



Project Scope Management and Performance of Projects among Security and Surveillance Technology Installation Firms in Lagos State

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ABSTRACT

This study investigates the effect of project scope management practices on the performance of projects among security and surveillance technology installation firms in Lagos State, with particular focus on firms operating within the Computer Village, Ikeja, Nigeria, the IT hub of the State. Employing a quantitative research design, data were collected through a standardized questionnaire distributed to 222 registered members of security and surveillance technology installation firms that sell and install Closed Circuit Television (CCTV). The results indicated that project scope planning has a significant and positive impact on operational efficiency of the firms, accounting for 24.4% of the observed variation, whereas project scope requirement significantly improved quality of performance of the firms, explaining 12.1% of the variance. The study concluded that project scope planning can improve operational efficiency, while project scope requirements can enhance quality of performance in firms. The study recommended that security and surveillance technology installation firms should make project scope planning and project scope requirements compulsory for all projects at the takeoff stage so as to reduce post-installation defects and system modifications.

Keywords: Operational efficiency, Project scope management, Project scope planning, Project scope requirement, Quality of performance, Security and surveillance technology installation

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INTRODUCTION

Project scope management is critical to successful implementation of projects (PMI, 2021). All project inclusions and exclusions lead to proper planning, coordination, and organization of projects (Kerzner, 2020). Project scope management includes defining what work is and is not included in a project (Wysocki, 2019). Project-based organizations in the security and surveillance technology industry operate in an environment that always grow technical requirements, acute stakeholder expectations, and heightened regulatory and ethical environments. Security and surveillance technology projects ranging from closed-circuit television (CCTV) installations and biometrics deployments to integrated command-and-control systems and drone surveillance are inherently complex. They combine hardware procurement, software engineering, network integration, and sensitive data handling (Ali, 2025). Such complexity magnifies the importance of rigorous project scope management because unclear or poorly controlled scope leads rapidly to cost escalation, schedule slippage, compromised system performance, and legal or ethical vulnerabilities.

Scope management is widely recognized as a foundational knowledge area in contemporary project management standards. The *PMBOK® Guide* (2021) emphasizes principles and performance domains that directly relate to the need to define outcomes, manage requirements, and tailor delivery approaches to project characteristics (Project Management Institute, 2021). For technology-intensive projects, this means translating high-level security objectives (for example, “improve perimeter detection”) into precise product and project scope statements, verifiable acceptance criteria, and measurable performance indicators. Without that translation, teams risk building technically correct solutions that nevertheless fail stakeholder acceptance tests or regulatory compliance checks.

Security and surveillance technology projects in Lagos State exhibit a striking paradox. The demand for high-quality, integrated surveillance solutions is rising rapidly, yet many projects continue to deliver late, over budget, or with compromised capabilities. Industry reports review that

continuous implementation issues, including discrepancies between promised functionalities and actual systems, frequent post-delivery alterations, and maintenance problems can affect long-term value, all showing deficiencies in upstream project processes, especially in scope management. This study investigates the specific effect of four scope indicators on project performance (Afolabi & Oke, 2020; Kwofie *et al.*, 2021).

Project scope planning is often insufficient or informal in many small and medium security firms. Rather than producing detailed scope statements, work breakdown structures, and traceable baselines, project teams rely on ad hoc quotes, evolving client instructions, and on-site improvisation. The absence of formal planning increases change frequency, complicates procurement of hardware (cameras, sensors, servers), and causes poor coordination between suppliers and installers. Empirical studies from Nigeria and other developing countries show that inadequate scope planning correlates strongly with cost overruns and schedule delays. This problem appears especially severe in projects that combine civil works, electrical installations, and IT integration, which are all common in surveillance deployments (Ogbu & Nwachukwu, 2022; Yusuf & Adeleke, 2021). This research therefore seeks to quantify and explain how variation in project scope planning practices among security and surveillance technology installation firms in Lagos relate to measurable delivery outcomes.

Project scope requirements are frequently underspecified. Security projects typically involve multiple stakeholders such as facility owners, security personnel, IT teams, and regulatory bodies each with different priorities. When project scope requirements are poorly implemented (ambiguous acceptance criteria, missing non-functional needs such as uptime or privacy constraints), downstream activities such as design, procurement, and testing are undermined. Studies in information systems and technology projects consistently identify requirements quality and volatility as primary predictors of project failure. In the Lagos surveillance context, this manifests as system behaviours that fail to meet detection thresholds, connectivity problems, or clashes with privacy regulations (Agu & Eze, 2023; Hassan & Mustapha, 2020). This raises the question of how

quality and volatility among Lagos security projects influence operational and quality of performance.

Operational efficiency in terms of execution and early operations is always reduced by scope instability. Reworks caused by late requirement changes drive repeated site visits, re-installation of equipment, and extended commissioning activities that consume labour, tie-up capital equipment, and reduce available cash flow. The knock-on effects include lower profit margins for firms and reduced system availability for clients. Current studies connecting scope control to operational metrics indicate that organizations with strong scope-change governance (including formal change boards, quantified change logs, and contractual mechanisms for variations) attain greater execution efficiency (Adeleke *et al.*, 2019; Olawumi & Chan, 2020). The investigative question becomes; to what extent do scope change frequency and governance practices predict operational efficiency metrics (installation time per site, rework incidence, first-time acceptance rates) in Lagos security firms?

Quality of performance is directly affected by scope processes (PMI, 2021). If acceptance criteria are absent or tests are informal, delivered systems may pass superficial checks yet perform poorly under operational stress (e.g., poor low-light detection, high false positives). Quality problems reduce client trust and increase lifecycle costs through frequent maintenance and upgrades. Quality management literature stresses the necessity of embedding quality planning within scope definition: testable requirements, verification protocols, and quality checkpoints across delivery phases (Garba & Ibrahim, 2021; Rahman & Al-Tahat, 2024). The practical problem is to identify how early quality planning within scope processes affects measurable quality outcomes (compliance, reliability, and client satisfaction) for surveillance projects in Lagos.

Finally, an overarching governance problem compounds these indicator-level issues. Many local firms lack standardized project management frameworks tailored to the hybrid nature of surveillance projects (civil + electrical + IT). The PMBOK® Guide (2012) and other standards recommend tailoring and domain-specific artifacts. However, adoption remains uneven. Without

institutionalized scope governance, even well-intentioned teams reproduce avoidable errors project after project. Thus, the core research problem is multi-layered. That is; to determine how project scope planning, project scope requirements, operational efficiency, and quality of performance interrelate and jointly shape final project success in security and surveillance installation firms in Lagos and to identify practical governance interventions that improve outcomes (PMI, 2021; Suleiman & Omotayo, 2019). The research hypotheses for the study is thereby formulated as follows

- i. Project scope planning does not have an effect on operational efficiency of project among security and surveillance technology installation firms in Lagos State.
- ii. Project scope requirements do not have an effect on quality performance of the firms in the study area

LITERATURE REVIEW

Project Scope Management

Project scope management is act of making sure that the intended projects are defined, documented, monitored, and controlled in order to ensure the successful delivery of end outcomes within allocated resources (Project Management Institute, 2021). It is an essential tool of project management that ensures stakeholders possess a jointed understanding of the project deliverables, milestones, and objectives. Proper scope management is very important in security and surveillance technology installation firms, where projects always entail intricate integration of hardware, software, and human elements (Kerzner, 2019).

Turner and Müller (2020) reported that project scope management have three stages which are project scope planning, project scope definition and project scope control. Project scope planning includes creating a guideline for deliverables; project scope definition states the deliverables, requirements, and exclusions; and project scope control ensures that changes are recorded and attended to avert unregulated scope creep. Scope creep is the unauthorized or uncontrolled modifications to a project's scope, which has been recognized as a primary contributor to cost overruns and delays in technology-driven projects (Okafor, 2022). Project scope management, as

delineated by PMI (2021), and Ibrahim and Ojo (2024), encompasses several fundamental elements that guarantee clarity, efficiency, and stakeholder alignment in project execution, including:

Project Scope Planning

Project scope planning is when a project is being defined by boundaries, deliverables, assumptions, and constraints to ensure that stakeholders have the understanding of what will and will not be delivered at the end of project. Efficient project scope planning mitigates uncertainty during implementation and establishes a justifiable benchmark for the assessment of schedule, cost, and quality (PMI, 2021). In contemporary project practice the emphasis has shifted from purely prescriptive checklists to outcome- and principle-driven scope definition that is tailored (or tailored) to the delivery approach (traditional, agile or hybrid) used by the organization (PMI, 2021). For firms in the security and surveillance sector where deliverables commonly include hardware (camera arrays, sensors), software (analytics, firmware) and services (installation, monitoring) project scope planning must explicitly account for technical interfaces, regulatory requirements (privacy, data protection), and service-level expectations. Studies show that lack of proper project scope planning at the beginning of a project is the primary cause of regular rework and cost/time overruns in technology projects (Delise, 2023). Prompt documentation of product specifications and acceptance criteria during project scope planning diminishes transaction costs associated with subsequent modifications and improves the clarity of procurement specifications for equipment and integrators.

Project Scope Requirements

Project scope requirements are the process of eliciting, documenting, analyzing, validating and controlling changes to stakeholder needs that the project must satisfy. While project scope planning defines the boundaries and deliverables, requirements' management operationalizes those boundaries into verifiable, testable items (e.g., detect faces at X meters with $\geq Y\%$ accuracy during night conditions). Clear requirements reduce ambiguity, support procurement of suitable hardware/software, and enable objective acceptance testing (PMI, 2021). Recent studies emphasize two persistent problems in requirements

practice: vague, high-level requirements that lack measurable acceptance criteria, and weak traceability between requirements and design/test artifacts. Both problems are particularly consequential in technology-heavy projects where integration risk is high (Olsson *et al.*, 2022; Dai *et al.*, 2023; Mucha *et al.*, 2024).

Project Performance

Project performance shows the outcome of which a project is being meeting up its established objectives concerning cost, time, quality, and stakeholder expectations (PMI, 2021). It is a multifaceted construct that encompasses both tangible outcomes, including cost efficiency and schedule compliance, and intangible results, such as stakeholder satisfaction and organizational reputation. In technology-driven industries such as security and surveillance, where projects necessitate intricate hardware-software integration, stringent regulatory adherence, and varied stakeholder interests, project performance is a crucial factor for business sustainability (Adeleke *et al.*, 2021). According to Adeleke *et al.* (2021); Oladipo *et al.* (2024); PMI (2021), project performance is a core component that indicates the result of ongoing projects which reflect the extent of project sustainability and outcomes in any organization, such components include:

a) Operational efficiency

Operational efficiency in project contexts refers to the ratio of useful output (delivered functionality, uptime, compliance) to the inputs consumed (time, cost, labour, downtime). In project delivery, efficiency shows up both during implementation (e.g., installation productivity, commissioning time) and in the operational lifecycle post-handover (monitoring costs, maintenance effort). Recent industry analyses emphasize that digital tools (project information systems, IoT-enabled commissioning, predictive maintenance) materially improve operational efficiency by reducing manual coordination and enabling real-time decision making (Pakkala, 2024). Within the security and surveillance sector, operational efficiency is shaped by supply-chain reliability (timely delivery of cameras, storage appliances), installation logistics (site access, power), and software configuration (integration of analytics engines). Empirical studies in technology and construction projects find that firms that adopt process standardization (consistent

installation checklists, prefabricated mounting assemblies), digital recordkeeping (as-built BIM or equipment registries), and measured KPIs (mean time to commission, rework hours per site) obtain higher throughput and lower cost per delivered site. These practices directly reduce schedule variability and contractor disputes common causes of cost overruns.

b) Quality of performance

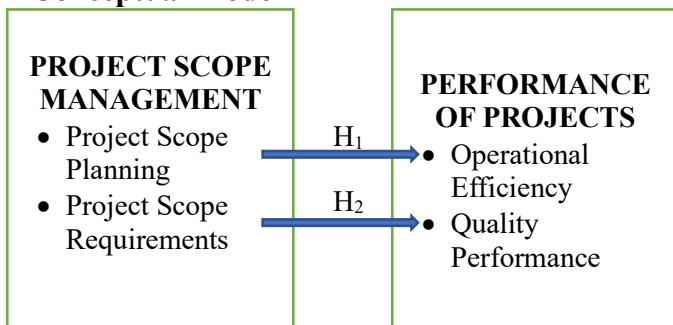
Quality performance in projects denotes the degree to which project deliverables meet specified requirements and stakeholder expectations. In project management research, quality is increasingly being acknowledged as both a product attribute denoting compliance with specifications and a process attribute pertaining to conformity with established procedures that reduce defects (Rocha *et al.*, 2023). Quality metrics for surveillance systems include detection and recognition accuracy, system availability, false alarm rate, and adherence to data protection regulations. Quality of performance is also influenced by the scope and requirements practices. Ambiguous requirements, incomplete acceptance criteria, and inadequately defined test protocols result in subjective acceptance decisions, increased rework rates, and conflicts. Conversely, when quality criteria are integrated into the scope baseline and linked to test plans, acceptance becomes more objective, and defects are identified earlier, thereby decreasing repair costs and minimizing schedule disruptions. Recent evaluations advocate for the incorporation of quality metrics into the performance framework utilized by project sponsors, rather than confining quality to a post-delivery audit. This alignment encourages project teams to ensure that quality is embedded from the outset instead of depending exclusively on inspection to identify defects.

The conceptual model for this study explains how project scope management affects Security and Surveillance Technology Installation firms, with operational efficiency and quality of performance as key outcomes. It identifies project scope planning and project scope requirements as independent variables. Project scope planning refers to the act of effectively defining all the activities of projects boundaries, deliverables, bottlenecks and what to expect to stakeholders while project scope requirement involves the eliciting, documenting, analyzing, validating and controlling changes. Both practices are hypothesized to directly enhance project performances measured by operational efficiency and quality of performance enhances confidence in security and surveillance technology installation firms. The model highlights the correlation between operational efficiency and quality of performance trust, indicating that improvements in one domain can enhance the other. The framework provides a conclusive basis for evaluating the influence of project scope management on the performance of projects in security and surveillance technology firms in Lagos State.

Theoretical Framework: Systems theory

Systems Theory was formally proposed by von Bertalanffy (1968) and posits that organisations and projects operate as interconnected and interdependent systems, wherein the components must collaborate effectively to attain optimal performance. The theory underscores integration, coordination, feedback mechanisms, and dynamic adaptation and looking from a project scope management viewpoint. Systems Theory emphasizes the importance of interaction among project scope planning, project scope control, and project scope requirements throughout the project time. Changes in one component of the scope inevitably affect other project elements such as time, cost, quality, and resource utilization (Kerzner, 2022). Thus, operational efficiency and quality of performance are portrayed not as isolated outcomes, but as system-wide results of effective scope governance. For security and surveillance technology installation firms, where installations involve electrical systems, network infrastructure, monitoring software, and human operators, Systems Theory provides a holistic framework for understanding how project scope planning and project scope requirements must be systemically

Conceptual Model



Source: Researchers’ computation (2026)

coordinated to sustain operational efficiency and uphold quality standards (PMI, 2021). This study benchmarked the System theory because it helps in scope management of project process and performance stages that forms a whole successful project.

Empirical Review

[Olatinwo \(2025\)](#) reported that quality control procedures and clear communication channels strongly predicted lower defect rates and fewer post-handover corrective actions. Firms with poor formal QA had higher rework and stakeholder dissatisfaction. The study concluded that quality of performance is tightly coupled to process discipline and formal QA mechanisms. Communication breakdowns exacerbate scope ambiguities that lead to defects. The study recommended the integration of quality criteria into scope documents, conducting regular QA audits during execution, and adopting supplier quality management for critical equipment.

[Akintelu et al. \(2025\)](#) investigated project scope and market share of selected telecommunications firms and revealed that project scope explained approximately 8.4% of the variation in market share, indicating that well-defined scope documentation, work breakdown structure development, stakeholder mapping, and scope control during execution significantly enhance subscriber base, sales contribution, and market expansion. Findings further showed high levels of implementation of scope management practices and correspondingly high market share performance among the firms. The study concluded that effective project scope management significantly improves the market share of telecommunications firms in Nigeria. The clearer and more controlled the project scope, the higher the likelihood of timely project completion, rapid market penetration, and improved organizational performance. The study recommended that Project scope should be strictly controlled, particularly through realistic completion timelines, a project scope definition committee should be established at the project initiation stage to review, analyze, and formally approve project boundaries before implementation, continuous scope monitoring and structured change control procedures should be institutionalized to minimize scope creep.

[Gitau and James \(2025\)](#) evaluated project planning and project performance from livestock projects at International Livestock Research Institute, Kenya and found that organizations with institutionalized scope management (templates, trained staff, and enforced change control) recorded higher probability of on-time completion and client acceptance. Ad hoc scope practices correlated with higher claims and cost escalations. The study concluded that institutional maturity in scope management is a robust predictor of project performance across sectors; transferability to security projects is high given similar integration and regulatory risks. The study recommended entrenching scope-management templates in organizational processes, mandating scope training for project leads, and enforcing formal change-approval paths.

[Kiani Mavi et al. \(2024\)](#) evaluated forecasting project success in the construction industry and reported that models that include scope-clarity and scope control metrics improve forecasting accuracy for project success; scope indicators were among the top predictors for time and quality outcomes. The study concluded that advanced predictive techniques confirm the practical importance of measurable scope practices for anticipating delivery performance and recommended the use of data-driven forecasting (with scope variables) to prioritize early corrective actions and to embed scope health metrics in project dashboards.

[Jawad \(2024\)](#) examined project control system (PCS) implementation in engineering companies and effects on scope, schedule and cost outcomes. The study revealed that firms implementing formal PCS (including scope baselines, variance logs, and change approval workflows) observed measurable reductions in rework and schedule variance; and scope artefacts improved procurement coordination for technical components. The study concluded that practical project control systems that formalise scope configuration and changes materially enhance operational efficiency and predictability. The study recommended implementation of lightweight PCS for SMEs (scope baseline, change log, approval gates), and ensuring PCS integration with procurement and commissioning checkpoints.

[Kilani et al. \(2024\)](#) revealed that the combined effect of scope, time, cost and quality management

explains a significant portion of variance in project performance and scope management (clarity and control) was instrumental in meeting deadlines and reducing costly rework in the finance industry. The study concluded that holistic attention to scope in combination with time/cost/quality management leads to better project outcomes; isolated focus on schedule or cost without scope control is inadequate. The study recommended that integration of scope health metrics into performance dashboards and mandating scope baselines before procurement begins.

Udeh (2024) examined the effect of project evaluation and analysis on project success in a case study of UGI Technologies, Lagos, Nigeria and revealed significant relationships between budget and budgetary control and project and between socio-economic effects of projects and customer satisfaction. Budget control explained 1.4% of variance in project specification, while socio-economic factors accounted for 30.9% of customer satisfaction variance. The study concluded that project evaluation and analysis are critical to successful project outcomes. Financial oversight and socio-economic considerations directly influence project performance and stakeholder satisfaction. The study recommended enhanced budget monitoring mechanisms, integration of socio-economic assessments into planning, and strengthened stakeholder communication to improve project performance and sustainability.

Akintelu *et al.* (2024) examined project management practices and sustainable project performance in a review of 36 peer-reviewed published papers between 2014 and 2022. The study synthesized findings across countries and industries to identify best practices and address existing knowledge gaps, and inconsistencies in applying these practices across cultural, economic, and sectoral boundaries, underscoring the need for adaptive frameworks that account for local contexts. The authors contribute to project management literature by proposing a conceptual framework that integrates flexible, and context-sensitive practices to optimize project performance globally. The paper recommended prioritizing key factors including sustainable project planning, monitoring and evaluation, stakeholder engagement and risk management to foster more effective and sustainable outcomes. In addition, it

recommended that future research should explore adaptive models that address the unique project management challenges posed by diverse geopolitical and economic landscapes.

Misbahuddin *et al.* (2024) investigated the relationship between ambidextrous leadership and project performance and reported that the moderating effect of project management approach result shown that hybrid approaches combined with clear scoping and adapted control gates yields better performance in complex projects and where scope management practices were immature, hybrid approaches underperformed. The study concluded that delivering complex technical projects benefits from hybrid practices but only when scope management maturity supports iterative decision points. The study recommended tailor scoping management procedures to the delivery approaches.

Arijeloye *et al.* (2021) studied the impact of construction project planning on project performance in Ondo State, Nigeria found that projects with explicit planning practices (scope statements, schedules, procurement planning) had significantly better adherence to schedules and budget than those without structured planning. The study concluded that local empirical evidence supports a direct link between formal project scope planning and improved delivery performance; informal or ad-hoc scoping correlates with increased rework and schedule slippage. The study recommended the adoption of mandatory scoping checklists, acquisition of baseline scope artefacts prior to procurement, and training SMEs in formal planning techniques.

Okafor (2022) examined factors affecting scope creep in project management in multiple industries and reported that poor initial scoping, weak requirements elicitation, stakeholder late changes, and inadequate change governance were primary drivers of scope creep. The study also revealed that scope creep significantly degraded time, cost, and quality of performance. The study concluded that scope creep remains a critical threat to project outcomes and its root causes are largely preventable through better scope and requirements practices. The study recommended that firm strengthen requirements elicitation, implement change control boards, quantify variation impacts in contracts, and

incorporate stakeholder engagement workshops during scoping.

Unegbu *et al.* (2022) examined the relationship between project performance measures and project management practices in the construction industry in Nigeria and reported significant relationships between selected project management practices (including scope-related planning and control) and standard performance outcomes (time, cost, quality, and client satisfaction). Practices associated with explicit planning and control demonstrated stronger predictive power for delivery outcomes. The study concluded that robust project management practices notably planning and scope control are positively associated with improved project performance in the Nigerian construction context; weaknesses in planning correspond to poorer time and cost outcomes. The study recommended that construction firms strengthen formal planning (detailed scope documents, WBS), improve institutionalised control systems, and provide practitioner training on integrated project controls to reduce overruns and quality lapses.

Unegbu (2022) examined the relationship between project management practices and project performance in construction projects and found out that formal project planning and scope control practices were positively associated with on-time delivery and cost adherence, weak requirements traceability and poor change control predicted higher rework and schedule slippage. The study concluded that Structured scope management (clear scope statements, WBS, and change-control protocols) significantly improves project delivery performance in Nigerian project settings and informal practices amplify risk of overruns. The study recommended that strengthening scope-definition processes, requiring traceability matrices, institutionalising formal change-request workflows; and training project teams in scope baseline management.

Komal *et al.* (2020) examined the impact of scope creep on project success. The authors reported that scope creep driven by informal change requests, unclear requirements, and weak stakeholder governance had a statistically significant negative effect on schedule adherence and budget performance. Projects with formal change control and stakeholder sign-offs mitigated these effects.

The study concluded that controlling scope creep via formal governance and measurable acceptance criteria is essential for project success, particularly in technology-heavy projects where integration risk is high. The study recommended firms enforce change-request templates, require cost/time impact assessments for all scope changes, and tie contractual approval steps to stakeholder authorities.

METHODOLOGY

This study was quantitative in nature as it depended on the response of the respondents to address the research questions and test the formulated Hypotheses which in return will provide accurate and deep understanding on how scope management affects the performance of information technology installation projects of security and surveillance technology firms in computer Village Ikeja Lagos state Nigeria. This study used survey research design as it is more effective and accurate for seeking answers to the research questions (Abbott and McKinney, 2016; Nardi, 2018). It describes the kind of data that must be gathered and the source of the data gathering process. The target audience for this study are security and surveillance technology installation firms within computer Village, Ikeja, Lagos State Nigeria. The study comprised a population of 500 (five hundred) registered members of security and surveillance technology installation firms which sell and install CCTV. This was sourced from the database of Association of Computer Village Technology Merchants of Nigeria as of 2020.

Simple random sampling technique was adopted for this study. This technique ensures that each respondent has an equal chance of being selected. In order to reduce the sample size to a size that is manageable, the Taro-Yamane's expression is applied as expressed below:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

N = Population

e = allowable error (%)

1 = a constant value

Given that, N = 500 and e is assumed to be 5%, then sample size is;

$$n = \frac{500}{1+500(0.05)^2}$$

$$n = \frac{500}{1+500(0.0025)}$$

$$n = \frac{500}{2.25}$$

$$n = 222$$

Thus, a sample of 222 security and surveillance technology installation firms was used for the study.

With this study being quantitatively inclined, a set of questionnaire was used to gather data from the security and surveillance technology installation firms in computer Village. The questionnaire gathered responses to give insights to the formulated research questions using the Five-item Likert scale of strongly agree, agree, undecided, disagree and strongly disagree.

The research instrument was validated using content and construct validity. Questions were well structured for respondents to understand and to ensure that the instrument accurately measured the variables under study. Similarly, literature was reviewed to formulate variable -related questions. The data collected was analysed using the Statistical Package for Social Science (SPSS). Descriptive statistics in the form of frequency and percentage was used to evaluate and present the demographic details of the respondents while regression was utilized to test the relationship between independent variables which are project scope planning, project scope requirements and dependent variables which are operational efficiency, and quality of performance.

RESULTS

Table 1 presents the descriptive statistics of respondents' perceptions regarding Project Scope Planning (PSP), Project scope Requirements (PSR), Operational efficiency (OE), and Quality of performance (QP). The weighted average mean of 3.93 indicates an overall perception across the constructs, as it is well above the benchmark mean of 3.00 on a five-point Likert scale. Project scope Planning (PSP1–PSP5) All five items measuring project scope planning recorded high mean scores ranging from 4.12 to 4.39, with relatively low standard deviations (0.573–0.760), indicating

strong consensus among respondents. PSP4 recorded the highest mean ($M = 4.39$, $SD = 0.573$), suggesting that respondents overwhelmingly agree that project scope planning practices are clearly implemented and effectively managed. The percentage of respondents who selected “Strongly Agree” and “Agree” across PSP items consistently exceeded 85%, demonstrating a strong positive perception.

The low variability further implies homogeneity in responses, reinforcing the conclusion that project scope planning practices are well established among the surveyed security and surveillance technology firms. Overall, project scope planning is perceived at a high level, suggesting structured processes for managing scope changes and preventing scope creep. The perception of project scope requirements appears mixed. PSR2 recorded a high perception ($M = 4.18$, $SD = 0.602$), indicating strong agreement that certain project scope requirements are effectively implemented. However, PSR1 ($M = 3.91$, $SD = 0.925$), PSR3 ($M = 3.54$, $SD = 0.940$), PSR4 ($M = 3.73$, $SD = 0.971$), and PSR5 ($M = 3.58$, $SD = 0.994$) were categorized under low perception. Particularly concerning is PSR3, which shows notable dispersion ($SD = 0.940$) and a considerable proportion of disagreement (approximately 19.8% selected “Disagree”). This suggests inconsistencies in requirements within projects. The relatively higher standard deviations across PSR items compared to PSP indicate greater variability in respondents' opinions. This implies that while project scope planning mechanisms are strong, project scope requirements practices may not be uniformly applied or consistently effective across firms.

Operational efficiency responses indicate generally low perception, except for one item: OE3 recorded a high perception ($M = 3.99$, $SD = 0.715$), suggesting that certain operational-related performance aspects are positively viewed. Other items (OE1, CR2, OE4, OE5) have mean values between 3.48 and 3.68, indicating moderate to low perception. Notably, OE2 recorded the highest standard deviation ($SD = 1.028$), reflecting substantial disagreement among respondents. The relatively high percentage of “Disagree” and “Strongly Disagree” responses in several OE items suggests challenges in maintaining long-term customer relationships or ensuring repeat patronage.

Table 1: Descriptive Statistics of Respondents(N=222)

SN	ITEMS	SA (%)	A (%)	UN (%)	D (%)	SD (%)	Mean	Standard Deviation	Decision
Project Scope Planning									
1	PSP1	81 (36.5)	121 (54.5)	10 (4.5)	10 (4.5)	0 (0)	4.23	0.735	High perception
2	PSP2	83 (37.4)	115 (51.8)	19 (8.6)	5 (2.3)	0 (0)	4.24	0.702	High perception
3	PSP3	76 (34.2)	121 (54.5)	20 (9.0)	5 (2.3)	0 (0)	4.21	0.694	High perception
4	PSP4	96 (43.2)	116 (52.3)	10 (4.5)	0 (0)	0 (0)	4.39	0.573	High perception
5	PSP5	69 (31.1)	121 (54.5)	22 (9.9)	10 (4.5)	0 (0)	4.12	0.760	High perception
Project Scope Requirements									
6	PSR1	51 (23.0)	128 (57.7)	19 (8.6)	19 (8.6)	5 (2.3)	3.91	0.925	Low perception
7	PSR2	58 (26.1)	150 (67.6)	9 (4.1)	5 (2.3)	0 (0)	4.18	0.602	High perception
8	PSR3	26 (11.7)	111 (50.0)	41 (18.5)	44 (19.8)	0 (0)	3.54	0.940	Low perception
9	PSR4	39 (17.6)	123 (55.4)	23 (10.4)	34 (15.3)	3 (1.4)	3.73	0.971	Low perception
10	PSR5	40 (18.0)	90 (40.5)	50 (22.5)	42 (18.9)	0 (0)	3.58	0.994	Low perception
Operational Efficiency									
11	OE1	31 (14.0)	107 (48.2)	43 (19.4)	37 (16.7)	4 (1.8)	3.56	0.986	Low perception
12	OE2	28 (12.6)	111 (50.0)	22 (9.9)	61 (27.5)	0 (0)	3.48	1.028	Low perception
13	OE3	41 (18.5)	151 (68.0)	16 (7.2)	14 (6.3)	0 (0)	3.99	0.715	High perception
14	OE4	22 (9.9)	113 (50.9)	49 (22.1)	38 (17.1)	0 (0)	3.54	0.890	Low perception
15	OE5	20 (9.0)	145 (65.3)	24 (10.8)	33 (14.9)	0 (0)	3.68	0.835	Low perception
Quality of Performance									
16	QP1	74 (33.3)	115 (51.8)	17 (7.7)	16 (7.2)	0 (0)	4.11	0.830	High perception
17	QP2	57 (25.7)	141 (63.5)	11 (5.0)	13 (5.9)	0 (0)	4.09	0.731	High perception
18	QP3	69 (31.1)	136 (61.3)	0 (0)	17 (7.7)	0 (0)	4.16	0.771	High perception
19	QP4	45 (20.3)	145 (65.3)	8 (3.6)	24 (10.8)	0 (0)	3.95	0.820	High perception
20	QP5	54 (24.3)	124 (55.9)	34 (15.3)	10 (4.5)	0 (0)	4.00	0.761	High perception

Note: N=222, SA = Strongly agree, A= Agree, UN = Undecided, D =Disagree, SD = Strongly disagree, Weighted average = 3.93

This pattern implies that although technical project processes (e.g., project scope control) are strong, translating these practices into sustained customer loyalty may require improvement. Quality of performance (QP1–QP5) All quality of performance items were rated under high

perception, with mean values ranging from 3.95 to 4.16. QP3 recorded the highest mean (M = 4.16, SD = 0.771), reflecting strong confidence in system functionality and performance. The proportion of respondents selecting “Strongly Agree” and “Agree” consistently exceeded 75% across all QP items.

The moderate standard deviations (0.731–0.830) suggest reasonable agreement among respondents. This indicates that the quality deployed by the firms are perceived as dependable, functional, and capable of meeting client expectations.

Hypotheses Testing

H₁: Project Scope Planning does not have effect on operational efficiency among security and surveillance technology firms in Lagos State

Table 2: Model Summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.494 ^a	0.244	0.241	0.57350

a. Predictors: (Constant), Project Scope planning

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	23.355	1	23.355	71.009	<0.001 ^b
	Residual	72.359	220	.329		
	Total	95.715	221			

a. Dependent Variable: Operational Efficiency

b. Predictors: (Constant), Project Scope Planning

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.874	0.332		2.636	0.009
	PSP	0.655	0.078	0.494	8.427	<0.001

a. Dependent Variable: Operational Efficiency

Table 2 presents the regression analysis that investigates the effect of project scope planning on the operational efficiency of projects within security and surveillance installation firms. The model summary indicates an R-value of 0.494, signifying a robust positive correlation between project scope planning and operational efficiency. An R square value of 0.244 indicates that 24.4% of the variance in operational efficiency is accounted for by project scope planning and the remaining 75.6% is affected by factors not accounted for in the model. The ANOVA table shows that significance of the model which are the F-statistic of 71.009, accompanied by a p-value of less than 0.001, indicates that the regression model is statistically significant at the 95% confidence level. Project scope planning profoundly affects operational efficiency, with the likelihood of this outcome arising by chance being virtually nonexistent.

The coefficients table shows that the effect of project scope planning on operational efficiency. The constant (intercept) value of 0.874 signifies the baseline operational efficiency when project scope planning is absent. The coefficient for project scope

planning is 0.655, indicating that each one-unit increase in project scope planning results in a 0.655-unit increase in operational efficiency. The t-value of 2.636 and a p-value of 0.009 indicate that project scope planning significantly affects operational efficiency and given that the p-value is below 0.05, the null hypothesis (H₀), which asserts that "project scope planning does not contribute to significant variations in operational efficiency," is rejected. This study confirms that project scope planning significantly improves to operational efficiency of projects among security and surveillance firms

H₂: Project scope requirements do not have significantly effect on quality of performance among security and surveillance technology firms in Lagos State

Table 3 shows of the regression analysis examining the effect of project scope requirements (SR) on quality of performance of projects among security and surveillance technology installation firms. The model summary shows an R-value of 0.348, indicating a strong positive relationship between

Table 3: Model Summary

Mode	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.348 ^a	0.121	0.117	0.49762

a. Predictors: (Constant), project scope requirements

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7.505	1	7.505	30.310	<0.001 ^b
	Residual	54.477	220	.248		
	Total	61.982	221			

a. Dependent Variable: Quality of Performance

Predictors: (Constant), project scope requirements

Coefficients^a

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.934	0.208		14.140	<0.001
	PSR	0.298	0.054	0.348	5.505	<0.001

b. Dependent Variable: Quality of Performance

Source: Researcher’s computation (2026)

project scope requirements and quality of performance. The R square value of 0.121 means that 12.1% of the variation in quality of performance is explained by project scope requirements and the remaining 87.9% is affected by other factors not included in the model. The ANOVA table shows that the model’s indicating that F-statistic of 30.310 with a p-value of <0.001 shows that the regression model is statistically significant at a 95% confidence level and this means project scope requirement significantly affects quality of performance, and the probability of this result occurring by chance is nearly zero. The Coefficients table shows that effects of project scope requirements on quality of performance and the constant (intercept) value of 2.934 represents the baseline level of quality of performance when project scope requirements is zero with coefficient for project scope requirements is 0.298, meaning that for every one-unit increase in project scope requirements, quality of performance increases by 0.298 units and t-value of 14.140 with a p-value of <0.001 confirms that project scope requirements have a statistically significant effect on quality performance since the p-value is less than 0.05, the null hypothesis (H₀) stating that “project scope requirements do not account for significant variations in quality performance” is rejected. This

confirms that project scope requirements significantly contribute to quality of performance of projects among security and surveillance firms.

DISCUSSION OF FINDINGS

This study examined the effect of project scope management on project of performance among security and surveillance technology installation firms in Lagos State, with specific focus on project scope planning and operational efficiency, as well as project scope requirements and quality performance. The findings clearly demonstrate that both dimensions of project scope management exert a statistically significant and practically meaningful effect on project performance in the sector.

The first hypothesis tested the relationship between project scope planning and operational efficiency. The regression results revealed a strong positive relationship between the two variables (R = 0.494), with project scope planning explaining approximately 24.4% of the variance in operational efficiency with the model being statistically significant (F = 2.636, *p* < 0.009), and the regression coefficient (β = 0.494, *p* < 0.05) confirmed that improvements in project scope

planning led to substantial gains in operational efficiency. This finding shows that security and surveillance projects with well-defined project scope planning record improves operational efficiency. The result aligns strongly with prior empirical evidence from Nigeria and comparable contexts which established that inadequate project scope planning is a leading driver of cost escalation, time overruns, and execution inefficiencies in technology-intensive projects (Arijeloye *et al.*, 2021; Ogbu & Nwachukwu, 2022; Yusuf & Adeleke, 2021).

From a theoretical perspective, this result supports the Theory of Constraints (TOC), which posits that system performance is limited by key bottlenecks (Goldratt, 1984). Poor project scope planning creates limitations in terms of procurement, scheduling, and coordination, thereby reducing throughput and increasing idle time. Conversely, robust project scope planning reduces uncertainty, aligns resources, and removes execution bottlenecks, thereby enhancing operational efficiency. Furthermore, the result is consistent with recent international studies which show that institutionalized project scope planning and digital planning tools significantly improve operational metrics such as installation cycle time and commissioning defect rates (Jawad, 2024). In the Lagos security environment, where infrastructure constraints, site access challenges, and equipment import delays are common, the role of detailed project scope planning becomes even more critical.

The second hypothesis tested show the effect of project scope requirements on quality of performance. The regression results revealed a very strong positive relationship ($R = 0.348$) with project scope requirements explaining 12.1% of the variance in quality of performance and the model was statistically significant ($F = 30.310, p < 0.001$) while the regression coefficient ($\beta = 0.348, p < 0.001$) which confirms that improvements in project scope requirements enhances quality of performance. This implies that security and surveillance systems installation firms with clearly documented functional and non-functional requirements, formal acceptance criteria, and controlled change processes achieve superior technical performance, lower defect rates, higher reliability, and greater client satisfaction. On the other hand, projects with unstable project scope

requirements always face post-installation modifications, maintenance challenges, and quality failures, also this outcome strongly corroborates earlier studies on requirements engineering and project quality, which consistently identified requirements clarity and volatility as critical predictors of project success in technology-based projects (Hassan & Mustapha, 2020; Rahman & Al-Tahat, 2024).

CONCLUSION

Project scope planning has a significant and positive effect on operational efficiency among security and surveillance technology installation firms in Lagos State. These firms should adopt proper project scope planning practices such as detailed scope statements, approved baselines, and structured work breakdown structures achieve higher efficiency in resource utilization, reduced rework, and faster project execution. Project scope requirements significantly and positively affect quality of performance of security and surveillance installation projects and projects with clearly defined functional and non-functional requirements at initiation stages, measurable acceptance criteria, and controlled requirement changes consistently deliver higher technical quality, reliability, and customer satisfaction. The findings provide strong empirical support for the Systems Theory which indicates that scope management operates as a strategic organizational capability that transforms technical resources into sustainable performance advantages.

RECOMMENDATIONS

Based on the findings and conclusion of this study, it is recommended that security and surveillance technology installation firms in Lagos State make project scope planning and project scope requirements compulsory for all projects at beginning to aid in operational efficiency and quality performance of cctv installation in order to reduce post-installation defects and system modifications.

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