International Journal of Civil Engineering, Construction and Estate Management,14(4),32-44,2026
Print ISSN: 2055-6578(Print)
Online ISSN: 2055-6586(online)
Website: https://www.eajournals.org/
Publication of the European Centre for Research Training and Development -UK

Artisans' Time-Management Practices and Construction Project Success Implications for Sustainable Construction in Abuja, Nigeria

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doi: https://doi.org/10.37745/ijcecem.14/vol14n43244 Published November 01, 2026

Citation: Yohanna Y., Habila M., Jacob A.M. (2026) Artisans' Time-Management Practices and Construction Project Success Implications for Sustainable Construction in Abuja, Nigeria, *International Journal of Civil Engineering, Construction and Estate Management*,14(4),32-44

Abstract: *Construction projects depend on coordinated labour, materials and equipment. Yet, artisans' day-to-day time allocation is often treated as an operational issue rather than a determinant of project performance. This study examines artisans' time-management challenges, identifies practical measures for improving time use, and evaluates the association between artisans' time-management practices and construction project success. The study used a questionnaire-based descriptive survey, with 320 questionnaires reportedly distributed and 228 valid responses identified in the questionnaire-administration table. Responses were analysed using descriptive statistics and linear regression in SPSS. The highest-ranked reported challenges were lack of task prioritisation (mean = 4.70, SD = 1.03), poor planning (mean = 4.55, SD = 0.88), inefficient communication (mean = 4.05, SD = 0.79), procrastination (mean = 4.03, SD = 0.73), and inadequate delegation (mean = 3.91, SD = 0.95). Training and skills development, project planning and coordination, access to resources and tools, communication and collaboration, and supervision and monitoring were identified as leading improvement priorities. The reported regression model was statistically significant ($R = 0.294$, $R^2 = 0.086$, adjusted $R^2 = 0.079$, $F = 12.467$, $p < 0.001$), indicating a positive but modest association: the model explained 8.6% of the observed variance in project success. The findings suggest that artisan time management should be addressed through an integrated site-level system combining task prioritisation, short-interval planning, reliable material availability, clear work sequencing, communication, and supportive supervision. These measures may also support cleaner production by reducing avoidable waiting, rework, and inefficient use of labour and materials. However, the study's original geographic and sample inconsistencies must be resolved before the results can validly be presented as evidence from Abuja. The manuscript therefore retains reported statistics but treats Abuja as the intended study setting pending confirmation against the original field records.*

Keywords: artisan productivity, time management, construction project success, Sustainable Construction

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INTRODUCTION

Construction is a resource-intensive production system in which project outcomes depend on the coordination of people, materials, equipment, information, and time. Artisans, including masons, carpenters, tilers, steel fixers, painters, electricians and plumbers, translate design information and work packages into physical outputs. Their work is interdependent: a delay in one trade can interrupt subsequent activities, create idle time for other crews, increase site overheads and contribute to schedule slippage. Consequently, time management at artisan level is not merely a personal efficiency concern; it is part of the production-control problem faced by construction project teams (Lee et al., 2023; Qi et al., 2024; Jian et al., 2025).

Time management can be understood as the deliberate process of assessing, planning, prioritising, monitoring and adapting how time is allocated to tasks. In construction, these behaviours are shaped by more than individual discipline. Artisans' ability to complete work on time depends on the clarity of instructions, realistic activity durations, availability of materials and tools, work-front readiness, coordination among trades, supervision, payment arrangements and the speed of decision-making. A narrow focus on individual behaviour may therefore misdiagnose problems that are partly caused by project organisation (ElSahly et al., 2023).

Poor time use can have implications for sustainability as well as schedule and cost performance. Waiting for materials, repeated mobilisation, poorly sequenced work and rework consume labour and equipment time without producing equivalent value. Rework can also generate additional material use and construction waste. Although time management alone cannot establish environmental performance, it offers a practical entry point for improving resource efficiency when combined with reliable planning, first-time quality and coordinated material supply (ElSahly et al., 2023; Jian et al., 2025).

Research on time management has examined workers, managers and organisational performance, while construction project-success research has frequently focused on project managers, contractors, finance, technology and broader critical-success factors. A more specific gap is the limited empirical attention given to how artisans' everyday time-management practices relate to construction project success in the Nigerian context, particularly in the Federal Capital Territory (FCT), Abuja. Addressing this gap requires attention both to the behaviours artisans report and to the operational conditions that enable or constrain those behaviours (Lee et al., 2023; Qi et al., 2024).This study therefore examines artisans' time-management challenges, identifies improvement priorities, and tests the relationship between artisans' time-management practices and construction project success in FCT Abuja, Nigeria. The intended contribution is a practical, artisan-centred approach to production control that connects individual work practices with site coordination and resource efficiency.

Important research note: If the original data were collected in Gombe State, changing the study location to FCT Abuja requires corresponding changes to the study population, sampling frame, methodology and geographical description.

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LITERATURE REVIEW AND CONCEPTUAL FRAMING

Artisan time management as a socio-technical process

Time management includes time awareness, planning and prioritisation, and monitoring progress against intended goals. For artisans, these behaviours can be operationalised through reviewing daily tasks, clarifying priorities, estimating durations, preparing tools and materials, sequencing activities, coordinating handovers, reporting constraints and learning from deviations. The supplied literature also identifies procrastination, distraction, inadequate delegation and weak time tracking as behaviours that can reduce effective work time. (Lee et al., 2023; Jian et al., 2025). These practices are socio-technical rather than exclusively individual. For example, an artisan may plan a task carefully but still experience delay when drawings are unclear, materials are unavailable, preceding work is incomplete or instructions change. Likewise, site supervisors can improve time use by ensuring that work fronts are ready, activity priorities are clear, and dependencies among trades are communicated. This perspective avoids assigning responsibility for all project delay to individual workers and instead recognises the interaction between worker capability and project-level systems. Research synthesis also identifies materials availability, worker skills, supervision and communication as important productivity conditions (Jian et al., 2025).

Construction project success and resource efficiency

Project success is multidimensional. The conventional time–cost–quality dimensions remain useful, but a project may meet a completion date while still generating substantial waste, rework or stakeholder dissatisfaction. A more complete assessment can therefore include schedule reliability, cost control, conformance to specifications, safety, client satisfaction and efficient use of resources. For the present study, the reported regression treats construction project success as the dependent variable, but the source material does not provide enough detail to establish the exact composition or validation of this outcome measure. Evidence from Abuja similarly identifies resource availability, coordination, experienced personnel and progress reviews as important project-performance considerations (Oghomwen et al., 2022). From a cleaner-production perspective, the relevant mechanism is indirect but plausible: better task planning and coordination may reduce waiting, unnecessary movement, repeated work and avoidable material losses. These are potential operational pathways, not environmental effects directly demonstrated by the reported data. Claims about waste reduction, carbon emissions or lifecycle benefits would require additional measurements. Recent reviews emphasise the importance of integrating time–cost optimisation and productivity monitoring, although environmental benefits must be measured separately (ElSahly et al., 2023; Lee et al., 2023).

Empirical gap and study contribution

The source document reviews studies on personal time management, employee productivity and construction project success, and argues that artisans have received less direct attention than managers and other occupational groups. The present study responds by focusing on artisans' reported time-management challenges and relating time-management practices to project success. Its main empirical result, however, is modest explanatory power. This indicates that artisan time management is one potentially relevant component of project performance, not a sufficient explanation on its own. Recent reviews of construction labour productivity likewise point to a broad, multi-factor evidence

base and the need for context-sensitive analysis (Qi et al., 2024; Jian et al., 2025). The conceptual framing used here is: artisan time-management practices (task prioritisation, planning, communication, time monitoring and task coordination) are associated with project success, while material availability, supervision, work sequencing, payment reliability, skill and project complexity may also influence the relationship. These additional factors are presented as contextual mechanisms for future testing; they were not established as moderators in the reported regression**.**

METHODOLOGY

Research Design

This study adopted a quantitative descriptive survey research design to examine artisans' time-management practices and their relationship with construction project success in the Federal Capital Territory (FCT), Abuja, Nigeria. The design was considered appropriate because it enabled the systematic collection of data from construction artisans regarding their time-management practices, challenges and perceived contributions to project performance. Data were collected using a structured questionnaire, allowing respondents' views to be quantified and analysed statistically. Descriptive statistics were used to summarise response patterns, while linear regression analysis was employed to examine the statistical relationship between artisans' time-management practices and construction project success. Given the cross-sectional survey design, the findings are interpreted in terms of statistical associations rather than causal effects.

Study Area and Population

The study area was the Federal Capital Territory (FCT), Abuja, Nigeria. Abuja was selected as the geographical context for investigating artisans' time-management practices because construction activities in the territory involve the coordination of multiple skilled trades, labour resources, materials and project schedules. These activities provide a relevant context for examining the challenges associated with time utilisation and their relationship with construction project performance. The target population comprised construction artisans working on building and construction projects within FCT Abuja. These included masons, carpenters, tilers, steel fixers, painters, electricians and plumbers, whose activities contribute directly to the execution of construction work packages. The source manuscript reports a population of 1,900 registered artisans. However, the sampling frame, registration source, and geographical coverage of this population must be verified against the original study records to establish that the figure specifically represents artisans in FCT Abuja. The final manuscript should identify the relevant registration body, construction sites, or professional associations from which respondents were selected.

Sample Size and Data Collection

The source study reported that 320 questionnaires were distributed to construction artisans. Of these, 230 questionnaires were retrieved, while 228 were classified as valid for analysis in the questionnaire-administration table. This represents a reported retrieval rate of 71.9% and a valid-response rate of 71.3% relative to the number distributed. However, the source abstract reports 282 valid responses, creating an inconsistency in the reported sample size. Consequently, the final analytical sample must be confirmed using the original questionnaires and corresponding SPSS dataset before the results are submitted for publication. Data were collected using a structured questionnaire designed to obtain information on artisans' time-management practices, challenges affecting effective time utilisation, and measures for improving time management on construction projects. The instrument also addressed practices perceived to support timely project completion and cost control. The questionnaire enabled the collection of standardised responses suitable for descriptive and inferential statistical analysis. To ensure geographical accuracy, the authors should verify the locations where the questionnaires were administered, the recruitment procedures and the fieldwork dates, and report these details specifically for FCT Abuja.

Validity and Reliability of the Research Instrument

The questionnaire was reportedly subjected to expert review by specialists in Building Technology to assess its face and content validity. This process was intended to establish whether the questionnaire items were relevant to the study objectives and adequately represented the dimensions of artisans' time-management practices and construction project success. A pilot test involving 20 construction artisans in Bauchi State was also reported, yielding an overall Cronbach's alpha coefficient of 0.86. This value indicates good internal consistency for the instrument tested, provided that the items were appropriately combined into a coherent scale. The use of Bauchi State for the pilot study should be distinguished from the main survey setting in FCT Abuja. The source manuscript also presents construct-level Cronbach's alpha coefficients of 0.701, 0.731, 0.892 and 0.810, based on a reported sample size of 122. Although these coefficients range from acceptable to good internal consistency, their relationship with the pilot-test result is unclear. The authors should therefore verify the questionnaire versions, construct definitions, sample sizes and corresponding statistical outputs before reporting these coefficients as definitive reliability estimates. Where multiple constructs were measured, reliability should be established separately for each relevant scale using the confirmed analytical dataset.

Methods of Data Analysis

Data analysis was reportedly conducted using the Statistical Package for the Social Sciences (SPSS), version 25. Descriptive statistics, including means and standard deviations, were used to summarise respondents' assessments of time-management practices and related challenges. Mean-based ranking was applied to identify the relative importance of the factors investigated, while linear regression analysis was used to examine the relationship between artisans' time-management practices and construction project success.

The reported regression model summary produced a correlation coefficient (\(R\)) of 0.294, a coefficient of determination (\(R^2\)) of 0.086, an adjusted \(R^2\) of 0.079, and a standard error of the estimate of 0.45587. The model's reported F-statistic was 12.467, with a significance value displayed in the source as 0.000. In accordance with standard statistical reporting conventions, this significance level should be presented as \(p < 0.001\), rather than \(p = 0.000\). The reported \(R^2\) indicates that the regression model accounts for 8.6% of the observed variance in the specified outcome variable, subject to confirmation of the model specification and analytical sample. Although the reported significance level suggests a statistically significant model, the strength and practical implications of the relationship should be interpreted cautiously. The relatively low explained variance indicates that other factors beyond the variables included in the model may contribute to construction project success. For transparent and reproducible reporting, the final analysis should include the regression coefficients, standard errors, confidence intervals, degrees of freedom, exact operational measure of construction project success and relevant diagnostic tests. The authors should also verify the dependent and independent variables used in the regression, confirm the analytical sample size, and assess the assumptions of linear regression before drawing substantive conclusions.This revised methodology establishes FCT Abuja as the intended study area, but the original sampling records must confirm that the main survey was actually conducted there. The reported population of 1,900 artisans, questionnaire totals and statistical outputs should not be presented as verified Abuja-specific evidence until the underlying records have been reconciled.

RESULTS

Main artisan time-management challenges

Table 1 presents the highest-ranked challenges reported in the source. The original table contains 18 entries, but its rank labels and some item numbering are inconsistent. The table below reproduces the leading five items most relevant to interpretation.

Table 1: Main artisan time-management challenges

Challenge	Mean	SD	Reported rank
Lack of task prioritisation	4.70	1.03	1
Poor planning	4.55	0.88	2
Inefficient communication	4.05	0.79	3
Procrastination	4.03	0.73	4
Inadequate delegation	3.91	0.95	5

Lack of task prioritisation had the highest reported mean (4.70), followed by poor planning (4.55). These results suggest that respondents regarded deciding what to do first and organising work before execution as particularly important weaknesses. Inefficient communication and procrastination were also highly ranked, indicating that time use may be affected both by individual work habits and by coordination between workers and other project participants. Inadequate delegation ranked fifth,

potentially reflecting difficulties in distributing tasks or coordinating assistance where work requires more than one person. The results should be interpreted as reported perceptions rather than independently observed behaviours. The high mean for prioritisation does not establish how much delay it caused, and the survey does not quantify lost hours, rework, material waste or schedule variance for these individual challenges.

Factors for improving time management

The findings identified five key priorities for improving time management among construction artisans in the Federal Capital Territory (FCT), Abuja: training and skills development, project planning and coordination, access to resources and tools, communication and collaboration, and supervision and monitoring. These priorities highlight the importance of both individual competencies and organisational arrangements in achieving effective time utilisation on construction projects. However, because the complete table of mean scores and standard deviations was not consistently available, the factors are presented without numerical scores or statistical rankings beyond the priorities reported in the source material.

Table 2: Factors for improving time management

Priority	Potential site-level application
Training and skills development	Practical instruction in task estimation, sequencing, daily planning and problem-solving.
Project planning and coordination	Translate the master schedule into short-horizon work plans and coordinate trade dependencies.
Access to resources and tools	Confirm material, equipment, drawings and work-front readiness before assigning tasks.
Communication and collaboration	Use brief daily coordination meetings and clear channels for reporting constraints.
Supervision and monitoring	Track planned versus completed work, identify blockers early and agree corrective action.

The findings suggest that improving time management among construction artisans requires an integrated approach that addresses both workforce capabilities and the conditions under which construction activities are performed. Training and skills development can strengthen artisans' ability to estimate task durations, prioritise activities and organise their daily work. However, these competencies may have limited practical value when construction materials, tools, equipment or work areas are unavailable when required. Similarly, inadequate planning and weak coordination between trades may create interruptions that prevent artisans from completing assigned tasks within the planned time.

Effective communication and collaboration are equally important because construction activities are interdependent. Delays in communicating design changes, material shortages or changes in work priorities can disrupt work sequences and reduce the productive use of labour. Regular coordination meetings and clear reporting procedures can help identify these constraints before they develop into significant schedule disruptions. In addition, effective supervision and systematic monitoring can support early identification of deviations from planned activities and facilitate appropriate corrective action.

From a construction management perspective, these findings indicate that time-management improvement should not be treated exclusively as an individual responsibility of artisans. Rather, it should be integrated into broader site-management practices involving work planning, resource allocation, communication, supervision and performance monitoring. For construction projects in FCT Abuja, this approach could help reduce avoidable waiting time, improve coordination among trades and support more efficient utilisation of labour and other project resources.

Nevertheless, these implications should be interpreted in accordance with the evidence available. The five factors represent the improvement priorities reported in the source material; without the complete descriptive statistics, it is not possible to establish their precise relative importance or determine whether differences between them are statistically significant.

Relationship between time-management practices and project success

The regression analysis examined the relationship between artisans' time-management practices and construction project success in the Federal Capital Territory (FCT), Abuja. The reported results indicate a positive but weak association between the variables, with a correlation coefficient (\(R\)) of 0.294. The coefficient of determination (\(R^2\)) was 0.086, indicating that the regression model explained 8.6% of the observed variance in construction project success. The adjusted \(R^2\) value of 0.079 further suggests that the model had limited explanatory power after adjustment for its specification.

Table 3: Relationship between time-management practices and project success

Statistic	**Reported value**
Correlation coefficient (R)	0.294
R square	0.086
Adjusted R square	0.079
Standard error of estimate	0.45587
F statistic	12.467
Significance	$p < 0.001$

The reported F-statistic of 12.467, with a significance level of \(p < 0.001\), indicates that the regression model was statistically significant. This suggests that the model provides evidence of a statistically significant relationship between the predictor and the outcome, subject to verification of the original regression output and model assumptions. Nevertheless, statistical significance should not be interpreted as evidence of a strong relationship or substantial practical impact.The coefficient of determination indicates that 8.6% of the observed variance in construction project success was explained by the model, while the remaining 91.4% was not explained by the included predictor. This unexplained variance may be associated with other determinants of project performance, measurement limitations or random variation. Potentially relevant factors include the availability of construction materials and equipment, financial management, workforce competence, site supervision, project planning, coordination among trades and the effectiveness of communication. However, these factors were not established as significant predictors by the reported model and would require further empirical investigation. From a construction management perspective, the findings suggest that artisans' time-management practices may be relevant to project success, but they are unlikely to provide a comprehensive explanation of project performance when considered in isolation. Effective time utilisation must be supported by appropriate planning, timely resource provision, clear work instructions and effective coordination among project participants. In FCT Abuja, these considerations provide a basis for developing integrated strategies that address both artisans' work practices and the organisational conditions influencing productivity.The findings should, however, be interpreted cautiously because the available results do not include the regression coefficient, its standard error, confidence interval or complete analysis of variance (ANOVA) table. Consequently, the magnitude and precision of the estimated regression slope cannot be established from the model summary alone. Furthermore, the positive direction of the relationship should be confirmed using the regression coefficients and variable coding in the original SPSS output. The final analysis should report these statistics and verify the analytical sample before definitive conclusions are drawn.

DISCUSSION OF RESULT

Prioritization and planning

The prominence of task prioritisation and poor planning is important because construction work is sequential and interdependent. When artisans begin tasks without clear priorities or an agreed sequence, critical activities may be delayed while less urgent work receives attention. Poor planning can also produce mismatches between labour, materials, tools and available work fronts. The practical implication is to make planning visible at the level where work is executed: daily priorities should be linked to the project schedule, predecessor completion, material readiness and required inspections. This interpretation is consistent with reviews highlighting planning, resource availability and site-management conditions as productivity factors (ElSahly et al., 2023; Jian et al., 2025). A short-horizon planning routine can help translate schedules into actionable commitments. At the start of each shift, the supervisor and trade representatives can identify tasks to be completed, confirm prerequisites, estimate realistic durations and record constraints. At the end of the shift, planned and completed work can be compared, with reasons for variance used to improve subsequent plans. Such a routine makes time management a shared production responsibility rather than an instruction to individual artisans to "work faster.

Communication

Inefficient communication and procrastination were also highly ranked. In a multi-trade environment, incomplete or late information can create waiting, duplicated effort and work that must later be altered. Clear task instructions, agreed handover points and prompt escalation of constraints can reduce these risks. Procrastination should be addressed carefully: while delayed task initiation may be an individual behaviour, it can also occur when workers are uncertain about instructions, lack materials or expect rework because upstream decisions remain unresolved. A 2025 meta-analysis also identifies effective communication, competent supervision, worker skills and materials availability among important construction labour-productivity factors (Jian et al., 2025). The ranking of inadequate delegation points to the importance of matching task demands with available skills and labour. Delegation should not mean transferring responsibility without adequate instructions or supervision. It should clarify who is responsible for each activity, what standard is required, when the task is due and how progress or obstacles will be communicated.

Interpreting the modest regression result

The regression result supports an association between time-management practices and project success, but its explanatory power is limited. This is plausible because project success is shaped by multiple factors, including design changes, procurement, finance, weather, contractor capability, site management, labour skills, safety and client decisions. The finding argues against a single-factor solution. Time-management interventions should be integrated with materials planning, realistic scheduling, supervision and quality control. This cautious interpretation is appropriate because construction productivity is influenced by multiple interdependent factors rather than a single practice (Qi et al., 2024; Jian et al., 2025). The result is also a reminder to distinguish statistical association from causal impact. The cross-sectional survey relies on self-reported responses and does not establish temporal order. Successful projects may themselves create better conditions for artisans to manage time, while poorly managed projects may generate behaviours that respondents interpret as time-management problems. Longitudinal studies, project records and direct observation would help clarify these relationships.

Practical implications

1. Introduce daily task-prioritisation and short-interval work plans that align artisan activities with the project schedule and trade dependencies.
2. Require supervisors to verify material, tool, drawing and work-front readiness before committing crews to an activity.
3. Provide practical time-management training focused on estimating durations, sequencing tasks, managing interruptions and learning from delays.
4. Use brief, structured coordination meetings and simple progress boards to communicate priorities, handovers and constraints.
5. Monitor planned versus completed work and record reasons for variance without automatically attributing every delay to artisan behaviour.
6. Coordinate payments, transport and access arrangements so that avoidable logistical barriers do not undermine work continuity.

7. Track rework, waiting time and material losses alongside schedule and cost indicators to test whether improved time management also supports cleaner production.

Limitations of the study

Several limitations must be resolved or acknowledged before submission. First, the source alternates between a sample of 282, 228 valid questionnaires and other inconsistent profile totals. Second, it identifies Gombe State as the original field setting, although the requested manuscript is framed around Abuja. Third, some demographic counts and percentages do not reconcile. Fourth, the complete numerical results for the second objective and the regression coefficients are not available in the extracted material. Fifth, the cross-sectional, self-reported design limits causal interpretation and may be affected by common-method bias. Finally, the study does not directly measure environmental outcomes, so cleaner-production implications remain prospective. Future research should use a verified Abuja sampling frame and clearly documented sampling procedure; collect project-level records alongside questionnaire responses; test the measurement properties of the time-management and project-success constructs; and use multivariable models that include material availability, supervision, skill, project complexity and payment reliability. Comparative or longitudinal designs could assess whether changes in planning and coordination precede improvements in schedule reliability, productivity, rework and material efficiency.

CONCLUSION

This study examines artisans' time-management challenges and their relationship with construction project success. The reported results identify lack of task prioritisation, poor planning, inefficient communication, procrastination and inadequate delegation as the leading challenges. Training, planning and coordination, resource availability, communication, and supervision emerge as practical improvement priorities. The reported regression is statistically significant but modest in explanatory power ($R^2 = 0.086$), indicating that time management is relevant but insufficient on its own to explain project success. The principal practical message is that artisan time management should be treated as a shared site-production system: artisans need planning skills, while project teams must provide clear priorities, reliable inputs, coordinated work fronts and responsive supervision. These changes may also improve resource efficiency, but environmental benefits require direct measurement. Crucially, the manuscript cannot be represented as an Abuja-based empirical study until the original field location, sample size and dataset have been verified.

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