Assessment of Cost and Time Performance of Tertiary Educational Trust Fund (TETFund) Construction Project in South-West Nigeria

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Funds have been allocated to TETFund annually for infrastructural development in Nigeria to address decays of educational facilities and create an enabling environment for teaching and learning. This study evaluates time and cost performance of public building construction projects funded by TETFund in South-West Nigeria. The study adopted questionnaire survey by self-administering two hundred and fifty (250) questionnaires to project clients, consultants and contractors engaged in TETFund projects in South-West Nigeria. One hundred and eighty-six 186 (74.4%) of the questionnaires were retrieved from the respondents and were used in the study. Also, record of project cost and duration were purposively obtained from two hundred and fifty-four (254) TETFund sponsored projects from Institutions in South-West Nigeria. Mean Score (MS) was used to rank the various items and components while regression analysis was used to forecast future project cost and time. The top three factors that influence cost and time based on the perceptions of the respondents are client satisfaction with the project (MS= 3.86), construction time predictability (MS= 3.85) and construction cost predictability (MS= 3.83). From the TETFund project records analysed, a total sum of ₦10,856,167,497.14 was spent on TETFund building construction projects in South-West Nigeria from 2003-2013 with a contingency sum of ₦163,248,265.44. The average percentage cost overrun for TETFund projects was 1.62% and that of time overrun was 112.23%. Regression analysis of the predicted project time and cost was significant and can be used to forecast time and cost of future TETFund projects. Therefore, it was recommended that accurate cost estimate, adequate project planning and good specification should be carried out by project stakeholders before contracts are awarded to enhance construction project performance. Also, the developed regression model of estimated project cost and time can be used to predict cost and time of future construction projects.
Keywords: Construction projects, cost, performance, TETFund, time

INTRODUCTION

The construction sector is a significant component of the economy and is crucial to the social, economic and national growth of any country (Ofori, 2015). It is a product-based industry with specific project features and stakeholders are involved throughout the project life cycle (Shabir & Tauha, 2014). Construction industry in the United Kingdom (UK) employs more than 3.2 million of skilled and unskilled experts in its small, medium and large construction firms, representing 12% of employed work force in the UK (UKCG, 2012). World Bank advised construction industries in developing nations like Nigeria to employ minimum of 3.2% of the countries' workforce. But the Nigerian construction industry's contribution to employment has stayed stable at 1.0% over the last ten years (Mangvwat *et al*., 2020; Olamoju & Olagoke-Salami, 2020). Also, in the first quarter of 2016, the nation experienced a negative growth in the Gross Domestic Product (GDP) of -0.36% in real terms (CBN, 2016; NBS, 2014). This trend continued to 2018 as the construction's average nominal current growth rate for 1st quarter (Q1) to Q4 in 2016 was -5.98, Q1 to Q4 in 2017 was 1.00 and the Q1 for 2018 was -1.58. These make construction industrial sector to negatively contribute to the GDP with relative contributions of 0.23 percentage points in the first quarter of 2018 (CBN, 2018; NBS, 2018). Also, despite Nigeria's massive infrastructure deficit and the construction sector receiving 70% of the country's fixed capital formation, building and construction industry has not yet reached its full potential relative to other sectors (Idrus & Sodangi, 2010; Mangvwat *et al*., 2020). Recently, building, construction and infrastructural development have not positively contributed to the GDP of Nigeria as their performance curve is abnormal and retrogressing (NBS, 2018). A study by Amaechi (2016), Zailani *et al*. (2019), Gupta and Kumar (2020) linked poor performance of the construction industry to poor cost, time and quality performance of construction projects which resulted in building collapse, project abandonment and poor quality of works executed by the industrial players (Adedeji & Ajayi, 2022). A cost and time framework that will enhance construction project performance and improve project delivery time and cost should be carried out to improve project performance.

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For the construction industry to provide value for money and successfully meet the needs of its clients, it is necessary to improve project performance and stakeholder efficiency (Johnson & Babu, 2018). In an attempt to enhance the relationships and effectiveness of the stakeholders involved on construction projects, several studies have been conducted in the industry to increase project performance. However, little improvement was recorded as 70% of construction projects in Nigeria experienced delay in their execution with additional cost to the client (Ayodele & Alibi, 2011; Adedeji & Ajayi, 2022). Amu and Adesanya (2011) also recorded that out of the 3, 407 civil engineering projects executed in South-West Nigeria, only 0.7% were completed on time, 46.1% suffered time overrun while (53.2%) were abandoned. Also, previous studies conducted in the industry on cost and time performance by Aibinu and Jagboro, (2002), Aje *et al*. (2009), Olatunji *et al*. (2016), Aghimien and Aigbavboa (2018), Mangvwat *et al*. (2020) and Isiofia *et al*. (2022) did not combine quantitative and qualitative research methods to reach a conclusion. This study used mixed methods research design to re-evaluate cost and time performance of TETFund building construction projects in South-West Nigeria.

The quantitative approach assessed the factors that influenced cost and time performance of construction projects from the stakeholders' perspective (client, consultants and contractors) while the other strand examined estimated project cost, final project cost, cost overrun, estimated project time, final project time and time overrun of 254 TETfund construction projects from 2003-2013 in South-West Nigeria.

PERFORMANCE OF TETFUND CONSTRUCTION PROJECTS IN NIGERIA

TETFunds was established in May 2011 to replace the Education Trust Fund (ETF) Act of 1993 to address decay of educational facilities especially construction and infrastructural projects and create an enabling environment for teaching and learning in tertiary institutions (Onyeike & Eseyin, 2014). The major source of fund to TETFund is 2% paid by companies in Nigeria from their annual profit and this accounted for 60% of infrastructure development in Nigeria tertiary institution. The administration of the fund includes 50% to the Universities, 25% to the Polytechnic education and 25 % to the Colleges of educations for infrastructural developments. According to Mangvwat *et al*. (2020), TETFund allocated one hundred and eighty-one tertiary institutions across the country with the sum of one trillion naira for a period of five (5) years for infrastructural developments among others. This fund if well utilized will provide several infrastructural developments and address the decay in Universities, Polytechnic and Colleges of Education in Nigeria. But recent findings have showed that time and cost performance of TETFunds construction projects delivered by stakeholders were poor (Ogundu & Nwokoye, 2015; Amaechi, 2016; Aghimien & Aigbavboa, 2018; Mangvwat *et al*., 2020).

Onyeike and Eseyin (2014) studied TETFund and the management of university education in Nigeria using a survey and document review techniques. Onyeike and Eseyin (2014) identified the challenges facing the administration of TETFund projects to include funding, government policies and implementation, level of cooperation between TETFund and benefiting Institutions, overloading of responsibilities, neglect of institutions by their proprietors, project stakeholders confidence, effective financial and project monitoring, political interference, inexperienced desk officers, lack of capacity to utilize funds, ability to enhance and boost teachers morale and increase in revenue generation which hinders TETFund from meeting their target on project delivery. The findings by Onyeike and Eseyin (2014) also identified cost as a major factor affecting TETFund construction projects in Nigeria and needs to be re-evaluated to create physical facilities in higher institution to improve teaching and learning (Saeed & Kayani, 2019). Gambo *et al*. (2017) study stakeholders' perception on the success of TETFund construction projects in Nigeria using data collected from questionnaires survey and the data were analysed with frequency and severity index. The result of Gambo *et al*. (2017) study shows that the factors hindering timely completion of TETFund projects are material management (procurement, inventory control and quality control), payment for interim valuation, competency of the project manager and economic factors.

Eze and Idiake (2018) assessed cost of rework on time and cost performance of building construction projects in Abuja, Nigeria. A pro forma was adopted for gathering data on rework cost, project cost and time of selected building projects. A structured questionnaire was used to collect information on the likely measures for reducing rework incidences on construction sites. Their studies reported a significant relationship between cost of rework and initial and final project cost. From Eze and Idiake (2018) study, cost of rework contributed to cost overrun and affects initial project delivery time. Aghimien and Aigbavboa (2018) also assessed the performance of selected funding methods used to deliver educational building projects in Nigeria through questionnaire survey and records from completed projects. Their findings reported poor time performance due to non-involvement of construction stakeholders at early stage of the project. According to Aghimien and Aigbavboa, (2018), eighty-five percent (86%) of the project investigated experience time overrun which was double the value gotten for cost overrun for the same

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project. Although, the project investigated are not fixed price project like TETFund projects, stakeholders' behaviours and its effect on project performance manifested during the investigation which needs to be re-evaluated. Zailani *et al*. (2019) investigated the roles of project management in TETFund construction projects in North-West Nigeria using questionnaire survey and the data collected were analysed with frequency and severity index. The identified role of project management by Zailani *et al*. (2019) are provision of relevant cost data, detailed design and specification, effective project planning, site inspection, cooperation among team members, engagement of competent project team, effective cash management, stable economic and weather condition and detailed buildability analysis. All the factors listed by Zailani *et al*. (2019) are factors affecting cost and time performance of TETFund construction projects in South-Eastern part of the country. To give the study a national look, these factors need to be re-evaluated in South-Western Nigeria to see if the results of the findings will correlate.

Mangvwat *et al*. (2020) examined time and cost performance of fixed price building contracts in tertiary institutions in (North-Central**)** Plateau state Nigeria. Questionnaire, interviews and records from completed and un going projects were analysed with regression to predict cost and time performance of TETFund projects. Mangvwat *et al*. (2020) findings also revealed poor time performance of TETFund projects as 78.26% of the projects experience time overrun and change in specification. The study recommended provision of detailed and comprehensive designs before TETFund projects are awarded to contractors. Mukhtar *et al*. (2021) investigated factors affecting time performance of TETFund construction projects in North-East Nigeria. Questionnaire survey adopted to collect data while frequency distribution, severity index, and Spearman's rank correlation methods were used to analyse the data collected. From the result of the study, contractors cited that client's tardiness in making progress payments was the most frequent cause of delays, while the clients and consultants cited poor planning and scheduling, poor site management, poor supervision and a lack of qualified workers as the reasons for the project's delay. The stakeholders agreed that late procurement of materials causes delay on construction site. According to their study, contractors should properly plan and schedule all project activities and carry them out at the appropriate times. Isiofia *et al*. (2022) also assessed time performance of TETFund construction projects delivery in public tertiary institutions in South-East Nigeria using structured questionnaires. The data collected were analysed using percent, frequency and t-test. The result of the study shows that, 29% of TETfund project investigated in Enugu State experienced time overruns, 39% of the projects were still ongoing beyond their schedule while 4% were abandoned. According to their study, only 28% of TETFund projects in South-East were completed at the stipulated time.

Table 1 presents the summary of empirical literature review of TETfund construction projects in Nigeria. All the studies in Table I pointed to poor performance of TETfund construction projects which need to be re-evaluated. TETfund was established to provide physical infrastructural facilities in the University, Colleges of Education and Polytechnics to positively promote academic excellence, students comfort and safety of both the staff and students (Saeed & Kayani, 2019).Carrying out this responsibility on schedule and within budgeted cost allocation and quality will promote performance of building construction projects (Oluyemi-Ayibiowu & Omolayo., 2022) .The key performance indicators of a successful construction project are client satisfaction, minimal defects, project cost predictability construction time predictability, profitability, skill and unskilled artisans productivity and safety of workers (Gupta & Kumar, 2020). Among these factors Ojo (2021) stressed that time performance mostly affect TETFund construction projects because of its fixed price contract nature (Mangvwat *et al.,* 2020). But Gupta and Kumar (2020) is of the opinion that studies on time and cost performance of construction projects should be carried out concurrently to give a better understanding of the global problem (Al- Khudhuri, 2020). Gupta and Kumar (2020) in their study of the factors causing time and cost performance of building construction projects, identified time performance factors as material management, change in design and specification, maintenance of plants and equipment, project finance and labour shortage while cost performance factors are inflation and variations due to change in prices of building material, breakdown of equipment, escalated transportation cost, rework due to errors or omission during construction . Most of the identified factors are human, management and technical related factors (ordinal variables) and numerical cost and time information (nominal variables) which needs the combination of methods to arrive at a logical conclusion. The study therefore, assessed cost and time performance of TETFund construction projects in South-West Nigeria with a view to enhancing the performance of public building projects and satisfy customers need.

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Table 1: Empirical Literature Review Summary of TETfund and TETFund Projects

Authors /Year	Issues Discussed	Location
Onyeike & Eseyin (2014)	Tertiary Education Trust Fund (TETfund) and the management of University education in Nigeria.	General
Gambo *et al*. (2017)	Stakeholders' perception of the success of Tertiary Education Trust fund (TETFund) construction projects in Nigeria	North-west
Aghimien & Aigbavboa (2018)	Performance evaluation of selected funding methods used to deliver educational building projects in Nigeria	Ondo state
Zailani *et al*. (2019)	The role of project management in TETFund construction projects	North-west
Mangvwat *et al*. (2020)	Time and cost performance of fixed price building contracts in tertiary institutions in Nigeria	North-central
Mukhtar *et al*. (2021)	Factors affecting time performance of Tertiary Education Trust Fund (TETFund) construction projects in North-east, Nigeria	North-east
Isiofia *et al*. (2022)	Assessment of time performance of TETFund construction projects delivery in public tertiary institutions in South-east, Nigeria.	Southeast

RESEARCH METHODOLOGY

Table 2 shows the population and sample size of TETFund projects and stakeholders across the selected higher institutions in South-West Nigeria. Preliminary investigation shows that there are two hundred and fifty-four (254) TETFund projects distributed among forty-seven (47) higher institutions in six southwest States namely Ekiti, Lagos, Ogun, Ondo Osun and Oyo as presented in Table 2. TETFund projects have two hundred and fifty-four (254) client's representatives, (254) contractors and 1524 consultants (Project managers, Architects, Builders, Quantity surveyors, Structural engineers and Mechanical and electrical (M & E) Engineers) which constituted the research population. Sample size of 250 was selected from all the higher institutions undergoing TETFund construction project in the South-West Nigeria using unlimited population formula by Kothari (2004) and proportional sampling size (Amare, 2015). However, two hundred and fifty (250) copies of questionnaires were self-administered to stakeholders to collect primary data from the respondents. The quantitative approach assessed the factors influencing performance of building construction projects from the stakeholder's perspective (client, consultants and contractors). The data collected were analysed using Statistical Package for Social Science (SPSS) version 23 and Excel 2013. Mean Score (MS) was used in ranking the various items and factors, Kruskal Wallis test, ANOVA and LSD post hoc test were also used to determine the convergence and divergent views of the stakeholders. Also, records on project cost and duration were purposively obtained from two hundred and fifty-four (254) TETFund project from 2003 to 2013 in southwest Nigeria to examine the estimated project cost, final project cost, cost overrun, estimated project time, final project time and time overrun. Regression analysis was used to predict future project cost and time of construction projects.

Table 2: Population and Sample Size

S/No	State	No. of Institutions	No. of TETFund projects
1	Ekiti State	4	49
2	Lagos State	12	48
3	Ogun State	6	37
4	Ondo State	5	28
5	Osun State	7	39
6	Oyo State	13	53
	Total	**47**	**254**

S/No.	Project Stakeholders	No.	Sample Size
1	**Client** (Director of physical planning)	254	47
2	**Contractors**	254	90
3	**Consultants**		
	Architect	254	
	Builders	254	
	Project Managers	254	113
	Quantity Survey	254	
	(M&E)	254	
	Structural Engineers	254	
	Total	**1,825**	**250**

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Table 3 shows the number of questionnaires administered to respondents with the response rate. Two hundred and fifty (250) questionnaires were administered while one hundred and eighty-six (186) questionnaires were retrieved representing 74.4% of the respondents. Based on the claim made by Yamane (1967) and Kothari (2004) that a survey's results might be deemed skewed and statistically meaningful if the return rate was not lower than 20–30%, the percentage retrieved was deemed sufficient for the investigation.

Table 3: Respondent Responses to Questionnaire Administration

QUESTIONNAIRE	PERCENTAGE
Questionnaire administered	250
Questionnaire retrieved	186
Response rate	74.4%

RESULTS AND DISCUSSION

Background Information of the Respondents

Table 4 shows the background information of the respondents. Table 4 represented gender, type of educational institution, types of construction projects executed, position of the stakeholder on construction project, highest educational qualification, year of experience and designation of the respondents. From the survey, 86.0% of the respondents were males while 14.0% of the respondents were female. The respondents were from various educational institutions with university having the highest percentages of 51.6%, these was followed by Polytechnic with 28.0% while College of educations were the least with 20.4%. response rate. Regarding the type of construction projects executed, it was evident that 51.7% of the respondent's construct building projects, 30.9% of the respondents execute both building and civil engineering projects while only 17.2% execute only civil engineering projects. The academic qualification of the respondent record 35.5% were B. Tech/B.sc holders, 24.7% were M.sc holders while 20.0% were HND holders. It was evidence that most of the respondents are educationally qualified to give accurate information on the subject matter. Also from Table 4, 40.9% of the respondents are consultants, 38.3% are contractors while 20.8 % of the respondents are clients' representative who have executed TETFund projects for over 10 years. The designation of the respondent shows that 34.9 % of the respondents are Builders, 28.2 % are Project managers and 19.5% are Engineers while the least represented was Architects with a percentage of 4.4%. Based on the forgoing information supplied by these categories of building construction project respondents having worked on TETFund project from 2004 to 2013. The information was considered adequate and reliable for the analysis upon which inferences was drawn.

Table 4: Background Information of the Respondents

Background Characteristics	Classifications	Freq.	Percentage (%)
Type of educational Institution	University	96	51.6
	Polytechnics	52	28.0
	College of Educations	38	20.4
	Total	186	**100**
Type of construction projects	Building	96	51.7
	Building/ Civil	57	30.9
	Civil Engineering	33	17.4
	Total	186	**100**
Position on construction project	Consultant	76	40.9
	Contractor	71	38.3
	Client	39	20.8
	Total	186	**100**
Academic qualification	ND/NCE	10	5.4
	HND	37	20.0
	PDG	19	10.2
	B.Tech/B.sc	66	35.5
	M.SC	46	24.7
	Ph.D.	8	4.3
	Total	186	**100**
Year of experience	5 -10 years	83	44.6
	11-15 years	70	37.6
	16-20 years	33	17.7
	Total	186	**100**
Designation of respondent	Architects	9	4.8
	Quantity Surveyors	24	12.9
	Project Managers	52	28.0
	Builders	65	35.0
	Engineers	36	19.4
	Total	186	**100**

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Factors that Influence Cost and Time Performance of TETFund Construction Projects

Table 5 indicated the factors that influenced performance of TETFund building construction project in the study area. The respondents from clients' regard construction time predictability (MS= 4.07), client satisfaction with the project (MS= 4.00) and poor project administration (MS= 3.51) as the factors with the highest influence on cost and time performance of TETFund construction projects while stakeholders' satisfaction with the project with mean score of 2.92 was ranked least. The respondents from the consultants ranked construction cost predictability and project risk avoidance or reduction with (M.S = 3.86) first while adherence and compliance to specifications with (M.S = 3.85) was ranked third. The perspective of the respondents among the contractors ranked quality of work rendered by the contractor (M.S. = 3.99) first, number of defects (M.S. = 3.85) second and construction cost predictability (M.S. = 3.82) third. Table 5 also, shows the relative importance of various variables affecting TETFund construction project's cost and time performance. The top three factors based on the perceptions of the respondents are client's satisfaction with the project (MS= 3.86) construction time predictability (MS= 3.85) and construction cost predictability (MS= 3.83). The least among the factors are number of defects with (MS= 3.52) and stakeholders' satisfaction with the projects with (MS= 2.84). Using clients, consultants and contractors as basis to test the convergence or divergence in the opinions of the respondents regarding cost and time performance of construction projects in southwest Nigeria, it was evidence from Kruskal Wallis test that the respondents had convergence views on eleven (11) factors out of the sixteen (16) factors listed. Construction time predictability, quality of work rendered by the contractor, project risk avoidance or reduction, accuracy of cash flow forecast and number of defects were the factors that the respondents had divergent views upon in predisposing cost and time performance of TETFund construction project in South-West Nigeria. The implication of these is that there are substantial variations in the opinions of clients, consultants and contractors (p value <0.01), pertaining to the listed factors. All the listed sixteen factors recorded high mean scores with the least been 2.84 and an average mean score of 3.64. In order to determine the order of susceptibilities of cost and time performance of TETFund construction project in South-West Nigeria, all the factors must be taken into consideration.

Table 5: Factors that Influence Cost and Time Performance

Project Stakeholders Perspectives	**Client**		**Consultant**		**Contractor**		**Overall**			
Factors	**M**	**R**	**M**	**R**	**M**	**R**	**M**	**S.D**	**R**	**A. S**
Client satisfaction with the project	4.00	2	3.84	6	3.80	5	3.86	0.7	1	0.315
Construction time predictability	4.07	1	3.84	4	3.73	7	3.85	0.59	2	**0.00****
Construction cost predictability	3,80	4	3.86	1	3.82	3	3.83	0.8	3	0.945
Quality of work rendered by the contractor	3.46	12	3.77	8	3.99	1	3.79	0.77	4	**0.00****
Human resource management	3.80	6	3.75	9	3.80	6	3.78	0.74	5	0.650
Poor project administration	3.82	3	3.84	5	3.59	13	3.74	0.67	6	0.029*
Amount of retention sum	3.57	8	3.74	10	3.80	4	3.73	0.79	7	0.229
Adherence and compliance to specifications	3.49	11	3.85	3	3.65	8	3.7	0.83	8	0.130
Stakeholder adherence to safety practices	3.80	5	3.71	11	3.61	12	3.69	0.72	9	0.340
Project risk avoidance or reduction	3.20	14	3.86	2	3.65	9	3.64	0.62	10	**0.00****
Accuracy of cash flow forecast	3.53	9	3.82	7	3.49	15	3.63	0.83	11	**0.01****
Level of material ordering, handling and management on Site	3.41	13	3.70	12	3.61	11	3.61	0.94	12	0.072
Variation in design and change order	3.51	10	3.50	14	3.62	10	3.55	0.62	13	0.245
Quality of coordination by construction team members	3.59	7	3.53	13	3.53	14	3.54	0.79	14	0.825
Number of defects	3.18	15	3.39	15	3.85	2	3.52	0.81	15	**0.00****
Stakeholders satisfaction with the project	2.92	16	2.83	16	2.80	16	2.84	0.97	16	0.435

Note: M=Mean, Rk=Rank, S.D = Std. Deviation, C.S = Chi-Square and A.S = Asymp. Sig

Anova Result of Factors that Influenced Cost and Time Performance

Table 6 shows the analysis of variance of factors that influenced cost and time Performance of TETFund construction projects. Table 6 assessed variance of clients, consultants and contractor's perspective on cost and time performance of TETFund construction project. As reflected in the table, there was a significant

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difference between client, consultants and contractors on cost and time performance of TETFund construction project in the study area. This implies that, the respondent's opinions on the success of the TETFund construction project were divided.

Table 6: Anova result of factors that influence cost and time performance

Stakeholders	No.	Mean	Std. Deviation	Std. Error	F	Significant
Client	39	3.57175	0.696813	0.485		
Consultants	76	3.676375	0.744375	0.672	3.723	0.034
Contractors	71	3.645188	0.766563	0.745		

LSD Post hoc test Result of Factors that influence Cost and time Performance

Table 7 shows the result of Post hoc test was carried out to further determines where the actual different lies among the respondents based on their position as clients, consultants and contractors. From the result of the LSD Post hoc test, the analysis reveals that they were significant different between the pairs of contractor and client (p-value = 0.01). The result implies that the contractors and clients' opinions on the success of the TETFund construction project were different. Clients view a successful project as projects that are completed on time and budgeted while contractors viewed a successful project as projects that brings good turn-over on their invested resources.

Table 7: LSD Post hoc test result of factors that influence cost and time performance

Position on project	Test statistic	Std. error	Std. test statistic	Sig.	Adj. Sig.
Contractor-Consultant	15.112	9.192	1.644	.100	.300
Contractor-Client	40.460	11.194	3.615	.000	**.001****
Consultant-Client	25.348	11.065	2.291	.022	.066

* At the 0.05 level; ** At the 0.01 level shows the mean difference is significant.

Time and Cost Performance of TETFund Construction Project in Southwest Nigeria

Table 8 shows the result of time and cost performance of two hundred and fifty-four (254) TETFund construction project examined in South-West Nigeria from 2003-2013. The total cost of the project is ten billion, eight hundred and fifty-six million, one hundred and sixty-seven thousand, four hundred and ninety-seven naira, fourteen kobo ₦10,856,167,497.14 while the additional money spent on cost overrun was one hundred and sixty-three million, two hundred and forty-eight thousand, two hundred and sixty-five naira, forty-four kobo ₦163,248,265.44. The Average Estimated Project cost (AEPc) was forty-two million, seven hundred and forty thousand, eight hundred and sixteen naira, nine two kobo (₦42,740,816.92), the Average Final Project cost (AFPc) was forty three million, three hundred and eighty three thousand, five hundred and twenty six naira, sixty two kobo (₦43,383,526.62), the Average Cost overrun (ACo) is ₦642,709.71 and the Average Percentage Cost overrun (APCo) is 1.62%. Data on 254 completed building projects were collected for this study, and it was found that the cost overrun was sufficient to cover contingency allowances. The work is in agreement with investigation by Aje *et al*. (2016), Aghimien and Aigbavboa (2018) and Mangvwat *et a*l. (2020) who also recorded percentage cost overruns and time overruns in their respective studies. All the studies recorded cost overrun that can make up for contingency sum of five (5%) to ten (10%) percentage as practiced in Nigeria. Nigeria construction industry allows for (5-10%) contingency sum in the execution of new construction projects while the United States Department of Energy (DOE) provided for fifteen percentage (15%) to twenty percentage (20%) as contingency sum for budget estimates of new buildings in the United States of America (USA). At the pre-contract stage, a contingency sum could reduce the additional financial burden brought on by project uncertainty. At APCo of 1.62%, the Nigerian Federal Government had spent a total cost overrun of one hundred and sixty-three million, two hundred and forty-eight thousand, two hundred and sixty-five-naira, forty-four kobo (163,248,265.44) on TETFund building construction projects in South-West Nigeria as represented in Table 8.

Table 8 also recorded that the Average Estimated Project time (AEPt) is 7 months' six days, the Average Final Project time (AFpt) is 14 months and twenty-six days, the Average Time overrun (ATo) is 7 months and twenty days while the Average Percentage Time overrun APTo is 112.23%. In this regard, a strong metric for evaluating non-performance of TETFund building construction

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projects is the percentage time overrun of completed projects against the initial time/duration of the projects. The study is in agreement with the findings by Aghimien and Aigbavboa (2018); Mangvwat *et al*. (2020) who identified time overrun as one of the causes of non-performance of construction projects among clients, consultants and contractors in Nigeria's construction business. Constant evaluation of cost and time of construction projects will enhance performance and ensure that money spent on building projects from the start to completion is worthwhile.

Table 8: Overview of Time and Cost Performance

TETFund Building Construction Project Cost and time in Southwest									
States	**No. of project**	**Epc *10^9₦**	**Fpc *10^9₦**	**Co *10^9₦**	**PCo**	**Ept**	**Fpt**	**TO**	**PTo**
Ogun	37	1.888	1,923	0.346	52.04	393.	847.00	454.00	4,411.12
Osun	39	0.953	0.985	0.315	130.70	254.0	564.00	310.00	5,566.68
Oyo	53	1.717	1.734	0.167	59.80	407.00	900.00	493.00	6,797.23
Ondo	28	1.150	1.166	0.169	40.65	200.00	419.00	219.00	2,983.32
Ekiti	50	2.987	3.027	0.398	74.40	399.00	833.00	434.0	6026.38
Lagos	47	2.157	2.181	0.238	53	338	697	359	5,275
Total	254	10.856	11.019	**1.633**	410.24	1,991.00	4,260.0	2,269.0	31,059.72
				AVERAGE VALUES					
Ogun	37	0.515	0.520	0.0933	1.41	10.6	22.89	12.27	119.22
Osun	39	0.244	0.253	0.0808	3.35	6.51	14.46	7.95	142.74
Oyo	53	0.324	0.327	0.0314	1.13	7.68	16.98	9.30	128.25
Ondo	28	0.411	0.417	0.0602	1.45	7.14	14.96	7.82	106.55
Ekiti	50	0.598	0.606	0.0796	1.49	7.98	16.66	8.68	120.5276
Lagos	47	0.459	0.464	0.0507	1.12	7.19	14.83	7.64	112.23
Avg.		**0.427**	**0.434**	**0.0642**	**1.62**	**7.84**	**16.77**	**8.93**	**122.28**

Note: *EPc = Estimated Project cost; FPc = Final Project Cost; Co= Cost overrun; PCo= Percentage Cost overrun; EPt= Estimated Project time; FPt = Final Project time; To= Time overrun; PTo= Percentage Time overrun; Avg= Average*

Regression Analysis for Estimated Project Cost and Time of TETFund Construction Projects

Table 9 shows the regression analysis for estimated project cost and time. Summary result of the regression model of cost performance in Table 9 indicated that the model explained 100% of the variance between Estimated Project cost (EPc) and Final Project Cost (FPc) and that the model was significant, F (1, 252) = 969316.701, p<0.001. It was found that EPc significantly predicts FPc (β_1 = 0.984, p<0.001). The final predictive model was: EPc = 55975.36 + (0.984 FPc). The result of the regression model summary in Table 9 also indicated that the regression model explained 49.1% of the variance in Estimated project cost (EPc) and Cost overrun (Co) and the model was significant, F (1, 252) = 243.485, p<0.001. It was found that EPc significantly predicts Co (β_1 = 30.514, p<0.001) and the final predictive model was: EPc = 2.3129x10^7+ (30.514 Co). The result of the regression also shows that the model explained 0.2% of the variance between Estimated project cost (EPc) and % Cost Overrun (PCo) and that the model was significant, F (1, 252) = 0.472, p<0.001. it was found that EPc did not significantly predicts PCo (β_1 = -0.687, p<0.001) and the predictive model was: Epc = 4.5703x10^7+ (-1.8342 x10^7 PCo).

From the result of the regression model on time performance in Table 9, the model explained 80.9% of the variance in Estimated Project time (EPt) against Final Project Time (FPt) and that the model was significant, F (1, 252) = 1073.515, p<0.001. It was found that EPt significantly predicts FPt (β_1 = 0.899, p<0.001). The final predictive model was EPt = 0.779 + (0.424 FPt). Also, from the result of the regression model on time performance, the model explained 48.9% of the variance in Estimated Project time (EPt) on Time Overrun (To) and that the model was significant, F (1, 252) = 242.976, p<0.001. It was found that EPt significantly predicts (TO) (β_1 = 0.701, p<0.001) and the final predictive model was: EPt = 3.006 + (0. 541 To). Also, the result of the regression model that predict time performance indicated that the model explained 4% of the variance in Estimated project time (EPt) on %Time overrun (PTo) and the model was also significant, F (1, 252) = 11.504, p<0.001. But it was found that Ept did not significantly predicts PTo (β_1 = -0.209, p<0.001) and the final predictive model was: Ept = 10.187+ (-0.019 PTo).

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Table 9: Regression analysis summary for Estimated Project Cost (EPc) and Estimated Project Time (EPt)

Variables	Predicting	R^2 adjusted	B	95%Confidence Interval (CL) for B	β	t	p
Estimated project cost (Epc)			55975.36	[-105176.777 217127.503]		.684	.495
	Final Project Cost (Fpc)	1.000	.984	[.982 .986]	1.000	984.5	.000
			$2.3129x10^7$	[$1.6596 x10^7$ $2.9662x10^7$]		6.97	.000
	Cost Overrun (Co)	0.489	30.514	[26.663 34.365]	0.701	15.60	.000
			$4.57x10^7$	[$3.3710x10^7$ $5.7696x10^7$]		7.51	.000
	% Cost Overrun (PCo)	0.002	$-1.834x10^7$	[$-7.092 x 10^6$ $3.423 x 10^6$]	-.043	-.687	.493
Estimated project time (Ept)			.779	[.166 1.391]		2.50	.013
	Final Project Time (Fpt)	0.809	.424	[0.399 0.450]	0.899	32.57	.000
			3.006	[2.233 3.779]		7.66	.000
	Time Overrun (To)	0.489	.541	[0.473 0.609]	0.701	15.59	.000
			10.187	[8.676 11.697]		13.28	.000
	%Time Overrun (PTo)	0.040	-.019	[-.030 -.008]	-.209	-3.39	. 001

Note: *EPc = Estimated Project cost; FPc = Final Project Cost; Co= Cost overrun; PCo= Percentage Cost overrun; EPt= Estimated Project time; FPt = Final Project time; To= Time overrun; PTo= Percentage Time overrun*

Regression Analysis of Percentage Cost Overrun (PCo) and Percentage Time Overrun (PCo)

Table 10 shows the regression analysis summary for Cost overrun (Co) and Time overrun (To). As presented in Table 10, variables obtained from cost performance was used to predict the ones from time performance to test for interdependency. The result of the model summary in Table 10 shows a week relationship between Percentage Cost overrun (PCo) and Percentage Time Overrun (PTo) (0.094). The result of the regression indicated that the model explained 0.5% of the variance and that the model was not significant, F (1, 252) = 2.235, $p<0.001$. From the model it was found that PCo did not significantly predicts PTo ($_{\beta 1}$ = 0.094, p (0.136)>0.001) and the final predictive model was: PCo = 1.298+ (0.003 PTo). Also, from the regression model between Cost overrun (Co) and Time overrun (To), a strong relationship exists between Co and To (0.242). The result of the regression indicated that the model explained 5.5% of the variance and that the model was significant, F (1, 252) = 15.665, $p<0.001$. It was found from the analysis that (Co) significantly predicts (To) ($_{\beta 1}$ = 0.242, $p<0.001$) and the predictive model was:

Co = $1.537 x10^5$+ ($5.474 x10^4$ To)

Table 10: Regression analysis of Percentage Cost Overrun (PCo) and Percentage Time Overrun (PTo)

Variable	Predicting	R^2 adjusted	B	95%Confidence Interval (CL) for B	β	t	p
% Cost Overrun (PCo)			1.298	[.836 1.761]		5.527	.000
	% time Overrun (PTo)	0.005	.003	[-.001 .006]	.094	1.495	.136
Cost Overrun (Co)			$1.537 x10^5$	[$1.544 x10^5$ $4.618 x10^5$]		0.982	0.327
	Time Overrun (To)	0.055	$5.474 x10^4$	[$2.751 x10^4$ $8.199 x 10^4$]	0.242	3.958	0.000

Note: *PCo= Percentage Cost overrun; PTo= Percentage Time overrun; Co= Cost overrun; To= Time overrun;*

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Summary of Regression Analysis of Estimated Project Cost and Time

Table 11 displays the results summary of a regression analysis of the Expected Project cost (EPc) on the Final Project cost (FPc), Cost overrun (Co), and Percentage Cost overrun (PCo), all of which were conducted for TETFund construction projects in South-West Nigeria. The results shows that EPc had significant effect on FPc and Co. The coefficient of determination R^2 were found to be 1.000 and 0.489 for the two variables which implies that 100% of the variations in EPc can be explained by FPc. Also 48.9% of the variation in EPc can be explained by the Co. Cost overrun arises from change in estimated project cost been different from the final project cost and these affects project performance. The result of the EPc on PCo did not have significant effect. The coefficient of determination R^2 was found to be -0.002 which implies that only -0.2% of variations in EPc can only be explained by PCo. The implication of these to decision makers is that when estimated project cost and percentage cost overrun are held constant final project duration can be predicted.

Also, Table 11 displays the results summary of a regression analysis of the Expected Project time (EPt) on Final Project time (FPt), Time overrun (To) and Percentage Time overrun (PTo) of TETFund construction projects in South-West Nigeria. The result shows that Ept had significant effect on FPt, (To) and PTo. The coefficient of determination R^2 were 0.809, 0.489 and 0.040 for the Three variables. These implies that 80.8% of the variations in EPt can be explained by FPt. Also 48.9% of the discrepancy in EPt can be elucidated by (To) but only 4% of EPt can be explained by PTo.

Table 11: Summary of Regression Analysis for Estimated Project Cost and Time

	Project Variable	R^2 adjusted	Regression Equation	F value
1	Final Project Cost (Fpc)	1.000	Epc = 55975.36 + (0.984 Fpc)	0.000 (significant)
2	Cost overrun (Co)	0.489	Epc = $2.3129x10^7$+ (30.514 Co)	0.000 (significant)
3	Percentage cost overrun (PCo)	-0.002	EpC = $4.5703x10^7$+(-$1.8342x10^7$ PCo)	0.493 (Not significant)
4	Final Project Time (Fpt)	0.809	Ept = 0.779 + (0.424 Fpt)	0.000 (significant)
5	Time Overrun (To)	0.489	Ept = 3.006 + (0. 541 To)	0.000 (significant)
6	Percentage Time Overrun (Pto)	0.040	Ept = 10.187+ (-0.019 Pto)	0.001 (significant)

Note: *EPc = Estimated Project cost; FPc = Final Project Cost; Co= Cost overrun; PCo= Percentage Cost overrun; EPt= Estimated Project time; FPt = Final Project time; To= Time overrun; PTo= Percentage Time overrun*

CONCLUSION AND RECOMMENDATIONS

The main goal of this research was to evaluates cost and time performance of (TETFund) public building construction project in South-West Nigeria. The survey strand found that there are three main factors predisposing the performance of TETFund building construction project in South-West Nigeria. The top three factors influencing the construction performance based on the perceptions of the respondents are client's satisfaction with the project construction time predictability and construction cost predictability. The results from the archival records showed that total cost of TETFund construction project executed from 2003-2013 in South-West Nigeria was ten billion, eight hundred and fifty-six million, one hundred and sixty-seven thousand, four hundred and ninety-seven naira, fourteen kobo (₦10,856,167,497.14) while the additional money spent on construction projects (cost overrun) was one hundred and sixty-three million, two hundred and forty-eight thousand, two hundred and sixty-five naira, forty-four kobo (₦163,248,265.44). The average percentage cost overrun was 1.62% while the average percentage time overrun was 112.23%. The regression analysis of estimated project cost on final project cost and cost overrun of TETFund building construction projects were significant. When estimated project cost, cost overrun and other project performance factors are held constant, final project cost can be predicted. Also, the regression analysis of estimated project time on final project time, time overrun and percentage time overrun of TETFund building construction projects was significant. Therefore, the estimated project time can be explained by final project time and time overrun.

Based on the outcomes of the research study, it was therefore recommended that:

1. Accurate cost estimate and adequate project time planning should be carried to enhance construction project cost and time performance.
2. On any TETFund construction projects, accurate cost information and visible estimated time should be set by stakeholders and should be used to monitor performance of the projects.
3. Special attention should be given to time and cost performance factors identified in the study during construction to reduce percentage time and cost overrun of construction projects.

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4. Regression model developed for estimated project cost and time can be used to predict project cost and time of future TETFund construction projects.

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