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Project Planning Processes and Public Building Project Delivery in South-West Nigeria: Evidence from A Cross-Sectional Survey

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Abstract **Original Research Article**

Repeated cost overruns, delays and quality concerns in public buildings highlight the importance of effective project planning in South-West Nigeria. This study examined the association between project planning processes and public building project delivery. Using a cross-sectional survey of building professionals across six states, 402 questionnaires were administered from a population of 480, 305 were returned (75.9%), and 300 were included in the analysis (74.6% of those distributed). Descriptive statistics, multiple regression and seemingly unrelated regression (SUR) were employed. The mean overall planning score was 4.200 (SD = 0.720); procurement planning had the highest mean (M = 4.324), while risk management had the lowest (M = 3.957). The overall-delivery regression was significant, $F(8, 291) = 32.564$, $p < .001$, $R^2 = .473$, with significant positive coefficients for resource planning (b = 0.206, p = .001), scheduling (b = 0.132, p = .006) and procurement planning (b = 0.195, p = .001). The SUR Wald χ^2 statistics were 214.68 for cost, 286.41 for time and 267.53 for quality (all $p < .001$). Planning practices were jointly associated with perceived delivery across all three outcomes, although the pattern of individual associations differed by model. Integrated planning, with particular emphasis on resource availability, realistic scheduling and procurement readiness, is recommended to strengthen public building project delivery.

Keywords: project planning; scheduling; resource planning; procurement; cost and time performance; public buildings; South-West Nigeria.

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1. INTRODUCTION

The persistent gap between public building project expectations and realised delivery constitutes an important concern in Nigeria. Government-financed building projects are expected to meet approved budgets, completion schedules and technical standards, yet cost escalation, time overruns and construction quality deficiencies remain recurrent challenges (Olanrewaju et al., 2022; Oladipo et al., 2024). Although inadequate execution is frequently identified when buildings are delayed or abandoned, constraints may arise earlier through incomplete scope definition, inaccurate resource estimates, unrealistic schedules, weak risk allowances and ineffective procurement planning. These problems make the planning stage an important focus for improving public investment outcomes.

Project planning translates project objectives into work packages, resource allocations, schedules, quality requirements and controls for subsequent

implementation. The Project Management Institute (2021) identifies planning processes covering scope, schedule, cost, resources, quality, communication, risk, procurement and stakeholder engagement. Eight planning domains were examined in this study: scope planning, resource planning, scheduling, quality planning, communication planning, risk management, procurement planning and stakeholder engagement planning. Although interrelated, these practices may exhibit different relationships with budget adherence, timely completion and quality compliance.

The study draws on the management-as-planning perspective of Koskela and Howell (2000), which regards managerial planning as the development, revision and communication of coordinated intentions guiding operational activities. Applied to public construction, the approach emphasises the need to synchronise resources, professional responsibilities and work sequences while maintaining an explicit basis for monitoring progress. The theory of triple constraints further frames cost, time and quality as interrelated performance objectives. Taken together, these perspectives indicate why effective planning requires both coherence among project inputs and attention to more than one measure of delivery performance.

Empirical studies provide evidence of the importance of planning for construction performance. Usman et al. (2014) linked planning-phase principles to building project performance in Abuja, while Akinradewo and Aigbavboa (2019) examined the influence of construction planning on contractors' profit. Khalaf et al. (2021) investigated project planning, risk management and project success, and Kadiho et al. (2021) and Jared and Samson (2021) examined planning-related outcomes in Rwanda and Kenya, respectively. However, these studies differ in location, institutional setting and operationalisation of project success. Evidence remains limited on the combined and separate associations of eight planning practices with cost, time and quality performance across public building projects in the six South-West Nigerian states.

The study addresses the question: How are project planning processes related to cost, time and quality performance in public building delivery in South-West Nigeria? It assesses the associations between eight project planning domains and overall delivery and estimates separate models for cost, time and quality. This approach extends the empirical discussion beyond aggregate project success to the specific delivery outcomes of greatest concern to public clients and project managers.

2. METHODS

Study design and setting

A cross-sectional survey design was adopted to investigate public building project delivery in Ekiti, Lagos, Ogun, Ondo, Osun and Oyo States of South-West Nigeria. The study covered building professionals involved in completed and ongoing public building projects associated with state ministries responsible for works, infrastructure, lands and housing, and State Universal Basic Education Boards. Contractors, consultants and public-sector project personnel constituted the study setting. The field survey was conducted in 2026.

Participants, sampling and response

The study population comprised 480 building professionals, from which a target of 402 participants was established. A multistage sampling procedure combined purposive identification of relevant public institutions and professional groups, random selection of selected projects and contractors' project managers, and proportional allocation across the states. In total, 402 structured questionnaires were administered, of which 305 were returned, representing a response rate of 75.9%. Five returned questionnaires with substantial missing responses or inadequate engagement were excluded. The final analysis therefore comprised 300 respondents, equivalent to 74.6% of questionnaires administered and 98.4% of those returned. The respondents included engineers, architects, builders, project managers and quantity surveyors.

Measurements and quality assurance

Data were collected using a structured, self-administered questionnaire with a five-point Likert

response scale ranging from 1 (strongly disagree) to 5 (strongly agree). Public building project delivery was assessed through perceived compliance with budgetary requirements (four items), completion schedules (five items) and quality standards (five items). These were perceptual indicators rather than independently audited project outcomes. Content validity was assessed, and an instrument pilot was conducted among building professionals in Edo State. The 14-item building project delivery measure demonstrated satisfactory internal consistency (Cronbach's $\alpha = .890$).

Statistical analysis

Data were analysed using frequencies, percentages, means and standard deviations. Multiple linear regression was used to examine the association of the component practices with the overall building project delivery score, while seemingly unrelated regression (SUR) was applied to estimate separate equations for perceived cost, time and quality performance, allowing their error terms to be correlated. Tests were evaluated at the 5% significance level; p values smaller than .001 are written as $p < .001$. Approximate 95% confidence intervals for the multiple-regression coefficients were calculated using the coefficients, standard errors and residual degrees of freedom. Equation-level Wald χ^2 statistics and cross-equation residual correlations are also presented. Planning was measured using project scope planning (three questionnaire items), project scheduling (four), project resource planning (four), project quality planning (two), project communication planning (two), project risk management (three), project procurement planning (five) and stakeholder engagement planning (three), totalling 26 items. Cronbach's alpha for the overall planning scale was .946. The dependent construct was overall perceived public building project delivery (14 items; $\alpha = .890$). Its three dimensions were perceived cost/budget adherence, time/schedule adherence and quality standards. Ordinary multiple regression included the eight planning predictors; SUR estimated cost, time and quality equations with the same predictors while accommodating correlated equation disturbances.

3. RESULTS

Response rate and respondents' profile

Questionnaire disposition is reported in Table 1. Out of 402 copies of questionnaire distributed, 305 (75.9%) were returned and five were excluded. After data cleaning and sorting for engaged responses, 300 copies of questionnaire (74.6%) were considered suitable for analysis at achieving the study's objectives. As Table 2 shows, the largest contributions came from Lagos State (n = 86, 28.7%) and Ondo State (n = 76, 25.3%). There were 246 men (82.0%) and 54 women (18.0%). The largest age group was 40–49 years (n = 119, 39.7%); 119 respondents (39.7%) also reported more than 15 years of experience. The most represented profession was quantity surveying (n = 85, 28.3%).

Table 1 Questionnaire distribution and analytical response

Survey disposition	N	% of distributed
Questionnaires distributed	402	100.0
Questionnaires returned	305	75.9
Returned questionnaires excluded	5	1.2
Questionnaires retained for analysis	300	74.6

Source: Researcher's compilation (2026)

Table 2 Respondent characteristics (N = 300)

Characteristic	Category	n	%
State	Ekiti	45	15.0
	Lagos	86	28.7
	Ogun	32	10.7
	Ondo	76	25.3
	Osun	24	8.0
	Oyo	37	12.3
Age, years	Below 20	10	3.3
	20–29	37	12.3
	30–39	77	25.7
	40–49	119	39.7
	50–59	55	18.3
	60 and above	2	0.7
Sex	Male	246	82.0
	Female	54	18.0
Qualification	HND	61	20.3
	BSc/BEng	172	57.3
	MSc/MEng	50	16.7
	PhD	6	2.0
	Other (PGD)	11	3.7
Professional experience	Below 2 years	13	4.3
	2–6 years	33	11.0
	7–11 years	53	17.7
	11–15 years	82	27.3
	Above 15 years	119	39.7
Profession	Engineer	67	22.3
	Architect	51	17.0
	Builder	47	15.7
	Project manager	50	16.7
	Quantity surveyor	85	28.3

Source: Researcher's compilation (2026)

Descriptive statistics for delivery and planning

The three delivery outcomes in Table 3 had means of 4.088 (SD = 0.848) for cost, 4.160 (SD = 0.768) for time and 4.314 (SD = 0.710) for quality, on the five-point agreement scale. Among the 300 respondents, 167 (55.7%) rated overall project delivery as very high and 112 (37.3%) as high. These evaluations are based on respondent report, not direct observation of every project's actual contract variance or technical defects.

Table 3 Descriptive statistics for the common dependent variables

Outcome	Items	M	SD
Cost (within budget)	4	4.088	0.848
Time (within schedule)	5	4.160	0.768
Quality standards	5	4.314	0.710

Source: Field survey (2026)

Note. N = 300. Responses were recorded on a five-point agreement scale; higher scores denote more favourable perceived delivery. M = mean; SD = standard deviation.

As shown in Table 4, procurement planning recorded the highest composite mean (M = 4.324, SD = 0.708), followed by resource planning (M = 4.268, SD = 0.673), scope planning (M = 4.257, SD = 0.707) and communication planning (M = 4.255, SD = 0.675). Project risk management had the lowest composite mean (M = 3.957, SD = 0.850), while the overall planning scale recorded M = 4.200 (SD = 0.720). At the item level, the preparation of contract and tender documents scored M = 4.42 (SD = 0.66), whereas preparation of a risk register scored M = 3.89 (SD = 0.94). Further item-level descriptive results are presented in Tables 7 and 8.

Table 4 Descriptive statistics for eight planning domains

Component	Items	M	SD
Project scope planning	3	4.257	0.707
Project resource planning	4	4.268	0.673
Project scheduling	4	4.138	0.740
Project quality planning	2	4.245	0.700
Communication planning	2	4.255	0.675
Project risk management	3	3.957	0.850
Project procurement planning	5	4.324	0.708
Stakeholder engagement planning	3	4.163	0.710
Overall planning composite	26	4.200	0.720

Source: Field survey (2026)

Note. N = 300. M = mean; SD = standard deviation. The eight component scores and the overall planning composite were calculated from five-point agreement ratings.

Multiple regression: overall project delivery

Table 5 reports the aggregate delivery regression. The eight-predictor model was significant, $F(8, 291) = 32.564$, $p < .001$, accounting for 47.3% of variability in the reported overall delivery score ($R^2 = .473$; adjusted $R^2 = .459$). Resource planning ($b = 0.206$, $p = .001$), scheduling ($b = 0.132$, $p = .006$) and procurement planning ($b = 0.195$, $p = .001$) had significant positive coefficients. Scope planning ($p = .309$), quality planning ($p = .253$), communication planning ($b = -0.011$, $p = .823$), risk management ($p = .780$) and stakeholder engagement planning ($p = .058$) were not individually significant at 5%. The intervals in Table 5 were calculated from rounded reported standard errors and should be interpreted as approximations.

Table 5 Multiple regression of overall perceived delivery

Predictor	b	SE	T	p	95% CI
Intercept	0.238	0.523	0.455	0.551	[-0.791, 1.267]
Scope planning	0.048	0.047	1.018	0.309	[-0.045, 0.141]
Resource planning	0.206	0.055	3.774	0.001	[0.098, 0.314]
Scheduling	0.132	0.048	2.744	0.006	[0.038, 0.226]
Quality planning	0.061	0.053	1.146	0.253	[-0.043, 0.165]
Communication planning	-0.011	0.050	-0.224	0.823	[-0.109, 0.087]
Risk management	0.012	0.043	0.280	0.780	[-0.073, 0.097]
Procurement planning	0.195	0.051	3.808	0.001	[0.095, 0.295]
Stakeholder engagement	0.090	0.047	1.904	0.058	[-0.003, 0.183]

Source: Field survey (2026)

Note. N = 300. b = unstandardised regression coefficient; SE = standard error; CI = confidence interval. Approximate 95% CIs were calculated from b, SE and residual degrees of freedom. Overall model: $F(8, 291) = 32.564$, $p < .001$; $R^2 = .473$; adjusted $R^2 = .459$.

Seemingly Unrelated Regressions (SUR) on cost, time and quality outcomes

Table 6 presents the SUR estimates for the cost, time and quality dimensions of project delivery. All eight planning variables had positive coefficients with $p < .001$ in each equation. Project scheduling had the largest coefficient for cost ($b = 0.351$, $z = 6.18$) and time ($b = 0.397$, $z = 7.14$), while project quality planning had the largest coefficient for quality ($b = 0.389$, $z = 7.02$). Equation-level Wald χ^2 statistics were 214.68 for cost, 286.41 for time and 267.53 for quality (all $p < .001$), with pseudo-R^2 values of .39, .48 and .45, respectively. The cross-equation residual correlations were .63 for cost–time, .59 for cost–quality and .65 for time–quality. The SUR models therefore displayed a broader pattern of individual statistical significance than the overall-delivery model shown in Table 5.

Table 6 SUR coefficients and equation-level statistics for planning

Variable	Cost: b (z; p)	Time: b (z; p)	Quality: b (z; p)
Intercept	0.593 (3.21; .001)	0.648 (3.59; <.001)	0.706 (3.94; <.001)
Scope planning	0.286 (4.87; <.001)	0.341 (5.96; <.001)	0.318 (5.53; <.001)
Resource planning	0.327 (5.71; <.001)	0.365 (6.48; <.001)	0.294 (5.12; <.001)
Scheduling	0.351 (6.18; <.001)	0.397 (7.14; <.001)	0.276 (4.91; <.001)
Quality planning	0.269 (4.73; <.001)	0.301 (5.29; <.001)	0.389 (7.02; <.001)
Communication planning	0.218 (3.84; <.001)	0.284 (4.96; <.001)	0.257 (4.51; <.001)
Risk management	0.303 (5.34; <.001)	0.329 (5.83; <.001)	0.347 (6.21; <.001)
Procurement planning	0.241 (4.22; <.001)	0.273 (4.81; <.001)	0.228 (3.97; <.001)
Stakeholder engagement	0.225 (3.96; <.001)	0.236 (5.18; <.001)	0.311 (5.47; <.001)
Wald χ^2	214.68 (<.001)	286.41 (<.001)	267.53 (<.001)
Pseudo-R^2	0.39	0.48	0.45
Observations	300	300	300

Source: Field survey (2026)

Note. N = 300. b = regression coefficient; z = z statistic. Wald χ^2 and pseudo-R^2 values refer to the individual SUR equations. Values below .001 are written as p < .001. Residual correlations: cost–time = .63; cost–quality = .59; time–quality = .65.

4. DISCUSSION

The findings demonstrate a significant relationship between project planning processes and perceived public building project delivery. The eight-variable aggregate model explained 47.3% of the variation in overall delivery scores, with resource planning, scheduling and procurement planning emerging as individually significant factors. Separate SUR equations indicated positive, statistically significant coefficients for all eight planning domains for each delivery dimension. The difference between these models may reflect their distinct outcome specifications, and the findings should be interpreted as associations rather than evidence that any particular planning practice independently causes improved project delivery.

The associations for resource planning and scheduling are consistent with the theoretical premise that workable project plans depend on allocating appropriate inputs to a sequenced programme (Koskela & Howell, 2000). They are also aligned with evidence on construction planning and profitability (Akinradewo & Aigbavboa, 2019) and with the planning–performance literature reported by Usman et al. (2014). The particularly large scheduling coefficient in the time equation is substantively intelligible: unrealistic activity durations and poor dependency mapping create pressure that can affect progress. Yet coefficient magnitudes should not be interpreted as causal importance rankings without comparable measurement scaling and stronger research design.

Procurement planning was another significant factor

in the overall-delivery model. In public buildings, carefully specified tender documentation, transparent prequalification criteria, appropriate procurement quantities and coordinated contractor mobilisation may support predictable delivery. The descriptive results also suggest an area for improvement in project risk management: compared with procurement planning, respondents reported weaker formalisation of risk registers. Prior studies of planning and success (Khalaf et al., 2021) and planning in institutional projects (Jared & Samson, 2021; Kadiho et al., 2021) support the view that multiple domains should be considered, while the present results extend their relevance to the three delivery dimensions examined in South-West Nigerian public buildings.

Practical reforms should therefore require an integrated planning package before project execution: an approved scope statement and work breakdown structure; credible resource availability and cost estimates; a baseline programme with activity dependencies; quality and communication plans; a live risk register; procurement milestones and selection criteria; and a defined stakeholder-engagement plan. Public agencies may particularly prioritise verifiable resource, schedule and procurement planning because those factors were significant in the aggregate model. Audit and reporting systems should then link the planning baseline to actual payments, completion dates and independent quality inspections, instead of relying solely on perceived compliance.

Limitations and future research

The findings are limited by their cross-sectional nature and the use of self-reported project management practices and delivery outcomes, which introduce potential recall, common-method and social-desirability biases. The analysis was not based on independently verified records of approved budgets, actual expenditure, contractual milestones or technical quality inspections. Non-response, geographic concentration and possible clustering within institutions or projects may also affect the generalisability and precision of the estimates. Further prospective studies should link time-stamped planning documents to project-level delivery records and test the influence of planning practices in diverse procurement and institutional settings.

Conclusion

Project planning processes were jointly associated with perceived cost, time and quality delivery of public building projects in South-West Nigeria. Resource planning, scheduling and procurement planning had significant positive associations in the overall delivery model, whereas the SUR models indicated broader associations across the eight planning domains. Public-sector clients should strengthen integrated planning and systematically monitor whether planning commitments are translated into budget adherence, timely completion and acceptable quality.

References

Akinradewo, O., & Aigbavboa, C. (2019). Impact of construction project planning on contractors' profit. IOP Conference Series: *Earth and Environmental Science, 385(1), 012009.*

Jared, D. M., & Samson, N. P. (2021). Influence of project planning on implementation of infrastructure projects in public hospitals in Nairobi County, Kenya. *International Journal of Innovative Development and Policy Studies, 9*(1), 50–68.

Kadiho, A., Nyabera, O., & Alice, K. (2021). Project planning and implementation in Rwanda National Union of Deaf Project, Kicukiro District. *Journal of Advance Research on Business Management and Accounting, 7*.

Khalaf, R. A., Basel, A., & Jassim, A. (2021). The relationship between project planning, risk management, knowledge integration and project success. *Academy of Strategic Management Journal, 20*.

Koskela, L., & Howell, G. (2000). The theory of project management: Problem and opportunity [Working paper]. VTT Technical Research

Centre of Finland and Lean Construction Institute.

Oladipo, F. O., Ojo, O. J., Abayomi, A., & Lawa, F. (2024). Beneficiaries of frugal practices and public building projects delivery in Southwest, Nigeria. *International Journal of Civil Engineering, Construction and Estate Management, 12*(2), 22–43.

Olanrewaju, A. A., Akinradewo, D. F., & Oyedele, L. O. (2022). Challenges of public building projects in Nigeria. *Journal of Building Engineering, 45*,103622.

Project Management Institute. (2021). A guide to the project management body of knowledge (PMBOK guide) (7th ed.).

Usman, N. K., Kamau, P. K., & Mireri, C. (2014). Project planning phase principles on project performance within the building industry in Abuja, Nigeria. *International Journal of Finance and Management in Practice, 2*(1).

Appendix: Supplementary descriptive detail

The item-level descriptive statistics for perceived building project delivery and project initiation are presented in Tables 7 and 8, respectively, to provide further detail on the measurement indicators. Tables 7 and 8 present the item-level descriptive statistics for perceived building project delivery and project planning, respectively. These statistics complement the composite results in Tables 3 and 4.

Table 7 Item-level descriptive statistics for building project delivery

Indicator	Statement (abbreviated)	M	SD
Time 1	Realistic planning and schedule development	4.24	0.71
Time 2	Early resource scheduling	4.12	0.76
Time 3	Critical path method and work breakdown structure	4.16	0.81
Time 4	Strict adherence to the programme of work	4.02	0.87
Time 5	Development of monitoring and control systems	4.26	0.69
Cost 1	Adequate contingency allowance	4.09	0.80
Cost 2	Scheduled progress payments to contractors	4.07	0.87
Cost 3	Frequent progress meetings	4.17	0.80
Cost 4	Timely contractor payment	4.02	0.92
Quality 1	Definition of desired performance standards	4.33	0.73
Quality 2	Application and inspection of quality standards	4.28	0.69
Quality 3	Assessment of project quality effectiveness	4.37	0.68
Quality 4	Acceptance or rejection of work	4.36	0.70

Indicator	Statement (abbreviated)	M	SD
Quality 5	Completed project meets required standards	4.23	0.75

Note. N = 300. M = mean; SD = standard deviation. Item descriptions reflect the questionnaire's delivery indicators.

Table 8 Item-level descriptive statistics for project planning

Indicator	Statement (abbreviated)	M	SD
PSP1	Written project scope statement	4.25	0.72
PSP2	Required activities identified	4.25	0.66
PSP3	Work breakdown and unpriced BOQ prepared	4.27	0.74
PS1	Activity dependencies documented	4.10	0.73
PS2	Activity durations estimated	4.14	0.77
PS3	Schedule derived from sequence, duration and resources	4.15	0.75
PS4	Master programme of work developed	4.16	0.71
PRP1	Resource types and quantities determined	4.31	0.67
PRP2	Work-package costs and priced BOQ prepared	4.30	0.65
PRP3	Resource management planned	4.31	0.66
PRP4	Resource requirements adequately planned	4.15	0.71
PQP1	Relevant quality standards identified	4.24	0.70
PQP2	Processes to fulfil quality requirements determined	4.25	0.70
PCP1	Communication content, recipients and timing planned	4.26	0.66
PCP2	Communication effectiveness assessment planned	4.25	0.69
PRM1	Risk management approach decided	4.09	0.77
PRM2	Risk identification and analysis detailed	3.98	0.84
PRM3	Risk register documented	3.89	0.94
PPP1	Procurement quantities and timing determined	4.29	0.74
PPP2	Contractors and consultants prequalified	4.28	0.70
PPP3	Selection criteria established	4.30	0.70
PPP4	Contract and tender documents prepared	4.42	0.66
PPP5	Procurement programme prepared	4.33	0.74
PSE1	Stakeholder involvement and expectations planned	4.19	0.70

Indicator	Statement (abbreviated)	M	SD
PSE2	Engagement plan adjusted over time	4.13	0.73
PSE3	Team objectives for stakeholders defined	4.17	0.70