

A Survey on Building Projects Delay Variables: Project Stakeholders' Viewpoints

^{*1}A. W. Adekeye, ²J. O. Ilori, ³M. O. Oyeleke, ⁴Y. N. Yakubu & ⁵S. B. Bakare

^{1, 3 & 5}*Department of Civil Engineering, The Federal Polytechnic Offa, Nigeria*

²*Department of Quantity Surveying, The Federal Polytechnic Offa, Nigeria*

⁴*Department of Building Technology, The Federal Polytechnic Offa, Nigeria*

Submitted: 15-05-2022

Revised: 20-05-2022

Accepted: 25-05-2022

ABSTRACT: Project delays are becoming more common, and as a result, project delays have been labeled a global concern affecting the construction industry's performance. The elements that cause delays in construction projects in Nigerian were investigated in this study. It also assessed the impact of these factors on the completion of construction projects and offered solutions to reduce them. Simple Random Sampling was deployed to select clients, consultants and contractors operating in Kwara State, North-Central, Nigeria. 128 structured questionnaires were self-administered to the respondents, from which 79 were filled and returned. This reflected a response rate of 62.0%. The results were analyzed using descriptive analysis and relative importance index (RII). It was found that the major factors responsible for delays in building projects in Nigerian construction industry are delay or non-payment for completed work which was ranked higher with RII of 0.922, and both inappropriate designs as well as wrong choice of banker were ranked least with RII of 0.669. The study also found that major effects of project delay factors on construction project delivery are time overruns, cost overruns and disputes with RIIs of 0.84, 0.79 and 0.73 respectively. The study ranked making progress payment on time higher with RII of 0.937, as one of the ways of minimizing the effects of project delay on project delivery. It therefore recommended that clients should effect all necessary progress payments on time to contractors and consultants as and when due to mention but few.

KEYWORDS: Building, Client, Construction industry, Consultants, Contractors, Delivery, Project delay.

I. INTRODUCTION

The Nigerian construction sector is vital to the country's development and is a key component of any national economy. The industry provides the infrastructure that allows the economy to grow. Although government expenditure, particularly in the infrastructure sub-segment, has been a substantial driver to the sector's growth, other factors have also played a role. Despite the industry's strategic position in a rising economy like Nigeria, relative to some African countries, its contribution to the nation's GDP of less than 2 percent is very negligible (NBS, 2008). Due to frequent emerging uncertainties in budgets, technology and developmental processes, the construction industry is becoming more dynamic in nature. Together with other numerous recorded problems, these uncertainties also lead to project delays and ultimately affect the performance of construction projects (Ogunlana et al. 1996). A good execution of construction projects is paramount to the construction industry as it provides value for money to customers. Owolabi et al. (2014) indicated that project must be delivered within the stipulated period. John et al. (2015) reported that the inability of most construction projects to be completed on time is commonly criticized. According to Aibinu and Jagboro (2002), the rising rate of project delivery delays is a major criticism of the Nigerian construction industry, and as a result, project delay is seen as a global problem associated with the construction

industry, affecting project performance in terms of cost, time and quality.

Assaf and Al-Hejji (2006) described project delay as the period spent either after the date of completion stated in a contract or after the date agreed to by the parties for the delivery of a project. Similarly, Aibinu and Jagboro (2002) perceived project delay as a situation where the contractor and the owner of the project jointly or severally contribute to the failure to complete the project within the original or stipulated or accepted contract duration. In summary, project delay can be termed as the failure of a chosen contractor to complete a construction project on a pre-planned timeline. Nonetheless, the frequent occurrence of project delays by stakeholders on construction projects has been identified as a major setback in the industry, resulting in schedule and expense overruns, consumer frustration, lawsuits, litigation, and, in some cases, outright abandonment of projects.

Oshodi and Iyagba (2005) suggested that project delays caused by project participants are one of the key problems of construction projects in developing countries and have negative effects on projects that typically lead to time overruns, cost overruns, conflicts, arbitration and abandonment of projects. Ibrionke et al. (2013) also reported that project delay is one of the major problems facing the construction industry with the resulting consequences, amongst others, of non-excusable time overrun delays, cost overruns and disputes.

Although, there are some studies in the literature that looked into the concept of project delay on construction projects in terms of its causes and effects of the delay. Few, if any, studies have examined how stakeholders in the construction industry contribute to these delays, particularly in the context of building projects in Nigeria. To reduce this gap, this study will examine the elements that contribute to building project delays in Nigerian construction industry, focusing on the stakeholders' contributions. The outcomes of this study will help construction project participants understand how each stakeholder contributes to building project delays and design strategies for reducing it.

FACTORS AFFECTING CONSTRUCTION PROJECT DELAY

Some factors have been identified by several researchers. Pourrostan and Ismail (2011) identified 25 causes of delays in Iranian construction projects, these include: inadequate project planning and scheduling by the contractor, financial difficulties by the contractor, delay in

customer progress payments, insufficient experience of the contractor, change in customer orders during construction, weak site management, incompetent subcontractor, delay in material delivery to site. Other factors include no supply of equipment, lack of materials on the market, delays in the development of design documents, errors and inconsistencies in design documents, slow customer decision-making process, errors during construction, incorrect forecasts, lack of coordination between parties, government barriers, late customer review and approval of design documents, lack of experience of consultants, improper subcontractor construction process, bad weather, weak consultant contract management, low labour productivity level, subcontractor issues, type of project bidding and award, neighbourhood and site condition issues and labour shortage.

From the perspectives of owners, contractors, and architectural/engineering firms, Mezher and Tawil (1998) performed a survey of the reasons for delays in the construction industry in Lebanon. Owners were more concerned with finance, contractors with contractual connections, and consultants with project management challenges as the most major reasons of delays. Chan and Kumaraswamy (1996) surveyed the causes of construction delays in Hong Kong, as seen by clients, contractors and consultants, as they studied the variables affecting productivity. The results of their research indicated that the five primary and recurrent causes of delays are insufficient site management and control, unforeseen ground conditions, slow decision-making affecting all project teams, client-initiated variations and needed job variations. Ethiopian construction projects have found that corruption, unavailability of on-site facilities, material inflation or price rises, lack of quality materials, late design and design documents, slow material delivery, late approval and receipt of full project work, poor site management and efficiency and scheduling are the most significant causes of project delay (Gebrehiwet and Luob, 2017).

From the report conducted by Oshodi and Iyagba (2005) on comparative research on the causes and effects of delay in Nigerian and Iranian construction projects, contractor financial difficulties, delay in customer progress payments, weak site management, inadequate contractor project preparation and scheduling and government obstacles were considered to be the most significant causes of project delay. Also, the study conducted by Ibrionke et al. (2013) on analysis of

non-excusable delay factors influencing contractors' performance in Lagos State, Nigeria found that delays are one of the biggest problems faced by construction firms and highlighted amount of equipment, inaccurate time estimates, monthly payment difficulties, change orders, inaccurate cost estimates, poor site management and supervision, inadequate modern equipment, shortage of construction materials and incompetent project team as the main causes of project delay. Others were improper planning and scheduling, contractor's financial difficulties, unreliable subcontractors, labour productivity, frequent equipment breakdown, late delivery of material, shortage of skilled labour, poor design/delays in design, slow site clearance, labour supply, slow decision making by client and lack of communication and coordination.

Mansfield et al. (1994) identified 16 major factors in Nigeria that cause delays and cost overruns. In Nigeria, a questionnaire study of contractors, consultants, and client companies was done. They discovered that delays and cost overruns in Nigerian construction projects were caused by funding and payment arrangements, poor contract management, material shortages, erroneous estimations, and general price volatility. Assaf, et al. (1995) also identified and defined the relative importance of 56 key causes of delay in Saudi large-scale construction projects. Preparation and acceptance of shop drawings, delays in the progress of the contractor, payment by owners and design adjustments were the most significant delay factors, based on the contractors surveyed. From the view of the architects and engineers, the key causes of delay were cash issues during building, the relationships with subcontractors and the sluggish decision-making of the owner. The owners decided that significant delay causes were also design mistakes, labour shortages and insufficient labour skills.

THE EFFECTS OF DELAY ON PROJECT DELIVERY

Delays in project execution have serious ramifications for project completion, contractual parties, and the economy as a whole. There have been few scholarly studies on construction delays. Additional expenditures, reduced efficiency and rework, lost productivity, late project completion, higher time-related costs, third-party claims, and contract termination are all repercussions of construction delays, according to Li et al., (2000). In the Nigerian construction industry, Aibinu and Jagboro (2002) analysed and assessed the impact of

construction delays on project completion. The six impacts of construction delay were discovered to be time overrun, cost overrun, disagreement, arbitration, litigation, and complete abandonment. Furthermore, Abdul-Rahman et al. (2006) found that effects of project delay include job interruption, loss of productivity, late project completion, increased time-related costs, claims from third parties and contract termination. Furthermore, Aibinu and Odeyinka (2006) showed that disputes and further delays are often caused by processing time and cost-related claims associated with delays.

MINIMIZING THE EFFECTS OF DELAY ON PROJECT DELIVERY

Delays in construction project may be caused by the client, contractor, consultants, acts of God and by the third party. According to Acharya et al. (2006), delays may occur early or late in the job. Whatever the case may be, a fair and timely attention can be advantageous (Bushbait and Cunningham, 1998). Several researchers have conducted studies in which different strategies have been developed to reduce project delays in building projects. Nguyen et al. (2004) analysed project performance factors in Vietnam's major construction projects and found that project delays can be minimised through engagement of competent project manager, multidisciplinary/competent project team, resource availability, project engagement, regular progress meetings, reliable initial time estimates, procurement of tenders to the right/experienced consultant and contractor, proper reliance on previous experience, participation of the community, systemic monitoring mechanisms, detailed contract documents, successful strategic planning, transparent knowledge and communication channels, use of up-to date technology and lack of bureaucracy.

In addition, two strategies for reducing or, if necessary expunge time overruns as identified by Aibinu and Jagboro (2002) are acceleration of site activities and contingency allowance. Koushki et al. (2005) revealed that reducing time delays and cost overruns would require sufficient and usable sources of funding until the completion of the project, allocating ample time and money during design stage, selecting a professional consultant and a reputable contractor to carry out the work, preparing project activities and resource specifications for pre-construction, hiring an independent supervisory engineer to oversee the work, and ensuring the timely delivery of materials.

Similarly, Odeh and Battaineh (2002) suggested that improving construction project situations requires the implementation of liquidation damage clauses and early completion incentives, production of human capital in the construction industry by proper training and classification of artisans, adoption of a new approach to contract award procedures by giving prices and mobility less weight and more weight to capacities and past performances of contractors and adopting new approaches for contracts such as design-build and construction management-type contracts. Oshodi and Iyagba (2005) affirmed that clients should hire qualified consultants and make progress payments on time, consultants should properly manage the design and development phase in order to mitigate adjustments during development, and contractors should put appropriate financial, material and schedule management processes in place to manage the construction phase of any project.

II. MATERIALS AND METHODS

The study analyzed factors responsible for delayed construction projects in the construction industry in Nigeria. It also evaluated the effects of these factors on the delivery of construction projects and suggested ways to mitigate the effects of the factors considered on the delivery of construction projects. For this study, the descriptive (survey) research design was adopted. The population of this study include key project stakeholders in Kwara State, North-Central, Nigeria, who were active in construction projects carried out in the state from 2015-2019, clients, consultants and contractors. Through a well-structured questionnaire that was self-administered to targeted stakeholders, the data used for this research was collected. The questionnaire was broken down into four primary parts. The respondents were asked to fill in the space provided with the relevant respondent's general information in section A of the questionnaire. While the respondents were also asked to rate the variables as contained in section B, C and D of the questionnaire in respect of factors responsible for delays in construction projects, the effects of these factors on the delivery of building projects and the ways by which the effects of these factors can be reduced on the delivery of building projects were all considered. A five-point Likert scale with scores ranking from 5 (signifying "strongly agree") to 1 (signifying "strongly disagree") was used. In this analysis, a simple random sampling technique was adopted. A total of 128 questionnaires were administered to the project stakeholders that were contained on the Kwara State Tender Board List, through a purposive sampling technique. The

choice of purposive sampling was adopted by the non-availability of an authoritative sampling frame of public building projects in the study area. Seventy-nine (79) completed questionnaires were retrieved and considered suitable for analysis, reflecting a 62 percent response rate. The data collected was analysed using the percentile and relative importance index (RII). Data processing was done with the aid of Statistical Package for Social Sciences (SPSS 17) software.

III. RESULTS AND DISCUSSIONS

The result showed that 23, representing 29.1% of the respondents work with client organizations, 20 (25.3%) work in consulting firms and 36, which represent 45.6% of the respondents work with private organizations. Majority of the professionals represented were Builders with 31.65%, Architects accounted for 28.57% while Engineers and Quantity surveyors equally represented 19.89% respectively. Similarly, the analysis further revealed that 18.99% hold HND, 13.92% hold a PGD, 35.44% and 31.65% of the respondents hold B.Sc/B.Tech. and M.Sc/M.Tech. respectively. More so, all the respondents were professionally qualified having attained corporate membership status in their respective professional bodies. The year of work experience brackets for majority of the respondents were 1-5 years, 6-10 years and 11-15 years. It was also indicated that most of the respondents have participated in an average of 10 building projects. This gave an indication that the respondents are experienced and that the data provided by the respondents can be relied upon.

THE FACTORS RESPONSIBLE FOR DELAY IN BUILDING PROJECT IN NIGERIAN CONSTRUCTION INDUSTRY

From Table 1, delay or non-payment for completed work was ranked first by all the respondents with RII of 0.922. This was closely followed by inadequate planning and site management which were ranked second by the respondents with RII of 0.866. Insufficient funding was ranked third with RII of 0.853. Inappropriate coordination of information and inappropriate use of construction method were both ranked fourth by the respondents with RII of 0.830. Inadequate contractor experience and client interference on execution of work were ranked sixth and seventh with RII of 0.820 and 0.818 respectively. However, improper contract packaging/delivery strategy has its RII=0.689, while inappropriate design and wrong choice of banker were both ranked least by

the respondents with RII of 0.669 as shown in the table below.

Table 1: Ranking and RII of Factors Responsible for Delay in Building Project in Nigerian Construction Industry

S/N	Factors	RII	Rank
i	Delay or non-payment for completed work	0.922	1
ii	Inadequate planning and site management	0.866	2
iii	Insufficient funding	0.853	3
iv	Inappropriate coordination of information	0.830	4
v	Inappropriate use of construction method	0.830	4
vi	Inadequate contractor experience	0.820	6
vii	Client interference on execution of work	0.818	7
viii	Poor coordination of subcontractors	0.785	8
ix	Wrong choice of consultants and contractor	0.747	9
x	Slow decision making	0.703	10
xi	Poor contract management	0.694	11
xii	Late identification, resolution of drawings, errors/ omissions	0.692	12
xiii	Improper contract packaging/delivery strategy	0.689	13
xiv	Inappropriate design	0.669	14
xv	Wrong choice of banker	0.669	14

The result of these findings are related with the conclusions of Oshodi and Iyagba (2005), Pourrostam and Ismail (2011), Sunjka and Jacob (2013) and Ibrinke et al. (2013), where these were considered as significant factors responsible for project delays thereby leading to failure to meet completion time as stipulated. Pourrostam and Ismail (2011) opined that untimely payment to contractors for completed work causes adverse cash flow for the contractor and lead to project delay, while Oshodi and Iyagba (2005) stated that ineffective planning and scheduling of project by contractor lead to project delay. The finding is buttressed by Ibrinke et al. (2013), who asserted that lack of communication and coordination sometimes cause project delay because if projects issues or contractor's requests are not addressed in time and information is not effectively managed, project activities can negatively be affected.

THE EFFECTS OF PROJECT DELAY FACTORS ON BUILDING PROJECT DELIVERY

From Table 2, the objective was to determine the effects of project delay factors on building project delivery. Six factors were identified and ranked based on relative important index values. The result of the analysis showed that time overrun is the major effects of project delay factors on building project delivery with RII of 0.840. The second major effect was cost overrun with RII of 0.790, followed by disputes with RII of 0.730. Similarly, project delay also led to total project abandonment with RII of 0.632. Litigation and arbitration were ranked least with RII values of 0.495 and 0.435 respectively. Thus, time overruns, cost overruns and disputes were the most common effects of project delay factors on building project delivery, which is in congruent with the findings of Aibinu and Jagboro (2002) on effects of construction delays on project delivery. The findings also agree with the study of Sunjka and Jacob (2013) on significant causes and effects of project delays in the Niger Delta region where project delays also result in time overruns, cost overruns and disputes.

Table 2: Ranking and RII of Effects of Project Delay Factors on Building Project Delivery

S/N	Effects	RII	Rank
i	Time Overrun	0.840	1
ii	Cost Overrun	0.790	2
iii	Disputes	0.730	3
iv	Total project abandonment	0.632	4
v	Litigation	0.495	5
vi	Arbitration	0.435	6

WAYS OF MINIMIZING EFFECTS OF PROJECT DELAY FACTORS ON BUILDING PROJECT DELIVERY

In order to identify the ways by which effects of building project delay factors could be minimized, six ways of reducing the effects of building project delay factors were identified for ranking. Table 3 revealed that making progress payment on time was ranked first with RII of 0.937, adequate and available sources of finance was ranked second with RII of 0.927, effective management of design and construction process

was ranked third with RII of 0.901. Frequent site progress meetings, selection of competent personnel and clear information and communication channel were ranked fourth, fifth and sixth respectively with RII of 0.896, 0.886 and 0.884. Therefore, some of the ways of minimizing the effects of project delay factors were making progress payment on time, adequate and available sources of finance and effective management of design and construction process as agreed by Nguyen et al. (2004) and Oshodi and Iyagba (2005).

Table 3: Ranking and RII of Ways of Minimizing Effects of Project Delay Factors on Building Project Delivery

S/N	Factors	RII	Rank
i	Making progress payment on time	0.937	1
ii	Adequate and available sources of finance	0.927	2
iii	Effective management of design and construction process	0.901	3
iv	Frequent site progress meetings	0.896	4
v	Selection of competent personnel	0.886	5
vi	Clear information and communication channel	0.884	6

IV. CONCLUSION & RECOMMENDATIONS

The study finds that strategies such as frequent site progress meetings, selection of competent employees, and clear information and communication channels are better ways to minimize the effects of project delay factors on project delivery, based on the findings mentioned above. It thus advises clients to make all necessary progress payments on time to both contractors and consultants as and when due in order to avoid job delay. Contractors should also manage their financial resources, plan and schedule their work as continuous activities throughout the construction process. To reduce project delays, consultants

should examine and approve design papers in a timely manner, as well as make appropriate repairs to errors and discrepancies in design documentation.

REFERENCES

- [1]. Abdul-Rahman H., Berawi, M. A, Berawi, A. R., Mohamed, O., Othman, M. & Yahya, I. A. (2006). Delay Mitigation in the Malaysian Construction Industry. *Journal of Construction Engineering and Management*, 132 (2), 125-133.
- [2]. Acharya, N. K., Lee, Y. D., Kim, S. Y. & Lee, J. C. (2006). Analysis of Construction Delay Factor: A Korean Perspective. *Proceedings: The 7th Asia Pacific Industrial*

- Engineering and Management Systems Conference. Bangkok, Thailand, 17-20, December.
- [3]. Aibinu, A. & Jagboro, G. (2002). The Effects of Construction Delays on Project in Nigeria Construction Industry. *International Journal of Project Management*, 20(8), 593-599.
- [4]. Aibinu, A. A. & Odeyinka, H. A. (2006). Construction Delays and their Causative Factors in Nigeria. *Journal of Construction Engineering and Management*, 132 (7), 667-677.
- [5]. Assaf, S. A., & Al-Hejji, S. (2006). Causes of Delay in Large Construction Projects. *International Journal of Project Management*, 24, 349-357.
- [6]. Assaf, S. A., Al-Khalil, M. & Al-Hazmi, M. (1995). Causes of Delay in Large Building Construction Projects. *Journal of Management in Engineering*, 11(2), 45-50.
- [7]. Bushbait, A. A. & Cunningham, M. J. (1998). Comparison of Delay Analysis Methodologies. *Journal of Construction Engineering and Management*, 124(4), 315-322.
- [8]. Chan D. M. W. & Kumaraswamy, M. M. (1996). A Comparative Study of Causes of Time Overruns in Hong Kong Construction Projects. *International Journal of Project Management*, 15(1), 55-63.
- [9]. Gebrehiweta, T. & Luob, H. (2017). Analysis of Delay Impact on Construction Project Based on RII and Correlation Coefficient: Empirical Study *Procedia Engineering*, 196, 366-374.
- [10]. Ibrinke, O. T., Oladinrin, T. O., Adeniyi, O. & Eboreime, I. V. (2013). Analysis of Non-excusable Delay Factors Influencing Contractors' Performance in Lagos State, Nigeria. *Journal of Construction in Developing Countries*, 18(1), 53-72.
- [11]. John, E. I., Abdullateef, A. S. & Abdulganiyu, A. O. (2015). A Study of Time and Cost Relationship of Private Building Projects in Abuja. *International Journal of Construction Engineering and Management*, 4(1), 26-34.
- [12]. Koushki, P. A., Al-Rashid, K. & Kartam, N. (2005). Delays and Cost Increase in the Construction of Private Residential Projects in Kuwait. *Construction Management and Economics*, 23(3), 285-294.
- [13]. Li, H., Love, P. & Drew, S. (2000), Effects of Overtime Work and Additional Resources on Project Cost and Quality. *Journal of Engineering, Construction, Architecture and Management*, 7 (3), 211-220.
- [14]. Mansfield, N. K., Ugwu, O. O. & Doran, T. (1994). Causes of Delay and Cost Overruns in Nigerian Construction Projects. *International Journal of Project Management*, 12(4), 254-260.
- [15]. Mezher, T. M. & Tawil, W. (1998). Causes of Delays in the Construction Industry in Lebanon. *Engineering Construction and Architectural Management*, 5(3), 251-260.
- [16]. Nguyen, L. D., Ogunlana, S. O. & Lan, D. T. X. (2004). A Study on Project Success Factors in Large Construction Projects in Vietnam. *Engineering, Construction and Management*, 11(6), 404-413.
- [17]. Nigerian Bureau of Statistics (2008). *Social Statistics in Nigeria*.
- [18]. Odeh, A. M. & Battaineh, H. T. (2002). Causes of Construction Delay: Traditional Contracts. *International Journal of Project Management*, 20(1), 67-73.
- [19]. Ogunlana, S. O., Promkuntong, K. & Jearkirm, M. (1996). Construction Delays in Fast Growing Economy: Comparing Thailand with Other Economies. *International Journal of Project Management*, 14(1), 37-45.
- [20]. Oshodi, O. S. & Iyagba, R. O. (2005). A Comparative Study on Causes and Effects of Delay in Nigerian and Iranian Construction Projects. *Asian Journal of Business and Management Sciences*, 3(1), 29-36.
- [21]. Owolabi, A. O., Chan, A. A. & Ogunlana, A. A. (2014). Root Causes of Construction Project Delays in Singapore. *Journal of Construction Management*, 4(1), 19-31.
- [22]. Pourrostam T. & Ismail, A. (2011). Significant Factors Causing and Effects of Delay in Iranian Construction Projects. *Australian Journal of Basic and Applied Sciences*, 5(7), 450-456.