Cost Reduction Strategies for Building Construction Projects in Minna

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Abstract

Reduction of the cost of construction is a constant goal for the construction industry. Despite the availability of various cost control techniques and project cost control software, many construction projects still do not achieve their cost objectives. To this end, the paper identified factors contributing to the increase in building construction cost and assesses the different strategies that could be used to reduce cost in building construction. Fifty questionnaires were distributed among professionals that were found on active construction sites using snowballing sampling technique. The results revealed that the three most important factors affecting building construction cost are construction management and contract arrangement (3.55), environmental factors and project resources (3.52) and design related issues (3.41). While the three most effective methods of minimizing building construction cost are design and value management strategy (4.02), project marketing and advertising strategy (3.90) and effective material management strategy (3.83). The problem of cost overrun will continue to be a serious issue in the construction industry if there is no clear allocation of responsibility for monitoring and controlling factors affecting construction cost to qualified individuals who can handle projects effectively.

Keywords

Construction cost, cost reduction, strategies, Minna

1. Introduction

The construction industry is a fragmented and unpredictable industry. The most indistinct concept of project management is project success. Since each

individual or group of people who are involved in a project have different needs and expectations, it is therefore not surprising that people interpret project success based on their own understanding (Cleland & Ireland, 2004). However, many efforts have been channelled toward the studies on performance of construction projects in Nigeria, which have attributed the causes of poor project performance to - cost and time overruns; quality failure to various factors (Okpala & Aniekwu, 1988; Elinwa & Buba, 1992; Aibinu & Jagboro, 2002; Baloi & Price, 2003; Ogunsemi & Aje, 2005). In spite of these research efforts, the performance of the construction industry in Nigeria has consistently been a source of concern to both public and private sector clients. Internationally, majority of studies in this area has so far been primarily concerned with investigating the factors affecting project success and success criteria. The few researches conducted on Nigerian construction industry attempted to predict cost or time overrun and also consider the performance of contractors' which led to these overruns (Aibinu & Jagboro, 2002; Ogunsemi & Jagboro, 2002), but did not capture the outcome of when a project could be regarded as being successful.

Nonetheless, Turner and Townsend (2012) asserted that the cost of construction will continue to rise in every nation of the world, not excluding Nigeria where the construction cost is acknowledged to be the highest. Alluding to this fact, Oyewobi *et al*. (2016) advanced reasons that underscore Turner and Townsend (2012) assertion. It was argued that construction work generally involved a multifaceted process which is traditionally fragmented and therefore, it is practically difficult to have a construction project accomplished without changes to either the original plan or the construction process. Keeping the cost of construction within the budget, time and quality are majorly the main goal for stakeholders in the construction industry. However, despite the availability of various cost control techniques and project cost control software, many construction projects still do not achieve their cost objectives. Although, Adafin *et al.* (2015) argued that the reliability of final construction cost especially in traditional contract approach is hinged on how accurate the baseline cost plans projection is at the design stage, but in spite of several efforts by researchers to make this approach work; construction works are still being realised at a much higher cost. Adafin *et al*. (2015) further contended that no matter how much effort or caution is exercised in the preparation of design stage elemental cost plans, deviations between the initial and the final tender sum submitted by the successful tenderer is inevitable. Nejat *et al*. (2014) underscored this by stating that the construction industry globally is facing price volatility which affects both

contractors and construction clients. This occurrence is attributable to instability in the economy, prices of construction materials, huge variances in unit tender items for different projects and among different regions is a sign that the problem is more complex (Nejat *et al*., 2014). What makes the Nigeria case worse is the presence of mono-economy and overdependence on imported construction materials. Hence, increasing demand for various construction types and limited financial availability has challenged the construction industry to cut building construction cost (Anyim, 2012). The literature search revealed that many of the previous research efforts focused on the causes of cost overrun and its effect on construction projects (Ogunsemi and Jagboro, 2002; Aibinu and Odeyinka, 2006). However, there is lack of studies that directly examines the strategies for reducing building construction cost with a view to minimising these effects. Twelve (12) years on, are there cost reduction strategies for building construction projects with specific reference to Minna?

2. Literature Review

The study conducted an extensive review of literature to explore the causes of price volatility of construction works in the construction industry and strategies for minimising the effects. These are presented in the subsections provided as follows:

2.1 Factors affecting construction cost

Cost is one out of the numerous variables that must be considered in the assessment of the success of any building project, the others being time and quality. On the other hand, there are few elements that are capable of influencing the cost of construction of building projects. According to American Institute of Architects (AIA) (2007), building cost is influenced by several elements such as location, design, performance requirements, and construction time. This assertion underscored Okpala and Aniekwu (1988) who examined the reasons for construction cost escalation in Nigeria. The study revealed that delays and direct cost overruns of the project as the main considerations prompting the high cost of construction. An aggregate of 17 elements were also identified as reasons for cost overruns which are outlined as follows; relationship between management and labour; wastage on site; inadequate availability of labour; disputes on site; effects of weather; economic instability; insurance cost; fluctuations in the prices of materials; project financing and payments; inadequate production of construction

materials by the contractor; wrong estimation methods; additional work; duration of contract; frequent changes in design; high labour cost; contracting procedure; government policies.

Al-Dulaijan (1989) clarified that the progressions that happened in the construction industry globally are created by the change in emphasis from new construction of building and infrastructure to operation and maintenance, the declining income from oil deals and the privatization of numerous parts of construction. Although the study was not conducted in the context of Nigeria but the outcome is analogous to the current situation in the country, where contractor financing has changed from premium free credits given by the government as vast development instalments to short-term, fee bearing advances given by business banks. A similar study by Elinwa and Buba (1992) that focused on the Nigerian construction industry also indicated that there are several factors influencing construction cost of buildings. It was further stated that the larger and more complex the building projects gets, the probability of having more factors affecting the cost. The study therefore summarized the causes of high construction cost for small and large buildings to include high cost of construction materials; high cost of machinery; incorrect planning; high transportation cost; bureaucracy in tendering method; number of construction work going on at same time.

Hanafi (1995) also emphasized the economic situations of Nigeria (oil sale and less government spending on projects) on contractors' performance revealing that because of the high competitions among contractors, sometimes very low profit margins are acceptable. Hanafi (1995) outlined four essential factors affecting construction costs as; High rate of interest charged by bankers on loans received by contractors, number of constructions going on at same time, level of competitions and number of competitions. However, Omoregie and Radfort (2005) in a research that focused on the Nigerian construction industry found 15 variables that cause project delays and construction cost increase through a survey of the perception of contractors, consultants and clients. The study revealed exchange rate as an impediment which influences the costs of construction material and general price level.

Based on the evidence from literature, the causes or factors responsible for increase in the cost of construction projects are subdivided into various divisions as follows:

Environmental Factors: Construction projects are affected very much by the surrounding environment unlike other industrial products. The environmental factors were subdivided into divisions as; weather effects, social and cultural impact, project location, government policies, level and number of competitors, labourers' nationality, lack of productivity and economic stability (Carr *et al.*, 1989).

Effect of weather: Nigeria has varied rainy and dry seasons with little rain during the dry season (Ubaid *et al.*, 1991). The climate of the southern part of Nigeria is directly affected by its geographical location. The relative humidity is at the highest at the thick of the rainy summer season in late July to early September. Rainfall is irregular, unreliable and occurring mostly between the months of October and April. Surface winds are at high to medium speed most of the year. These winds are usually accompanied by a rise in temperature and humidity which may cause dust. In a related development, Al-Khaldi (1990) also indicated that in the Eastern Part of Saudi Arabia it has some of the harsh climate conditions that are unfavourable for contractors to work in. So, operations conducted during such climatic conditions suffer a decrease in productivity. Furthermore, an increase in the cost of maintenance cost of the equipment will result from the climatic variables of humidity and temperature (Hinze 1989).

Project location and site condition: Project location and site condition affect cost of construction in terms of time, quantities and quality. Factors such as the quality and quantity of available foremen and labourers, harsh working conditions on sites, difficult living condition and heavy traffic congestion should be considered. According to Adonoje (1990), the geographic location of a building site, to a large extent, affect costs of construction. The cost of building a structure on a site in some States in Nigeria such as Lagos, Delta, Bayelsa or Rivers would be as much as 30% more expensive than building a similar structure in a remote town in other States. This is due to higher wages, materials, restrictions on the use of mechanical plant and protection of adjoining and adjacent buildings and pedestrians because of the congested nature of the site. Comparatively, a project located in a rural area may involve long lengths of temporary access road, provision of stand-by generators and increased costs of transporting building materials and operatives to construction site. Some project locations may be more prone to theft than others (Ubaid *et al.*, 1991). Also, the condition of the site, bearing capacity of the soil, presence of rock, ground water level, slope and existing conditions (such as old foundation or buried hazardous wastes) influence cost

of substructure and basic building cost. Urban sites may require underpinning, extra security and limitations on access and manoeuvrability.

Construction Management Factors:The construction processes are divided into conception, design and construction stages. Project conception is the recognition of a need that can be satisfied by a physical structure. The project design phase translates the primary concept into an expression of a spatial form that will satisfy the requirements of the client in an optimum economic manner. Construction operations are the final phase of the three-part process. They create the physical form that satisfies the conception and permits the actual realization of the design (Fisk, 1997). To minimize high cost of construction, overlap conflict between the construction processes should be avoided through the issuing of clear specification, good delegation and smooth communication (Fisk, 1997). Construction management problems are inadequate planning/packaging; inadequate financial control on site; disputes on construction site; relationship existing between management and labour; and lack of coordination among consultants and contractors.

Inadequate planning/packaging: The planning stage is one of the real stages that influence the cost of construction. Contractors should know about all assets that may be required for the project. The contractor ought to use the assets proficiently. Legitimate planning is vital to use project assets viably else, the project cost will experience an increment in cost.

Poor financial control on site: Monetary control of project is not a simple issue on site. All project assets, for example, labour, materials, instruments and supplies should be adequately controlled. It is fundamental for project managers to know about this variable with a specific end goal to have better monetary control on site.

Relationship between management and labour: A gap exists between the project management and labour. This gap ought to be as insignificant as could be expected under the circumstances so that the bond existing between management and labour can be reinforced. There ought to be cooperation between the groups in order to assemble a project with least cost. In the event that the relationship between management and labour is sufficiently bad, efficiency will diminish thereby prompting an increment in project cost.

Contract procedure: The contract document expresses the principles among all parties (contractor, owner and consultants) to the agreement. The contract

procedure is a component of the contract document. The contract procedure demonstrates the sort of agreement, payment technique, requirements and regulations arising from the agreement. The cost of project is influenced by the sort of agreement reached by the parties. Unclear contract agreement will prompt dispute, project deferment and cost overrun (Fisk, 1997).

Design Related Factors: Continuous design changes happen generally because of the client's requirements. This design changes may influence the contractor regarding postponement and also cost. Apart from client's requirements, other reasons such as government regulations could bring about design changes. The point of project control in the construction industry is to guarantee that a project is completed on time, within client's budget furthermore accomplishing different objectives of the project.

2.2 Strategies to minimize building construction cost

It is very clear from literature that high construction cost negatively affects the construction industry generally. The consequences of this are very enormous ranging from: abandonment of project, reduction in building activities, bad reputation to inability to secure fund for projects. However, applying the suitable strategies would restore the trust clients' have in consultants, lessen risks in project and support the practicality and manageability of the construction process generally. In line with this thought, several techniques have been proposed to minimize cost of construction. For example, Fisk (1997) highlighted two vital cost reduction procedures: the use of "value engineering concept". The essence of this concept is to deliberately dissect every capacity and remove or adjust things that add to the project cost without adding values to the project. Fisk (1997) further proposed a cautious examination of procurement costs, materials accessibility, construction routines, planning and sorting out and comparative cost affecting things, through which a change in the general cost of project can be figured out. The second strategy suggested is to give comprehensive designs devoid of avoidable errors and specifications in order to reduce misinterpretations by the contractor or deferral because of missing details.

However, Cooke and Williams (2003) opined that strategies for reducing cost include the removal or minimization of changes in design and site wastage. Cooke and Williams (2003) elucidated that the strategies will involve the establishment of the requirements and components of the project accurately before beginning, setting up the project team to do its best by keeping the project on the right track, effective human resource management through

inspiration, and project tracking including perceiving early the plans that may lead nowhere and applying restorative activities early (Ashworth 2002). Damnjanovic *et al.* (2009) suggested among other strategies the use of a variant of PPP arrangement which is tagged "availability fee" which may be capable of reducing construction cost and assist in budget planning before the commencement of work. Hanif (2008) itemised several ways of minimising the construction cost of buildings among which is to develop building technologies that will offer increased productivity; decreased construction time at the building-site, reduce waste of materials and resources. Furthermore, Damnjanovic *et al*. (2009) also proposed an effective development of a comprehensive cost risk management process at both project and programmes level. By implementing this approach, cost risk components could be identified and be managed as they occur. More recently, Building Information Model (BIM) which is an innovative idea has capability of reducing or keeping construction cost within budget by detecting design errors that often lead to increase in cost of construction early enough and eliminate rework before it occurred (Fung *et al*., 2014).

3. Research Methodology

In order to empirically examine the factors contributing to the increase in construction cost and assesses the different strategies that can be used to reduce construction cost without compromising the quality. The study adopted a quantitative approach using a survey method because it provides a formal and systematic process through which numerical data could be obtained to measure phenomena and generates finding to explain such occurrences (Akadiri & Fadiya, 2013). The survey method involved the use of a well-structured questionnaire which offers the advantage of being apposite for distribution across a wide geographical area and to a large number of respondents (Alreck & Settle, 2004).

Questionnaire design: Following the review of relevant literature on the causes of price volatility in the construction industry, an industry questionnaire survey was developed to elicit the opinions of construction professionals (architects, engineers and quantity surveyors) regarding the importance of the identified factors. Therefore, in order to explore these constructs (factors and strategies), the study adapted the measurement scales developed and used in a previous study conducted in the US that focused on construction in the transport sector (Damnjanovic *et al*., 2009). The

questionnaire was divided into three parts, first section focused on the background information of the respondents and their organisations, such as years of experience as well as their position within the organisation, the researcher believed their experience assisted the study in increasing the internal validity of the data. Section two explored the factors affecting building construction cost within the study area by using data obtained from the survey, while the last section examined strategies for reducing building construction cost. The level of severity of the factors responsible for the increase in cost of construction works is measured through the questionnaire survey based on a five-point Likert scale ranging from 1-5, where 1 is "not severe", 2 "fairly severe", 3 "severe", 4 "very severe", and 5 "extremely severe", while the assessment variables for section three was measured on a five-point Likert scale ranging from not effective to very effective. Respondents were requested to indicate the level of severity or level of effectiveness as the case maybe for each variable so as to identify and rank them in order of significance. The questionnaire was self-administered in order to increase response rate and to also provide explanation should there be the need in the course of administering the survey. However, as means of assessing the extent of the clarity and comprehensiveness of the questionnaire, a pilot survey was first conducted amongst three academic staff that has a consultancy firms and also practice in the industry as recommended (Oppenheim, 2003). This assisted in testing the appropriateness of the variables included in the survey so as to reduce non-response rates (Oppenheim, 2003). In order to ensure that the sampled population truly represent the target professionals that have the requisite experience in managing construction projects, a sample from a population that is identical and widespread was used (Alreck and Settle, 2004).

Although, there is no database or comprehensive list of such category of construction professionals from their respective professional bodies in the study area, hence, the study snowball sampling technique or respondent-driven approach which is non-probability sampling approach (Heckathorn, 2002). This technique has been described to be greatly useful in studying hidden populations (Kalton & Anderson, 1986) and in providing statistically dependable sampling behaviour in a wide range of situations (Salganik & Heckathorn, 2004). Initially, five (5) active construction sites with professionals were found but with the assistance of these professionals, 45 other professionals were found within Minna metropolis who had been involved in public construction projects in the last five years. One of the constraints of snowball sampling techniques is the challenge encountered in

estimating the size of the population to be studied, and hence the response rate achieved for the entire population and sub-groups within this population. However, in the end only 37 professionals fully responded to the survey amounting to 74% response rate, which were found valid for further analysis.

4. Data Analysis and Discussion

This section shows data analysis of the factors affecting building construction cost.

4.1 Causes of high cost of building

Table 1 shows that Quantity surveyors ranked transportation cost and cost of machineries/maintenance as the most significant factors, Architects ranked fluctuations in the prices of materials and wastage on site as the highest while builders ranked cost of machineries/maintenance and fluctuation in the prices of materials as the most significant factors affecting building construction cost. However, from the overall mean of the opinion of the stakeholders, it can be deduced that, fluctuation in the prices of materials was ranked the highest with a mean score of 4.26, followed by cost of machineries/maintenance scoring 4.25 and the third is transportation cost with a mean score of 4.20.

Table 1 Quantity suveor's ranked transportation costs

Variables	QS		Arc		Engr		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Fluctuations in the prices of materials	3.56	3	5.00	1	4.23	2	4.26	1
Limited storage facilities	1.72	7	2.50	6	3.46	4	2.56	6
Availability of construction material with respect to project location (transportation cost)	4.67	1	4.00	3	3.92	3	4.20	3
Government restrictions on importing materials	1.83	6	2.25	7	3.15	6	2.41	7
Cost of machineries/ maintenance	4.61	2	3.75	5	4.38	1	4.25	2
Wastage on site	3.06	4	4.50	2	2.77	7	3.44	5
Effects of weather	3.06	4	4.00	3	3.46	4	3.51	4

Table 2 indicates the relationship between management and labour was ranked the highest by the Quantity surveyors followed by lack of coordination between consultants and contractors, Architects ranked poor financial control on site and lack of coordination between consultants and contractors as the most significant factors while Engineers also ranked relationship between management and labour and inadequate planning/ packaging as the highest factors affecting building construction cost. Lack of coordination between consultants and contractors was the highest in the overall with a mean score of 3.84, poor financial control on site was ranked the second with a mean score of 3.81 while disputes on site was ranked third with a mean score of 3.63.

Table 2 - Construction management and contract arrangement

Variables	QS		Arc		Engr		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Contractual procedure	2.94	8	3.75	4	3.46	7	3.39	7
Project duration	3.39	3	3.75	4	3.46	7	3.53	5
Prequalification requirements for contractors	3.22	5	3.25	8	3.62	4	3.36	9
Inadequate planning/packaging	2.83	9	3.50	6	3.77	2	3.37	8
Disputes on sites	3.28	4	4.00	3	3.62	4	3.63	3
Poor financial control on site	3.00	7	4.75	1	3.69	3	3.81	2
Lack of co-ordination between consultants and contractors	3.89	2	4.25	2	3.38	9	3.84	1
Relationship between management and labour	4.06	1	2.75	9	3.92	1	3.58	4
Inconsistency of cost estimate and accuracy over the project development process	3.17	6	3.50	6	3.62	4	3.43	6

As shown in Table 3, Quantity surveyors ranked lack of detailed client's brief at the design stage as the highest followed by frequent design changes while Architects and Engineers ranked frequent design changes and lack of detailed client's brief at the design stage as the highest factor. However, from the overall mean it is shown that frequent design changes are ranked the highest with a mean score of 3.81 followed by lack of detailed client's brief at the design stage and lack of design experience with a mean score of 3.50 and 2.92 respectively.

Table 3 - Design related issues

Variables	QS		Arc		Engr		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Frequent design changes	2.83	2	4.75	1	3.85	1	3.81	1
Lack of design experience	2.11	3	3.50	3	3.15	3	2.92	3
Lack of detailed client's brief at the design stage	3.06	1	3.75	2	3.69	2	3.50	2

4.2 Identification of Strategies for Reducing Building Construction Cost.

This section shows the results of the analysis of strategies to mitigate building construction costs in the industry. It shows the mean scores of the strategies and their ranks to indicate the most significant ones in which the stakeholders should consider or concentrate on in order to actualize the goals of the projects. From the Table 4, ensuring adequate site supervisions and evaluating local market conditions for availability of resources were ranked the most effective strategies to reduce building construction costs by both Quantity surveyors and builders while Architects ranked plan ahead and discuss requirements for materials to suppliers in advance as the highest and ensure adequate site supervisions to check the quality of workmanship as the second strategy. Considering the overall mean however, ensuring adequate site supervisions to check the quality workmanship was ranked the highest with a mean score of 4.46, evaluate local market for availability of materials to effectively plan construction project was ranked second with a mean score of 3.95 while the third ranked strategy was Plan ahead and discuss requirements for materials to suppliers in advance with a mean score of 3.89.

Table 4 Adequate site supervisions and local markey conditions

Variables	QS		Arc		Engr		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Plan ahead and discuss requirements for materials to suppliers in advance	2.89	4	5.00	1	3.77	3	3.89	3
Evaluate local market for availability of materials to effectively plan construction project	4.00	2	4.00	3	3.85	2	3.95	2
Evaluate restrictions on imported materials	3.56	3	2.75	5	3.62	5	3.31	4
Add price adjustment clause to contracts	2.22	5	4.00	3	3.69	4	3.30	5
Ensure adequate site supervisions to check the quality of workmanship	4.33	1	4.50	2	4.54	1	4.46	1

The material management strategy in Table 5 indicates that all the stakeholders ranked effective waste control on site as the most effective strategy, Builders and quantity surveyors ranked bulk purchase of materials as the second most effective strategy while Architects ranked consider locally available materials in design as the second. However, in order to show the strategies with the more significant effect on construction cost, ensuring effective waste control on site has the highest mean score of 4.64 followed by considering locally available materials in design then considering bulk purchase of materials which are 3.70 and 3.65 respectively.

Table 5 Stakeholders' ranking

Variables	QS		Arc		Engr		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Consider locally available materials in design	4.06	3	3.50	2	3.54	3	3.70	2
Reuse and recycle materials	3.83	4	3.25	3	2.92	4	3.34	4
Consider bulk purchase of materials	4.11	2	2.75	4	4.08	1	3.65	3
Ensure effective waste control on site	4.83	1	5.00	1	4.08	1	4.64	1

In the design and value management strategy shown in Table 6, review specifications to check if they are applicable to the given project was ranked highest by the Quantity surveyors, hire experienced workers and motivate qualified workforce to improve productivity and quality of workmanship was ranked second which was the first by the architects and review specifications to check if they are applicable to the given project was ranked second. Engineers ranked check cost effectiveness of specified items at early stage as the first strategy followed by hire experienced workers and motivate qualified workforce to improve productivity and quality of workmanship. The highest ranked strategies in this section are hire experienced workers and motivate qualified workforce to improve productivity and quality of workmanship with a mean score of 4.37, followed by review specifications to check if they are applicable to the given project and check cost effectiveness of specified items at early stage with mean scores of 4.34 and 4.12 respectively.

Table 6 - Design and value management strategy

Variables	QS		Arc		Engr		Overall	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Consider alternative designs	4.44	2	4.25	3	3.62	4	4.10	4
Check cost effectiveness of specified items at early stage	4.28	4	4.00	4	4.08	1	4.12	3
Review specification to check if they are applicable to the given project	4.67	1	4.50	2	3.85	3	4.34	2
Understand and manage environmental restrictions	3.28	6	4.00	4	3.54	5	3.61	5
Provide schedule flexibility to contractors	3.39	5	4.00	4	3.31	6	3.57	6
Hire experienced workers and motivate qualified workforce to improve productivity and quality of workmanship	4.44	2	4.75	1	3.92	2	4.37	1

Table 7 shows that providing comprehensive information required for easier interpretation of drawings and setting out of the works was ranked highest by the Quantity surveyors followed by educate and train consultants and contractors about new/different design criteria, however there is no variation in the ranking of strategies in this section by the Architects while builders ranked educate and train consultants and contractors about new/different design criteria as the highest then have enough knowledge about the contractors and their capacities. The overall mean of all the stakeholders however shows that educate and train consultants and contractors about

new/different design criteria is ranked highest with a mean of 3.99 followed by provide enough information required for easy interpretation of drawings and setting out of the works with a mean score of 3.79 and the third strategy is having enough knowledge about the contractors and their capacities with a mean score of 3.75.

Table 7 - Information and training strategy

No	Variables	QS		Arc		Engr		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	Provide enough information required for easy interpretation of drawings and setting out of the works	4.17	1	3.75	1	3.46	3	3.79	2
2	Have enough knowledge about the contractors and their capacities	3.72	3	3.75	1	3.77	2	3.75	3
3	Cross-district sharing of lessons learned	3.17	4	3.75	1	3.38	4	3.43	4
4	Educate and train consultants and contractors about new/different design criteria	4.06	2	3.75	1	4.15	1	3.99	1

In Table 8, provide for contractor opinion when developing drawings, specifications, and the construction schedule was ranked highest by the Quantity surveyors followed by conduct pre-bid meetings, Architects ranked conduct pre-bid meeting as the highest followed by conduct constructability

reviews. Structural engineers/builders however ranked conduct pre-bid meeting as the highest followed by provide for contractor opinion when developing drawings, specifications, and the construction schedule. Conduct pre-bid meetings came first in the overall with a mean score of 3.82, followed by provide for contractor opinion when developing drawings, specifications, and the construction schedule with a mean of 3.51 and conduct constructability reviews with a mean of 3.21.

Table 8 - Stakeholder input strategy

Variables	**QS**		**Arc**		**Engr**		**Overall**	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
Conduct pre-bid meetings	3.83	2	4.00	1	3.62	1	3.82	1
Provide for contractor opinion when developing drawings, specifications, and the construction schedule	4.00	1	3.00	4	3.54	2	3.51	2
Involve contractor in the design process	2.89	3	3.25	3	3.23	3	3.12	4
Conduct constructability reviews	2.89	3	3.50	2	3.23	3	3.21	3

From Table 9, the highest strategy ranked by the quantity surveyors are taking adequate time during design to get it right in the first place and the second is to Implement formal risk identification and management programme, market new projects aggressively was ranked highest by the architects followed by implement formal risk identification and management programme while builders ranked avoid lumping too many work items together as the highest strategy followed by develop selection tools for contracting methods based on past performance of alternative contracts. In the overall mean, both avoid lumping too many work items together and take more time during design to get it right in the first place have the highest

scores of 4.15 then develop selection tools for contract methods based on past performance of alternative contracts with a mean score of 3.91.

Table 9 - Project marketing and advertising strategy

No	Variables	QS		Arc		Engr		Overall	
		Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
1	Market new projects aggressively	2.50	6	4.50	1	3.54	5	3.51	6
2	Avoid lumping too many work items together	3.89	4	4.25	2	4.31	1	4.15	1
3	Take more time during design to get it right in the first place	4.61	1	4.00	4	3.85	3	4.15	1
4	Do a more thorough job of determining and optimizing the scope of the project before design begins	4.00	3	3.75	6	3.69	4	3.81	5
5	Implement formal risk identification and management program	4.11	2	4.25	2	3.31	6	3.89	4
6	Develop selection tools for contracting methods based on past performance of alternative contracts	3.67	5	4.00	4	4.08	2	3.91	3

5. Discussion of findings

The determinants of the increase in building construction cost and the different strategies that can be used to reduce building construction cost were categorized under different headings. These were done in order to bring to the fore factors responsible for upsurge in cost of construction works. The finding revealed that the most critical environmental and project resources factor that accounts for cost increase as identified by the professionals is fluctuation in the prices of materials. These results affirmed the assertion of Elinwa and Buba (1992) and Omoregie and Radfort (2006), who among other factors identified unstable cost of materials as one of the main factors responsible for high cost of building.

The causes of cost increase of construction cost under the category of construction management and contract arrangement indicates that lack of coordination between consultants and contractors, poor financial control and dispute on construction site are the three major factors responsible for increment of construction cost. The findings presented here underscored Fisk (1997) who asserted that unclear contractual or procurement methods will certainly prompt dispute, project delay and cost overrun. However, Love *et al*. (1998) who identified poor coordination and communication between stakeholders as one of the major causes of clients' dissatisfaction. Alnuaimi *et al.* (2010) also posited that contractors capitalized on bad contractual procedure to increase cost of construction works by taking advantage of loose ends in the contract clauses.

Frequent changes in the design were rated as the most severe causes of increase in cost of construction works under design-related issues. This is because inconclusiveness of design gives room for variations and may result in cost overrun (Enshassi *et al*., 2010).

In order to mitigate the determinants of increase in the cost of construction works, the findings revealed the need to ensure adequate site supervisions to check the quality of workmanship; ensure effective waste control on site; hiring of experience workers and motivation of qualified workforce to improve productivity and quality of workmanship; educate and train consultants and contractors about new/different design criteria such as conduct pre-bid meetings; avoid lumping too many work items together; take more time during design to get it right in the first place.

6. Conclusion and recommendations

Conclusively, the primary factor influencing cost of construction as settled upon by the stakeholders in the construction industry is fluctuation in the costs of materials. Quantity Surveyors as cost specialists are encouraged to analyse this element and take extraordinary consideration when assessing to incorporate contingency in the budget, plan for and control the negative impacts of this factor on building construction cost. Additionally, it was concluded that the best procedure to reduce building construction cost is by effective waste control on site; hence contractors, site managers and project managers are encouraged to take necessary measures to minimize wastage on construction site. However, construction cost control ought to begin at feasibility stage, this will guarantee the achievement of cost reduction and other project goals. It was recommended that the best strategies are to control wastage on site, and institute regular and effective work supervision to check the level and quality of workmanship.

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