a project’s success. A construction project is considered successful if it is completed within the stated budget, on schedule, conform to user expectations, meet specifications and achieve quality of workmanship and with minimized construction aggravation (Songer and Mollenaar 1997). According to Fisk (1982), obtaining a construction budget at first instance is more of abstraction than reality. Fisk (1997), has observed that this situation could lead to many diverse problems such as arbitral cases, abandonment of projects, creating loss of profit through penalties or non completion and negative word of mouth that could jeopardize his/her chances of winning further jobs if at fault for contractor. To the consultants, it means inability to deliver value for money and could tarnish their reputation and result in loss of confidence reposed in them by clients, resulting in less returns on investment to the client and the added costs are passed on as higher rental/ lease costs or prices to the end users etc. in the construction industry.

No two infrastructure projects will cost the same amount of money no matter how similar they are. Apart from the basic technical factors, the wide range of economic and institutional conditions in different locations will lead to variations. But there is a need to moderate, minimize, reduce or cut cost which has become a big challenge to the construction industry in Nigeria over some years ago.

The problem of high construction costs is becoming obvious in this county and it has being observed that the substantial increase between final construction always get higher than the budgeted cost of construction. The causes of these problems are varied, some are not only difficult to predict but also difficult manage (Morris and Hough 1991). High cost of construction generally undermines the viability and sustainability of the construction industry as well as its participants. According to Mbachu and Nkado (2004), to the client, high cost implies added costs. To the professionals, high cost implies inability to deliver value for money and could well tarnish their reputations leading to loss of confidence reposed in them by clients. To the contractor, it means loss of profit for non completion; this could jeopardize the chances of winning future jobs, if at fault.

The assessment undertaken would enable construction participants, the client, consultant and contractors adopt an economic approach to construction work as well as identify the most relevant factors leading to high construction cost in Nigeria.

Cost performance is a measure of the divergence between final cost and the initial (budgeted) cost. This is a major criterion of building project success. This assertion is corroborated by

Memon et-al (2010), who also opined that construction cost is one of the most crucial measure of project success throughout the life cycle of the project and it is of high concern to those who are involved in the construction industry. To fulfill the desires of the client, cost is one of the major issues to be considered throughout the life of a project because it is a prime factor of project success (Memon et-al 2012). The construction industry has a serious challenge of poor cost performance, and this is serious in both developed and developing countries (Aziz, Memon, Rahman and Karim 2013). Azhar et-al (2008), have asserted that it is uncommon to see construction projects completed within the estimated cost. This can be attributed to the fact that construction cost is affected by a large number of factors arising from the multidisciplinary nature of the construction industry that involves many parties, such as the owner, various professionals, contractors and suppliers (Chan and Park 2005). Ogunsemi and Jagboro (2006), cited in Aje et-al (2015) have also observed that since construction expenditure accounts for 50% of the Nigerian government's expenditure, attempts directed towards ameliorating construction efficiency through cost-effectiveness and timeliness would be commendable and will surely contribute to cost savings for the whole country.

Based upon their guidance, there is therefore the need for measured actions to be taken to curtail or forestall the negative impact which several of variables can have on construction cost. Research works are abound that have studied construction project cost escalations as one of the problems facing the Nigerian construction industry while an appreciable number of these studies to a great extent have assisted in understanding of the causative factors of cost escalations, others focused on the identifying the factors that are responsible for cost overruns resulting in sums higher than the initial sums. There would however appear in relative terms lack of deliberate efforts directed towards an empirical assessment to, rank the severity of the various factors on construction cost escalations. This research is one of such efforts; it appraises the degree of the impact of the various factors which influence the cost of construction. This it has achieved by undertaking a severity rank of the various factors, which influence construction cost. The research focuses on construction cost of projects in Port-Harcourt metropolis, situated in Rivers State of Nigeria which lies between latitudes 4.85E and longitudes 6.9N.

Kangari (1989), from a study on the relative weight of ten major causes of a business failure in the United States of America, revealed construction cost related factors as mostly contributing to business failure. They include: Bad profit, management, incomplete, lack of experience, inadequate sales, loss of market and economic decline. Elinwa and Silas (1992), identified 31 essential factors causing high cost of buildings. In the study fraudulent practices and kick backs ranked second (2<sup>nd</sup>) most important factor in Nigeria. Frimpong, Oluwoye and Crawford (2003), from a study on Ghana, a developing country identified factors such as monthly payment difficulties from agencies, poor contract management, material procurement, poor technical performances and escalations of materials as the five most important factors underlying causes of delay and cost overruns in ground water projects as agreed by clients, consultants and contractors.

The research draws from previous works of other scholars: Omoregie and Radfort (2006) from a study of the Nigerian construction industry as well as opinion sample of contractors, consultants and clients established 15 (fifteen) cause responsible for projects delays and construction cost escalation in Nigeria. The survey revealed price fluctuation as the most severe cause of project cost escalation; this is attributable to the limitation in exchange rate, which in turn affects construction material prices and general price level. Aje et-al (2015) from a research undertaken in Ibadan, Oyo state on factors inhibiting cost performance in construction projects revealed that the top five factors inhibiting construction cost performance as follows: price fluctuation (SI =

79.18%), design changes (SI=75.83%), inaccurate estimate (SI=75.41%), financing and payment of completed works (SI=74.32), errors and discrepancies in contract documents (SI=73.33). in this study, the preparation and approval of drawings, shortening of contract periods and unstable government policies with severity of 62.19%, 61.62% and 54.6% respectively were ranked least among the construction cost performance inhibiting factors.

The structure of the paper is as follows: it undertakes a conceptual elucidation on factors that influence the cost of construction. The aim of the study was to determine the severity of factors affecting cost of construction projects in Nigeria, with a view to recognizing the extent and the proportional contributions of the various factors to cost of construction as observed perceived by clients, consultants and contractors, and using the outcome as (i) a basis towards achieving success in project cost objectives. The objectives of the study are as follows. Identify the factors affecting cost of construction (ii) to determine the severity rank of the factors as assessed by clients, consultants and contractors. (iii) To determine if significant differences exist in the severity rank of the factors between clients, consultants and contractors. Thirdly it summarizes the research methodology adopted. Next it undertakes an analysis of the factors that influence cost of construction based on the severity rank.

### **Variables Influencing Construction Cost**

There are several factors that inhibit the completion of projects within the estimated budget cost (Aje et-al 2015). The factor that influence cost of construction can be grouped as follows: (i) Cost related (ii) Waste on construction (iii) Site and environmental (iv) Socio-economic factors. Memon and Rahman (2014) have also divided the factors that inhibit cost performance in large projects into groups and found contractors site management category as the most prominent in exhibiting significant effect on cost performance of large construction projects in Malaysia. Arditi et-al (1985), have observed that the causes of construction cost are attributed to inflationary pressures, increases in material prices and workmen's wages, difficulties in obtaining construction materials, construction delays, deficiencies in cost estimated prepared by the consultants and the unexpected sub-soil conditions. Mansfield, Ugwu and Doran (1994) found out that construction cost were attributed to problems in finance and payments arrangements, poor contract management practices material shortages, changes in site conditions, design changes, mistakes and discrepancies in contract documents, mistaken during constructions, price fluctuations, inaccurate estimating, delays, additional works, shortening of construction periods and fraudulent practices and kickback, etc.

There is a need to control the cost of projects through good project planning and scheduling. This is with view to ensuring labour productivity, material availability and minimizing material wastage as well disputes on sites. Several factors influence the effective and smooth project management of projects and thus construction cost. Ogunlana, et-al (1996), advanced an array of factors that are responsible for inadequate production of raw materials in the county defective supply of materials in the country. Defective supply of materials occasioned by general shortages, poor communication amidst sites and head office, poor purchasing planning and material coordination. Ogunlana et-al (1996), further highlighted that mode of financing bonds and payments have a propensity to cause an upward cost in construction projects. There are cases where clients fail to honour architect's certificate of payments for up to 6 months or more where as the contract conditions, in most cases stipulates about 28 days. Poor contract management affects cost of construction. Mansfield, Ugwu and Doran (1994), attributes this to the manner in which contracts are awarded, lack of management skills and the scenario where projects are awarded to the lowest bidder. Irregular financing of public project is a major cause of liquidity problem for contractors. 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 and have very little, if any ability to plan and coordinate contracts.

Eyo-Ita-Eyo (2001), also noted that Nigeria still imports cement, when her cement production potentials surpass any other African country except Egypt and that 100% raw materials required for cement production is readily available in Nigeria. According to Fisk (1997), unclear contract procedures will lead to disputes, project delay and cost overrun. Omorgie and Radfort (2006), have asserted that material price is subject to supply and demand. Currency exchange, low or high demand, material specification, inflation pressure and availability of new materials are other factors affecting material cost. Price fluctuation is the most severe cause of project cost escalation in Nigeria. This could be attributed to the limitation in exchange rate which in turn affects construction materials prices and the general price level. Other factors include the unstable inflationary trend in Nigeria which is as a result of demand exceeding supply.

Inadequate management of cost in construction projects leads to great amount of cost overrun and attendant negative impact on both the physical and economic development of a country, making it essential to complete construction projects within the estimated cost (Memon and Rahman 2014). Government policies through regulation 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 (Aibinu and Jagboro 2002). Husseni (1991) has noted that fraudulent practices and kickbacks occasioned by greed are perpetrated by some major players in the construction industry. Elinwa and Silas (1993), have observed that fraudulent practices and kick back was the second most important factor affecting construction cost in Nigeria.

Omole (1986) has revealed that 80 percent of the contractors in Nigeria are indigenous companies. The government agencies in most cases are teleguided by the political heavy weight to award contract to party stalwarts at very high prices. The consultants estimates are disregarded in most cases when awarding contracts and where possible manipulated. It is a general knowledge that governments and parastals particularly during the last political era gave a very short time to consultants to prepare contract documents for tender purposes.

### **Research Methodology**

The research adopts questionnaire survey. Data for the study was collected, using questionnaire administered on consultants, contractor and clients within the construction industry in Rivers State of Nigeria. The questionnaires were administered to ascertain the factors influencing construction cost performance according to their importance. The questionnaires were administered to ascertain the severity rank of the factors influencing cost consultants, contractors and clients.

A total of 90 questionnaires were sent out. 76 questionnaires were returned, this represents about 85% of the total questionnaires sent out. This was considered appropriate for the analysis on the research variables undertaken. The data collected and collated from the returned questionnaire were analysed with the aid of mean item score and severity index. This methodology was also implored by Aje et-al (2015), in a study that assessed inhibiting cost performance in construction industry in Oyo state of Nigeria. The research method therefore adopted is considered appropriate in view of the variables that are analyzed in this research.

### **Research Design**

The research adopts a well structured questionnaire survey for the administration and collection of data. The respondents to administer the questionnaires were selected at random. The

questionnaire also formed the basis for the collection of primary data from the clients, consultants and contractor group operating in various areas within Port-Harcourt metropolis. The questions were structured in closed question and open response manner.

According to Wheather and Cook (2003), closed questions and an open response manner give chances to the respondents to express other likely range of opinions within questions. The questions were designed in sections with the following constituents: The personal data about the respondent, the type of company or organization. The group categorization of the respondents that is client, contractor or consultant, respondent's professional background as well as years of experience of the professional Assessment of the severity rank of the factors affecting construction cost projects; here respondents ticked the factors they consider the most severe contributing towards cost of construction.

The questionnaire were distributed to various groups (Clients, Consultants and Contractors) operating in various areas within Port-Harcourt metropolis. The choice of Port-Harcourt is predicted on its status as an administrative capital city as well the relative high level of construction activities. This coupled with the incessant increases in the price of materials and labours, consequently grants the choice of the location further impetus.

The collated data from the various groups (Client, Contractor and Consultants) were expressed in spread sheet format. The collated data were analyzed using SPSS (The statistical Package for Social Science). The data collated from the questionnaire from the various groups (clients, contractors and consultants) were analyzed and interpreted using the statistical techniques of mean score as well severity index rank. Frequency distribution and percentiles were used for the analysis of the preliminary data on the various groups that is type of company or organization, years of experience of the respondent in construction and the respondent's professional background. The statistical technique of Spearman's rank correlation coefficient was used for the assessment of the severity of the likely factors affecting cost performance, whilst the student's test formed the basis for the hypotheses testing, which was to ascertain if significant difference exist between the severity rank of the factors influencing construction cost performance as accessed by clients, contractors and consultants.

The spearman's rank correlation co-efficient is expressed as follows:

Where d, is the difference between the ranks within each pair of data points and n is the number of data paired.

$$R_s = 1 - \frac{6 \sum d^2}{n^3 - n}$$

The student's test is expressed as follows:

Where X1 and X2 are the population means for samples 1 and 2

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{(n_1 + n_2 - 2)}}} \times \frac{n_1 n_2}{n_1 n_2}$$

$S_1^2$  and  $S_2^2$ , are the variances for samples 1 and 2 (i.e. the square of the standard deviation) and  $n_1$  and  $n_2$  are the sample the significant difference between the population means is set at 95% confident level.

In the determination of the severity ranks of factors affecting construction cost among clients, consultant and contractors, a 5 scale point weighting system was adopted as follows:

1- Not Severe, 2 - Less Severe, 3 - Neutral, 4 - Severe, 5 - Extremely Severe.

**Presentation of the Research Data, Results and Discussion of Findings**

**Table 4.1 Presents values of the research parameters.**

Table 4.1: Mean Score, Rank and Identification of the most Severe Factors Affecting Construction cost as accessed by the Different Groups.

Factors	Consultants: N=25							Contractors: N = 29							Clients: N = 22						
	5	4	3	2	1	Means	Rank	5	4	3	2	1	Mean	Rank	5	4	3	2	1	Mean	Rank
Cost of materials	7	9	6	2	1	3.76	3	10	6	8	2	3	3.62	3	8	5	2	5	2	3.55	4
Contractor's cartel	7	5	5	6	2	3.36	10	8	4	2	7	8	2.90	15	5	2	3	7	5	2.77	18
Additional works	5	3	9	3	5	3.00	14	11	6	4	2	6	3.48	6	9	1	4	1	7	3.14	13
Contractual procedures	11	4	6	4	0	3.88	2	8	6	7	5	3	3.40	7	7	5	5	3	2	3.55	4
Currency exchange	8	5	4	3	5	3.32	11	6	13	4	2	4	3.52	5	4	8	2	4	4	3.18	12
Bureaucy in tendering method	7	9	3	4	2	3.60	5	9	4	7	4	5	2.28	9	7	5	4	3	3	3.45	6
Disputes on site	5	14	1	3	2	3.68	4	3	10	2	4	10	2.72	16	3	6	4	2	7	2.82	17
Duration of contract period	7	7	2	5	4	3.32	11	7	6	5	7	4	3.17	12	8	4	5	3	2	3.59	3
Economic stability	6	10	0	3	6	3.28	12	8	8	3	9	1	3.45	6	5	7	2	4	4	3.23	11
Fluctuation of prices of materials	9	5	4	4	3	3.52	7	11	5	4	3	6	3.41	7	8	4	1	5	4	3.32	9
Incorrect planning	3	11	5	2	4	3.28	12	4	15	5	5	0	3.52	5	3	9	4	3	3	3.27	10
Wrong method of estimation	5	10	2	7	1	3.44	8	5	11	4	8	1	3.38	8	4	12	0	4	2	3.55	4
Contract management	6	9	5	3	2	3.56	6	5	13	3	4	4	3.38	8	6	7	4	1	4	3.45	6
Previous experience of contractor	3	5	4	8	5	2.72	18	3	7	3	6	10	2.55	19	2	3	4	6	7	2.41	20
Absence of construction cost data	4	6	7	2	6	3.00	14	5	12	7	3	2	3.52	5	10	5	3	4	0	3.95	1
Additional cost	6	8	4	4	3	3.40	9	6	10	9	4	0	3.62	3	4	8	7	2	1	3.55	4
Project financing	7	4	8	5	1	3.44	8	8	5	11	1	4	3.41	7	6	4	5	6	1	3.36	8
High cost of transportation	5	9	6	2	3	3.44	8	7	8	9	2	3	3.62	3	7	4	5	3	3	3.41	7
Poor financial control on site	8	5	6	4	2	3.52	7	9	12	4	4	5	4.07	1	2	8	6	2	4	3.09	14
Fraudulent practices and kick backs	4	11	5	2	3	3.44	8	7	9	5	5	3	3.41	7	6	10	2	4	0	3.27	10
Inadequate labour availability	3	6	9	3	4	3.04	14	2	5	13	4	5	2.83	17	5	4	9	2	2	3.36	8
High cost of machinery	9	4	10	1	1	3.76	3	11	3	10	3	2	3.62	3	6	4	8	0	4	3.36	8



Inadequate production of raw materials.	4	13	0	7	1	3.48	8	6	11	7	4	1	3.59	4	3	10	2	4	3	3.27	10
Supplier manipulation	2	15	5	3	0	3.64	4	4	12	6	2	5	3.28	9	5	8	4	4	1	3.55	4
High cost of labour	7	8	6	1	3	3.60	5	6	14	0	4	5	3.41	7	2	9	11	0	0	3.59	3
Government policies	1	17	3	2	2	3.52	7	4	13	2	6	4	3.66	2	3	10	4	2	3	3.36	8
Relationship between management and labour	4	6	8	4	3	3.16	13	3	4	14	5	3	2.97	15	0	2	13	6	1	2.73	18
Frequent design changes	9	10	1	5	0	3.92	1	7	11	3	4	4	3.45	6	4	8	6	1	3	3.36	8
High interest rate charged by banks	5	7	4	3	6	3.08	14	6	8	3	10	2	3.21	11	4	10	3	5	0	3.59	3
Social and cultural impacts	3	2	10	9	1	2.88	16	5	3	12	6	3	3.03	14	3	5	6	4	4	2.95	3
Lack of coordination between designers and contractors	6	8	4	2	5	3.32	11	7	9	3	4	6	3.24	10	3	5	6	4	4	2.95	15
Long period between design and tendering time.	4	6	5	7	3	3.04	14	5	7	6	8	3	3.10	12	4	8	5	3	2	3.41	7
Mode of financing bond and payments	2	8	7	4	4	3.00	14	3	11	5	8	2	3.17	12	0	10	3	5	4	2.86	16
Political interferences	6	10	1	3	5	3.36	10	7	4	7	6	5	3.07	13	5	6	2	6	3	3.18	12
Number of competitors	3	1	5	16	0	2.64	19	2	5	3	11	8	2.37	20	1	2	7	8	4	2.45	20
Lack of productivity standard	3	6	7	5	4	2.96	15	3	7	5	9	5	3.07	13	4	5	8	1	4	3.18	12
Number of construction going on at the same time	1	7	6	8	3	2.80	17	5	4	8	12	0	3.07	13	2	4	7	3	6	2.68	19
Insurance cost	3	8	4	7	3	3.04	14	4	7	2	9	7	2.72	18	2	5	4	9	2	2.82	17
Labour nationality	2	5	0	15	3	2.52	20	2	4	3	11	9	2.28	20	1	6	2	12	1	2.73	18
Inflation of project cost	6	8	2	9	0	3.44	8	12	3	1	6	7	3.24	10	7	6	3	5	1	3.59	3
Site characteristics	7	4	5	7	2	3.28	12	5	9	4	7	4	3.14	12	3	7	2	4	6	2.86	16
Location of the construction project	3	8	5	6	3	3.08	14	3	7	11	3	5	3.00	14	4	7	2	5	4	3.09	14
Unforeseen site conditions	9	7	1	5	3	3.56	6	10	8	4	2	5	3.55	4	8	6	5	3	0	3.86	2
Waste on site.	6	9	5	4	1	3.60	5	6	10	2	6	5	3.21	11	3	11	4	2	2	3.50	5

**Table 4.2 Presents Results of the Student’s T-test on the Severity rank of the factors affecting construction cost.**

Table 4.2: Test of Significant Differences on the Severity Rank of Factors Affecting Construction Cost as Accessed by the Different Groups.

Groups	RS	T-cal	T-tab	Decision	P Value
Contractors/clients	0.91	0.13	1.98	Reject H <sub>0</sub>	<0.05
Clients/consultants	0.91	0.70	1.98	Reject H <sub>0</sub>	<0.05
Consultants/contractors	0.93	1.14	1.98	Reject H <sub>0</sub>	<0.05

### Discussion of Research Findings

The results as shown on table 4.1, establishes the order of the Severity rank of Factors affecting construction cost performance as perceived by clients, consultants and contractors. From the results, the most severe factor affecting cost of construction according to consultants, client and contractor is summarized in table 4.3 below.

Order of Severity Rank of Factors	As Accessed by Consultants	As Accessed by Client	As Accessed by Contractors
1 <sup>st</sup>	Frequent Design Changes (3.92)	Absence of Cost Data (3.95)	Financial Control on Site (4.07)
2 <sup>nd</sup>	Contractual Procedure (3.88)	Unforeseen Site Condition (3.86)	Government Policies (3.66)
3 <sup>rd</sup>	Cost of Materials (3.76)	Cost of Materials (3.55)	Cost of Material (3.62)
4 <sup>th</sup>	Disputes on Sites (3.68)	Duration of Contract (3.59)	Inadequate Production of Raw Materials (3.59)

### Summary of Research Findings

Drawing from the results on Table 4.2, it was established that the values of the T-cal 0.13, 0.70 and 1.14 are less than T-tab value of 1.98 and Pvalue is <0.05, hence the rejection of the null hypothesis and acceptance of the alternate hypotheses. Thus there is significant different on the severity rank of the factors affecting construction cost; this also implies that the different groups (i.e. clients, consultants and contractors) with respect to their perceptions on the severity ranks of the factors affecting construction cost in the research location are not in agreement.

The result obtained from table 4.1, the severity rank of the most important factors affecting construction cost, established that the different groups showed minor differences but most of the order were almost the same. For instance consultants and contractors rank cost of materials, high cost of machinery to be same. Also clients and consultants ranked waste on site, number of competitors as same. The three groups ranked location of the construction project as having the same impact on construction cost.

The outcome of the research finding indicate the perception of the different groups (client, consultants and contractors) from the analysis do not have same experiences neither see the factors that affect construction cost have the same severity.

The implication of the result on the most severe factors as assessed by the three groups is however suggestive that factors that influence cost of construction are invariably considered have equal importance as assessed by the three groups (client, consultants and contractors). The result of this research is consistent with that of Omoregie and Radfort 2005 as cited in Aje et-al

(2015) who from the sampled opinions of contractors, consultants and clients discovered 15 factors responsible for project delays and construction cost escalations in Nigeria. In that research, price fluctuations, was established as the most severe cause of project cost escalation; this is attributed to increase in exchange rate which in turn affects construction material prices and general price level. Memon et-al (2012), also established, that the major contributors to poor cost performance in the Peninsular Malaysia was found to include design and documentation issues, financial resources management project management and contract administration.

The result of this research are however not in total agreement with that of Elinwa and Silas (1992), who identified 31 essential factors causing high cost of buildings, of which project fraud and corruption ranked as the second most important factors in Nigeria. Hussain (1991), also posited that fraudulent practice and kick back occasioned by greed are perpetuated by some major players in the construction industry. In a related perspective Adetona (2016), has asserted that corruption and fraud are like cancers that have become the bane of our collective existence and have together created an assault on the integrity of our nation. Our citizen all over the world have been subjected to abuse, ridicule and humiliation and assault as all are perceived or expected to be fraudulent.

### **Conclusion**

Arising from the analysis of the research parameters as well as the reviews on related literature the following conclusions are drawn. The three groups (clients, consultants and contractors), ranked and identified the most important factors affecting construction to be same, showing only minor differences of the values of the mean scores. Conclusively, the most factors affecting cost of construction as assessed by the three key players are: poor financial control on site, absence of construction cost data, frequent design changes, government policies, contractual procedures, unforeseen site conditions, cost of materials, suppliers manipulations, additional cost, high cost of labour, currently exchange, duration of current period and wrong method of estimation. There were however significant difference on the severity rank of these factors, affecting construction cost in Nigeria, with respect to the perceptions of the three groups.

### **Recommendation**

The following recommendations are drawn. The key players (clients, consultants and contractors) should undertake the execution of construction works with deliberate and due diligence towards mitigating the severity of the most important factors influencing cost performance of construction as identified from the research. This necessarily requires the professional inputs of Quantity Surveyors/Project Managers in order to reduce the cost of construction. Clients should at the inception and conceptual stage of project, clearly identify project requirements viz visa financial requirements. Contractors should adopt clear plan and strategy before undertaking to execute projects.

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