

ASSESSMENT OF CAUSES OF TIME AND COST OVERRUNS IN BUILDING PROJECT DELIVERY IN OSUN STATE NIGERIA

¹Oyewo O.W.; ²Raji M.; ³Alimi W.O. & ⁴Oyedele A.J.

1, 2, 3 Department of Quantity Surveying, Osun-State Polytechnic, Iree; Osun-State;

4 Department of Quantity Surveying, Osun State College of Technology, Esa-Oke, Osun State.

Corresponding Author's E-mail: olumideoyewo4@gmail.com

ABSTRACT

Time and cost overrun occurs in building projects when final cost and completion period exceed initial contract sum and time allocated the project. In Nigeria, with the ever increasing number of public building construction projects from time to time. it becomes difficult to complete projects within the allocated cost and time, which usually results in a lot of abandoned projects. Osun State as one of the states in Nigeria is not exempted in this scenarios. Therefore, this research was set out to identify and assess causes of time and cost overrun in building projects in Osun state and its effect on the construction industry in the state. Questionnaire survey was used to collect data on time and cost overruns. A total of 70 questionnaires were distributed to clients, consultants and contractors with the total number of 52 answered, filled and returned. Analysis was carried out using both descriptive and inferential statistics. The Research identified and assessed causes of time and cost overrun in projects delivery in Osun state, with Inflation or sudden increase in prices of building materials ranked highest amongst other factors, while delay was ranked highest as the effect of these factors on project delivery in Osun state Nigeria.

Keywords: Delays, Inflation, Time and cost overrun

INTRODUCTION

One of the important criteria for project success is project completion within budget, time and clients' satisfaction of the project requirements. In the construction industry, completing a project within budget is a complex task, even more critical, as companies work on narrow margins. Even with various cost control software and techniques, cost overruns in construction projects are not uncommon all over the world (Olawale & Sun, 2010). Eden, Ackermann & Williams (2005) illustrated that the growth in project cost is "amoebic" in nature. Hence, according to them, it is not easy to track down what drives total cost overrun. They also stated that project costs escalate in an exponential manner and not linearly. Therefore cost overrun has become a common phenomenon on construction projects all over the world. Chan and Park (2005) established that the cost of construction is affected by many factors. However, these factors differ from country to country and these include: political, economic and cultural factors. The Nigeria construction industry is delighted at keeping the final project cost within the initial budget estimate, or at least very close to it. Between 1983 and 1988, it was reported that out of thirty-seven (37) projects abandoned as a result of changes in contract prices, twenty-seven (27) were caused as a result of cost

escalation; three(3) were as a result of corruption; four (4) were due to lopsided foreign agreement; and three (3) due to political reasons. Omoniyi (1996) revealed that changes in contract prices in Nigeria were principally as a result of a number of factors including variations, claims and compensations, fluctuation, delayed payment, over-payment for political or corruptive motives, disputes, expenditure of provisional sums and quantities, prime cost sums and day work. These changes are responsible for the abandonment of a number of building projects in Nigeria. Primarily, cost is one way of gauging how successful a project had been. This is more real in Nigeria like other developing countries particularly when it comes to public projects which are executed with the taxes of the citizens. Songer and Molenaar (1997); Arditi et al, (1997); Frimpong et al, (2003) and Atkinson (1999) asserted that the common criteria for determination of a project's success are generally considered to be cost, time and quality. Songer and Molenaar (1997) considered a project successful if it was completed on budget, on schedule, conformed to user expectations, met specifications, attained quality of workmanship and minimized construction aggravation. Darrell, (1995) however added, that completion alone does not constitute success for the project owner. For the owner,

much of the success of a project depends on many factors, the most important of which is project completion within specified cost parameters (i.e. within a specified budget). The second most important factor affecting success is timely completion; as delays in completion of facilities often directly equate to financial losses due to lack of revenue from facility operation. On the whole, a project cannot be considered successful except it is executed within the expected cost and time, meeting the proposed utilization date as well as technical specification. Hence, this research is aimed at identifying factors causing time and cost overrun and their effects on construction building projects.

LITERATURE REVIEW

Construction cost includes but not limited to the following: the cost of Labour, Material, Plant, land and professional fee used in actualization of a building (Abubakar, 2009). Shanmugapriya and Subramanian (2013) defined cost overrun as the difference between original cost estimate of a project and actual construction cost on completion. This implies that cost overrun is the amount of money spent over what was planned or intended. Similarly, the authors defined time overrun as the extension of time beyond planned completion date traceable to the contractor.

Also, Bentil, Nana-Addy, Asare and Fokuo-Kusi (2017) cited in Kadri, Dele & Babajide, (2017) defined cost overrun as the change in contract amount divided by the original contract award amount converted to percentage for ease of comparison. In other words, cost overrun is the percentage difference in cost between the final construction cost of a project and the contract award amount. Ahabab (2012) affirmed that cost overrun occurs when the actual cost of a project is more than the estimated cost. Similarly, that time overrun occurs when a project is finished later than the original estimated time. Vaardini and Subramarian (2015) observed that all projects regardless of size and complexity are burdened by uncertainties in deadlines. There have been extensive research on the causes of cost overrun in construction projects in various countries such as Vietnam (Hoai, Lee & Lee, 2008) Nigeria (Mansfield, Ugwu and Doran, 1994), Ghana (Frimpong, Oluwoye, and Crawford, 2003), Kuwait (Koushki, Al-

Rashid & Kartam, 2007) Turkey (Arditi, Akan & Gurdamar, 1985), Malaysia (Abdulkadir et al., 2005), Libya (Al Gathafi, 2005), Pakistan (Azhar, Farooqui & Ahmed, 2008) and Indonesia (Kaming et al., 1997). These studies concluded that cost overrun is a common phenomenon in construction projects all over the world.

Factors causing cost overrun differ from country to country and depend on the political, economic and cultural climate. Ameh and Osegbo (2011) focused on the relationship between time overrun and labour productivity in construction sites in Nigeria, found out that most projects executed in the study area experienced 51% time overrun.

Summary of Causes of Inaccurate Time/Cost Overruns in Building Projects Delivery:

It has been established by various authors that overruns in cost and time in projects accounted for delays in projects completion. These problems include: Management problem, inflation, fluctuation, contractors cash flows related problems.

RESEARCH METHOD

Data were collected through questionnaires administrated on key players in project delivery with particular focus on clients, consultants and contractors in Osun State. Seventy (70) respondents were selected through systematic random sampling techniques. Information relating to causes of cost and time overruns were obtained from the respondents as they were asked to express their view on this issues. Also, their individual particulars were requested so as to establish the reliability of the data collected from them. Out of 70 distributed questionnaires, 52(74.29%) were returned and used for analysis. Data collected were subjected to descriptive and inferential statistics. Mean Score method was adopted to establish the relative importance of the causes of time/cost overrun for public building construction projects in Osun state. The mean score (MS) for each variables of Time/cost Overrun is computed by using the following formula;

$$MS = \frac{\sum(f \times S)}{N} \text{-----eqn[3.1]}$$

Where:

MS – Mean Score

- F – Frequency of responses for each score
- S – Scores given to each factor (from 0 to 4)
- N – Total number of responses concerning each factor

The Spearman (rho) rank correlation coefficient is used for measuring the differences in ranking between two groups of respondents scoring for various factors (i.e. clients versus consultants, clients versus contractors, and consultants versus contractors).

The Spearman (rho) rank correlation coefficient for any two groups of ranking is given by the following formula:

$$\text{Rho}(\rho_{\text{cal}}) = \frac{1 - 6 \sum d_i^2}{N(N^2 - 1)} \text{-----eqn [3.2]}$$

Where:

Rho(ρ_{cal}) – Spearman rank correlation coefficient

d_i – The difference in ranking between each pair of factors

N – Number of factors (variables)

Procedure for hypothesis testing:

- I. Define the null hypothesis (H_0) and the alternative hypothesis (H_A)
- II. Choose a value for ρ (i.e. choose the significance level)
- III. Calculate the value of the test statistic
- IV. Compare the calculated value with a table of the critical values of the test statistic.
- V. If the calculated value of the test statistics is less than the critical value from the table, accept the null hypothesis (H_0). If the absolute (calculated) value of the test statistics is greater than or equal to the critical value from the table, reject the null hypothesis (H_0) and accept the alternative hypothesis (H_A).

DATA ANALYSIS

Below shows the number of questionnaires distributed to clients, consultants and contractors and the number of questionnaires returned from these stakeholders including their percentage response rate.

Table 1 Summary of number and percentage of questionnaires distributed

No.	Respondent	Questionnaire Distributed	
		No.	(%)
1	Consultants	32	45.7
2	Contractors	25	35.7
3	Clients	13	18.6
	Total/Average	70	100.00

Table 2 Summary of number of Questionnaire returned

No.	Respondent	Questionnaire Returned		Response Rate
		No.	(%)	(%)
1	Consultants	28	53.85	87.50
2	Contractors	17	32.69	68.00
3	Clients	07	13.46	53.85
	Total/Average	52	100.00	74.29

Table 1 and 2 show the number of questionnaires distributed and returned. The total of 70 questionnaires were distributed to Clients, consultants, and contractors in the state of Osun who have been involved in public projects with 32 questionnaires distributed to construction consultants (45.7%) with 28 duly filled and returned which stood for (53.85%); and a response rate of (87.50%) which shows that the research has a good response to make the research valid and relevant. Likewise, contractors questionnaires distributed 25 (35.7%), returned 17(32.69%), response rate (68%); and clients questionnaires distributed 13 (18.6%), returned 7(13.46%), response rate (53.85%). Thus, the researchers had a good response from the questionnaire response thus making his finding reliable and valid.

Table 3 The professionals who serve as consultants

Professionals	No Dist.	No Ret.	No not Ret.	% of Return	% of not Ret.	Total
Project Management	4	4	0	100%	0.0%	100%
Architectural	8	7	1	87.5%	12.5%	100%
Quantity Surveying	10	10	0	100%	0%	100%
Civil Engineering	5	4	1	87.5%	12.5%	100%
Estate Managers e.t.c	5	3	2	60.0%	40.0%	100%
Total	32	28	4	87.5%	12.5%	100%

Table 3 shows the construction consultants engaged in this research, the table shows the how the questionnaires were distributed; thus; making them relevant for the purpose of this research, and making their response valid.

Table 4 Academic Qualifications of the respondents

	Frequency	Percent
HND	7	13.46%
BSC/BTech	12	23.08%
MSC/MTech	25	48.08%
Ph.D.	8	15.38%
Total	52	100.0

Table 5 Years of Experience of the Respondents

Years of Working Experience	Midpoint X	Frq.	FX
0-5	2.5	10.00	25.00
6-10	8	12.00	96.00
11-15	13	13.00	169.00
15-and above	15	17.00	255.00
Total		52.00	545.00

Mean working experience

$$= \sum FX / \sum F = 545/52 = 10.48 \approx 11 \text{ years}$$

Tables 4 and 5 show the Academic and Years of working Experience. From the two table above it was observed that most of the respondents are well educated and had a very good years of working experience which make them useful for the purpose of this research with their response relevant and valid for the purpose of this research.

Causes of Time Overrun in Building Projects:

In order to assess the causes of time overrun in building projects, the respondents were asked to rank the identified causes of time overrun based on (literature reviewed) on a significant scale of 1 to 4 with 1= not significant, 2=Moderately significant, 3=Very significant, 4= Highly significant

Table 6: Causes of time overrun in Building Project Osun state Nigeria

Causes of Time Overrun	MS of Client	MS of Contractor	MS of Consultant	Weighted Avg.	Responsible Party	Remark	Rank
Change orders and/or lack of control on excessive change orders	2.75	3.08	3.14	3.00	Client & Consultant	Very significant	3
Delay of drawings and/or Instructions desired by the contractor.	2.75	3.08	3.07	2.97	Consultant	Moderately Significant	4
Changes in plans and drawing	2.75	2.83	3.14	2.92	Clients, & Consultants	Moderately Significant	5
Need for re-measurement of Provisional Quantities.	2.75	2.92	2.86	2.84	Consultant	Moderately Significant	6
Late identification of problems	3.08	2.67	2.71	2.82	Consultant & Contractor	Moderately Significant	7
Late hand-over of site to the Contractor	2.92	2.75	2.79	2.82	Client	Moderately Significant	7
Lack of planning and coordination or less emphasis to planning	3.17	3.33	3.21	3.24	Client	Very significant	1
Ambiguous specifications	2.75	3.00	2.64	2.79	Consultant	Moderately Significant	8
Lack of thorough geotechnical investigation	2.92	3.00	3.29	3.08	Consultant	Very significant	2
Discrepancies in Tender documents	2.83	2.83	2.57	2.74	Consultant	Moderately significant	11
Work suspension order by the Engineer	2.58	2.58	2.57	2.58	Consultant	Moderately significant	12
Supplementary/additional agreement	2.75	2.58	2.14	2.47	Client & consultant	Moderately significant	14
Modifications originated from the clients or end users	2.17	2.92	3.14	2.76	Client	Moderately significant	10
Difficulties in obtaining construction materials in the local market	3.00	2.75	2.57	2.76	Contractor	Moderately significant	10
Complexity of construction projects	2.75	2.42	2.36	2.50	Consultant & Contractor	Moderately significant	13
Poor communication among contractor, consultant, and the client	2.42	2.50	2.50	2.47	Client, Consultant & Contractor	Moderately significant	14
Defective work at construction stage	2.42	2.67	2.36	2.47	Consultant & Contractor	Moderately significant	14
Delayed payments to contractors by the Client	2.00	3.00	2.21	2.39	Client	Moderately significant	15
Bureaucratic effect of client's organization resulting in delayed action	2.42	2.50	2.14	2.34	Client	Moderately significant	16
Opening up of executed work where the contractor is not at fault	2.50	2.17	2.21	2.29	Client & Consultant	Moderately significant	17
Indemnities that the employer has contractually undertaken to assume	2.42	2.42	2.00	2.26	Clients	Moderately significant	18
Errors in setting out which are based on incorrect written data supplied by the Engineer	3.00	2.75	2.57	2.76	Consultant	Moderately significant	9
Different consultant for Design, Supervision & Contract Administration	1.58	2.33	2.71	2.24	Consultant	Moderately significant	19
Searching for defects which are not the fault of the contractor	2.17	2.50	1.93	2.18	Client & Consultant	Moderately significant	20

Source Field survey 2018

Causes of Cost Overrun in Building Projects:

In order to assess the causes of time overrun in building projects, the respondents

were asked to rank the identified causes of Cost overrun based on (literature reviewed) on a significant scale of 1 to 4 with 1= not significant, 2=Moderately significant, 3=Very significant, 4= Highly significant

Table 7: Causes of cost overrun in Building projects in Osun state Nigeria

Hypothesized Causes of Time/cost Overrun	MS of Client	MS of Contractor	MS of Consultant	Weighted Avg.	Responsible Party	Remark	Rank
Fluctuations	3.42	3.33	2.64	3.11	Economy	Very significant	2
Extra costs incurred through variations	3.00	3.00	3.21	3.08	Consultant	Very Significant	3
Change in foreign exchange rate (for imported materials)	2.75	3.50	2.93	3.05	Government	Very significant	4
Costs due to special risks, e.g civil unrest etc	2.92	3.00	3.07	3.00	Clients, Consultant & Contractor	Very significant	5
Over/ Under Estimation of Quantities	3.25 3.25	3.33 3.33	2.00 2.00	2.82 2.82	Consultant Consultant	Moderately Significant	6
Inflation or increase in the cost of construction materials	3.00	3.67	3.14	3.26	Clients	Very significant	1
Insolvency Contractors	2.67	3.17	2.57	2.79	Contractor	Moderately significant	7
Damage/Loss through anticipated risks or employers risk	2.50	2.83	2.43	2.58	Client	Moderately significant	8
Cost associated with test of samples not provided in the contract	2.42	2.25	2.57	2.42	Client & Consultant	Moderately significant	9
Cost under estimation	2.92	3.08	2.43	2.79	Client, Consultant & Contractor	Moderately significant	7
Contract acceleration required by the employer (to shortening the contract time)	2.33	2.75	1.79	2.26	Client & end user	Moderately significant	10
Sudden change in tax/ government monetary policies	2.25	2.75	1.71	2.21	Economy	Moderately significant	11

Source Field survey 2018

Tables 6 and 7 show the level of significance of this identified factors as the causes of the time and cost overruns in building project in Osun state, Lack of planning and coordination or less emphasis to planning, is ranked highest as the cause of time overrun with a weighted average of (3,24) while Inflation of prices of material or increase in

the cost of construction materials was ranked highest with a weighted average of (3.26), which shows the level of its significance to be very severe, it is observed that these aforementioned factors causes project to either experience cost or time overrun in building projects in Osun state. Furthermore factors like Sudden change in

tax/government monetary policies and Searching for defects which are not the fault of the contract or have no significance effects on causing a project to either experience cost or time overrun on a project in Osun state.

CONCLUSION AND RECOMMENDATION

Time and cost over utilization in construction project is of a paramount importance. Identification of causes of cost or time overrun is a prerequisite to minimize or to avoid cost and time over utilization in the construction industry. However, the analysis of the results from the open-ended section of the questionnaire was carried with the use of descriptive analysis. From the results of the analysis of theoretical study and respondents' responses the following conclusions are made:

➤ That Inflation of prices of material or increase in the cost of construction materials are the major cause of cost overrun in construction project in Osun State, Nigeria.

➤ That lack of proper planning of project also causes Time overrun in Delivery of construction project in Osun State, Nigeria. From the results of the analysis of theoretical study and respondents' responses the following recommendation are made:

➤ The client should ensure early payment of contractors valuation payment to ensure that the contractors doesn't suffer from cash flow constraint which can further linger the execution of the projects this will ensure prompt delivery of the project.

➤ Proper planning of project should be done by conducting feasibility studies, and all necessary assessment to ensure that project is feasible before proceeding.

➤ Government should encourage and introduce flexible market prices to avoid inflation and increase in prices of materials.

➤ Further studies should be done on assessing the impacts of proper planning as a tool in mitigating against time overrun in construction projects in Osun State.

REFERENCES

- Adams, O. (1997). Contractor Development in Nigeria: Perceptions of Contractors and Professionals Construction Management and Economics. *Journal of Construction managements and Economics*, 15(1), 95-108.
- Ameh, O. J., & Osegbo, E. E. (2011). Study of Relationship between time overrun and productivity on Construction Sites. *International Journal of Construction Supply Chain Management*, 1(1), 56-67.
- Assaf, S. A., Al-Khali, M., & Al-Hazim, M. (1995). Causes of Delays in Large Building Construction Projects. *Journal of Management in Engineering ASCE*, 11(2), 45.
- Baldwin, J. R., & Manthei, J. M. (1971). Causes of Delays in the Construction Industry. *Journal of Construction Division ASCE*, 97(1), 177-187.
- Bennie, F. G. (1982). *Control Procedure for Development Projects in Construction Projects: Their Financial Policy and Control*. London: Construction Press Publication.
- Charles, T. J., & Andrew, M. A. (1990). Predictors of Cost-Overrun Rates. *Journal of Construction Engineering and Management*, 116(3).
- Dele, S. K., & Babajide, O. O. (2017). Cost and Time Overruns in Building Projects Procured Using Traditional Contracts in Nigeria. *Journal of Sustainable Development*, 10(5), 234.
- Eden, C., Ackermann, F., & Williams, T. (2005). The Amoebic Growth of Project Costs. *Project Management Institute*, 36(1), 15-27.
- Frimpong, Y., Oluwoye, J., & Crawford, L. (2003). Causes of Delay and Cost Overruns in Construction of Groundwater projects in Developing countries: Ghana as a case study. *International Journal of Project Management*, 21, 321-326.
- Ibrahim, A. O., & Aminu, K. H. (2004, December 8). Causes and Impacts of Differentials in Contract sums of Building Projects in Nigeria. *The Nigerian Quantity Surveyors*, 49, 26-33.
- Idoro, G. I. (2007). *A Comparative study of Direct Labour and Design-Tender-Construct procurement system in Nigeria*. University of Lagos, Akoka Yaba, Department of Building, Lagos.
- Omoniyi, M. I. (1996, April/May). A Critical Analysis of Abandoned Projects in Nigeria. *Builders Magazine*, pp. 4-10.
- Shanmugapriya, S., & Submanian, K. (2003). Investigation of Significant factors Influencing Time and Cost Overruns in Indian Construction Projects. *International Journal of Emerging Technology and Advanced Engineering*, 3(10), 732-740.
- Vaardini, U. S., & Subramanian, K. (2015). Identification of Causes and Impacts of Time Overrun in Construction Projects. *International Journal of Applied Engineering Research*, 10(19), 14253-14261.