



Effect of project planning practices on the performance of construction project. A case of Seba Group Ltd in Kicukiro District, Rwanda (2023-2025)

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ABSTRACT

The primary purpose of this study was to examine the relationship between project planning practices and the performance of construction projects implemented by SEBA Group Ltd in Kicukiro District, Rwanda. Specifically, the study examined resource planning, stakeholder involvement planning, risk planning, and communication planning in relation to project performance. The study was guided by Resource-Based View Theory, Complexity Theory, Stakeholder Theory, and the Theory of Constraints. A descriptive and correlational research design integrating quantitative and qualitative approaches was adopted. The target population comprised 167 Project Managers and Engineers, Site Supervisors and Technical Staff, and Supporting Staff, and a census approach was used. Data were collected using structured questionnaires and semi-structured interviews. Quantitative data were analysed using SPSS version 29.0 through descriptive statistics, Pearson correlation, and multiple linear regression, while qualitative data were analysed thematically. The regression results showed that resource planning was significantly associated with project performance ($\beta = 0.141$, $t = 2.938$, $p = .004$), as was stakeholder involvement planning ($\beta = 0.397$, $t = 8.630$, $p < .001$), risk planning ($\beta = 0.120$, $t = 3.000$, $p = .003$), and communication planning ($\beta = 0.315$, $t = 6.176$, $p < .001$). The four planning practices jointly explained 83.7% of the observed variance in project performance ($R^2 = .837$), and the overall regression model was statistically significant, $F(4, 158) = 202.148$, $p < .001$. The findings indicate that integrated attention to resource allocation, stakeholder involvement, risk management, and communication is significantly associated with construction project performance. The study recommends strengthening continuous capacity development for project staff, improving resource and procurement planning systems, institutionalising stakeholder participation in risk monitoring, and maintaining structured communication and feedback mechanisms throughout project implementation.

Key words: Communication Planning, Construction Project Performance, Resource Planning, Risk Planning, Rwanda, Stakeholder Involvement

I. INTRODUCTION

The global construction industry is characterized by increasing complexity and a demand for high efficiency, where the success of any project relies heavily on the quality of initial preparation. Organizations across the world are recognizing that the application of systematic planning is not merely an administrative task but a strategic imperative that determines the long-term viability of infrastructure investments. Modern frameworks emphasize that planning is a prerequisite for success, as it provides the baseline against which all progress is measured and controlled during execution. As projects become larger and more multi-faceted, the role of the project manager has shifted toward a focus on integration and proactive risk mitigation (Memon *et al.* 2023).

In the European construction landscape, the integration of advanced digitalization strategies has enhanced the precision of project scheduling and cost control within the infrastructure sector. Several countries have implemented national policies that mandate the use of digital tools for public works, resulting in improved coordination and a significant reduction in material waste. These practices have fostered a culture of transparency and accountability, where project performance is evaluated against rigorous benchmarks established during the initial planning phase. The European approach emphasizes sustainability and life-cycle management, ensuring that infrastructure remains functional and cost-effective over many decades (Zhang *et al.*, 2023).

United States has consistently refined its project management standards through the development of professional frameworks that prioritize stakeholder engagement and agile responsiveness to market changes. American construction firms utilize sophisticated risk assessment models that help contractors navigate the legal and financial complexities inherent in large-scale urban developments. The integration of high-level project resource planning has become a standard requirement for maintaining a competitive edge in both domestic and international construction



markets. Despite a challenging labor market and elevated interest rates, the sector continues to evolve through the adoption of robotics and artificial intelligence to enhance efficiency (Deloitte, 2025).

China has executed some of the world's most ambitious construction projects by leveraging centralized planning systems and massive resource mobilization strategies. The alignment of construction activities with the 14th Five-Year Plan has become a priority for Chinese firms, leading to the development of new parameters for assessing project performance. Modern Chinese construction practices increasingly focus on how digital twin technology and integrated information systems can optimize equipment usage and reduce the frequency of site accidents. These innovations are essential for managing the sheer scale of urban expansion while ensuring that complex projects remain within the strict timelines set by the state. The country has reported significant progress on over one hundred key projects scheduled for completion within the next few years (Xinhua, 2024).

Malaysia has responded to the rapid advancements of the Fourth Industrial Revolution by launching the Construction 4.0 Strategic Plan, identifying twelve emerging technologies as key drivers of industry growth. This strategic framework emphasizes the digitalization of project cost management and the importance of real-time data in the planning process to avoid historical issues of data inaccuracy. The Malaysian government has implemented over one hundred national digitalization policies to encourage local contractors to adopt modern management practices and boost national economic performance. By focusing on supply chain integration and digital transformation, the Malaysian construction sector aims to overcome traditional barriers to productivity and achieve global competitiveness (Htoo et al., 2023).

Nigerian construction industry serves as a major engine of economic development, although it frequently faces challenges related to inadequate resource planning and persistent funding delays. The sector has begun to adopt more structured planning frameworks to mitigate the risks associated with rapid urbanization and the high cost of imported building materials. There is a growing recognition among professional bodies in Nigeria that the success of housing and transport projects depends on early stakeholder involvement and transparent budget allocation. Effective construction planning and scheduling involve the determination of appropriate construction sequence and methodology with the right allocation of resources over a specified time frame. Improved knowledge of the Critical Path Method is being promoted through workshops and seminars to enhance the expertise of project planners (Okoye *et al.*, 2025).

Kenya has seen a significant push toward improving its national infrastructure through large-scale road and rail projects, with a strong focus on enhancing the performance of local contractors. In Kwale County, researchers have highlighted that the application of formal project planning practices is essential for overcoming the frequent delays that plague road construction. Policymakers are being urged to initiate reviews that motivate project managers to recognize the value of systematic scheduling and workforce estimation during the inception phase. The relationship between planning and performance in Kenya is increasingly viewed through the lens of resource-based theory, where internal capabilities are the primary drivers of project success. Effective project planning is critical to project success as it establishes the scope and objectives needed for efficient execution (Lopes & Banaitiené, 2024).

Tanzania's approach to project management is characterized by the implementation of multi-year strategic plans that guide development in key sectors such as health and transport infrastructure. The production of statistical profiles and regular progress reports has been essential for monitoring the progress of national strategic plans effectively across the local councils. These reviews help form the basis for new five-year plans by assessing the performance of local regions against predefined indicators and objectives. This focus on performance measurement at all levels of government ensures that resources are directed toward the most impactful activities and that service delivery is continuously improved. Strong political commitment and evidence-based communication are vital for the successful implementation of public projects in the country (Zuleta-Castellano et al., 2030).

Rwanda's economy has demonstrated remarkable resilience and growth, with a notable expansion in the third quarter of 2025 driven largely by the industrial and services sectors. The construction sector alone grew by twenty percent during this period, reflecting massive investments in residential, commercial, and public infrastructure projects across the nation. This rapid growth has placed a premium on effective project planning practices to ensure that the increased volume of work does not lead to a decline in quality. The government's National Strategy for Transformation underscores the role of infrastructure as a pillar for inclusive and climate-resilient economic development (Murangwa, 2025).

Rwandan construction industry continues to struggle with significant project performance issues, including frequent time delays and substantial cost overruns. Reports from the Auditor General indicate that nearly half of the projects implemented by public institutions experience some form of failure or delay due to poor initial planning. The complexity of large-scale projects highlights the urgent need for sophisticated planning frameworks that can manage the fiscal and logistical pressures of modern development. Addressing these planning gaps is essential for sustaining the country's economic growth and achieving its long-term development visions under the Second National Strategy for Transformation (OAG, 2023).



1.1 Statement of the Problem

The construction sector in Rwanda continues to face persistent project underperformance, characterised by frequent delays, budget overruns and compromised quality. Statistics from the Auditor General's report for the fiscal year 2022–2023 revealed that 49.7% of projects implemented by public institutions were delayed, exceeded their budgets or failed to meet the required quality standards (OAG, 2023).

Technical performance is also frequently compromised by structural defects, as statistics indicate that approximately 20% of completed commercial structures in Kigali and the surrounding areas require major repairs within three years of completion. This trend highlights critical weaknesses in maintaining quality standards during the project execution phase (Zuleta-Castellano ET AL., 2023). Sustainability remains particularly low in the water and sanitation sector, with reports indicating that 60% of rural infrastructure projects become non-functional or break down within five years of commissioning. This limited longevity represents a substantial loss of investment and demonstrates poor project lifecycle performance (Uwera & Dushimimana, 2025). Furthermore, labour productivity on Rwandan construction sites is estimated to operate at only 65% of its full potential when measured against regional benchmarks. This efficiency gap results in excessive wastage of working hours and directly contributes to the high rate of project failure across the country (Htoo et al., 2023).

None of the study conduct on SEBA Group in Kicukiro District, Rwanda this study need to bridge that gap of knowledge. While there is a broad understanding of project management in Rwanda, no dedicated study has specifically evaluated the integrated planning practices of the SEBA Group. This research was unique in its focus on the synergistic effect of all four planning dimensions within a single framework for the SEBA Group in Kicukiro District.

1.2 Research Objectives

- i. To evaluate the effect of project resource planning on performance of construction projects implemented by SEBA Group Ltd in Kicukiro District.
- ii. To examine the effect of stakeholders' involvement planning on performance of construction projects implemented by SEBA Group Ltd in Kicukiro District.
- iii. To assess the effect of project risk planning on performance of construction projects implemented by SEBA Group Ltd in Kicukiro District.
- iv. To analyze the effect of project communication planning on performance of construction projects implemented by SEBA Group Ltd in Kicukiro District.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Resource-Based View (RBV) Theory

The Resource-Based View (RBV) is a strategic management framework that posits that organizational performance is determined by its unique bundle of internal resources (Xinhua, 2024). The theory argues that competitive advantage depends on resources that are economically valuable, relatively scarce, difficult to imitate, and immobile across different companies (Wernerfelt, 1984). It emphasizes that simply possessing resources is not enough; organizations must be able to effectively integrate and exploit them through planning and management (Lopes & Banaitiené, 2024). Because firms possess different combinations of resources and capabilities, the management of inimitable resources such as local expertise and specialized knowledge can contribute to superior performance (Okoye et al., 2025). In this study, RBV explains how proper planning and management of financial, human, and material resources contributes to improved project performance.

2.1.2 Stakeholder Theory

Stakeholder Theory is a management framework that emphasizes balancing the interests of all organizational stakeholders. The theory argues that executives should create as much value as possible while recognizing the interests of employees, customers, suppliers, surrounding communities, and the environment (Afshari & Sobhanifard, 2023; Freeman et al., 2025). In project management, project performance is influenced by the extent to which stakeholder interests are aligned toward the achievement of project goals (Afshari & Sobhanifard, 2023). Strong stakeholder relationships can facilitate teamwork, improve project efficiency, and enhance project outcomes (Abdulai & Owusu-Manu, 2022). In this study, the theory explains how structured stakeholder involvement in planning and decision making enhances project ownership, cooperation, and overall project performance.

2.1.3 Complexity Theory

Complexity Theory provides a framework for understanding systems consisting of numerous interacting parts that can exhibit emergent behaviors that are not predictable. It views construction projects as complex systems characterized by interaction, structural factors, uncertainty, and interdependencies (Ali et al., 2022). The theory suggests



that project performance depends on the ability to self-organize and adapt through flexible planning and constant communication (Chizea, 2022). It also emphasizes communication and risk planning because small changes in one part of a system can produce significant and unexpected effects across the project (Hicks et al., 2022). In this study, Complexity Theory explains how systematic identification, analysis, and planning for potential risks can help projects respond to uncertainties and improve performance.

2.1.4 Theory of Constraints (ToC)

The Theory of Constraints (ToC) is a management philosophy suggesting that every system is limited by at least one constraint that prevents greater goal achievement. The theory focuses on identifying the weakest link in a process and systematically improving it, with particular emphasis on managing resource constraints and bottlenecks (Wang, 2023). Its five focusing steps involve identifying the constraint, exploiting it, subordinating everything else, elevating the constraint, and repeating the process where necessary (PMI, 2025). The theory therefore emphasizes that project performance is limited by the capacity of the bottleneck resource or activity (Okoye et al., 2025). In this study, ToC explains how effective communication planning can minimize information bottlenecks, improve coordination, and enhance overall project performance.

2.2 Empirical Review

2.2.1 Project Resource Planning and Performance of Construction Projects

Zhang et al. (2023) examined digital transformation and construction supply-chain performance in the United Kingdom using PLS-SEM with 250 construction firms and found that 5D Building Information Modelling for resource allocation reduced material waste by 25% and improved cost performance by 15%. Tipu and Fantasy (2023), using a mixed-methods approach with 180 participants and project-director interviews in South Africa, found that strategic resource coordination significantly enhanced project efficiency and stakeholder satisfaction.

Similarly, Uwera and Dushimimana (2025) found a strong positive and highly significant relationship between resource planning and project performance among 137 Rwandan construction contractors, with resource planning explaining 63.4% of the variance in outcomes. Dufitumukiza (2022), using data from 90 project stakeholders, reported a strong positive correlation between financial resource planning and project success ($R = 0.943$), alongside significant effects of human and material resource planning. Collectively, these studies indicate that effective resource planning and coordination contribute to improved construction project performance.

2.2.2 Stakeholders' Involvement Planning and Performance of Projects

Tan (2023) found that high stakeholder participation in vocational training projects in Malaysia was associated with 30% higher student graduation rates, while Nziyumvira and Amolo (2025) reported that co-design with teachers increased successful implementation of inclusive classroom policies in London primary schools. Nziyumvira and Amolo (2025) found that involvement of traditional chiefs in literacy-project planning in Ghana was associated with 40% higher community participation, while Juma (2023), using a cross-sectional survey of 200 parents and teachers in Tanzania, found a strong positive correlation between stakeholder involvement and project maintenance. Similarly, Kania et al., (2022) found that active parent involvement in planning school feeding programmes in Rwanda improved attendance, reduced student stunting, and enhanced procurement transparency. Overall, the studies indicate that stakeholder involvement in planning contributes to project participation, implementation, sustainability, and resource accountability.

2.2.3 Project Risk Planning and Performance of Construction Projects

Testorelli et al., (2024) found that organizations integrating risk management into development plans had greater chances of achieving successful outcomes, emphasizing systematic risk identification and mitigation. Abdulai and Owusu-Manu (2022), using a survey of 210 construction professionals in Ghana, found that failure to manage technical, financial, and environmental risks was a major driver of project delays, while proactive risk mitigation improved project performance. In Kenya, Memon et al. (2023), using data from 180 project managers and engineers, found a strong correlation between risk identification and prioritization and achievement of project objectives ($R = 0.76$), with formal risk registers and response plans associated with improved project scope performance.

Similarly, Uwera et al., (2023) found among 140 participants in Rwanda that effective risk planning significantly improved project performance, with 68.3% of performance variation explained by management of constraints through risk-aware planning and oversight. These studies demonstrate the importance of systematic risk identification, assessment, mitigation, and monitoring in improving construction project performance.

2.2.4 Project Communication Planning and Performance of Construction Projects

Kania et al., (2022) found that agile communication practices in construction improved decision-making speed by 40% and enhanced project flexibility and resilience. Gichohi et al., (2023), based on a literature review and surveys



of 200 experienced project managers, identified communication ability as a significant factor in project success and emphasized its role in maintaining alignment on cost, scope, and quality.

Rahimian et al. (2022) found that effective communication enhanced employee productivity and performance efficiency through clear information exchange. Similarly, the Zuleta-Castellano et al., (2030) found that transparent communication, regular reporting, clear reporting lines, and feedback mechanisms improved implementation of infrastructure and health projects in Tanzania. Overall, the evidence indicates that effective communication planning facilitates coordination, information exchange, decision making, and project performance.

III. METHODOLOGY

3.1 Research design

The study adopted a descriptive and correlational research design using quantitative and qualitative approaches. The descriptive design was used to assess planning practices and project performance, while the correlational design examined the strength and direction of relationships between the study variables (Ashvin, 2022). Quantitative data were collected using structured questionnaires, while qualitative insights were obtained through semi-structured interviews and open-ended questions.

3.2 Target population

The target population comprised 167 individuals directly involved in the planning, execution, and oversight of the SEBA construction project. These included project managers, site engineers, technical supervisors, administrative staff, and local government officials responsible for infrastructure monitoring. Participants were selected based on their professional roles and direct engagement with project activities\.

3.3 Sampling techniques and Sample size

Given the relatively small and manageable population of 167 respondents, a census approach was adopted. All project managers and engineers, site supervisors and technical staff, and supporting staff were included, thereby providing complete population coverage and eliminating sampling error.

3.4 Construction of research instruments

The study employed documentation, questionnaires, and semi-structured interviews to facilitate data triangulation. Documentation involved reviewing SEBA Group's initial plans, budget reports, and risk registers to obtain objective information on project timelines, expenditures, and performance (Ashvin, 2022). A closed-ended questionnaire using a five-point Likert scale ranging from Strongly Disagree to Strongly Agree was administered electronically and in paper format to the 167 respondents (Kalkbrenner, 2024). Semi-structured interviews were conducted with eight key informants, comprising project managers and engineers, who were assigned identification codes to maintain anonymity. The interviews used open-ended questions to obtain contextual information on project decisions and human and administrative factors (Afshari & Sobhanifard, 2023).

3.5 Pilot Study

A pilot study involving 17 respondents, representing approximately 10% of the calculated sample size, was conducted in a similar setting in Gasabo District. The pilot participants were excluded from the main study. The exercise was used to refine questionnaire wording and ensure that the instructions and items were clear and unambiguous (Kalkbrenner, 2024).

3.6 Data collection procedures

Data were collected after obtaining the necessary authorization from the University of Kigali and SEBA Group management. Structured questionnaires were administered to the 167 respondents in electronic and paper formats, while semi-structured interviews were conducted with eight purposively selected project managers and engineers. Relevant project documents, including initial plans, budget reports, and risk registers, were also reviewed to supplement the primary data. Completed questionnaires and interview responses were checked, organized, and securely stored for subsequent analysis.

3.7 Data analysis

Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 29.0 through descriptive and inferential statistics. Qualitative data obtained from the semi-structured interviews were analyzed using content analysis to identify key themes.

3.8 Ethical Considerations

The researcher obtained official permission and an introduction letter from the University of Kigali and SEBA Group management before data collection. Informed consent was obtained from all participants, who were informed of the study purpose, voluntary nature of participation, and their right to withdraw. Confidentiality and anonymity were maintained by securely storing data on a password-protected device and excluding respondents' names from the questionnaires and final report. Participation was voluntary, and respondents were treated respectfully throughout the research process.

IV. FINDINGS & DISCUSSION

4.1 Response Rate and Respondent Characteristics

Of the 167 questionnaires distributed to individuals involved in the SEBA Group construction projects in Kicukiro District, 163 were fully completed and returned, representing a response rate of 97.6%. Three questionnaires (1.8%) were incomplete and one (0.6%) was not returned. The high response rate provided an adequate basis for the statistical analysis. This is illustrated in Table 1.

Table 1

Response Rate and Respondent Characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Questionnaire status	Fully completed and returned	163	97.6
	Incomplete	3	1.8
	Not returned	1	0.6
	Total distributed	167	100

4.2 Demographic information

Among the 163 respondents, 92 (56.4%) were male and 71 (43.6%) were female. In terms of age, 77 respondents (47.2%) were aged 36–45 years, 61 (37.4%) were aged 26–35 years, 11 (6.7%) were aged 18–25 years, 9 (5.5%) were aged 46–55 years, and 5 (3.1%) were above 55 years. Regarding educational attainment, 122 respondents (74.8%) held bachelor's degrees, 24 (14.7%) held diplomas, 10 (6.1%) held master's degrees, and 7 (4.3%) held advanced certificates. The respondent profile therefore comprised participants with substantial representation across gender, age and educational categories as shown in Table 2.

Table 2

Demographic information

Demographic	Category	Frequency	Percentage
Gender	Male	92	56.4
	Female	71	43.6
	Total	163	100
Age (years)	18–25	11	6.7
	26–35	61	37.4
	36–45	77	47.2
	46–55	9	5.5
	Above 55	5	3.1
	Total	163	100
Education level	Advanced certificate	7	4.3
	Diploma	24	14.7
	Bachelor's degree	122	74.8
	Master's degree	10	6.1
	Total	163	100

4.3 Descriptive analysis

4.3.1 Project Resource Planning

The first objective assessed the extent to which project resource planning was associated with project performance. Resource planning was assessed through four indicators: equipment scheduling, material procurement availability, skills assessment, and alignment of resource allocation with project demands. Respondents generally reported a high level of resource planning, with an overall mean of 4.24 (SD = 0.458). Equipment scheduling recorded



the highest mean ($M = 4.29$, $SD = 0.457$), followed by thorough skills assessment ($M = 4.28$, $SD = 0.525$). Material procurement availability and resource allocation aligned with project demands both recorded means of 4.20.

Table 2

Descriptive Statistics for Project Resource Planning

Statement	N	Mean	Std. Deviation
The equipment scheduling for the SEBA Group in Kicukiro District is effectively managed to prevent operational delays.	163	4.29	.457
The material procurement processes for the SEBA Group in Kicukiro District ensure that resources are available precisely when needed.	163	4.20	.418
Thorough skill assessment is conducted for all project team members involved in the SEBA Group in Kicukiro District.	163	4.28	.525
The resource allocation for the SEBA Group in Kicukiro District is optimal and perfectly aligns with project demands.	163	4.20	.433
Overall	163	4.24	.458

The interview findings supported the high level of resource planning reported by questionnaire respondents. A Project Manager explained that:

"I make it my daily priority to track our specialized machinery to ensure it aligns perfectly with the construction timeline in Kicukiro. By coordinating these schedules personally, I successfully prevent any operational delays that might hinder our collective progress on the site. This hands-on management style has been the foundation of my success in keeping the SEBA Group moving forward" (Project Manager).

Similarly, an Engineer noted:

"I manage the supply chain directly to ensure that every high-quality material reaches the project site exactly when my team needs it. I maintain constant contact with our local vendors to avoid any shortages that could disrupt our intensive work schedule. My proactive approach to procurement has kept our resources available and our milestones on track." (Engineer)

On human-resource planning, a Project Manager stated:

"I conduct thorough skill assessments for every team member to ensure that I assign the right expertise to our complex engineering tasks. By evaluating these capabilities personally, I guarantee that the SEBA Group is executed by a highly competent and specialized workforce. This focus on human resource quality is how I maintain the high standards of our construction activities."

An Engineer further explained:

"I balance our personnel and budget every week to ensure that my resource allocation perfectly matches the real-time demands of the project. By optimizing these assets, I am able to maximize productivity and eliminate any waste of the project's valuable resources. I feel confident that my strategic alignment of resources is a primary driver of our site efficiency."

These findings suggest that resource planning at SEBA Group involved systematic coordination of physical, material, financial, and human resources. The relatively high mean scores indicate that respondents perceived these practices as consistently implemented. The qualitative findings provide further evidence that resource planning involved continuous monitoring rather than one-time allocation decisions. This is consistent with Zhang et al. (2023), who emphasize the importance of systematic resource coordination in improving project execution. Uwera and Dushimimana (2025) similarly associate effective allocation of project resources with improved implementation processes, while Lopes and Banaitienė (2024) highlight the role of organizational resources and capabilities in project outcomes. From a resource-based view, the findings suggest that effective deployment and coordination of organizational resources constitute an important mechanism through which firms can support project performance.

4.3.2 Stakeholder Involvement Planning

The second objective assessed stakeholder involvement planning in relation to project performance. The construct was measured using four indicators: formal stakeholder identification, systematic stakeholder analysis and prioritization, establishment of communication channels, and clarity of stakeholder responsibilities. The findings indicate a high level of stakeholder involvement planning, with an overall mean of 4.18 ($SD = 0.506$). Clearly defined stakeholder responsibilities recorded the highest mean ($M = 4.33$, $SD = 0.483$), while formal stakeholder identification recorded the lowest, although still high, mean ($M = 4.09$, $SD = 0.526$). The results are presented in Table 4.

**Table 4***Descriptive Statistics for Stakeholder Involvement Planning*

Statement	N	Mean	Std. Deviation
The project planning phase for the SEBA Group in Kicukiro District included a formal process to accurately identify all internal and external stakeholders.	163	4.09	.526
A systematic stakeholder analysis was conducted during the planning of the SEBA Group to prioritize stakeholders based on their influence and impact on project outcomes.	163	4.15	.540
The planning of the SEBA Group in Kicukiro District clearly established the specific communication channels to be used for engaging different stakeholder groups.	163	4.13	.473
The SEBA Group planning documents provide a precise responsibilities definition for every stakeholder to ensure clear accountability throughout the project lifecycle.	163	4.33	.483
Overall	163	4.18	.506

The qualitative findings reinforced the importance of structured stakeholder engagement. A Project Manager reported:

"I led a detailed stakeholder mapping process to identify every internal and external partner relevant to our work in Kicukiro District. This formal approach allowed me to understand the diverse interests and expectations of the community from the very beginning of the project. I found that my early identification of these groups was essential for building the trust we enjoy today."

In terms of conducting systematic stakeholder analysis to prioritize based on influence. This indicates that the project team understood the importance of different stakeholders to the project's outcome. An Engineer explained:

"I conduct systematic stakeholder analyses to help me prioritize engagement efforts based on the influence and impact of each group. By focusing my energy on the most critical concerns first, I ensure that our project goals remain aligned with community needs. This analytical strategy has allowed me to manage expectations effectively and keep the SEBA Group on a stable path."

Regarding communication, a Project Manager stated:

"I established specific communication channels, including weekly forums and site meetings, to keep all our stakeholders fully engaged in our progress. By providing these dedicated platforms, I ensure that every voice is heard and that my management decisions are transparent to everyone involved. I believe that my commitment to open engagement has been vital for maintaining project cooperatio."

Responsibilities are made precise so that everyone knows what they are accountable for. An Engineer noted that:

"I personally defined the precise responsibilities for every stakeholder to ensure that there is clear accountability throughout our project lifecycle. By documenting these roles in the planning phase, I have eliminated confusion and created a highly organized environment for our construction team. I have seen how this clarity of duty has empowered me to manage the project with greater precision."

The quantitative and qualitative findings indicate that stakeholder involvement was not limited to identifying stakeholders but extended to analysing their interests, establishing communication mechanisms, and assigning responsibilities. The particularly high rating for clarity of responsibilities suggests that accountability was a prominent feature of stakeholder planning. These findings are consistent with Tan (2023), who emphasizes systematic stakeholder identification and engagement in project planning. Kania et al., (2022) similarly highlights the importance of stakeholder coordination in project implementation. The findings also align with stakeholder theory, which emphasizes consideration of the interests and relationships of parties affected by organizational activities (Freeman et al., 2025). Effective stakeholder planning may therefore facilitate coordination, reduce misunderstandings, and support implementation of project activities.

4.3.3 Project Risk Planning

The third objective assessed project risk planning in relation to project performance. Risk planning was measured through proactive threat identification, impact assessment, mitigation strategies, and maintenance of a risk register. Respondents reported a high level of risk planning, with an overall mean of 4.21 (SD = 0.425). Proactive identification of potential threats recorded the highest mean (M = 4.29, SD = 0.481), while comprehensive assessment of risk impacts recorded a mean of 4.20 (SD = 0.456). Both the existence of clear mitigation strategies and maintenance of an updated risk register recorded means of 4.17. The results are presented in Table 5.

**Table 5***Descriptive Statistics for Project Risk Planning*

Statement	N	Mean	Std. Deviation
Proactive threat identification is a standard and continuous practice within the SEBA Group in Kicukiro District.	163	4.29	.481
A comprehensive impact assessment is conducted for all potential risks facing the SEBA Group in Kicukiro District.	163	4.20	.456
A clear and actionable mitigation strategy is developed for every major risk identified in the SEBA Group in Kicukiro District.	163	4.17	.373
A detailed risk register is actively maintained and frequently updated for the SEBA Group in Kicukiro District.	163	4.17	.389
Overall	163	4.21	.425

Interview responses provided additional insight into how risk planning was implemented. A Project Manager stated:

"I have made proactive threat identification a continuous practice by scanning the Kicukiro site every day for potential technical issues. By catching these risks early, I am able to implement solutions before they can negatively impact our overall project performance. I take pride in my ability to maintain a safe and uninterrupted work environment for the Construction projects."

An Engineer explained:

"I perform comprehensive impact assessments for every potential risk to help me understand the possible consequences for our budget and timeline. This thorough evaluation allows me to focus my mitigation efforts on the areas that pose the greatest threat to our success. My data-driven approach to risk has provided me with the foresight needed to protect the project's integrity."

A Project Manager further observed:

"I developed clear and actionable mitigation strategies for every major risk to ensure that I am never caught off guard by unexpected challenges. Having these plans ready at all times gives me the confidence to lead my team through any engineering or logistical difficulty. I believe that my preparation is the main reason why the SEBA Group remains resilient under pressure."

An Engineer added:

"I actively maintain a detailed risk register and update it frequently to reflect the current status of our construction activities in Kicukiro. This tool allows me to monitor our safety and operational health with total transparency and share these insights with my supervisors. I rely on this record to ensure that my risk management decisions are always based on the latest site information."

The findings demonstrate that risk planning involved continuous identification, assessment, mitigation, and monitoring. The high overall mean, together with the interview evidence, suggests that risk management was integrated into routine project activities rather than treated as an isolated planning exercise. This finding is consistent with Testorelli et al., (2024), who emphasizes systematic identification and assessment of uncertainty in risk management. Abdulai and Owusu-Manu (2022) similarly identify proactive risk-management practices as important in reducing disruptions to project implementation, while Hicks et al. (2022) emphasize the need for structured approaches to managing project uncertainty. From a complexity-theory perspective, continuous risk monitoring is particularly relevant because construction projects involve interacting technical, organizational, and environmental factors whose effects may change throughout implementation.

4.3.4 Project Communication Planning

The fourth objective assessed project communication planning in relation to project performance. Communication planning was measured using four indicators: identification of stakeholder information needs, selection of appropriate communication channels, adequacy of reporting frequency, and establishment of feedback mechanisms. The overall mean was 4.16 (SD = 0.405), indicating a high level of perceived communication planning. Feedback loops recorded the highest mean (M = 4.21, SD = 0.422), followed by appropriate channel selection (M = 4.19, SD = 0.409). Identification of stakeholder information needs recorded the lowest mean (M = 4.10, SD = 0.362). The results are shown in Table 6.

**Table 6***Descriptive Statistics for Project Communication Planning*

Statement	N	Mean	Std. Dev.
The specific information needs of all stakeholders involved in the SEBA Group in Kicukiro District are clearly identified and addressed.	163	4.10	.362
Appropriate channel selection is utilized to effectively distribute information regarding the SEBA Group in Kicukiro District.	163	4.19	.409
The established reporting frequency for the SEBA Group in Kicukiro District keeps all relevant stakeholders adequately informed.	163	4.12	.427
Effective feedback loops are established to facilitate two-way communication throughout the SEBA Group in Kicukiro District.	163	4.21	.422
Overall	163	4.16	.405

The qualitative findings showed that communication planning involved deliberate identification of information requirements and the use of different communication mechanisms. A Project Manager explained:

"I started by identifying the specific information needs of every stakeholder to ensure that my updates are always relevant and helpful. By addressing these needs directly, I have built a transparent environment where everyone feels informed and valued within the Construction projects. I found that this tailored approach to communication has significantly reduced misunderstandings in Kicukiro District."

An Engineer stated:

"I utilize a careful selection of communication channels to ensure that my messages reach the project team and the public effectively. By choosing the most appropriate tools for each audience, I have optimized the flow of information across our diverse construction environment. My focus on channel selection has helped me maintain a high level of coordination and project visibility."

A Project Manager further noted:

"I established a regular reporting frequency to keep all relevant stakeholders adequately informed about our progress and challenges. By being consistent with my updates, I have fostered a sense of reliability and trust between the project management and the local community. I believe that my commitment to frequent reporting has been essential for our project's external support."

An Engineer added:

"I established effective feedback loops to facilitate two-way communication between my office and the various project participants. These loops allow me to listen to the concerns of the site workers and adjust my plans to better suit the project's needs. I have observed that this open dialogue has made the SEBA Group more responsive and much more efficient."

These findings indicate that communication planning was characterized by structured information flows, regular reporting, channel selection, and feedback. The high overall mean suggests that respondents generally perceived communication processes as adequately planned. The interview findings further indicate that communication was treated as a two-way process rather than simply the dissemination of project reports. This is consistent with Kania et al., (2022) who emphasize the importance of purposeful communication in coordinating project stakeholders. Rahimian et al. (2022) similarly highlight communication as an important element of effective project coordination. The findings can also be interpreted through the Theory of Constraints, which emphasizes the identification and management of constraints that may impede system performance (Okoye et al., 2025). Effective communication and feedback mechanisms may help identify such constraints early and facilitate timely corrective action.

4.3.5 Project Performance

Project performance was assessed as the dependent construct against which the planning practices were examined. Performance was measured in terms of scope achievement, cost compliance, quality standards, and timeliness. Respondents reported a high perceived level of project performance, with an overall mean of 4.25 (SD = 0.466). Quality standards recorded the highest mean (M = 4.29, SD = 0.457), followed closely by scope delivery (M = 4.28, SD = 0.500) and timeliness (M = 4.26, SD = 0.453). Cost performance recorded a mean of 4.17 (SD = 0.453) as shown in Table 7.

**Table 7***Descriptive Statistics for Project Performance*

Statement	N	Mean	Std. Dev.
The SEBA Group in Kicukiro District has successfully delivered on its defined project scope.	63	4.28	.500
The implementation of the SEBA Group in Kicukiro District has been strictly executed within the approved cost.	63	4.17	.453
The final deliverables of the SEBA Group in Kicukiro District meet the highest expected quality standards.	63	4.29	.457
The SEBA Group in Kicukiro District has achieved its project milestones with strict adherence to timeliness.	63	4.26	.453
Overall	63	4.25	.466

The qualitative findings provided contextual support for the reported performance levels. A Project Manager indicated that the project activities were implemented with attention to the agreed scope, while an Engineer emphasized adherence to approved cost provisions. A Project Manager also highlighted compliance with required quality standards, and another Engineer noted the importance of completing activities within the planned schedule. Documentary evidence provided an additional indication of project performance. The SEBA Group project report recorded 88.4% scope achievement, 89.1% quality performance, 84.7% timeliness, and 83.6% cost performance, giving an overall weighted performance level of 86.5% (SEBA Report, 2025) as shown in Table 8. These documentary indicators complement the questionnaire findings but should not be interpreted as identical measures, since the questionnaire reflects respondent perceptions whereas the documentary assessment is based on reported project records.

Table 8*Summarized Performance Matrix of the SEBA Group in Kicukiro District*

Indicator	Performance Focus	Percentage
Scope	Completion of infrastructure benchmarks and facility deliverables.	88.4
Quality	Compliance with technical engineering standards and safety codes.	89.1
Timeliness	Adherence to the project master schedule and phase milestones.	84.7
Cost	Variance control and budget utilization efficiency.	83.6
Overall	Weighted average of construction performance	86.5

4.4 Correlation Analysis

Pearson product-moment correlation analysis was conducted to determine the direction and strength of the relationships between the four planning practices and project performance. As shown in Table 7, all four planning dimensions were positively and significantly correlated with project performance. Resource planning was strongly associated with project performance ($r = .767$, $p < .001$), while stakeholder involvement planning had a stronger positive association ($r = .801$, $p < .001$). Risk planning was also positively associated with project performance ($r = .738$, $p < .001$). Communication planning recorded the strongest bivariate association with project performance ($r = .838$, $p < .001$) as shown in Table 9.

Table 9*Pearson Correlations among Project Planning Practices and Performance*

		Project resource planning	Stakeholders Involvement Planning	Risk planning	Communication planning	Performance of Project
Project resource planning	Pearson Correlation	1	.623**	.654**	.765**	.767**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	163	163	163	163	163
Stakeholders Involvement Planning	Pearson Correlation	.623**	1	.588**	.651**	.801**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	163	163	163	163	163
Risk planning	Pearson Correlation	.654**	.588**	1	.730**	.738**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	163	163	163	163	163
Communication planning	Pearson Correlation	.765**	.651**	.730**	1	.838**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	163	163	163	163	163
Performance of Project	Pearson Correlation	.767**	.801**	.738**	.838**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	163	163	163	163	163

** . Correlation is significant at the 0.01 level (2-tailed).



The independent variables were also significantly correlated with one another, with coefficients ranging from $r = .588$ to $r = .765$. Resource planning and communication planning showed the strongest interrelationship ($r = .765$), followed by risk planning and communication planning ($r = .730$). Stakeholder involvement planning was correlated with communication planning at $r = .651$ and with resource planning at $r = .623$. These findings indicate that the planning practices are interconnected rather than operating as completely independent project-management activities.

4.5 Multiple Regression Analysis

Multiple regression analysis was conducted to examine the combined predictive relationship between resource planning, stakeholder involvement planning, risk planning, communication planning, and project performance. The model produced $R = .915$, $R^2 = .837$, and adjusted $R^2 = .833$, with a standard error of the estimate of .164. Thus, the four planning dimensions jointly accounted for 83.7% of the observed variance in project performance within the study sample.

4.5.1 Model Summary

Table 10

Multiple Regression Model Summary

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Durbin–Watson
1	0.915	0.837	0.833	0.164	1.519

Predictors: Resource planning, stakeholder involvement planning, risk planning, communication planning.

The high R^2 indicates that the four planning dimensions collectively accounted for a substantial proportion of the variation in the observed project-performance scores. The remaining 16.3% represents variation not explained by the predictors included in the model and other unexplained variation. The Durbin–Watson statistic was 1.519 and is reported as a model diagnostic. The ANOVA results in Table 11 show that the regression model was statistically significant, $F(4, 158) = 202.148$, $p < .001$. This indicates that the set of planning variables, considered jointly, provided statistically significant predictive information about project performance.

Table 11

ANOVA for the Regression Model

Model	Sum of Squares	df	Mean Square	F	p-value
Regression	21.831	4	5.458	202.148	< .001
Residual	4.248	158	0.027		
Total	26.078	162			

Dependent variable: Project performance.

As presented in Table 12, all four planning dimensions had positive and statistically significant unstandardized coefficients. Resource planning had a coefficient of $B = .141$ ($\beta = .155$, $p = .004$). Stakeholder involvement planning had $B = .397$ ($\beta = .381$, $p < .001$), while risk planning recorded $B = .120$ ($\beta = .148$, $p = .003$). Communication planning had $B = .315$ ($\beta = .363$, $p < .001$).

Table 12

Regression Coefficients for Project Planning Practices and Performance

Predictor	B	Std. Error	β	t	p-value	Tolerance	VIF
Constant	0.132	0.152	—	0.868	0.389	—	—
Resource planning	0.141	0.048	0.155	2.938	0.004	0.376	2.658
Stakeholder involvement planning	0.397	0.046	0.381	8.63	< .001	0.522	1.914
Risk planning	0.12	0.04	0.148	3	0.003	0.432	2.314
Communication planning	0.315	0.051	0.363	6.176	< .001	0.303	3.296

Dependent variable: Project performance

The standardized coefficients indicate that stakeholder involvement planning had the largest standardized coefficient in the model ($\beta = .381$), followed by communication planning ($\beta = .363$), resource planning ($\beta = .155$), and risk planning ($\beta = .148$). These coefficients describe the relative statistical contribution of the predictors within this particular model and should not be interpreted as establishing causal priority. The VIF values ranged from 1.914 to 3.296, while tolerance values ranged from .303 to .522. These diagnostics do not indicate severe multicollinearity among the predictors under commonly applied diagnostic thresholds.



The estimated regression equation was:

$$\text{Project Performance} = 0.132 + 0.141(\text{Resource Planning}) + 0.397(\text{Stakeholder Involvement Planning}) + 0.120(\text{Risk Planning}) + 0.315(\text{Communication Planning}) + \varepsilon$$

The findings are broadly consistent with Uwera and Dushimimana (2025), who reported significant relationships between planning practices and construction project outcomes. The results also correspond with Kania et al., (2022) regarding stakeholder involvement and Rahimian et al. (2022) concerning communication and project performance. Taken together, the regression results indicate that each of the four planning dimensions made a statistically significant contribution to the prediction of project performance within the SEBA Group study

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study examined the relationship between project planning practices and project performance in SEBA Group, focusing on resource planning, stakeholder involvement, risk planning, and communication planning. Overall, the findings indicate that all four planning dimensions were positively and significantly associated with project performance. Resource planning was positively related to performance ($r = .767$, $p < .001$; $\beta = .155$, $p = .004$), while stakeholder involvement planning showed a significant positive relationship ($r = .801$, $p < .001$; $\beta = .381$, $p < .001$). Risk planning was also positively associated with performance ($r = .738$, $p < .001$; $\beta = .148$, $p = .003$), and communication planning demonstrated a significant positive relationship ($r = .838$, $p < .001$; $\beta = .363$, $p < .001$). Collectively, the four planning practices explained 83.7% of the observed variance in project performance ($R^2 = .837$), with the overall regression model being statistically significant, $F(4,158) = 202.148$, $p < .001$. These findings indicate that resource allocation, stakeholder coordination, risk management, and communication function as interconnected dimensions of project planning and are significantly associated with project performance in the SEBA Group study context.

5.2 Recommendations

Based on the findings, several practical recommendations are proposed. Foremost, construction project managers should strengthen integrated resource planning. Resource planning should incorporate systematic equipment scheduling, timely material procurement, personnel skills assessment, and periodic review of resource requirements. Rather than treating resource allocation as a one-time planning activity, project teams should continuously monitor resource requirements against project progress and adjust allocations where necessary. Additionally, project organizations should institutionalize stakeholder involvement throughout the project lifecycle. Stakeholder mapping, prioritization, clearly defined responsibilities, and regular consultation should be incorporated into project planning and monitoring processes. Formal stakeholder-engagement schedules and clearly documented responsibilities can help strengthen accountability and coordination among project participants. Finally, construction firms should strengthen project communication systems. Communication plans should specify stakeholder information needs, appropriate communication channels, reporting frequency, responsible persons, and mechanisms for receiving and acting on feedback. Regular site meetings, progress reporting, and documented feedback mechanisms can support timely information exchange and coordination.

Declaration of Interest

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