Delays in Construction Projects: Causes, Effects and Remedies

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Abstract
Construction delays threaten cost certainty, quality, contractual relationships and infrastructure delivery in Nigeria. This study examined the principal causes and effects of construction delays and assessed the remedies used by project stakeholders. A convergent mixed-method design was adopted. Structured questionnaires were distributed to 120 clients, contractors and consultants in Lagos, Abuja, Port Harcourt and Kano; 102 valid responses were returned, representing an 85 per cent response rate. Semi-structured interviews with 15 professionals supplemented the survey. Questionnaire data were analysed with frequencies, percentages and the Relative Importance Index, while interview evidence was organised thematically. Delayed client payments ranked first among the causes of delay (RII = 0.91), followed by poor project planning and scheduling (RII = 0.87), shortage of skilled labour (RII = 0.82), design errors and late revisions (RII = 0.81), and inadequate communication (RII = 0.79). Cost overrun was the most frequently reported effect (90.2 per cent), followed by project abandonment (72.5 per cent) and disputes or litigation (64.7 per cent). Regular progress meetings were the most widely adopted remedy (70.6 per cent), while formal dispute-resolution mechanisms were least reported (42.2 per cent). The findings show that delays arise from interacting financial, managerial, technical and institutional weaknesses. The study recommends enforceable payment schedules, coordinated design review, critical-path monitoring, staged adoption of digital project controls, workforce development and time-bound regulatory approvals. It concludes that sustainable improvement requires shared accountability among clients, contractors, consultants and public regulators.

Keywords: *construction delay, cost overrun, project planning, Building Information Modelling, Nigeria*

1 Introduction

The construction industry converts public and private investment into roads, housing, schools, hospitals, industrial facilities and other assets required for economic and social development. In Nigeria, the sector contributed 4.85 per cent to real gross domestic product in the first quarter of 2026, illustrating its continuing importance to national output and infrastructure provision (National Bureau of Statistics [NBS], 2026). Its developmental contribution, however, depends on the ability of projects to achieve planned time, cost and quality objectives. When completion dates are repeatedly extended, scarce capital remains tied up, intended services are postponed and the credibility of project institutions declines. A construction delay occurs when project activities or completion extend beyond the period established in the approved programme or contract. Delay

may arise from late decisions, payment difficulties, inadequate planning, design changes, labour and material shortages, equipment failure, regulatory approvals, adverse weather or several interacting factors. Responsibility can therefore rest with clients, contractors, consultants, suppliers, regulators or events outside the direct control of the parties. Assaf and Al-Hejji (2006) demonstrate that the causes of delay are rarely isolated, while Aibinu and Jagboro (2002) show that their effects spread across project participants through additional costs, disputes and impaired relationships. The problem has a long history in Nigeria. Mansfield, Ugwu and Doran (1994) identified finance and payment arrangements, poor contract management, material shortages, inaccurate estimating and price fluctuations as leading explanations for time and cost overruns. Later Nigerian research continued to identify weak scheduling, contractors' financial difficulties, political influence, site conditions, price instability and delayed material delivery as significant constraints (Egwim et al., 2023). Recent evidence also connects material-price volatility and delayed payments with schedule disruption, funding pressure and reduced contractor profitability (Nnadi & Najjobyo, 2025). The persistence of similar findings across periods suggests that construction delay is not merely a technical scheduling failure. It reflects weaknesses in project finance, information, institutional coordination and accountability. Delay also produces consequences beyond the individual contract. Cost escalation reduces the number of projects that a fixed budget can support. Prolonged construction exposes materials and partially completed work to deterioration, while hurried recovery measures can impair quality and safety. Disputes consume managerial attention and professional fees, and abandonment postpones public services while leaving communities with stranded assets. Sambasivan and Soon (2007) identify cost overrun, time overrun, disputes, litigation, arbitration and abandonment as interrelated effects. Similar consequences have been observed across developing-country construction environments, although their severity varies with contract administration, financing and institutional capacity (Frimpong et al., 2003; Odeh & Battaineh, 2002). Digital tools offer important but incomplete remedies. Scheduling platforms can clarify activity logic, resource requirements and critical paths, while Building Information Modelling (BIM) can improve design coordination and information exchange. Yet Nigerian studies report that BIM implementation is constrained by cost, limited expertise, organisational resistance, interoperability problems and weak institutional support (Olanrewaju et al., 2020; Saka & Chan, 2020). Technology cannot compensate for an unfunded project, delayed certification, unclear authority or poor communication. Effective delay control therefore requires a combination of financial discipline, competent planning, coordinated design, capable personnel and enforceable project-governance arrangements. Against this background, the study examines the causes, effects and remedies of construction project delays in Nigeria. Its objectives are to identify and rank the principal causes of delays, assess their major effects on project delivery, and evaluate the mitigation measures adopted by stakeholders. The study addresses three questions: What are the principal causes of construction project delays? How do delays affect cost, quality and stakeholder relationships? Which measures are currently used, and which reforms are required to prevent or reduce delay?

2 Literature Review

2.1 Concept and Classification of Construction Delay

Construction delay is the difference between the planned and actual timing of an activity, milestone or project completion. It becomes contractually significant when it affects the critical path, prevents a party from performing as agreed, or extends the completion date. Delay should be

distinguished from disruption. Delay concerns time, whereas disruption concerns loss of productivity or interruption to the planned sequence of work; the two frequently occur together because disrupted work can lengthen the programme. Aibinu and Jagboro (2002) treat delay as both a performance outcome and a source of wider project consequences, while Assaf and Al-Hejji (2006) emphasise the need to identify the actors and events responsible. Delays may be excusable or non-excusable, compensable or non-compensable, and concurrent or independent. An excusable delay arises from an event recognised by the contract as outside the contractor's reasonable control, such as exceptional weather or a client-directed change. A non-excusable delay results from matters for which the contractor bears responsibility, including poor mobilisation, inadequate supervision or preventable equipment failure. A compensable delay entitles the affected party to time and, where the contract permits, additional cost. Concurrent delay arises when two or more effective causes operate during the same period. These categories matter because delay analysis is not only a technical exercise; it determines entitlement, risk allocation and liability.

2.2 Causes of Construction Project Delay

Client-related causes include late payment, delayed site possession, slow approval of variations, changes in scope and indecisive project governance. Payment delay is especially damaging because contractors use interim certificates to finance labour, materials, equipment and subcontractors. Where certification or payment is delayed, the contractor may reduce the pace of work, defer procurement or suspend activities. Mansfield et al. (1994) identified finance and payment arrangements as major Nigerian delay factors, and Aibinu and Jagboro (2002) similarly connected financial weakness with adverse delivery outcomes. Nnadi and Najjobyo (2025) reinforce the contemporary importance of client funding, payment valuation and material-price volatility. Contractor-related causes include unrealistic programmes, poor site management, insufficient working capital, weak coordination of subcontractors, low productivity and inadequate risk planning. A schedule that lists activities without credible logic, resource loading or regular updating cannot function as a management instrument. Poor planning also reduces the time available to respond to procurement lead times and emerging risks. Egwim et al. (2023) found that project quality control, schedule management, contractor finance, political influence, site conditions and price fluctuations were strongly associated with delay in Nigeria. Their findings show that the contractor's performance is embedded in a wider project system rather than determined solely by site effort. Consultant-related causes arise from incomplete design, errors or inconsistencies in drawings, slow response to requests for information, delayed certification and weak supervision. Design changes during construction can interrupt work, produce rework and alter quantities. Doloi et al. (2012) found that ineffective planning, communication and decision-making were central to delay, demonstrating that technical information and managerial coordination are closely linked. Consultants must therefore produce coordinated documents before mobilisation and operate time-bound procedures for clarifications, approvals and valuation.

External and institutional causes include regulatory approvals, political change, insecurity, inflation, exchange-rate pressure, weather, shortages and supply-chain disruption. Frimpong et al. (2003) showed how economic conditions and procurement difficulties intensify delay and cost overrun in a developing-country setting. In Nigeria, material-price volatility changes cash requirements after contracts have been awarded, while approval procedures can interrupt work where agencies do not apply predictable service standards. Weather and site conditions are partly

external, but their effects can often be reduced through seasonal planning, investigation, contingency allowances and realistic risk allocation (Egwim et al., 2023).

Table 1

Common Categories and causes of Construction Delay

Category	Causes
Client related	Late payment, slow approvals, scope changes and delayed site possession
Contractor related	Poor planning, weak site management, inadequate finance and equipment failure
Consultant related	Design errors, incomplete information, delayed certification and weak supervision
External and institutional	Price volatility, regulation, supply disruption, weather and insecurity

Note. Synthesised from the reviewed literature.

2.3 Effects of Construction Delay

The most immediate effect of delay is usually cost overrun. Extended site presence increases preliminaries, security, supervision, equipment hires, utilities, insurance and financing costs. Inflation may also raise the price of labour and materials during the additional period. Clients face higher final accounts and delayed benefits, while contractors experience reduced margins and cash-flow pressure. Odeh and Battaineh (2002) found that owner and contractor factors jointly influenced delay, illustrating why the resulting cost cannot always be attributed to one party.

Delay also generates claims, disputes and litigation. When records are incomplete or programmes are not updated, parties may disagree about causation, concurrency and entitlement. Legal or arbitral proceedings then add further cost and time. Sambasivan and Soon (2007) found that disputes, litigation, arbitration and abandonment were connected consequences of delay. Cooperative contract administration, contemporaneous records and early neutral intervention can therefore reduce the escalation of disagreement. Quality can deteriorate when prolonged work exposes materials or completed components, when financial pressure encourages substitution, or when recovery schedules compress inspection and testing. Delay may also erode trust among clients, consultants and contractors. Repeated failure to meet revised dates weakens confidence in forecasts and creates defensive behaviour. At the national level, delayed or abandoned infrastructure postpones access to services, reduces the return on public investment and constrains development.

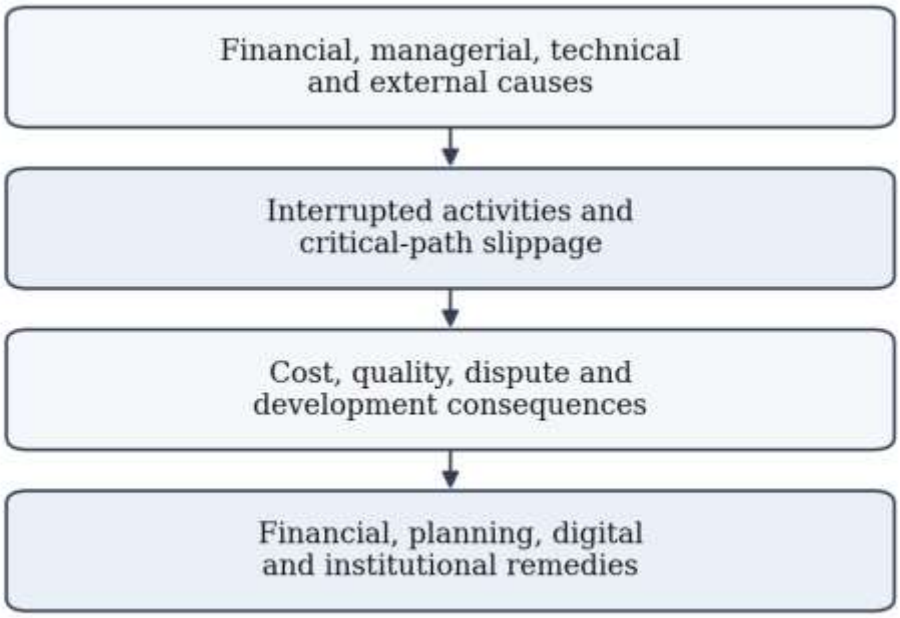


Figure 1. Conceptual Pathway from Construction Delay Causes to Remedies
Note. Authors' synthesis based on the reviewed literature.

2.4 Remedies and Preventive Strategies

Effective planning begins before contract award. Feasibility studies should establish scope, funding, land availability, regulatory requirements and major risks. Design information should be sufficiently coordinated for construction, and procurement choices should reflect project complexity. During execution, a logic-linked baseline programme should identify critical activities, procurement lead times, decision dates and resource requirements. Regular updates allow the team to distinguish actual progress from optimistic reporting and to introduce corrective action before delay becomes irreversible. Financial controls are equally important. Clients should confirm funding before mobilisation and apply transparent procedures for valuation, certification and payment. Contractors require realistic cash-flow forecasts and should avoid taking on work beyond their managerial and financial capacity. Price-adjustment and fluctuation clauses may be appropriate where inflation and exchange-rate movements cannot reasonably be absorbed by one party. Timely payment does not eliminate delay, but it protects the financial chain that supports suppliers, subcontractors and labour. Communication and collaborative governance reduce uncertainty. Regular progress meetings should assign responsibility, deadlines and escalation routes rather than merely record discussion. Requests for information, variations and approvals should be logged and tracked. Early warning procedures enable parties to identify events that may affect time or cost and agree mitigation before positions become adversarial. Where disagreement arises, negotiation, mediation, adjudication or arbitration can provide structured resolution without allowing the dispute to paralyse the project. Digital project controls can strengthen these processes. Scheduling software improves programme development and monitoring, while BIM supports coordinated models, clash detection, quantity information and shared decision-making. However,

Nigerian studies demonstrate that adoption is constrained by training costs, limited expertise, organisational culture and inadequate standards (Olanrewaju et al., 2020; Saka & Chan, 2020). Digital reform should therefore be staged: basic scheduling discipline and common data standards must accompany software acquisition.

2.5 Empirical Review and Research Gap

Studies from Nigeria and comparable settings consistently identify finance, planning, design, management and external conditions as delay drivers. Mansfield et al. (1994) provided early Nigerian evidence that payment, contract management, shortages, estimation and price changes were central. Aibinu and Jagboro (2002) documented the effects of delay on delivery, while Frimpong et al. (2003) and Assaf and Al-Hejji (2006) demonstrated that financial and managerial factors also recur outside Nigeria. Sambasivan and Soon (2007) linked causes to consequences, and Doloi et al. (2012) showed the importance of planning and coordination. More recent Nigerian research refines this understanding. Egwim et al. (2023) used expert evidence to extract underlying delay factors and highlighted late material delivery, poor decision-making and adverse weather within broader clusters of project conditions. Olanrewaju et al. (2020) and Saka and Chan (2020) explain why BIM cannot be assumed to spread automatically, despite its value for coordination. These studies indicate that proposed remedies must be institutionally feasible and supported by skills, standards and management commitment. The remaining gap concerns the simultaneous comparison of causes, effects and remedies across clients, contractors and consultants within major Nigerian urban centres. Many studies identify delay factors, but fewer place the ranking of causes beside the reported consequences and the mitigation measures currently used by stakeholders. This study addresses that gap by combining survey rankings with professional interviews and by evaluating whether the most widely adopted remedies correspond to the highest-ranked causes.

3 Methodology

3.1 Research Design and Study Area

The study adopted a convergent mixed-method design, combining a questionnaire survey with semi-structured interviews. The quantitative component ranked causes, effects and remedies, while the qualitative component provided contextual explanations of how these factors operate in practice. Mixed methods were appropriate because numerical rankings establish the relative prominence of factors, whereas professional accounts help explain relationships that cannot be reduced to a single score (Creswell & Plano Clark, 2018).

Data were collected from construction stakeholders in Lagos, Abuja, Port Harcourt and Kano. These urban centres were selected to reflect different geographical regions and a range of public, private, residential, commercial and infrastructure projects. The study does not claim that the four cities represent every Nigerian construction market; rather, they provide a multi-city view of delay conditions among experienced project participants.

3.2 Population Sample and Sampling

The study population comprised clients or owners, contractors, and consultants, including architects, quantity surveyors and engineers involved in construction delivery. A target sample of 120 respondents was distributed across these stakeholder categories. Purposive sampling was used to select participants with direct project experience. Of the questionnaires distributed, 102 were validly completed, giving an 85 per cent response rate. Because the sampling was purposive and

the finite population frame was not specified, the results should be interpreted as informed stakeholder evidence rather than as statistically representative estimates for the entire Nigerian industry.

Table 2
Distribution of the Target Sample and Valid Responses

Stakeholder group	Target sample	Valid responses	Share of valid responses (%)
Clients	30	25	24.5
Contractors	50	45	44.1
Consultants	40	32	31.4
Total	**120**	**102**	**100.0**

Source: Authors' field data.

3.3 Instruments Validity and Reliability

The questionnaire contained sections on respondent characteristics, causes of delay, effects and remedies. Items were rated on a five-point Likert scale where required. A pilot study involving ten respondents was used to test clarity and administration. Content validity was assessed by three academic experts and two construction-industry professionals. The reported Cronbach's alpha coefficient of 0.82 indicates satisfactory internal consistency for the scale items.

Semi-structured interviews were conducted with 15 professionals: five clients, five contractors and five consultants. The interviews examined payment practice, planning, coordination, regulatory processes and mitigation. The supplied draft did not include verbatim transcripts; consequently, this completed paper reports only the recurring themes documented in the study and does not invent participant quotations.

3.4 Data Collection and Analysis

Questionnaires were administered physically and electronically over six weeks. Quantitative responses were analysed using frequencies, percentages and the Relative Importance Index (RII). The RII for each factor was calculated as:

$$\mathbf{RII = \Sigma W \div (A \times N)}$$

where **W** is the weight assigned by respondents, **A** is the highest possible weight on the scale, and **N** is the number of valid respondents. A higher RII indicates that respondents considered the factor more important. Interview material was organised through thematic analysis, focusing on financial, managerial, technical, human-resource and institutional explanations. Survey and interview evidence were compared during interpretation.

Participation was voluntary, and respondents were assured of confidentiality and academic use of the information. The study reported that ethical clearance was obtained before fieldwork. No respondent names are presented.

4 Results

4.1 Respondent Profile

Contractors formed the largest respondent group, with 45 participants (44.1 per cent). Consultants accounted for 32 respondents (31.4 per cent), while clients accounted for 25 (24.5 per cent). The distribution provides evidence from the principal parties responsible for financing, designing, administering and executing construction work.

Table 3

Professional Distribution of Respondents

Profession	Frequency	Percentage (%)
Contractors	45	44.1
Consultants	32	31.4
Clients	25	24.5
Total	**102**	**100.0**

Source: Authors' field data.

4.2 Causes of Construction Delay

Delayed client payments ranked first with an RII of 0.91 and were identified by 87 respondents (85.3 per cent). Poor project planning and scheduling ranked second (RII = 0.87), followed by shortage of skilled labour (RII = 0.82), design errors and late revisions (RII = 0.81), and inadequate communication (RII = 0.79). Equipment breakdown, poor site management, material-price fluctuations, regulatory bottlenecks and adverse weather completed the ranking.

Table 4

Ranking of the Principal Causes of Construction Delay

Rank	Cause of delay	Frequency	RII
1	Delayed client payments	87	0.91
2	Poor planning and scheduling	79	0.87
3	Shortage of skilled labour	74	0.82
4	Design errors and late revisions	72	0.81
5	Inadequate communication	69	0.79
6	Equipment breakdowns	67	0.77
7	Poor site management	64	0.75
8	Material-price fluctuations	61	0.73
9	Regulatory bottlenecks	58	0.71
10	Adverse weather	55	0.69

Source: Authors' field data. RII = Relative Importance Index.

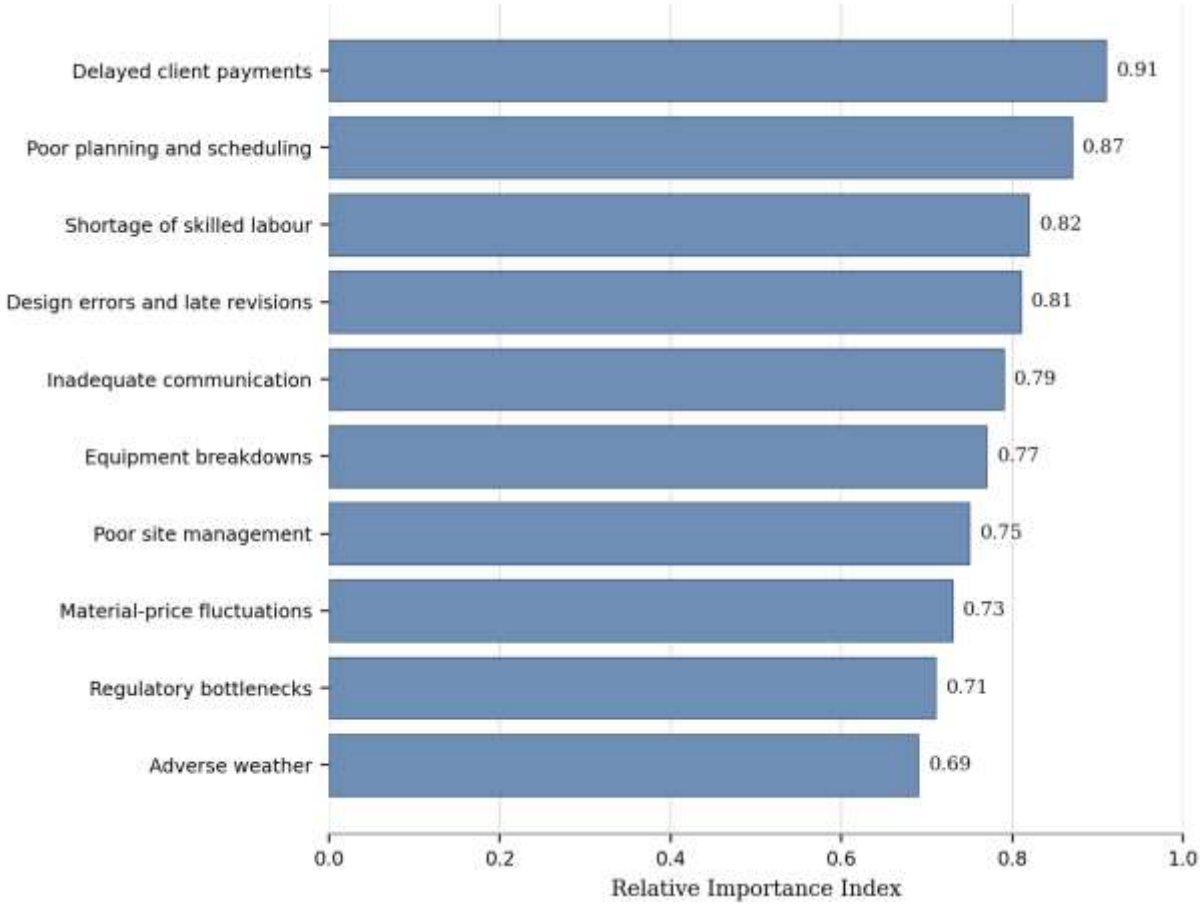


Figure 2. Relative Importance of the Principal Causes of Construction Delay
Source: Authors' field data.

The ranking shows that delay is produced by a combination of client, contractor, consultant and external factors. Payment and planning occupy the first two positions, indicating that project finance and managerial control are the most immediate areas for intervention. Design, communication and skills also rank highly, showing that financial reform alone would be insufficient.

4.3 Effects of Delay

Cost overrun was reported by 92 respondents, representing 90.2 per cent of the valid sample. Project abandonment followed at 72.5 per cent, while litigation and disputes were reported by 64.7 per cent. Poor quality of work, loss of client confidence and delay to national development objectives were also widely identified.

Table 5

Reported Effects of Construction Delay

Rank	Effect	Frequency	Percentage (%)
1	Cost overruns	92	90.2
2	Project abandonment	74	72.5
3	Litigation and disputes	66	64.7
4	Poor quality of work	60	58.8
5	Loss of client confidence	57	55.9
6	Delayed development objectives	51	50.0

Source: Authors' field data. Items were assessed separately; percentages are not additive.

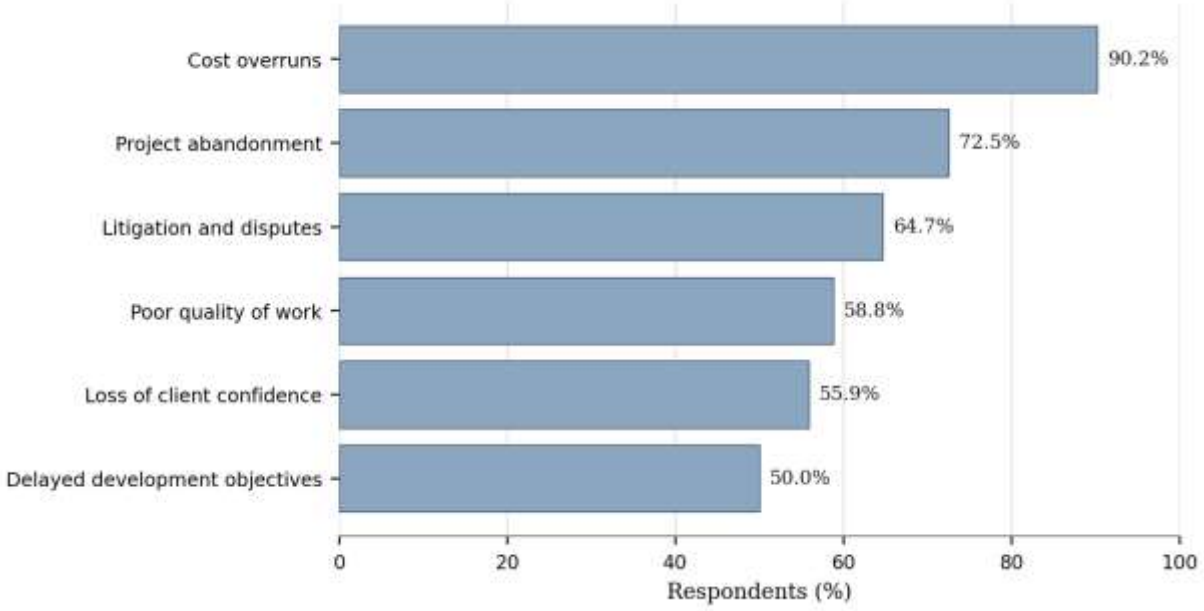


Figure 3. Reported Effects of Construction Delay

Source: Authors' field data.

These results show that the effects move from the project account to contractual relationships and wider development. Cost escalation is the most visible consequence, but abandonment and disputes demonstrate that prolonged delay can threaten the continuation of the contract itself. The quality and confidence indicators also show that completing a delayed project does not necessarily remove the damage caused during execution.

4.4 Remedies Adopted by Stakeholders

Regular progress meetings and communication protocols were the most frequently reported remedy, adopted by 72 respondents (70.6 per cent). Scheduling software followed at 67.6 per cent, while early procurement was reported by 62.7 per cent. BIM adoption was reported by 53.9 per cent, and formal dispute-resolution mechanisms by 42.2 per cent.

Table 6

Delay Remedies Reported by Stakeholders

Remedy	Frequency	Percentage (%)
Progress meetings	72	70.6
Scheduling software	69	67.6
Early procurement	64	62.7
BIM adoption	55	53.9
Dispute-resolution mechanisms	43	42.2

Source: Authors' field data. Items were assessed separately; percentages are not additive.

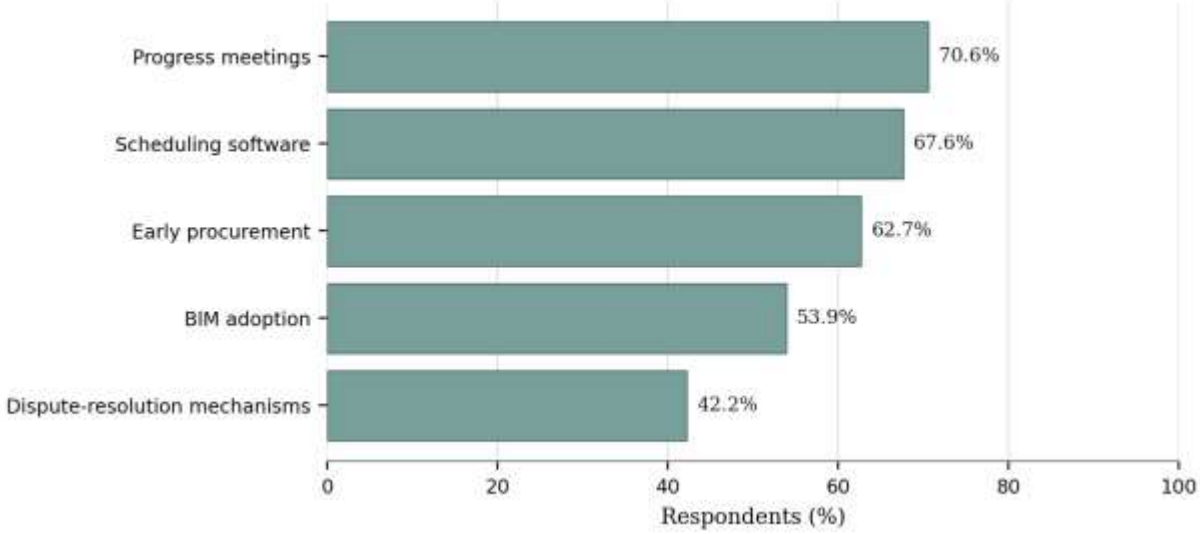


Figure 4. Adoption of Delay Remedies by Respondents

Source: Authors' field data.

The remedy pattern suggests that stakeholders favour measures that can be introduced within existing organisations, particularly meetings, scheduling and procurement. The lower figures for BIM and formal dispute resolution may reflect cost, expertise and institutional barriers. More importantly, none of the listed remedies directly guarantees prompt client payment, even though delayed payment was the highest-ranked cause. This mismatch is a central finding of the study.

4.5 Synthesis of Interview Themes

The interviews reinforced four themes. First, payment delays were described as producing a chain reaction through contractor cash flow, supplier delivery, labour payment and site productivity. Second, participants associated weak planning with unrealistic programmes, delayed decisions and inadequate coordination between main contractors and subcontractors. Third, design revisions and slow information flow were linked to rework and interrupted activity sequences. Fourth, respondents regarded technology as useful but dependent on staff capability, reliable data and management commitment. These themes support the survey rankings without replacing the numerical evidence.

5 Discussion

5.1 Financial and Managerial Causes

The dominance of delayed payment is consistent with the Nigerian evidence developed over three decades. Mansfield et al. (1994) placed finance and payment arrangements among the leading causes of delay and cost overrun, while Aibinu and Jagboro (2002) linked financial weakness to adverse delivery outcomes. The present RII of 0.91 demonstrates that the problem remains central in the study sample. Nnadi and Najjobyo (2025) similarly connect poor availability of client funds and payment valuation disputes with schedule disruption. The practical implication is that a contractor's planning competence cannot fully protect a project when certified work is not paid for within the agreed period. Poor planning and scheduling ranked second. This supports Egwim et al. (2023), who identify schedule management, contractor finance and decision-making among the underlying conditions associated with Nigerian project delay. The result should not be interpreted as a demand for more elaborate programmes alone. A schedule becomes useful only when its logic, resources and procurement dates are credible and when actual progress is updated. Projects often fail because the programme is prepared for tender compliance and then receives little managerial attention. Shortage of skilled labour, equipment breakdown and poor site management show that production capacity remains important. Labour shortages reduce output, but their effects are intensified where crews are not matched to work fronts or where supervisors cannot coordinate trades. Equipment failure similarly reflects both mechanical condition and preventive maintenance. Toor and Ogunlana (2008) found that inadequate resources, poor management and organisational problems were significant in major construction projects. The present findings therefore point to the need for workforce planning, training, maintenance systems and realistic contractor prequalification.

5.2 Design Communication and External Conditions

Design errors and late revisions ranked fourth, while inadequate communication ranked fifth. These results are closely related because design information must be coordinated, issued, explained and revised through an agreed process. Doloi et al. (2012) show that planning, communication and decision-making are important determinants of delay. Where drawings conflict or responses to requests for information are slow, contractors may stop work, proceed at risk or complete work that later requires correction. Material-price fluctuations and regulatory bottlenecks occupied lower positions than payment and planning, but they remain substantial. Price volatility changes procurement decisions and cash requirements, especially where contracts do not contain workable adjustment provisions. Regulatory delay may also affect permits, inspections and approvals. Frimpong et al. (2003) demonstrate that financial and external conditions can combine with project-level weaknesses. The lower rank of adverse weather should not be understood as evidence that it is unimportant; rather, respondents considered it less influential than factors that stakeholders could more directly control.

5.3 Consequences for Project and National Performance

Cost overrun, reported by 90.2 per cent, is the clearest consequence of extended time. Longer site presence increases preliminary and financing costs, while inflation raises the cost of outstanding work. Aibinu and Jagboro (2002) identify cost escalation and disputes among the effects of delay, and Sambasivan and Soon (2007) similarly connect delay with time overrun, cost overrun and deteriorating relationships. The high percentage in this study therefore reflects a well-established

causal pathway rather than an isolated perception. Project abandonment was reported by 72.5 per cent. Abandonment represents the point at which delay ceases to be only a scheduling problem and becomes a failure to deliver the asset. It may arise from funding exhaustion, political change, insolvency or unresolved conflict. The result is especially serious for public projects because communities bear the opportunity cost of services that remain unavailable. The finding supports the need for funding verification and stage-gate review before mobilisation. Disputes and litigation were reported by 64.7 per cent. Delay claims are difficult where programmes, site records, instructions and payment certificates are incomplete. Sambasivan and Soon (2007) show that delay can lead to disputes, litigation and arbitration, while Odeh and Battaineh (2002) emphasise the shared influence of owners and contractors. Stronger records and early dispute management would therefore serve both prevention and resolution.Poor quality and loss of confidence confirm that project performance cannot be reduced to time and cost. A delayed project may be rushed to recover time, completed with substituted materials or delivered after relationships have deteriorated. These effects influence future tendering, professional reputation and willingness to collaborate. The appropriate performance framework should therefore include quality, safety, satisfaction and dispute indicators alongside schedule variance.

5.4 Evaluation of Existing Remedies

Progress meetings were the most widely adopted remedy. Their effectiveness depends on whether they generate decisions, responsible officers and deadlines. A meeting that merely records delay does not control it. Progress reviews should compare the updated programme with the baseline, examine the critical path, resolve information needs and escalate overdue actions. This converts communication from a general aspiration into a management control. Scheduling software was reported by 67.6 per cent, suggesting that basic digital project control is more established than BIM. Software, however, cannot correct unreliable input. Activity logic, durations, constraints, resources and progress data must be technically sound. Contractors and consultants therefore require competence in planning methods as well as access to software. BIM adoption was reported by 53.9 per cent. This moderate figure should be interpreted cautiously because the questionnaire measured reported adoption rather than the depth of implementation. Nigerian research identifies cost, training, standards and organisational resistance as barriers to BIM use (Olanrewaju et al., 2020; Saka & Chan, 2020). A project may use three-dimensional models for visualisation without integrating scheduling, quantities or collaborative information management. Policy should therefore encourage capability-based implementation rather than treating software possession as evidence of maturity. The lowest adoption rate concerned dispute-resolution mechanisms. This is problematic because disputes were a major effect of delay. Contracts should establish negotiation, mediation, adjudication or arbitration pathways, but formal mechanisms should not replace early operational resolution. Contemporary records, prompt notices and neutral review can prevent disagreements from escalating. The greatest policy gap is the absence of a direct remedy for delayed payment. The highest-ranked cause cannot be addressed principally through meetings or software. Contracting authorities and private clients require secured funding, time-bound certification, enforceable payment periods and consequences for unjustified delay. Delay control will remain partial until financial obligations are treated as measurable project-performance commitments.

6 Conclusion Recommendations and Limitations

6.1 Conclusion

The study demonstrates that construction delay in Nigeria is systemic and multi-actor. Delayed payment, poor planning, skill shortages, design revisions and inadequate communication were the five highest-ranked causes. Their interaction explains why isolated remedies frequently produce limited improvement. A contractor cannot maintain the programme without cash flow; timely payment cannot prevent rework caused by incomplete design; and digital tools cannot compensate for weak decisions or unreliable data. The effects extend beyond the completion date. Cost overrun, abandonment and disputes were the most frequently reported outcomes, while quality, client confidence and national development were also affected. Existing remedies focus mainly on meetings, scheduling software and procurement. These measures are useful, but the mismatch between the leading cause and the available responses shows that payment governance requires greater attention.

6.2 Recommendations

1. Enforce project funding and payment discipline. Clients should demonstrate adequate funding before award and maintain a project cash-flow plan. Contracts should specify time limits for valuation, certification and payment, with transparent escalation and consequences for unjustified delay. Public agencies should avoid commencing projects that lack credible multi-year funding.

2. Make the programme a live control document. Contractors should submit logic-linked and resource-informed baseline programmes that identify critical activities, procurement lead times and decision dates. Progress should be updated at agreed intervals, and recovery plans should address causes, resources and responsibility rather than simply promise a revised completion date.

3. Improve design coordination and information response. Consultants should complete interdisciplinary design reviews before mobilisation, maintain registers for drawings and requests for information, and apply time-bound procedures for instructions, variation assessment and certification. Design changes should be subjected to explicit time-and-cost impact review.

4. Develop skills and equipment reliability. Contractors, professional bodies and training institutions should expand practical training in planning, supervision, digital construction and modern production methods. Equipment plans should include preventive maintenance, critical spares and contingency arrangements for high-risk operations.

5. Adopt digital controls in stages. Organisations should begin with consistent scheduling, document control and common data standards before expanding BIM use. Government and professional bodies should support training, interoperability standards and pilot requirements for suitably complex public projects. Evaluation should focus on coordination outcomes, not software ownership.

6. Establish predictable approvals and early dispute resolution. Regulatory agencies should publish approval requirements, responsible offices and service timelines. Projects should maintain

early-warning and issue registers, while contracts should provide accessible negotiation, mediation, adjudication or arbitration routes supported by contemporaneous records.

6.3 Limitations and Further Research

The study relied on purposive sampling and self-reported professional perceptions from four cities. It did not independently examine project files, approved programmes, payment certificates or final accounts. The findings therefore indicate the relative importance assigned by respondents and should not be treated as nationally representative incidence rates. The supplied interview record did not contain verbatim transcripts, which limited quotation and deeper comparison among stakeholder groups. Future research should combine stakeholder surveys with audited project records to measure actual schedule variance, payment periods and cost growth. Larger probability-based samples could test regional and project-type differences. Longitudinal studies should examine whether BIM, e-procurement, time-bound approvals and prompt-payment provisions produce measurable reductions in delay. Political and institutional influences on abandoned public projects also require focused investigation.

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