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Strategies to Mitigating the Effect of Delay on Performance of Building Projects in Selected Tertiary Educational Institutions in Oyo State, Nigeria

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ABSTRACT

This study assessed the strategies to mitigate the effects of delay on performance of TETFund projects in Selected Tertiary Educational Institutions In Oyo State, Nigeria. These was with a view to enhancing project delivery. Data were collected through structured questionnaire to elicit information on strategies to mitigate the effect of delay on cost and time performance of TETFund projects. The study adopted equal percentage selections from target population as follows: 50% each of Consultant Architects, Consultant Engineers, Consultant Quantity surveyors, Client's representatives, Contractors and Project Financier. This gives a total sample size of 118. The data collected were analysed using mean response analysis, factor analysis and frequency. The results showed that Top on the seven highest strategies for mitigating the effect of delay is selection of a competent consultant and reliable contractor to carry out construction work (MS) of 4.33. It is followed by allocation of sufficient time and money at the design phase (MS=4.19), effective site management and supervision (MS=4.12), adopting a new approach to contract award procedure by giving less weight to prices and more weight to capabilities and past performance of contractors (MS=4.09), performing a preconstruction planning of project tasks and resource needs (MS=4.09), ensure timely delivery of materials (MS=4.08) and comprehensive contract documentation (MS=4.08). The study concluded that top on the seven highest strategies is selection of a competent consultant and reliable contractor to carry out the work. It is followed by allocation of sufficient time and money at the design phase, effective site management and supervision, adopting a new approach to contract award procedure by giving less weight to prices and more weight to capabilities and past performance of contractors, performing a preconstruction planning of project tasks and resource needs, ensure timely delivery of materials and comprehensive contract documentation. Also, from factor analysis, the 4-component generated for the strategies to mitigating the effects of delay accounted for 71.846% of the variability explained.

Keywords: Cost, Delay, Performance, Strategies, Time, Building Projects, Tertiary Educational Institutions, Oyo State, Nigeria

1. INTRODUCTION

The construction industry is a highly dynamic sector that plays a very important role in the development of any country including Nigeria. Osei (2013) posited that the construction sector is a crucial industry having strong backward and forward growth linkages. It deals with all economic activities directed at the creation, renovation, repair or extension of fixed assets in form of buildings, engineering structures, land improvements and developments. Although the industry has experienced rapid growth in Nigeria since independence, it continues to face chronic problems including poor performance of time, cost and quality, construction waste, low productivity and over dependence on foreign technical staff. However, according to Gambo et al. (2016), poor time and cost performance are most severe. Delay occurs when the progress of a contract falls behind schedule. According to Abbas (2016), delay is the late completion of construction projects compared to the planned schedule or contract schedule. It may be caused by participants in a construction project and may be a direct result of one or more circumstances which have adverse effects on both the owner and the contractor (either in the form of lost revenues or extra expenses) and it often raises the contentious issue of responsibility for the delay, which may result in conflicts.

In Nigeria, public sector projects are funded through yearly budgetary allocations. However, the funding of budgets is usually not adequate which in most cases can be as low as 30% (Fakunle and Fashina., 2020). Consequently, public tertiary institution projects are poorly funded. To address this shortcoming, the Federal Government established the Tertiary Education Trust Fund (TETFund). TETFund is an Agency of the Federal Government of Nigeria established to provide fund for projects, among other activities, in higher educational institutions; namely Universities, Polytechnics and Colleges of Education through the aggregation of 2% education tax charged on assessable corporate profits of all registered companies in Nigeria. (Alsuliman., 2019), There have been previous studies on delay globally. However, studies on delay peculiar to projects with special funding intervention like TETFund projects seem scanty in literature. It is against this background that this study becomes imperative to assess the issue of delay and their effects on the cost and time performance of TETFund projects with particular reference to selected tertiary institutions in Oyo State, Nigeria. The choice of Oyo State for the study is informed by the good number of beneficiary Institutions that are spread all over the State. It is however expected that the outcome of the study will very well be applicable to the entire country.

2. LITERATURE REVIEW

2.1 Delay in Building Projects

Delay in construction is a state in which the actual progress of the phases of a construction project becomes slower than as planned or completing the project late (Bekr, 2015). It is a phenomenon that indicates a prolonged period of construction and interruptions of events that distract the programme of the work. In the opinion of Majid (2006), projects are considered delayed when their stipulated completion durations have not been achieved. In the construction industry, delay is one of the commonest problems as it causes a number of negative impacts on both the project itself and the parties involved. Aftab (2014) opined that delay in construction is a situation where the contractor and the project owner jointly or severally contribute to the non-completion of projects within the originally stipulated or agreed contract period. Similarly, Nwosu, and Aggrey, (2020), stated that delay is an act or event that extends the time required to perform the tasks under a contract.

Marzouk andTarek (2014) defined construction delay as a time over-run either beyond the contract date or beyond the date that the parties have agreed upon for the delivery of the project. Nwosu and Aggrey, (2020), described delay as “an act or event which results in extending the required time to perform or complete work of the contract for additional days of work”. An investigation by Odeyinka and Yusif (2010) showed that seven out of ten projects surveyed suffered delay in their execution; and that the rate at which delay occurs in project delivery has been a major criticism facing the Nigerian construction industry. According to Ochoa (2013), a project’s success or failure, particularly for building projects, depends largely on whether the project work schedule is realistic and achievable. He concluded that the impact of delays on Clients is much in that they have to absorb or pay additional costs for the project and are still not able to use or occupy their property for the intended purpose. He went further to group delays into concurrent, excusable and non-excusable.

Excusable delays are those that are beyond the contractor’s control, and can be categorized as compensable and/or excusable types while non-excusable delays are those that fall within the contractor’s control (Lepage, 2017). Delays could also be categorized into internal and external. While internal delays arise from the project stakeholders, external delays emanate from third parties involved within the project delivery process (i.e. utility service providers, government authorities, labour unions). All these types of delay affect the management of projects. Ansah and Sorooshian (2018) proposed a theoretical framework; the 4P project delays, grouping them based on their shared characteristics. Adam et al. (2017) conducted a literature analysis to provide an aggregated ranking of project delays, which was limited to forty (40) journal articles reporting on delays in publicly funded construction projects.

Eizakshiri et al. (2015) reviewed a range of studies on project delays to identify gaps and to propose further research questions on the subject. However, due to their limitations, these studies did not provide a longitudinal view of studies reporting the Construction Project Delay (CPD). Research on the CPDs has attracted considerable attention for decades now. A review of the studies on this subject reveals various research approaches such as evaluation of the factors causing project delay (Chiu & Lai, 2017); case studies analyzing project delays; and comparative studies on project delays between different countries (Shebob et al., 2012).

Types of Delay in Building Projects

As stated earlier, Trauner et al. (2009) and Enshassi et al., (2010) came out with an opinion based on study conducted that construction delays could be non-excusable or excusable, non-concurrent or concurrent, non-critical or critical, and non-compensable or compensable. Construction project delays are fundamentally excusable or non-excusable. According to Ahmed et al (2012), delay is excusable or non-excusable depending on the conditions contained in the terms of contract. An excusable delay generally is as a result of an unanticipated occurrence that exceeds the control of the contractor and/or the subcontractors (Trauner et al., 2009). The writer also believes that delays coming from issues such as labour unrest, flood, differing site conditions, force-majeure or Acts of God, client’s variation, and delays from unexpected occurrences result in a control that exceeds that of the contractor. This is referred to as excusable delays. With Non-compensable delays, Ahmed et al. (2012) and Mpofu, B., Ochieng, E. G., Moobela, C. and Pretorius, A. (2017) grouped both excusable but non-compensable and that of the compensable as one. Delays that are compensable are caused by the client or the designer (i.e. architect/engineer).

Under this condition, the contractor may be given an extension of time or an opportunity will be given to him to claim for costs relating to the delays or both. Mpofu, B., Ochieng, E. G., Moobela, C. and Pretorius, A. (2017); Ahmed et al. (2003); Trauner et al. (2009); and Ochoa (2013) established that excusable delays can be classified as excusable non compensable as well as excusable compensable. Delays that are compensable result either through the client or the architect/engineer as opined by Mpofu, B., Ochieng, E. G., Moobela, C. and Pretorius, A. (2017). According to Aimobarak et al., (2013), delays that are excusable non-compensable are usually beyond the client's or the contractor's control; like fire, conflicts, labour unrest, weather conditions, national crises. Trauner et al. (2009) stressed that delays can be non-compensable or compensable in terms of extension of time or fiscal compensation depending essentially on the contract conditions and the nature of the delay.

2.2 Strategies For Minimizing Delay In Building Projects

Delays in construction projects cannot be avoided or eliminated. However, appropriate measures, if put in place, can reduce or eliminate some of the factors that cause construction delays. From literature, it is observed that the causes of construction delays are multi-various ranging from excusable to non-excusable; compensable to non-compensable; critical to non-critical; which have been categorized into consultant-related, contractor-related and client-related (Elharare et al., 2016). It is the effect of these delays that manifests in cost over-run, time over-run and /or project abandonment. The risks of construction delays are low productivity, inflation and cost and time overruns. Delays could be avoided by timely delivery of materials, contingency allowance, community involvement, less bureaucracy and use of current technology. Construction is a risky business; it is a risk that owners and contractors face that can affect construction time and the cost of a lost day on a construction project may be staggering (Trauner et al., 2010). The issue of delay and ways of minimizing it has been studied by researchers from various countries. In studies on minimizing delay, researchers have recommended ways to reduce it. They are, by introducing better management and engaging technology and promoting interpersonal relationships (Chen et al., 2017).

The owner, contractor, and consultants are essential in a construction project. Therefore, ideas of minimizing delays in construction works are suggested based on owner, contractor and consultant perspectives (Chen et al., 2017). Therefore, minimizing delay in management is divided into time, finance, manpower, work scope, and control. Time is very important to minimize delays in the construction sector. Proper project planning and scheduling are the essentials of an efficient time management. Thus, a realistic schedule ensures that the site manager is able to coordinate the labours into proper project constructions (Durdyev et al., 2017). Management also needs to apply techniques to manage a construction project with proper planning, scheduling, financial charts, rules and regulations (Chen, et al., 2017). Furthermore, this project plan serves as a blueprint for the measurement of the work performed at different phases of the construction. An effective planning phase has to be executed in detail and carefully so that delays can be avoided. Studies in Zambia recommended that projects should be pre-planned and timed for the works to be executed in seasons of clement weather (Gebrehiwet, and Luo, 2017). It is therefore important for a construction project to be well pre-planned and scheduled from the starting phase and strictly followed by construction parties to avoid delays in the project. Al-Emad et al. (2017) recommended that fast payment to the contractor would enable contractors to finance the project. It concluded that financial support to contractors from owners is important to maintain the work progress according to the schedule and contract agreement to motivate contractors and labours to increase work performance.

The enforcement of liquidated damages and offering of incentives for early completion were also strong measures suggested by Odeh and Battaineh. (2002) to improve construction project situations. Lessing, B., Thurnell, D. and Durdyev, S. (2017) studied on time delay and cost overrun minimization. They pointed out the following measures; sufficient and readily available financial resources until completion of the project, selecting highly skilled consultants and reliable and competent contractors to carry out the project. Summary of mitigating construction delays as discussed above and identified from literature are represented in Table below;

Table 1: Strategies for Mitigating Construction Delay

SN	Strategies	Authors
1.	Contingency allowance	Abdul Rahman et al. (2006); Abedi, Fathi and Mohammad (2011);
2.	Acceleration of site activities	Abdul Rahman et al. (2006);
3.	Systematic control mechanism	Ng (2007); Abdul Rahman et al. (2006); Olawale and Sun (2010)
4.	Community involvement	Abdul Rahman et al. (2006)
5.	Proper emphasis on past experience	Abdul Rahman et al. (2006); Abedi, Fathi and Mohammad (2011);
6.	Ensure timely delivery of	Abdul Rahman et al. (2006)
7.	Effective strategic planning	Abdul Rahman et al. (2006); Abedi, Fathi and Mohammad (2011);Kasimu and Abubakar (2012)
8.	Developing professionalism and skillfulness of human resources in the construction industry through proper training	Ng (2007); Abdul Rahman et al. (2006); Abedi, Fathi and Mohammad (2011); Nwosu, and Aggrey, (2020),
9.	Clear information and communication channels	Abdul Rahman et al. (2006); Abedi, Fathi and Mohammad (2011);
10.	Engaging the right/experienced consultants and contractors	Al-Emad, et al (2017)
11.	Construction management (CM) type of contracts	Al-Emad, et al (2017)
12. 13.	Adopting new approaches to contracting such as Design-Build (Accurate initial time estimates D/B)	Al-Emad, et al (2017) Abdul Rahman et al. (2006); Nwosu,and Aggrey,. (2020),; Kasimu and Abubakar (2012); Love et al. (2000);
14.	Absence of or less bureaucracy	Abdul Rahman et al. (2006)
15.	Making use of current technology	Al-Emad, et al. (2017)
16.	Multidisciplinary/competent project team	Abdul Rahman et al. (2006); Nwosu, and Aggrey(2020),;
17.	Hiring of an independent supervising professional to monitor progress of the work	Abdul Rahman et al. (2006)

SN	Strategies	Authors
18.	Offering incentives for early completion	Abdul Rahman et al. (2006)
19.	Enforcing liquidated damages clause	Abdul Rahman et al. (2006)
20.	Frequent progress meetings	Ng (2007); Abdul Rahman et al. (2006);
21	Ensuring adequate and available source of finance till project completion	Abdul Rahman et al. (2006)
22	Comprehensive contract documentation	Abdul Rahman et al. (2006); Nwosu, and Aggrey,(2020); Kasimu and Abubakar (2012)
23	Engagement of competent project managers	Abdul Rahman et al. (2006);
24	Ensuring commitment to projects	Abdul Rahman et al. (2006); Nwosu, and Aggrey,(2020),
25	Resource availability	Abdul Rahman et al. (2006); Nwosu, and Aggrey, (2020),
26	Allocation of sufficient time and money at the design phase	Abdul Rahman et al. (2006);
27	Selection of a competent consultant and reliable contractor to carry out the work	Abdul Rahman et al. (2006); Kasimu and Abubakar (2012)
28	Performing a preconstruction planning of project tasks and resource needs	Ng (2007); Abdul Rahman et al. (2006); Abedi, Fathi and Mohammad (2011);
29	Adopting a new approach to contract award procedure by giving less weight to prices and more weight to capabilities and past performance of contractors	Abdul Rahman et al. (2006);
30	Proper project planning and scheduling	Al-Emad, et al (2017)
31	Effective site management and supervision	Al-Emad, et al (2017)

3. RESEARCH METHODOLOGY

The population for this research consists of stakeholders in the TETFund projects executed between 2015 and 2025 in educational institutions in Oyo State. This period (2015-2025) was chosen because of the availability of relevant data on completed projects and Project data beyond 10 years may not be readily available. Table 3.1 shows the list of TETFund beneficiary institutions in Oyo State, Nigeria. The target population of stakeholders consists of Consultant Engineers, Consultant Quantity Surveyors, Consultant Architects, Contractors, Clients and Project financiers in the selected institutions in Oyo State, Nigeria. These stakeholders were Quantity Surveyors (52), Structural Engineers (57), Architects (42), Client's Organisation (11), Contractors (70), and Project Financier (1), giving a total of 233 stakeholders.

A sample size of 50% of five Stakeholders was used for this study including Quantity Surveyors (26), Structural Engineers (29), Architects (21), Client's Organisation (6), Contractors (35). However, 100% of project financier was used because it is only one (1). This gave a total sample size of 118. Mean score and factor analysis was used in analyzing the qualitative data obtained, which is aimed at examining the delay mitigating strategies to be adopted in TETFund projects in the study area. The mean score was adopted for this study to achieve objectives 1 and 4. A 6-point Likert-type scale was employed for data collection. It is a suitable tool to use because it helps to get the average value of the distribution. The formula for mean score is given as:

$$MS = \frac{5n5 + 4n4 + 3n3 + 2n2 + 1n1 + 0n0}{n5 + n4 + n3 + n2 + n1 + n0} \quad \text{(Equation 3.1)}$$

Where MS = Mean Score

Where no= no of respondents who answered "no occurrence" or "no impact"
n1 = no of respondents who answered "very low occurrence" or "very low impact n2
= no of respondents who answered "low occurrence" or "low impact"
n3 = no of respondents who answered "medium occurrence" or "medium impact"
n4 = no of respondent who answered "high occurrence" or "high impact"
n5 = no of respondents who answered "very high occurrence" or "very high impact"

3.1 Reliability of Responses

Cronbach's alpha was used to test the reliability of the responses provided for the three scales used for this study. A Cronbach's alpha value of greater than 0.6 suggests that the scales are reliable. From the Table, it can be deduced that all the scales are reliable and can therefore be used for analysis.

Table 2: Reliability of the Scales

Scale	No. of Items	Cronbach's Alpha Coefficient
Extent of occurrence of causes of delay	41	0.969
Impact of occurrence of causes of delay	41	0.970
Significance of the strategies for mitigating the effects of delay on cost and time performance	31	0.972

Table 3: Background of Respondents

Profiles	Frequency	Percent	Valid Percent	Cumulative Percent
Highest educational qualification				
HND	2	2.2	2.4	2.4
B.Sc./B.Tech./B.Engr.	38	41.3	46.3	48.8
M.Sc./M.Tech./MBA	30	32.6	36.6	85.4
Ph.D.	6	6.5	7.3	92.7
Others	6	6.5	7.3	100.0
No response	10	10.9		
Total	**92**	**100.0**		
Professional qualification				
MNSE/FNSE	24	26.1	28.2	28.2

Profiles	Frequency	Percent	Valid Percent	Cumulative Percent
MNIQS/FNIQS	32	34.8	37.6	65.9
MNIA/FNIA	14	15.2	16.5	82.4
MNIS/FNIS	3	3.3	3.5	85.9
MNIOB/FNIOB	7	7.6	8.2	94.1
Others	5	5.4	5.9	100.0
No response	7	7.6		
Total	**92**	**100.0**		
Designation of respondents Consultant Civil Engineers	22	23.9	27.2	27.2
Consultant Quantity Surveyors	22	23.9	27.2	54.3
Consultant Architects	9	9.8	11.1	65.4
Project Financier	3	3.3	3.7	69.1
Contractors	19	20.7	23.5	92.6
Client Organisation	6	6.5	7.4	100.0
No response	11	12.0		
Total	**92**	**100.0**		
Working experience	**Frequency**	**Percentage**	**Midpoint (x)**	**Fx**
0-5	7	8.3	2.5	17.5
5-10	20	23.8	7.5	150
10-15	34	40.5	12.5	425
15-20	8	9.5	17.5	140
20 and above	15	17.9	22.5	337.5
No response	8			
Total	**92** Mean= $\sum fx/\sum f$ = 1070/84 = 12.74 ≈ 13 years	**100.0**		**1070**
Number of TETFund projects undertaken in the last 10 years 1-5	14	19.2	3	42
6-10	28	38.4	8	224
11-15	14	19.2	13	182
16-20	9	12.3	18	162
21 and above	8	11.0	23	184
No response	19			
Total	**92** Mean= $\sum$	**100.0** fx/$\sum$f = 794/73 =	10.88 ≈ 11 No.	**794**

4. STRATEGIES FOR MITIGATING THE EFFECT OF DELAY ON COST AND TIME PERFORMANCE

This was achieved using primary data from respondents via a questionnaire survey. Respondents were requested to tick their preferred option from a five-point Likert-like scale set against a list of 32strategies for mitigating the effect of delay synthesized from Literature. The assessment scale comprised: no effect (0), very low effect, (1), low effect (2), moderate effect (3), high effect (4) and very high effect (5). The data collected on this objective were analysed using mean score and the results are as presented on Table 4.10. The Table shows that seven out of the 32 strategies for mitigating delay investigated are high in occurrence in the study area.

The other 25 causes have average mitigating effect on TETFund building projects in the study area. Top on the seven highest strategies for mitigating the effect of delay is selection of a competent consultant and reliable contractor to carry out the work (MS) of 4.33. It is followed by allocation of sufficient time and money at the design phase (MS=4.19), effective site management and supervision (MS=4.12), adopting a new approach to contract award procedure by giving less weight to prices and more weight to capabilities and past performance of contractors (MS=4.09), performing a preconstruction planning of project tasks and resource needs (MS=4.09), ensure timely delivery of materials (MS=4.08) and comprehensive contract documentation (MS=4.08).

Furthermore, one-way ANOVA was conducted to compare the rankings of the strategies for mitigating the effect of delay on cost and time performance of TETfund projects based on the designations of the respondents. There was statistically significant difference in the rankings of the respondents for 18 strategies ($p < 0.05$). Some of these strategies are Systematic control mechanism, ensuring timely delivery of materials, developing professionalism and skillfulness of human resources in the construction industry through proper training, clear information and communication channel and engaging the right/experienced consultants and contractors. The details are presented in the Table.

The three most effective strategies for mitigating the effects of delay on cost and time performance of TETFund projects were selection of competent consultants and a reliable contractor to carry out the work, allocation of sufficient time and money at the design phase and effective site management and supervision. This shows that availability of finance and proper management and planning of a construction work will reduce the delay experienced considerably. Other significant strategies were timely delivery of materials, comprehensive contract documentation and resource availability. The least significant strategy for mitigating the effects of delay was community involvement.

Table 4: Strategies for Mitigating the Effects of Delay on Cost and Time Performance

		Overall		Consultants		Contractors		Client Organization		Project Financiers		One-way ANOVA	
S/N	Strategies	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	F	Sig
1	Selection of a competent consultant and reliable contractor to carry out the work	4.33	1	4.60	1	3.74	1	3.83	3	4.33	8	5.383	.002
2	Allocation of sufficient time and money at the design phase	4.19	2	4.49	4	3.47	10	3.67	8	5.00	1	5.581	.002
3	Effective site management and supervision	4.12	3	4.45	6	3.63	2	3.00	24	3.33	30	5.888	.001
4	Adopting a new approach to contract award procedure by giving less weight to prices and more weight to capabilities and past performance of contractors	4.09	4	4.43	7	3.42	11	3.50	13	3.67	28	6.783	.000
5	Performing a preconstruction planning of project tasks and resource needs	4.09	5	4.49	4	3.37	15	3.17	17	4.33	8	6.501	.001
6	Ensure timely delivery of materials	4.08	6	4.38	10	3.39	12	3.67	8	4.00	16	4.317	.007
7	Comprehensive contract documentation	4.08	7	4.51	2	3.37	15	3.83	3	4.00	16	7.149	.000
8	Developing professionalism and skillfulness of human resources in the construction industry through proper training	4.05	8	4.42	8	3.61	4	3.17	17	4.00	16	4.352	.007
9	Resource availability	4.05	9	4.36	11	3.53	7	3.00	24	4.00	16	3.836	.013
10	Ensuring adequate and available sources of finance until project completion	4.04	10	4.30	14	3.58	5	3.83	3	4.00	16	1.800	.154
11	Multidisciplinary/competent project team	4.03	11	4.32	13	3.37	15	3.83	3	5.00	1	5.079	.003
12	Ensuring commitment to projects	4.03	12	4.51	2	3.16	24	2.67	30	4.33	8	11.121	.000
13	Effective strategic planning	3.99	13	4.23	17	3.39	12	3.67	8	4.00	16	2.586	.059
14	Engagement of competent project managers	3.99	14	4.36	11	3.53	7	2.83	27	3.33	30	5.153	.003
15	Proper emphasis on past experience	3.98	15	4.15	22	3.39	12	3.83	3	4.33	8	1.977	.125
16	Proper project planning and scheduling	3.98	16	4.40	9	3.63	2	2.67	30	3.67	28	6.083	.001
17	Frequent progress meetings	3.98	17	4.28	16	3.58	5	3.67	8	4.33	8	1.817	.151
18	Absence of or less bureaucracy	3.96	18	4.23	17	3.37	15	4.00	1	4.67	4	2.693	.052
19	Systematic control mechanism	3.93	19	4.23	17	3.28	19	3.50	13	4.00	16	3.133	.030
20	Engaging the right/experienced consultants and contractors	3.93	20	4.30	14	3.00	28	2.83	27	4.67	4	7.982	.000
21	Clear information and communication channel	3.93	21	4.23	17	3.11	25	3.17	17	4.33	8	3.668	.016
22	Accurate initial time estimates	3.86	22	4.19	21	3.00	28	4.00	1	4.00	16	3.036	.034

23	Making use of current technology	3.84	23	4.15	22	3.26	21	3.33	17	4.67	4	**3.303**	**.025**
24	Enforcing liquidated damages clauses	3.77	24	4.08	24	3.53	7	3.00	24	4.33	8	1.385	.254
25	Contingency allowance	3.75	25	3.87	27	2.83	30	3.50	13	4.00	16	2.075	.111
26	Offering incentives for early completion	3.71	26	3.94	25	3.11	25	3.50	13	4.67	4	1.854	.144
27	Acceleration of site activities	3.68	27	3.79	29	3.11	25	3.67	8	4.00	16	1.261	.294
28	Adopting new approaches to contracting such as Design-Build (D/B)	3.68	28	3.89	26	3.28	19	2.83	27	4.00	16	1.633	.189
29	Construction management (CM) type of contracts	3.58	29	3.81	28	3.17	23	3.17	17	4.00	16	1.160	.330
30	Hiring of an independent supervising professional to monitor progress of the work	3.55	30	3.77	30	3.21	22	3.33	17	4.33	8	.949	.421
31	Community involvement	3.44	31	3.51	31	2.83	30	3.33	17	5.00	1	1.998	.121

Factor analysis was used to group similar strategies to arrive at more significant categories that account for the majority of the total variance. A KMO value greater than 0.60 suggests that the data is adequate for factor analysis to be conducted. Also, a significant Bartlett's test of Sphericity ($p<0.05$) also suggests that factor analysis can be conducted.

Table 5: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.911
Bartlett's Test of Sphericity	Approx. Chi-Square	2776.410
	Df	465
	Sig.	.000

From Table 6, four categories were generated (eigenvalue > 1) which accounted for a cumulative variance of 71.85%. According to Hair (2014), a solution that accounts for about 60% of the total variance can be considered. This suggests that the four categories sufficiently accounts and determines the variation that occurs on the scale and can be used as further categorization of the items. All the strategies identified will therefore be redistributed into these four categories. This is shown in Table 7.

Table 6: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	17.121	55.230	55.230	17.121	55.230	55.230	8.968	28.929	28.929
2	2.247	7.250	62.480	2.247	7.250	62.480	5.291	17.068	45.997
3	1.648	5.315	67.796	1.648	5.315	67.796	4.484	14.465	60.463
4	1.256	4.050	71.846	1.256	4.050	71.846	3.529	11.383	71.846
5	.996	3.214	75.060						
6	.834	2.691	77.751						
7	.759	2.448	80.199						
8	.682	2.202	82.400						
9	.637	2.053	84.454						
10	.570	1.839	86.293						
11	.482	1.554	87.847						
12	.447	1.443	89.290						
13	.376	1.215	90.504						
14	.372	1.199	91.703						
15	.343	1.108	92.811						
16	.264	.852	93.663						
17	.229	.740	94.403						
18	.213	.688	95.092						
19	.201	.649	95.741						
20	.179	.576	96.317						
21	.170	.547	96.864						
22	.159	.512	97.376						
23	.147	.476	97.851						
24	.128	.413	98.264						
25	.122	.394	98.658						
26	.103	.331	98.989						
27	.082	.263	99.253						
28	.069	.221	99.474						
29	.066	.213	99.687						
30	.057	.183	99.870						
31	.040	.130	100.000						
Extraction Method: Principal Component Analysis.									

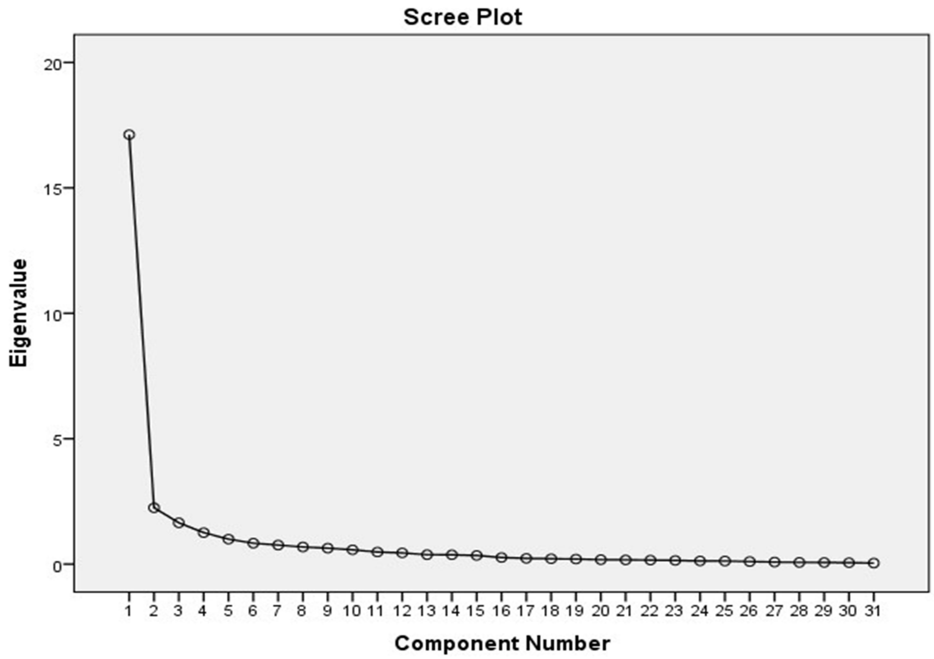

Fig. 1: Scree Plot level of significance Strategies for Mitigating the Effects of Delay on Cost and Time Performance

Table 7 shows the redistribution of all the strategies for mitigating the effects of delay identified into the four significant categories derived above. The rotated factor matrix shows how the variables are weighted for each component and also the correlation between the items and the component. Because these are correlations, possible values range between -1 to +1. Every item categorized under any component has a fairly strong correlation with that component. A total of 16 strategies were redistributed into category 1, seven were redistributed into category two, five were redistributed into category 3 and three were redistributed into category 4.

4.1 Administrative/Technical Factors

This category accounts for 55.23% of the variance explained by the factor analysis model. A total of 16 strategies fall into this category. Majority of the strategies relate to the administration of TETfund projects. The strategy with the highest weight was accurate initial time estimate (r=0.833). It was followed by effective strategic planning (r=0.738) and contingency allowance (r=0.723). The other strategies in this category were timely delivery of materials, adequate and available sources of finance until project completion, multidisciplinary/competent project team, making use of current technology, absence of or less bureaucracy, systematic control mechanism, enforcing liquidated damages clauses, proper emphasis on past experience, clear information and communication channels, frequent progress meetings, resource availability, acceleration of site activities and developing professionalism and skilfulness of human resources.

4.2 Management Factors
The strategies in the category relate to the management of and smooth coordination of activities on TETfund projects. This category accounts for 7.25% of the variance explained by the factor analysis model. Seven strategies are in this category. They are: engagement of competent project managers, effective site management and supervision, ensuring commitment to projects, comprehensive contract documentation, proper project planning and scheduling, engaging the right consultants and contractor and adopting new approach to contract award procedure.

4.3 Contractual/Supervision Factors
Five strategies fall into this category. This category accounts for a variance of 5.315% of the model. The strategies are adopting new approaches to contracting, construction management type of contract, community involvement, hiring of independent supervising professionals to monitor progress of work and offering incentives to progress of work.

4.4 Resource and Logistics Factors
The three strategies in this category are selection of competent consultant and reliable contractor to carry out the work, allocation of sufficient time and money at design stage and performing a preconstruction planning of project tasks and resources needs.

Table 7: Rotated Component Matrix[a]

	Component			
	1	2	3	4
Accurate initial time estimates	.833			
Effective strategic planning	.738			
Contingency allowance	.723			
Ensure timely delivery of materials	.718			
Ensuring adequate and available sources of finance until project completion	.716			
Multidisciplinary/competent project team	.714			
Making use of current technology	.698			
Absence of or less bureaucracy	.698			
Systematic control mechanism	.682			
Enforcing liquidated damages clauses	.678			
Proper emphasis on past experience	.672			
Clear information and communication channel	.591			
Frequent progress meetings	.583			
Resource availability	.571			
Acceleration of site activities	.565			
Developing professionalism and skillfulness of human resources in the construction industry through proper training	.540			
Engagement of competent project managers		.758		
Effective site management and supervision		.721		
Ensuring commitment to projects		.698		
Comprehensive contract documentation		.683		
Proper project planning and scheduling		.670		

	Component			
	1	2	3	4
Engaging the right/experienced consultants and contractors		.657		
Adopting a new approach to contract award procedure by giving less weight to prices and more weight to capabilities and past performance of contractors		.643		
Adopting new approaches to contracting such as Design-Build (D/B)			.841	
Construction management (CM) type of contracts			.809	
Community involvement			.806	
Hiring of an independent supervising professional to monitor progress of the work			.727	
Offering incentives for early completion			.537	
Selection of a competent consultant and reliable contractor to carry out the work				.750
Allocation of sufficient time and money at the design phase				.629
Performing a preconstruction planning of project tasks and resource needs				.584
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 21 iterations.				

Table 8: Details of Strategies Components

Components	Title	Variance	Cumulative variance
1	Administrative/Technical factors	55.230%	55.230%
2	Management factors	7.250%	62.480%
3	Contractual/ Supervision factors	5.315%	67.796%
4	Resource and Logistics factors	4.050%	71.846%

4.5 Summary

The results of this research and the detailed discussions of findings are presented in this chapter. The occurrence and extent of the causes of delay on Tetfund projects were discussed as well as the best strategies for mitigating the effects of delay on the cost and time performance of Tetfund building projects. The next chapter outlines the summary of findings, conclusions and recommendations of this study.

6. CONCLUSION

Based on the strength of the findings of the study, the following conclusions were drawn:

Finally, regarding the strategies to mitigate the effects of delay, top on the seven highest strategies is selection of a competent consultant and reliable contractor to carry out the work. It is followed by allocation of sufficient time and money at the design phase, effective site management and supervision, adopting a new approach to contract award procedure by giving less weight to prices and more weight to capabilities and past performance of contractors, performing a preconstruction planning of project tasks and resource needs, ensure timely delivery of materials and comprehensive contract documentation. Also, from factor analysis, the 4-component generated for the strategies to mitigating the effects of delay accounted for 71.846% of the variability explained.

7. RECOMMENDATIONS

Stakeholders, especially consultant's intervention should not be taken lightly. Instead seriousminded people should be saddled with the responsibility of handling them to avoid the effects of delay in relation to time and cost performances in TETFund building projects. In addition, appropriate actions should be taken to guide against all the causes of delay. This will result into an improved entity of enticed TETFund building project in the study area and in Nigeria at large. Lastly, attention should be paid to the strategies to mitigating the effects of identified causes of delay. This will help to know the measures to take to reduce the effects of delay in TETFund building projects in the study area.

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