

Delay factors of Construction Project Delivery in Nigeria

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Abstract- It is evident in the Nigeria construction industry that it is a rare event that the projects are completed on the scheduled time, budgeted cost, and desired quality because the construction projects experience a tremendous amount of delays. Timely completion of construction project is a major criterion of project success. The need to control the causes of delays during the construction process comes out when the number of delay project has been increasing from time to time. Hence, it is essential to identify the causes of this problem from the early stage of construction project. The objectives of this study are to Develop a framework for mitigating delay factors on construction project delivery in Nigeria, the study tends to evaluate the causes of delay in term of frequency occurrence and severity effect and have develop a framework to mitigate its occurrence. A total of 136 contractors, consultants, site engineers and project managers with an experience in construction of infrastructural project were involved in the study. A questionnaire survey was conducted to identify the significant causes of delay in order to avoid or minimize their impact on construction project. The perspective of contractors, consultants and client has been analyzed and ranked based on Relative Important Index (RII). The study indicate that the top major causes of delay were 'Owner interference', 'Frequent change orders', 'Long waiting time for approval of tests and inspection', 'Shortage of construction material', 'Mistakes in design documents', 'Inappropriate organizational structure linking all parties involved in the project', 'Mistakes and discrepancies in design documents', 'Discrepancies in contract document' and 'Delays caused by subcontractors'. In addition, the top major effects of delay were; time overrun, cost overrun, dispute, arbitration, litigation and abandonment.

Keywords: Construction Industry, Construction Delays, Project Delivery, Construction Stakeholders, Nigeria

I. INTRODUCTION

Nigeria is regarded as a developing country that is moving forward at a fast pace. The construction industry is one of the fastest and highest growing sector in Nigeria, encompassing huge number of developmental projects across the country. The sector

is supporting both long-term and short-term economic growth. This trajectory growth in the industry is beneficial for the country because being a developing country, infrastructural development is very important to fuel growth (Okafor et al, 2025; Akinsiku and Akinsulire, 2023).

There are three criteria which account for construction project success; completion on-time, within budget, and in accordance with the specifications (Akinsiku and Akinsulire, 2023). In addition to that, stakeholders' satisfaction also plays a significant role in this regard. There are several factors contributing to these phenomena, and they include unavailability of adequate land for undertaking mass Construction Project, shortage of fund for large scale Construction Project, high cost of construction, scarcity of construction materials, lack of knowledge in construction techniques and construction delays etc (Obodoh and Obodoh, 2024; Mamman and Umesì, 2023).

Delays in construction projects are considered one of the most common problems causing a multitude of negative effects on the project and its participating parties. Along with delay, the frequently faced consequences are project failure, reduction of profit margin, and loss of belief of citizen in government funded projects, etc. When delays do occur, they are either accelerated or have their duration extended beyond the scheduled completion date. These are not without some cost consequences. Delays also give rise to disruption of work and loss of productivity, late completion of project increased time related costs, third party claims, abandonment and termination of contract (Abdul-Rahman, 2006)

Previous researches by Divya and Ramya, (2015) also showed that the main causes of delay and cost overrun in construction is improper project management and claim administration. Due to unforeseen incidences and contract management

problems, construction projects experience delays which directly impacts all parties involved. stakeholders who give their trust on the Construction companies are the one who are suffering most and have no control on the matter (Egwim et al, 2022; Fashina et al, 2023).

Delay in building construction project can be defined as the lateness of completion; it either exceeds the date specified in the contract or the date decided by the parties for delivery of the project. It slips over its planned schedule and is considered as a common problem in construction projects. Construction delays result in claim by contractors. Claims related to construction projects are inevitable and there is no way of eliminating all project risks, as some are unforeseeable. However, if scope of the project is well thought and transferred in the design, duties of all parties clearly defined and played, most uncertainties will be eliminated (Shrivastava and Singla, 2024).

This paper examines causes of delay in an integrated manner and determines how critical delay causes are most influential in project performance. This will provide owners, consultants and construction companies involved in construction projects with the foundation on which such strategies and framework – on how to avoid delays - can be developed. This thesis focuses on construction projects in Nigeria, which were assessed for delay causes and examines the corresponding effects identified and provide recommendation based on the findings to improve project performance within the construction projects as well as the general public construction projects.

The paper aims to answer the following questions

1. What are the factors that causes delay in construction projects delivery in Nigeria, identified by the construction-related professionals?
2. What are the most significant delay factors that causes delay in construction projects delivery in Nigeria, identified by the construction-related professionals?

II. METHODOLOGY

This study adopted survey research design. Survey was used to collect data for this work. The data were collected using questionnaire structured in Likert five-point scales. The questionnaire were structured as a 5 scale Likert items, and comprises of three sections. The first section is the respondent's profile. The second section dealt on the causative factors of delay in construction project, while the third is on the effects of delay on construction project. Limitation of time and budgeting together with the researcher's skill were considered when determining the research design. Also, method and ways to get adequate information for the research were considered. Thus, only individuals who have in-depth knowledge of the research area, which are construction-related professionals were contacted. The systematic method of handling sample design and others were also considered when dealing with the research design and procedure. The research was designed to get opinion from contractors, consultants, site engineers, project managers and construction companies in regard to the factor causing delays and effects of delays. The possible causes of delays were identified from the literature reviews. A total of 29 delay causing factors in projects were identified after thoroughly reviewing the literatures and questions were designed according to these factors to get the opinion from stakeholders of real estate construction.

The instrument used for primary data collection is survey (questionnaire administration). A questionnaire is a research instrument for collecting quantitative or qualitative data/ information using well-constructed and well-arranged questions. It consists of a list of questions relating to the aim and objective of the study and the hypothesis to be verified, to which the respondents are required to answer (Okafor, 2023). The questionnaire was divided into sections. Each section contains items (questions), and they are structured to reflect the goal of the section. The questions are structured as close ended questions.

Research population is generally a large collection of individuals or objects that have similar characteristics and is the main focus of a scientific investigation. It

is the total of all the individuals who have certain characteristics that are of interest to a researcher (Okafor, 2023). For this study, the research population is the total number of construction-related professionals in South-South Nigeria, in the official register of the Ministry of Works. The population was made of consultants and contractors with an experience in the construction industry and currently

involved in oil and gas construction projects. More over all respondents had high position, lengthy year of experience and educational background attended higher level education implies the respondents have enough knowledge of the construction industry with issues relating to causes and effects of delay.

Table 1. Distribution of respondents according to States in the study area

	Delta	Rivers	Akwa-Ibom	Cross Rivers	Edo	Bayelsa	Total
Number Distributed	35	35	35	35	35	35	210
Number of Responses	25	28	21	20	22	20	136
Percentage Response	71.4	80	60	57.1	62.8	57.1	64.7

Table 2. Distribution of respondents according to profession in the study area

Classification	Frequency	Percent (%)
1 Contractors	67	49.2
2 Consultants	19	14.0
3 Site Engineers	23	16.0
4 Project Managers	27	19.85
Total	136	100

3.1 Method of Data analysis

The data analysis is determined to establish the relative importance of various factors that contribute to causes and effects of construction delays. Analysis of data consists of calculating the Relative Importance Index (RII) and Ranking of factors in each category based on the Relative Importance Index (RII).

$$RII = \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5}{A * N} \quad \text{Equation 3.1.}$$

Where,

RII = Relative Importance Index, n1, n2, n3, n4, n5 = Number of respondents answer each factor

1, 2, 3, 4, 5 = weight given for each factor (ranging from 1 to 5),

A = highest weight (i.e. 5 in our case), N = total number of respondents.

The importance indices were calculated for all delay causes and the delay causes were ranked accordingly. In order to identify how project delay can be mitigated, it is important to identify the responsible

party. Therefore, the responsibility of the delay causes is illustrated in the factor or category column

III. RESULTS

4.1 Respondents Profiles

A total of 210 questionnaires were distributed among the respondents of different backgrounds working on Oil and gas construction projects and 136 responded fully to the questionnaire, giving 64.7 percent responds rate. One is rejected making only 70 respondents usable in the analysis. This sub-section presents the educational qualification and years of experience of the respondents

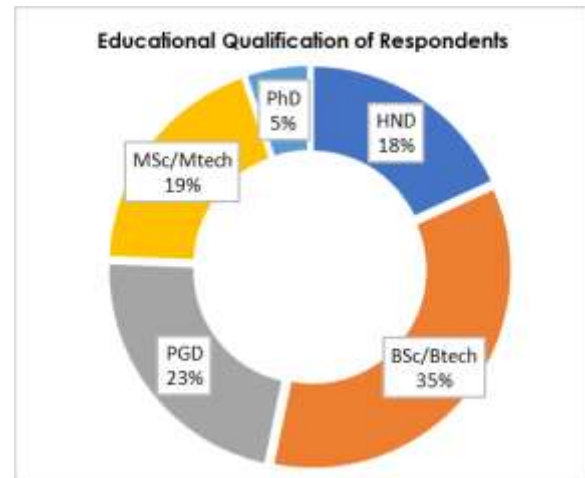


Figure 1. Educational Qualification of Respondents

As shown in Figure 4.1, all of the selected professionals have educational qualifications above

that of secondary education. Greater number (35%) of the respondents holds B.Sc/ BTech degrees, while only few (5%) holds PhD degree. 19% and 18%, respectively, of the respondents, holds MSc/MTech degrees and HND. Put differently, almost half (47%) of the respondents holds qualifications (PhD, Msc/MTech and PGD) above that of HND and bachelor's degree. This indicates the advanced level of educational pursuit among the respondents.

Respondents Experience in Construction Industry

The experience possess by the respondents may help in providing a better understanding of this matter and in better position in giving much precise answer required to the questionnaires form.



Figure 2. Respondents' Years of Work Experience

As shown in Figure 4.2, many (35%) of the respondents have years of experience above 15 years. This is followed by those with 11-15 years (31%). Fewer number (12%) of the respondents have years of experience between 0-5 years, while 22% have years of experience between 6 to 10 years. Put differently, 66% of the respondents have work experience spanning from 11 years to above 15 years. This indicates that most of the respondents have been in the industry for more than 11 years.

The results and discussion below are devised in three parts corresponding to the research questions and also the sections of the questionnaire. These divisions can help tackle one question at a time. The first part of the results and discussion contains the findings of the questions directed towards identifying the importance of delay causes and raking in the level of their severity. A total of 29 potential delay causes were selected from previous studies and grouped in eight categories: client related factors, contractor related factors, consultant related factors, material related factors, labour and equipment factors, contract related factors, contractual relationship factor and external factors. Thus, respondents were asked to rank delay causes factors in a five-point scale range from 1 to 5 based on frequency of occurrence from rarely to greatly often. In the second part respondents were asked to identify the most important and frequent effect of construction delay. Similar to delay causes, six potential effects were selected from previous studies. These effects of delay had also a five-point scale ranged from 1 to 5 and the results of both questions are presented and discussed accordingly.

3.2. The importance and ranking of delay caused by respondents

The construction delay is universally evident reality and is counted as a common problem in construction projects. Delays in construction projects happen because of various factors and causes. A total of 29 delay causing factors were identified and classified in to eight factor groups: client related factors, contractor related factors, consultant related factors, material factor, labour and equipment factor, contract factors, contractual relationships factors and external factors. In this respect the respondents were asked to rank the importance of delay causes using five points' scales. The importance and ranking of delay causes resulted by the research methodology of questionnaire survey and evaluated by statistical formula for each factor group are shown below.

Table 3. Importance and ranking of Client related delay causes

Delay causes	Strongly Disagree	Disagree	Slightly Disagree	Agree	Strongly Agree	Total	RII	Rank
Finance and payment of completed work	0(0)	(0)	10(30)	70(280)	56(280)	590	0.868	2

Slow decision making	2(2)	3(6)	13(39)	64(256)	54(270)	573	0.843	3
Owner interference	0(0)	(0)	12(36)	63(252)	61(305)	593	0.872	1
Unrealistic contract duration imposed by owners	1(1)	6(12)	11(33)	74(296)	44(220)	562	0.826	4

From Table 3, the analysis shows that owner interference (RII = 0.872, Rank 1) is the most critical client-related factor causing delays, followed by finance and payment of completed work (RII = 0.868, Rank 2). This indicates that delays in payments and frequent client interventions disrupt

project schedules. Similar findings in Nigeria revealed that late payment and interference are among the leading causes of delay (Ameh et al., 2010). Mitigation requires prompt client payment schedules, clearer scope definition, and minimizing client interference.

Table 4. Importance and ranking of Contractor related delay causes

Delay causes	Strongly Disagree	Disagree	Slightly Disagree	Agree	Strongly Agree	Total	RII	Rank
Poor site management,	0(0)	7(14)	19(57)	41(164)	69(345)	580	0.853	5
Improper planning	0(0)	0(0)	9(27)	79(316)	48(240)	583	0.857	3
Inadequate contractor experience,	0(0)	0(0)	10(30)	70(280)	56(280)	590	0.868	1
Mistake during construction	0(0)	2(4)	10(30)	73(292)	51(255)	581	0.854	4
Improper method	1(1)	1(1)	12(36)	76(304)	46(230)	572	0.841	6
Delays caused by subcontractors.	0(0)	1(1)	9(27)	74(296)	52(260)	584	0.859	2

As shown on the table 5, the top-ranked cause is inadequate contractor experience (RII = 0.868, Rank 1), closely followed by delays caused by subcontractors (RII = 0.859, Rank 2). Poor site management and planning also scored high (RII > 0.84). This suggests that Nigerian contractors often

lack adequate technical expertise, leading to poor planning and reliance on inefficient subcontractors (Frimpong et al., 2003). To mitigate this, contractors should improve training, adopt modern project management techniques, and carefully evaluate subcontractors.

Table 5. Importance and ranking of consultant related delay causes

Delay causes	Strongly Disagree	Disagree	Slightly Disagree	Agree	Strongly Agree	Total	RII	Rank
Poor contract management	1(1)	7(14)	10(30)	78(312)	40(200)	557	0.819	4
Inadequate experience of consultant	0(0)	1(2)	8(24)	73(292)	54(270)	588	0.865	1
Mistakes and discrepancies in design documents	2(2)	3(6)	13(39)	64(256)	54(270)	573	0.843	2
Long waiting time for approval of tests and inspection	1(1)	6(12)	8(24)	80(320)	42(210)	567	0.834	3

According to table 5, the most significant consultant-related delay is inadequate consultant experience (RII

= 0.865, Rank 1). Design mistakes and poor contract management also contributed significantly (RII =

0.819–0.843). This aligns with studies showing that errors in design documents and weak supervision extend project durations in Nigeria (Odeyinka & Yusuf, 1997). Strengthening consultants’

professional competence and ensuring thorough design reviews before construction begins can reduce these delays.

Table 6. Importance and ranking of Material related delay causes

Delay causes	Strongly Disagree	Disagree	Slightly Disagree	Agree	Strongly Agree	Total	RII	Rank
Poor quality material supply	0(0)	0(0)	28(84)	63(252)	45(225)	561	0.825	2
Shortage of construction material	0(0)	2(4)	6(18)	72(288)	56(280)	590	0.868	1

According to table 6, shortage of construction materials (RII = 0.868, Rank 1) is the top factor, followed by poor quality material supply (RII = 0.825, Rank 2). This reflects Nigeria’s dependency on imported materials and fluctuating supply chains

(Odeh & Battaineh, 2002). Mitigation strategies include fostering local material production, improved procurement planning, and bulk purchasing agreements.

Table 7. Importance and ranking of Labour & equipment related delay causes

Delay causes	Strongly Disagree	Disagree	Slightly Disagree	Agree	Strongly Agree	Total	RII	Rank
Labour supply labour productivity,	0(0)	0(0)	8(24)	74(296)	54(270)	590	0.868	1
Equipment availability and failure.	1(1)	4(8)	10(30)	72(288)	49(245)	572	0.841	2

According to table 7, Labour supply and productivity (RII = 0.868, Rank 1) emerged as the key factor, while equipment availability and failure (RII = 0.841, Rank 2) was also notable. Labour shortages and equipment breakdowns have consistently been

reported as delay drivers in developing countries. Training programs, better labour welfare, and preventive equipment maintenance can address these issues.

Table 8. Importance and ranking of Contract related delay causes

Delay causes	Strongly Disagree	Disagree	Slightly Disagree	Agree	Strongly Agree	Total	RII	Rank
Frequent change orders	0(0)	3(6)	11(33)	76(304)	46(230)	573	0.843	1
Mistakes in design documents	1(1)	2(4)	12(36)	69(276)	52(260)	577	0.849	2
Discrepancies in contract document	0(0)	0(0)	8(24)	68(272)	60(300)	596	0.876	3

According to table 8, discrepancies in contract documents (RII = 0.876, Rank 3) ranked highest, suggesting that ambiguities in contractual agreements strongly impact timelines. Frequent change orders (RII = 0.843) and design document mistakes also play major roles. In Nigeria, poor contract

documentation is a recurrent challenge (Egwim et al, 2022; Mamman and Umesi, 2023). Early-stage contract reviews, clear risk allocation, and standardized documentation templates can reduce these risks.

Table 9. Importance and ranking of Contractual related delay causes

Delay causes	Strongly Disagree	Disagree	Slightly Disagree	Agree	Strongly Agree	Total	RII	Rank
Major disputes	0(0)	0(0)	8(24)	70(280)	58(290)	594	0.874	1
Negotiations during construction	1(1)	3(6)	10(30)	74(296)	48(240)	573	0.843	4
Inappropriate organizational structure linking all parties involved in the project,	0(0)	2(4)	6(18)	73(292)	55(275)	589	0.866	2
Lack of communication between these parties	0(0)	0(0)	12(36)	68(272)	56(280)	588	0.865	3

According to table 9, Major disputes (RII = 0.874, Rank 1) and inappropriate organizational structure (RII = 0.866, Rank 2) were dominant causes. Lack of communication (RII = 0.865) also ranked high. These reflect weak collaboration between stakeholders in

Nigeria's construction industry (Egwim et al, 2022). Effective dispute resolution mechanisms, structured communication channels, and clear organizational roles are crucial for mitigation.

Table 10. Importance and ranking of Client related delay causes

Delay causes	Strongly Disagree	Disagree	Slightly Disagree	Agree	Strongly Agree	Total	RII	Rank
Poor weather conditions,	0(0)	0(0)	12(36)	68(272)	56(280)	588	0.865	3
Changes in regulations,	0(0)	0(0)	10(30)	70(280)	56(280)	590	0.868	4
Problems with neighbours	1(1)	1(2)	12(36)	76(304)	46(230)	573	0.843	1
Unfavourable Site conditions.	1(1)	6(12)	11(33)	74(296)	44(220)	562	0.826	2

According to table 10, Among external causes, changes in regulations (RII = 0.868, Rank 4) and poor weather conditions (RII = 0.865, Rank 3) ranked high, with problems with neighbours (RII = 0.843, Rank 1) also significant. Unfavourable site conditions (RII = 0.826) further impacted projects. These findings align with Nigerian studies emphasizing regulatory bottlenecks and weather as external risk factors (Mamman and Umesi, 2023). Proactive environmental assessments, regulatory consultations, and stakeholder engagement with host communities can mitigate such delays.

Conclusively, the tables show that the most severe delay factors in Nigeria's construction industry stem from contractual discrepancies, inadequate experience (contractors and consultants), payment delays, and material shortages. This supports previous empirical findings across developing

countries. Addressing these issues requires systemic reforms in contract management, stronger professional capacity, better material supply chains, and improved stakeholder collaboration.

3.3 Top Delay Causes

Table 11. Top ten delay causing factors

Top 10 importance and ranking delay causes factors by RII value		
Delay causes	RII	Rank
Discrepancies in contract document	0.876	1
Major disputes	0.874	2
Owner interference	0.872	3
Finance and payment of completed work	0.868	4
Inadequate contractor experience	0.868	4
Shortage of construction material	0.868	4
Labour supply labour productivity	0.868	4
Changes in regulations	0.868	4
Inappropriate organizational structure linking all parties involved in the project	0.866	9
Inadequate experience of consultant	0.865	10

In Table 11 above, as ranked by the respondent, 10 most important factors causing delay in construction project are summarized and presented. Discrepancies in contract document (RII=0.876) is suggested as the most important factor causing delay on building construction projects. This is closely followed by Major disputes (RII=0.874). Owner interference (RII=0.872) comes third followed by Finance and payment of completed work, inadequate contractor experience, Shortage of construction material, labour supply labour productivity and Changes in regulations ranked 4th with (RII=0.868) respectively. Inappropriate organizational structure linking all parties involved in the project ranked 9th while Inadequate experience of consultant ranked 10th.

3.4 The Importance and Ranking of effects of Delay by respondents

The desire to finish a project on time, under the planned budget, and with the highest quality is common goals for all contracting parties, including the Owner, Contractor and Consultant. Delay usually

result in losses of one form or another for everyone. The causes lead to the effects of delay on construction projects.

The six effects of delay identified were:

1. Time overrun
2. Cost overrun
3. Dispute
4. Arbitration
5. Litigation
6. Abandonment of the project

Table 4.10 shows that Time overrun ranked the highest with RII of 0.964, while cost overrun ranked second with RII of 0.891. Time overrun and cost overrun affect the two components of project namely budget and schedule. Dispute among parties involved ranked third with RII value of 0.768. Arbitration and litigation were ranked fourth and fifth RII values of 0.636 and 0.568 respectively.

Abandonment of the project was ranked sixth with RII value of 0.577.

Table 12. Importance and ranking of effects of delay

Importance and ranking of effects of delay by RII value		
Effects	RII	Ranking
Time overrun	0.964	1
Cost overrun	0.891	2
Dispute	0.768	3
Arbitration	0.636	4
Litigation	0.568	5
Abandonment	0.577	6

IV. CONCLUSION AND RECOMMENDATIONS

One of the most important problems that may arise in the construction project is delays and the magnitude of these delays varies considerably from project to project. Some projects are only a few days behind the schedule: some are delayed over a year. So, it is essential to define the actual causes of delays in order to minimize and avoid the delays in any construction projects. Based on the study results, the following causes are identified as a potential delay causes on construction projects. Owner interference which results in design change, material change is the most influential delay causing factor in construction project. Frequent change orders, Long waiting time for approval of tests and inspections, mistakes in design documents, mistakes and discrepancies in design documents and discrepancies in contract documents are found as real causes of delay in the Oil and gas construction projects.

Based on the study findings, the following recommendations are put forward:

1. Owners should be informed about their role and the effect scope changes. The culture of thinking

to change while the construction is on process must be avoided by effectively utilizing the design stage to eliminate future changes.

2. Conducting proper investigation and giving adequate time in the design and preparation of documents.
3. Conducting design reviews by highly qualified and experienced group of professionals. Constructability reviews and value engineering studies on the final design must be conducted before going to tendering.
4. A standard checklist has to be prepared with all necessary details for reviewing the completeness of designs, plans, specifications and tender documentations. Accordingly, documentations have to be checked before floating the tender.
5. Design consultants have to cover (indemnity) the additional costs that the client incurs due to incorrect designs or insufficient data supplied by them and this has to be clearly included in the service contract agreement.

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